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The Relative Effectiveness of Women-Only and Mixed-Gender Treatment for Substance-Abusing Women

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Abstract

Following research indicating that the treatment needs of women are different from those of men, researchers and clinicians have argued that drug treatment programs for women should be designed to take their needs into account. Such programs tend to admit only women and incorporate philosophies and activities that are based on a social, peer-based model that is responsive to their needs. To assess the relative effectiveness of women-only (WO) outpatient programs compared to mixed-gender (MG) outpatient programs, 291 study volunteers were recruited (152 WO, 139 MG), and a 1-year follow-up was completed with 259 women (135 WO, 124 MG). Using bivariate, logistic regression, and generalized estimating equation analysis, the following four outcomes were examined: drug and alcohol use, criminal activity, arrests, and employment. In both groups, women showed improvement in the four outcome measures. Comparison of the groups on outcomes yielded mixed results; women who participated in WO treatment reported significantly less substance use and criminal activity than women in MG treatment, but there were no differences in arrest or employment status at follow up compared with those in MG treatment.

Keywords

Treatment for women; Women-only programs; Mixed-gender programs; Treatment outcomes; Propensity score

1. Introduction

A considerable amount of research over the past two decades has assessed the treatment needs of substance-abusing women as compared to their male counterparts. Consistent findings from this body of literature show that, compared with men, women have elevated histories of childhood trauma and abuse, interpersonal violence in adolescent and adult relationships, addiction, criminal activity, involvement with child protective services, homelessness, and dependency on others for financial support (Anderson, Rosey, & Saum, 2002; Grella, Stein, & Greenwell, 2005; Messina, Burdon, & Prendergast, 2003; Messina, Burdon, Hagopian, & Prendergast, 2006; Yan, 2010). Despite these differences, the usual

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standard of care in community treatment programs is to deliver treatment to both men and women simultaneously, without much variability in services with regard to gender (Grella, Polinsky, Hser, & Perry, 1999; Oser, Knudsen, Staton-Tindall, & Leukefeld, 2009). Services specifically for women are minimally available. For example, in a national survey of substance abuse treatment facilities, of the 13,371 facilities surveyed, 33% offered special programs or groups for adult women, 14% offered services for pregnant or postpartum women, 9% offered childcare, and 4% offered residential beds for children (SAMHSA, 2005).

Many have argued that there is a need for gender-responsive and gender-specific (i.e., women only) treatment programs¹, since the treatment issues and needs of women are quite different and more multifarious compared to those of men (Bloom, 1999; Bloom, Owen, & Covington, 2003; Cranford & Williams, 1998; Greenfield & Grella, 2009; Grella, Joshi, & Hser, 2000; Messina, Wish, & Nemes, 2000). The expectation is that gender-responsive programs can provide services that are focused towards women's patterns of substance use and other specific needs and that they are implemented in a manner that promotes women's recovery. This expectation, however, lacks strong support in the literature, since previous studies of such treatment programs are few in number and have design limitations.

1.1 Treatment Elements (MG versus WO Programs)

Mixed-gender (MG) and women-only (WO) programs typically differ with regard to philosophies, treatment approaches, types of services provided, and staffing patterns. WO programs place a greater emphasis on social model, peer-based treatment approaches than do MG programs (Kakutas, Zhang, French, & Witbrodt, 2004; Grella et al., 1999). The differences in program characteristics often reflect broader societal gender differences, including women's lower economic status and primary responsibility for child-rearing (Grella, 2008). For example, MG outpatient treatment usually includes group discussions of addiction, relapse prevention, anger management, HIV-education, and 12-step work. Typical group discussions rely on staff and peer confrontations to break down denial and increase participation. Treatment components in WO programs include those previously listed, but with a focus on how they relate to women's recovery, and group discussions utilize a more supportive and less confrontational approach to treatment (Grella et al., 1999). Moreover, some WO programs also provide classes on self-esteem, assertiveness training, healthy versus disordered relationships, physical/sexual abuse, trauma, parenting, and sex- and health-related issues. WO programs are also more likely than MG programs to provide assistance with housing, transportation, job training, practical skills training, and on-site childcare services. Research suggests that the provision of such wraparound services can greatly improve successful recovery for women (Grella et al., 1999; Grella, 2008; Oser, Knudsen, Staton-Tindall, & Leukefeld, 2009). WO programs also tend to employ only women in counseling positions, creating a gender-specific environment. Although participants in each type of program may receive treatment for equal lengths of time, the additional services provided in the WO programs may imply greater treatment intensity.

1.2 Treatment Outcomes for Women

It has long been established that duration of treatment is associated with successful post-treatment outcomes (DeLeon, 2000; Simpson, 1981). However, women are often less likely to enter and remain in MG treatment programs compared with men (Greenfield, Brooks, et

¹Gender-responsive programs are designed to provide a secure environment for women to safely discuss histories of trauma, abuse, and addiction without fear of judgment, which are implemented in a manner that promotes psychological growth and pro-social behaviors among women (Bloom, Owen, & Covington, 2003). In contrast, gender-specific programs may employ and treat only women, but may not always provide a gender-responsive curricula or environment.

al., 2007; Straussner & Zelvin, 1997). Some studies have found that gender-specific factors are associated with the lower likelihood that women enter and stay in MG treatment programs, including a higher prevalence of depression (DeLeon, 1974; Williams & Roberts, 1991), involvement with drug-dependent partners (Anglin, Hser, & Booth, 1987), histories of sexual or physical abuse (Stevens & Glider, 1994), prior arrests for prostitution (Messina et al., 2000; Moise, Reed, & Conell, 1981), sexual harassment from both male participants and counselors (Reed, 1985), and child-care responsibilities (Prendergast, Wellisch, & Falkin, 1995).

Specific treatment approaches can also differentially affect outcomes by gender. While WO treatment has not been consistently shown to be more effective than MG treatment, some evidence indicates that women are less likely to dropout of WO programs, which is likely to lead to better outcomes (Grella, 1999; Greenfield, Brooks, et al., 2007). Moreover, greater effectiveness has been demonstrated by treatment programs that address problems and issues common among substance-abusing women, such as childcare issues, services for pregnant or postpartum women, or histories of trauma and/or domestic violence (Greenfield, Brooks, et al., 2007; Greenfield, Trucco, et al., 2007; Grella, 2009; Grella, Joshi, & Hser, 2000). Improved outcomes have also been found for women involved in the criminal justice system. For example, two studies found decreased post-release drug use for women receiving specialized drug treatment in prison (Hall, Prendergast, Wellisch, Patten, & Cao, 2004; Messina, Grella, Cartier, & Torres, 2010). The more recent study randomized 115 women in prison to a gender-responsive program using Helping Women Recover and Beyond Trauma (Covington, 2002; 2003) compared with standard therapeutic community treatment (Messina, Grella, Cartier, & Torres, 2010). Those in the gender-responsive program had greater reductions in post-treatment drug use, remained in residential aftercare treatment longer (2.6 months vs. 1.8 months, $p < .05$), and were less likely to have been reincarcerated within 12 months after parole (31% vs. 45%, respectively; a 67% reduction in odds for the experimental group, $p < .05$).

1.3 Comparisons of Women in WO versus Women in MG Treatment Programs

A number of studies have directly examined outcomes for women who have participated in WO programs and MG programs. A large-scale comparison study of 4,117 women in WO residential treatment and MG residential treatment found that women were twice as likely to complete the specialized WO programs as the MG programs (Grella, 1999) and that longer retention rates were strongly associated with high levels of post-treatment abstinence (Grella et al., 2000). Although in this study women were not randomly assigned to the WO and the MG programs, the large sample size increases the generalizability of the findings.

A few controlled studies comparing women in MG versus WO treatment programs are available. In Sweden, Dahlgren and Willander (1989) randomly assigned 200 female alcoholics to WO or MG outpatient programs throughout the community. At a two-year follow-up, the WO participants showed significantly greater retention in treatment, greater decreases in alcohol consumption, and improved social adjustment (e.g., employment, improved mother-child relationship) compared with those in the MG programs. However, since the women in the WO programs were in treatment longer than women in the MG programs, it is difficult to determine whether the differences in outcome were due to the WO treatment elements or to the longer time in treatment.

In contrast to the generally positive findings of Dahlgren and Willander (1989), Kaskutas, Zhang, French, & Witbrodt (2004), in a study which randomly assigned women to a WO or to a MG day treatment program, found no significant differences between the two groups with regard to treatment outcomes (i.e., psychiatric symptom severity, problems with family/friends, or rates of drug use at follow up). The authors note, however, that their study was

limited by its small sample (31 women in the WO group versus 91 in the MG groups) and by the short length of treatment exposure (participants stayed in treatment on average of 2–3 weeks), both of which may have made it difficult to detect differences in outcome.

In a recent exploratory pilot study (Greenfield et al., 2008), women with high severity of psychiatric symptoms made greater reductions in substance use at the end of 12 weeks of group therapy treatment when they were randomly assigned to WO treatment as opposed to MG treatment. Substance abuse treatment outcomes for women with high psychiatric severity enrolled in the WO group continued to improve over the 6-month post-treatment follow-up compared with those enrolled in the MG group. Effect sizes were medium to large in spite of the small sample size (7 women were randomized to the MG group versus 29 to the WO group).

Lastly, a recent experimental study randomized women drug court participants to WO (N = 85) or MG (N = 65) substance abuse treatment (Messina & Calhoun, under review). The WO group was given gender-responsive and trauma-informed curricula (Helping Women Recover and Beyond Trauma; Covington, 2002; 2003). Women were assessed for post traumatic stress disorder (PTSD) symptomology via the Post Traumatic Stress Diagnostic Scale (Foa, 1997) at baseline and 18 month follow up. Those in the WO group consistently reported reduced symptomology for each PTSD symptom measured (i.e., re-experience, avoidance, arousal, functioning). In contrast, the women in the MG groups reported an increase in re-experiencing of their traumatic event from baseline to follow up, and no change in their other symptoms.

1.4 Meta-Analysis of Women's Treatment

A meta-analysis by Orwin, Francisco, & Bernichon (2001) was the first formal quantitative synthesis of findings from outcome studies on women's treatment. The authors used the standardized mean difference, d , to combine effect sizes across the studies examined. Effect size (ES) thresholds were based on the benchmarks developed by Cohen (1988): .20 = *small*; .50 = *medium*; .80 = *large*. Findings from studies that contrasted women in WO or MG treatment programs and women in standard WO or enhanced WO programs are summarized below:

Four studies were included in the average ES of WO treatment versus MG treatment programs. These studies contrasted six outcome domains: alcohol use ($ES = .15$), drug use ($ES = .04$), psychiatric symptoms ($ES = .30$), psychological well-being ($ES = .06$), attitudes and beliefs ($ES = .14$), and criminal behavior ($ES = .16$). One of these six ESs, reduced psychiatric symptoms, exceeded the small effect size threshold. However, the ESs for all of the six outcomes were positive, indicating better, even if small, outcomes for the WO treatment participants. The authors indicate that findings should be interpreted with caution due to the limited number of studies that were available and/or eligible for the meta-analysis.

The average ES of outcomes from enhanced WO versus standard WO treatment programs were calculated from eight studies. These studies contrasted eight outcome domains: alcohol use ($ES = .00$), drug use ($ES = .01$), psychiatric symptoms ($ES = .18$), psychological well-being ($ES = .57$), attitudes/beliefs ($ES = .61$), HIV risk behaviors ($ES = .33$), criminal behavior ($ES = .00$), and pregnancy outcomes ($ES = .64$). Three contrasts exceeded the medium effect threshold – improved psychological well-being (based on five studies), improved attitudes/beliefs (based on two studies), and improved pregnancy outcomes (based on five studies). A fourth contrast exceeded the small effect threshold – reduced HIV risk behavior (based on four studies). The remaining ESs were either neutral or positive in direction. The findings suggest that enriching women's treatment with additional components oriented toward meeting women's needs (e.g., child-care services, parenting

training, self-esteem and assertiveness training, and sexuality and family planning) could add value to the expected effects of WO treatment programs. Still, it appears that enhanced WO programs included in the meta-analysis had little effect on improving drug use and crime outcomes specifically. Overall, small sample sizes, limited research designs, and low follow-up rates characterized many of the studies included in the meta-analysis.

In sum, the existing research on outcomes for women is limited in many respects. Nonetheless, a large comparison study (Grella, 1999) found that retention in treatment was greatly improved for women in WO treatment programs compared with women in MG programs. Further evidence from three controlled studies (Dahlgren & Willander, 1989; Greenfield, Trucco, et al., 2007; Messina & Calhoun, under review) and a meta-analysis (Orwin et al., 2001) have shown that a variety of outcomes can be improved for women in WO programs compared with women in MG programs.

1.5 Study Hypotheses

The current study further assesses the relative effectiveness of WO outpatient programs² compared to standard MG outpatient programs to promote four outcomes that are of primary interest in examining treatment effectiveness—drug and alcohol use, criminal activity, arrest, and employment—among substance-abusing women who were predominantly referred to community treatment through the criminal justice system. Based on the literature reviewed above, we expected improved outcomes in substance abuse for WO programs. From this literature as well as from general expectations for outcomes from substance abuse treatment programs (McLellan et al., 1996), we also hypothesized greater improvements in criminal activity, arrests, and employment for clients in WO programs. Specifically, we had the following hypotheses:

- H₁** Women in the WO treatment condition will report less substance use (including both alcohol and illicit drugs) use than will women in the MG treatment condition at the 12-month follow-up.
- H₂** Women in the WO treatment condition will report less criminal activity than will women in the MG treatment condition at the 12-month follow-up.
- H₃** Women in the WO treatment condition will have fewer arrests than will women in the MG treatment condition at the 12-month follow-up.
- H₄** Women in the WO treatment condition will show greater improvement in their employment status than will women in the MG treatment condition at the 12-month follow-up.

2. Methods

2.1 Study Conditions

The data for this study were collected between 2005 and 2009 as part of a quasi-experimental study. Women were recruited from existing state- and county-funded outpatient substance abuse programs. Women entering treatment in each of the participating outpatient programs during the recruitment period were eligible to participate in the study. Participants must have been in their outpatient treatment program for approximately two weeks. Only adults 18 or older were eligible. Pregnant women and those in need of prenatal

²The programs that participated in the current study are referred to as “women-only” programs because they were existing programs that may not have provided a specific gender-responsive curriculum or philosophy; however, all programs included in the WO category were gender-specific with regard to staff and participants (Greenfield & Grella, 2009).

services were eligible for the study. All study procedures were reviewed and approved by the UCLA Institutional Review Board.

Recruitment sites included drug courts, Proposition 36 courts,³ and outpatient drug treatment programs in Los Angeles County. A total of 3 courts and 20 treatment programs (8 MG and 12 WO) served as recruitment sites for the study. There were a total of eight contracted treatment providers, and many offered both MG and WO program services. All of the programs had been operating for at least 10 years. Participating programs included those providing criminal justice related treatment (drug court, California Proposition 36, and parolee services), Department of Children and Family Services (DCFS) perinatal programs, and other women-focused programs. The programs were free-standing non-profit programs that offered outpatient treatment, which consisted primarily of group sessions provided 3–5 days per week. Specific differences between the mixed-gender and the women-only programs are described below.

2.1.1 Mixed-gender treatment—Most substance abuse programs throughout California and specifically Los Angeles County are required to meet a minimum standard level of care and services. The standard treatment available in the community is typically MG outpatient treatment. Drug court and Proposition 36 programs are further required to provide individual and group counseling (with a strong emphasis on vocational/educational counseling and referral), 12-step meetings, mutual self-help group discussions, and random urine testing throughout treatment. Some programs may provide additional services beyond the minimum requirements, including relapse prevention, family planning, anger management, HIV/AIDS education, and referrals for psychological, medical, and/or legal services. The average time in treatment for study participants in MG programs was 7 months ($SD=5.3$).

2.1.2 Women-only treatment—WO programs typically include the components listed above for the MG programs, but with a focus on issues specific to women's recovery in a setting compatible with women's interactional styles. Program elements described by one or more of the participating providers that are specific to the WO programs include, but are not limited to, groups on trauma from physical, emotional, and sexual abuse (survivors groups), development of a sense of self-esteem, establishment of growth-fostering relationships, parenting techniques, perinatal services, child-care, child development services, sex and health-related issues, nutrition and fitness, grief and loss, and decision-making skills. The average time in treatment for study participants in WO programs was 9 months ($SD = 6.2$).

2.2 Data Collection

2.2.1 Data sources—The measures used to describe the study participants and to test hypotheses were collected using standard forms such as the UCLA Integrated Substance Abuse Treatment (ISAP) interview forms, which have been used in previous ISAP studies. ISAP interview forms include detailed questions about demographics, education/employment background, living situation, histories of trauma and abuse, physical and mental health, and HIV risk behaviors.⁴ Additionally, information on arrest history was obtained from the California Department of Justice.

Standardized measures included the following:

³Proposition 36 (officially know as the Substance Abuse and Crime Prevention Act) was passed by 61% of California voters on November 7, 2000. This vote changed state law to allow first- and second-time nonviolent, simple drug possession offenders the opportunity to receive substance abuse treatment instead of incarceration.

⁴Copies of the instrument can be requested from the first author.

Structured Clinical Interview for DSM-IV (SCID I-II). Interviewers administered the Structured Clinical Interview for DSM-IV (SCID I-II) at the baseline interview. The SCID (First, Spitzer, Gibbon, & Williams, 1998) provides diagnoses of Axis I mental disorders and Axis II personality disorders consistent with the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) (American Psychiatric Association, 1994). All interviewers had a social science bachelor's degree and were trained by a Ph.D. clinician.

The Brief Symptom Inventory (BSI). The BSI is a 53-item questionnaire that assesses nine psychological symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The BSI was administered at the baseline and follow-up interviews. The scores can be combined to form The Positive Symptom Total (PST). The BSI PST is designed to help quantify a patient's severity-of-illness and provides a single composite score for measuring the outcome of a treatment program based on reducing symptom severity. Across the dimensions, internal consistency estimates (Cronbach's alpha) range from .71 to .85, and test-retest reliability estimates range from .68 to .91 (Derogatis & Melisaratos, 1983).

Marlowe-Crowne Social Desirability Scale. To control for social desirability in self-report, we administered the Marlowe-Crowne Social Desirability Scale Form C (MC-C) (Reynolds, 1982), which is a widely used measure that consists of 13 items that assess subjects' tendency to engage in impression management. The MC-C was administered at the baseline and follow-up interviews. Items include "No matter who I'm talking to, I'm always a good listener" and "I sometimes feel resentful when I don't get my way." Response options are true/false and higher scores indicate greater impression management. Cronbach's alpha reliability is .72 (Salsman, Brown, Brechting, & Carlson, 2005) and Kuder-Richardson formula 20 reliability is .76 (Reynolds, 1982).

Treatment Services Review (TSR). All subjects still in treatment at the 30-day mark received the 30-Day Treatment Services Review (TSR), which is a brief (5 – 10 minute) structured interview designed to provide information on the type, amount, and efficacy of services provided (directly or indirectly) to a substance abuse patient by the treatment program. Compared to treatment records, which may be incomplete or compiled long after the fact, the client is a better source of information on the types and amounts of treatment actually received in the recent past (McLellan, et al., 1992).

2.2.2 Interview procedures—Participants were asked to participate in three interviews throughout the course of the study. Informed consent and the baseline interview were conducted at the time of recruitment into the study or soon after. On average, the baseline interviews took approximately 2–3 hours, and participants were paid \$40 in the form of gift cards. The in-treatment interview, administered about 30 days following program admission, assessed the services received and took approximately 10–15 minutes to complete, and participants were paid \$10 in gift cards. The 12-month follow-up interview took approximately 1.5 hours to complete, for which participants were paid \$60 in gift cards. If a participant was incarcerated at the time of the follow up interview, a money order was deposited into her inmate trust account.

2.3 Description of Subject Participation and Characteristics

As shown in Figure 1, a total of 425 potential subjects were approached for the study. Of those, 51 refused. Among those who gave reasons for their refusal, the most common were: they did not want any additional responsibilities, did not want to discuss personal issues, and did not want to give contact information for follow-up. An additional 30 potential subjects were approached, but were deemed ineligible for the study. Although recruited, 27 women

did not show up for the baseline interview. An additional 26 dropped out of treatment before study intake was complete (typically after 1–2 days). The WO programs included 152 study participants, with 135 completing the 12-month follow-up interview. The MG programs included 139 participants, with 124 completing follow-up. Because of missing data, the regression models include 130 women who attended WO treatment and 121 who attended MG treatment.⁵

As shown in Table 1, participants were predominantly Black (38%), White (30%), and Hispanic (23%), and 51% reported being previously married at the time of program admission while 16% had never been married. On average, participants were approximately 36 years old ($SD = 10.1$). Thirty-seven percent had less than a high school diploma, 7% had graduated high school, and 5% had achieved a GED, 29% had some college, and 21% had participated in a trade or technical school. A majority of the women were unemployed (64%) prior to program admission.

Ninety-seven percent met DSM-IV criteria for either alcohol/drug abuse or dependence upon program entry (DSM-IV disorders not shown in Table). Twenty-eight percent of the women met Axis I DSM-IV criteria for depressive disorders and 24% met the criteria for a diagnosis of PTSD. Forty-one percent met Axis II criteria for antisocial personality disorder, and 26% met criteria for borderline personality disorder. Thirty-seven percent also reported histories of sexual abuse before the age of 15. Participants were predominantly stimulant users, with 33% reporting methamphetamine and 28% reporting cocaine/crack as their primary drug problem. Women also reported having an average of 9 ($SD = 17.2$) arrests in their lifetime. Fifty-one percent of the women overall participated in a drug court or Proposition 36 program and 49% in a program with some other funding source (e.g., Department of Child and Family Services, CalWORKs⁶, or self-pay). There was no difference between the groups on the Positive Symptom Total of the BSI, however, both groups were higher than the norm of 30.80 reported for outpatient populations (Derogatis & Melisaratos, 1983). Women in the WO group had significantly higher levels of socially desirable responses at baseline.

2.4 Data Analysis

The primary analyses tested the study hypotheses by comparing participants in the WO group with those in the standard MG group using an intent-to-treat design (i.e., all subjects were included in the analyses, regardless of their completion of the treatment program). Although the hypotheses are expressed as one-tailed, we recognize that outcomes may occur that were not in the direction expected. Therefore, all hypotheses were tested at the .05 significance level using a two-tailed test. In Table 1, t-tests were used to compare the WO participants and the MG participants for characteristics represented by a single continuous variable. For categorical and binary outcome variables, chi-square analysis was used.

2.4.1 Propensity score—Propensity score analysis was conducted to reduce the potential impact of baseline differences among women in each of the two program types on outcome measures. Propensity score analysis is often used to address the potential selection bias in the absence of random assignment (Rosenbaum & Rubin, 1983; Rubin, 1979). The propensity score of a respondent is the conditional probability of being assigned to the treatment group, given the respondent's covariates. In other words, propensity score is a function of the observed covariates that equalizes the conditional distribution of the

⁵Bivariate analyses were conducted to determine if there were any differences between those lost to follow up and those interviewed. No statistically significant differences on the variables included in Table 1 were found.

⁶The California Work Opportunities and Responsibility to Kids (*CalWORKs*) program provides temporary financial assistance and other focused services to families with minor children who have income below state maximum limits for their family size.

covariates given the propensity score for treated and comparison subjects. We used demographic and other baseline variables to create a propensity score for each participant, representing the probability of being selected for WO group. The propensity score was used as a covariate for the multivariate regression and GEE models examining the outcome variables (D'Agostino, 1998; Rubin, 1979). Variables for the propensity score were selected based on group differences at baseline, and include age, ethnicity, years of education, income less than \$10,000, employment in past 12 months, marital status, previous treatment, funding source, number of previous arrests, lifetime duration of incarceration, childhood sexual abuse, primary drug of use, BSI Positive Symptom Total, Marlowe-Crowne social desirability score, any depressive disorders, any anxiety disorders, amphetamine dependence, cocaine dependence, and Axis II personality disorder.

2.4.2 Logistic regression models—A logistic regression model was developed for substance use, criminal activity, and arrest. As described below, a GEE model was used for change in employment. Owing to the varied nature of the outcomes and the limited sample size, likely predictor variables were customized for each logistic regression model. For each outcome, we selected demographic and other variables likely to have a relationship with the outcome variable as indicated either by previous research or bivariate correlations at baseline. Then, simple logistic regressions by each potential predictor on each outcomes variable were conducted, with predictors selected for the final model that had a *p*-value of 0.2 or less. The specific predictors included in each model are listed in the Results section. In addition, we controlled for a subject's baseline status on each outcome variable. For example, in the logistic regression for arrests at 12 months, we controlled for the number of previous arrests at baseline.

2.4.3 GEE model—Change in employment over time was analyzed using the Generalized Estimating Equations (GEE) method. GEE is used to analyze repeated measures data, taking into account the possibility of correlated data. This method can also accommodate a wide variety of distributions, such as normal, binomial, and gamma, and it provides the option of including covariates in the model. The employment data reflected a binomial distribution.

3. Results

3.1 Bivariate Results

Percentages for the outcome variables at baseline and follow-up are shown in Table 2. The groups differed on all of the outcomes variables at baseline (marginally so for substance use). At baseline, women in the MG programs were more likely than women in WO programs to report substance use and criminal activity in the 30 days prior to the interview and were more likely to have been arrested in the previous year. By contrast, MG women were more than twice as likely to be employed. At follow-up, for women in both groups, substance use and crime came down while employment increased, and statistically significant differences between the groups are evident. However, as is evident from Table 1, the two groups differed on important variables at baseline, as they did on baseline levels of the outcome variables. Thus, selection bias is a likely factor in accounting for the differences in bivariate comparisons at follow-up. Such differences at baseline would be expected from a quasi-experimental design. Hence, we provide a less biased examination of differences between the groups on the outcomes of interest by our use of propensity scores and multivariate models.

3.2 Multivariate Results

3.2.1 Any substance use—The logistic regression model for substance use in the 30 days prior to follow-up controlled for propensity, substance use in the 30 days before

treatment, age, ethnicity, sexual abuse before age 15, ever in treatment, CJ/non-CJ funding source, and primary drug. For use of any substance during the 30 days prior to the follow-up interview, we found that Hypothesis 1 was supported; only group status predicted substance use (see Table 3), with WO treatment participants being about 2 $\frac{1}{3}$ times less likely than those in the MG group to use during that period.

3.2.2 Self-reported criminal activity—The logistic regression model for criminal activity at follow-up controlled for propensity, criminal activity in the 30 days before treatment/arrest, ever in treatment, and CJ/non-CJ funding source. Using that model, we found that Hypothesis 2 was supported; only group status was predictive of criminal activity during the 12 months following treatment entry (see Table 4), with WO participants being about 2 $\frac{1}{2}$ times less likely to engage in criminal activities during that period.

3.2.3 Arrests—We used California Department of Justice records to determine whether subjects were arrested in the 12-month period after baseline. The logistic regression model for this outcome controlled for propensity, any recorded arrests in the 12 months before treatment, relationship status, income, ever in treatment, CJ/non-CJ funding source, and had child. For arrests during the year following baseline, we found that group status did not predict arrests (see Table 5). Those in the WO group were not significantly less likely to be arrested than those in the MG group. Therefore, Hypothesis 3 was not supported. Arrest in the 12 months following treatment was predicted by marital status. Those who were previously married or in a relationship (but not currently married/in a relationship) were 4 times less likely to have been arrested during the follow-up period than were those who were never married/in a relationship. Additionally, those who had a criminal justice source of funding were almost six times more likely to be arrested than were those whose treatment was funded from some other source.

3.2.4 Employment—The GEE model for change in employment from baseline to follow-up by treatment group controlled for propensity score, time (baseline to follow-up), education, ethnicity, relationship status, income, sexual abuse before age 15, CJ/non-CJ funding source, had child, and BSI score. In addition, a time in treatment by group interaction term was included. The results of this model indicate that women in both groups improved their employment status, but the difference between groups was not significant, thus Hypothesis 4 was not supported (see Table 6). Other baseline variables did have a statistically significant association with change in employment. For all participants, gains in employment were predicted by years of education, a past-year income in excess of \$10,000, and a low (positive) BSI score. On the other hand, poorer employment outcomes were found among women who identified themselves as Multi-ethnic or Other relative to those who identified themselves as White.

4. Discussion

Following from research indicating that the treatment needs of women are different from those of men, researchers and clinicians have argued that treatment programs for women should be designed to take their needs into account. Such programs tend to admit only women and have a philosophy and activities that are based on a social, peer-based model that is responsive to their needs. The current study assessed the relative effectiveness of WO outpatient programs compared to MG outpatient programs with respect to four outcomes: drug and alcohol use, criminal activity, arrests, and employment among substance-abusing women, predominantly referred to community treatment through the criminal justice system.

This study examined outcomes for women who participated in publically funded WO programs and MG programs as they typically operate in a large urban setting. For purposes

of the study, neither WO programs nor MG programs received any enhancements or special curriculum. Although most of the WO programs included elements of what has come to be called “gender-responsive” programming, these elements varied across the programs. The study did not specifically examine the effectiveness of specially developed gender-responsive programming for women. Instead, the study examined outcomes for women who participated in WO programs and MG programs as such publicly -funded programs typically operate in a large urban setting.

Women who participated in both types of programs—that is, those who participated in standard community programs without enhancements serving a heterogeneous population—showed improvements in substance use, criminal activity, arrests, and employment from study admission to the 12-month follow-up. Comparison of outcomes at the follow-up assessment yielded mixed results. A year after treatment entry, women who participated in WO treatment reported significantly less substance use and criminal activity than did women in MG treatment, but they were not less likely to be arrested or more likely to improve their employment status compared with those in MG treatment.

Specifically, controlling for propensity score and other baseline variables in logistic regression modeling, women in WO treatment were about two and one-third times less likely than women in MG treatment to report any substance use in the 30 days prior to the follow-up interview. Similarly, WO participants were about two and one-half times less likely to report having engaged in criminal activity in the 12 months following treatment entry. By contrast, there were no significant differences between the groups in arrest. Arrest was significantly less likely for those who were married or living together and for those whose treatment was funded from a non-criminal justice source. Comparison between the two groups in change in employment was examined using a GEE model. Although women in both groups improved their employment status from baseline to follow-up, the between-group difference was not significant. Thus, the findings supported two out of the four hypotheses examined.

Given that the primary purpose of substance abuse treatment programs is to reduce substance use, it is notable that participants in WO programs were significantly less likely than those in MG programs to report substance use at follow-up. This finding is consistent with previous studies that found that WO programs have a positive impact on substance use over time (Dahlgren & Willander, 1989; Grella et al., 2000; Hall, Prendergast, Wellisch, Patten, & Cao, 2004; Owen, Francisco, & Bernichon, 2001). The fact that this study had a relatively large sample size and that the subjects consisted of women participating in typical community-based treatment programs adds weight to this finding.

As noted, WO women were significantly less likely to report having engaged in criminal activities than were MG women, while the groups did not differ significantly for having been arrested. If WO participants were committing less crime, it is reasonable to infer that they would also be less likely to be arrested. At least two possible reasons may account for the difference in the two measures of crime. First, it is possible that women who participated in WO programs were more likely to give socially desirable responses at the follow-up interview and, as a result, under-report their criminal activity. This seems unlikely since the scores of the two groups did not differ on the Marlowe-Crowne Social Desirability Scale at follow-up. Second, differences in the type of supervision between the two groups may account for the differences in criminal activity and arrest outcomes. A higher percentage of women in the WO group had their treatment funded by the Department of Child and Family Services (24% for WO vs. 3% for MG). The higher level of supervision (and surveillance) that is associated with being subject to child protective services might have resulted in a

greater likelihood of discovery of criminal activity and subsequent arrest, despite a lower level of criminal activity.

More generally, the majority of women who participated in this study were under varying degrees of external pressure to comply with treatment, whether that pressure was from a judge (drug court or Proposition 36) or from child protective services. Such pressure increases the length of time that clients are in treatment, and may be at least as important as the type of treatment in accounting for participation in treatment and for long-term outcomes.

With regard to employment, the simple bivariate comparison of employment indicated that MG women were more likely to be employed at baseline and follow-up than were WO women (see Table 2). But after propensity-score adjustment, although women in both types of programs did improve their employment situation from baseline to follow-up, there were no significant differences in change in employment status between the groups. The lack of a significant group difference in employment from baseline to follow-up might be accounted for by two observations. First, a higher percentage of MG participants than WO participants were referred to treatment from drug court (76% vs. 28%), where being employed is a condition of graduation. Second, a higher percentage of WO participants had children (92% vs. 68%), particularly young children, making it more difficult for them to be employed. Still, the findings suggest that treatment programs (and their funders) need to pay greater attention to assisting women with employment.

4.1 Limitations

Findings of this study need to be considered in light of several limitations. First, the women were not randomly assigned to participate in WO or MG programs. This quasi-experimental design likely introduced selection bias, which we attempted to address through propensity-score adjustment using baseline characteristics. While we are confident that this approach balanced the samples based on characteristics we measured, it is not able to provide balance on unmeasured or unobserved characteristics that may have influenced outcomes. Second, although there is increasing focus on gender-responsive treatment (Covington, 2002; Messina et al., 2010), this study does not directly address the effectiveness of that approach since the main contrast in programs was whether the program served women only or both genders. While most of the women-only programs contained elements of what would be regarded as gender-responsive treatment, some did not. Third, the sample size for the regression models did not have sufficient power to detect small effects, although the question remains whether a small effect in outcome (e.g., a 5 percentage point difference in arrest) would be considered of clinical or policy significance. Fourth, the study recruited women from a large urban area where methamphetamine and cocaine are the predominant drugs and who received treatment in publicly funded programs. Findings may not be generalizable to more suburban or rural areas, to cities where other types of drugs predominate, or to programs with other funding sources.

4.2 Summary

Within a large urban system of publically-funded programs, the outcomes of women who participated in WO treatment compared with those in MG treatment were varied. Participation in WO programs appear to have resulted in less criminal activity and less substance use at 12 months following treatment entry, but it did not have a significant impact on arrest or employment. Women-only programs are designed to address the needs of women, and appear to have a positive effect on at least some important outcomes. But other studies are needed, particularly of programs that explicitly incorporate gender-responsive elements of treatment for women.

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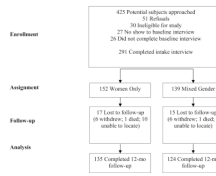


Figure 1.
Case Flow in the Study

Table 1

Sample Characteristics at Treatment Admission, by Group

Characteristics	Mixed-Gender (<i>n</i> = 139) % <i>M</i> (<i>SD</i>)	Women-Only (<i>n</i> = 152) % <i>M</i> (<i>SD</i>)	Total (<i>N</i> = 291) % <i>M</i> (<i>SD</i>)
Race/Ethnicity*			
White	40	22	30
Black	34	43	39
Hispanic	18	26	22
Multi-Racial/Other ^a	8	9	9
Marital Status			
Never Married	17	15	16
Prev married	49	52	51
Married/live tog	34	33	33
Partner/Spouse in Drug Treatment Past Year	21	32	27
Partner/Spouse Physically Abused You	49	45	47
Age at Admission	36.5 (10.2)	34.9 (10.1)	35.7 (10.2)
Highest Level of Education			
Less Than High School	30	39	35
High School	7	9	8
GED	5	5	5
Some College	38	24	31
Trade or Technical School	20	23	21
Employment Status Prior to Incarceration*			
Full Time/ Part Time	43	31	37
Other	57	69	63
Has any child***	68	91	80
Sexually abused before age 15	35	38	37
Annual Legal Income Under \$10,000	71	78	75
Primary Drug Problem (Self-Report)			
Cocaine/Crack /Meth	58	64	61
Other ^b	42	36	39
Been in Drug Treatment Previously***	82	60	70
Treatment Funding Source***			
Drug Court/ Prop 36	76	28	51
Other ^c	24	72	49
Arrested in past yr before BL***	78	45	61
Total Lifetime Arrests	9.8 (12.6)	8.3 (18.4)	9.0 (15.9)
BSI Positive Symptom Total	37.5 (34.4)	38.1 (33.3)	37.8 (33.8)
Social Desirability***	5.6 (2.8)	6.5 (3.0)	6.1 (2.9)

^aIncludes Asian, American Indian, Hawaiian.

^b Includes PCP, inhalants, marijuana, and other opiates.

^c Includes Perinatal, CalWorks, and self pay.

*
p<.05

**
p<.01

Table 2

Results (unadjusted) for outcome variables at baseline and follow-up for women in Women-Only Treatment and Mixed-Gender Treatment

Outcomes	Baseline			Follow-up		
	WO (%)	MG (%)	p value	WO (%)	MG (%)	p value
Any Substance Use in past 30 days	76.2	85.1	0.07	27.7	43.0	0.01
Any Criminal activities in past 30 days	63.9	76.9	0.02	22.3	39.7	0.003
Any Arrest in past year	23.9	39.7	0.01	16.2	23.1	0.16
Employed in past 30 days	10.8	22.3	0.01	22.3	40.5	0.002

Table 3

Logistic regression: Predictors of any substance use in past 30 days at 12 months post intake

	Coefficient	SE	p value	Odds Ratio	95% Confidence Interval of Odds Ratio
Group status (Women Only) ^a	-0.86	0.34	0.01	0.42	0.22—0.82
Propensity score	-0.02	0.19	0.91	0.98	0.68—1.41
Any substance use in past 30 days at baseline ^b	-0.06	0.36	0.87	1.06	0.52—2.15
Age at baseline	-0.00	0.01	0.93	1.00	0.97—1.03
Ethnicity ^c					
African American	0.02	0.39	0.96	1.02	0.48—2.18
Hispanic	-0.08	0.45	0.85	0.92	0.38—2.21
Multi/other	0.64	0.54	0.23	1.91	0.66—5.47
Abused sexually before age 15 ^d	0.19	0.29	0.51	0.83	0.47—1.46
Any previous treatment at baseline ^e	-0.01	0.35	0.99	1.01	0.51—1.99
Criminal justice funding source ^f	-0.28	0.51	0.59	0.76	0.28—2.07
Primary Drug (Meth) ^g	0.13	0.31	0.69	1.13	0.62—2.08

NOTE: Hosmer and Lemeshow test for goodness-of-fit, $p = .27$.

^a compared to mixed gender

^b compared to no use

^c compared to White

^d compared to no childhood sexual abuse

^e compared to no previous treatment

^f compared to all other funding sources

^g compared to other drugs

Table 4

Logistic regression: Predictors of any criminal activity at 12 months post intake

	Coefficient	SE	p value	Odds Ratio	95% Confidence Interval of Odds Ratio
Group status (Women Only) ^a	-0.91	0.34	0.01	0.40	0.21—0.79
Propensity score	-0.11	0.15	0.47	0.90	0.67—1.21
Baseline criminal activity, past 30 days/before arrest ^b	-0.22	0.31	0.48	0.80	0.43—1.49
Any previous treatment at baseline ^c	0.09	0.35	0.81	1.09	0.55—2.16
Criminal justice funding source ^d	0.29	0.43	0.50	1.34	0.57—3.12

NOTE: Hosmer and Lemeshow test for goodness-of-fit, $p = .27$.^a compared to mixed gender^b compared to no criminal activity^c compared to no previous treatment^d compared to all other funding sources

Table 5

Logistic regression: Predictors of any arrests at 12 months post intake

	Coefficient	SE	p value	Odds Ratio	95% Confidence Interval of Odds Ratio
Group status (Women Only) ^a	0.34	0.41	0.40	1.41	0.64—3.13
Propensity score	-0.10	0.20	0.61	0.90	0.61—1.34
Any arrest in past 12 months at baseline ^b	0.60	0.35	0.09	1.82	0.91—3.63
Marital status ^c					
Married/live tog	-0.25	0.46	0.60	0.78	0.32—1.94
Prev marr/live tog	-1.40	0.50	0.01	0.25	0.09—0.66
Income > \$10,000 at baseline ^d	0.58	0.42	0.17	1.78	0.78—4.04
Any previous treatment at baseline ^e	0.10	0.44	0.81	1.11	0.47—2.64
Criminal justice funding source ^f	1.74	0.61	0.01	5.71	1.72—18.99
Had child at baseline ^g	-0.16	0.43	0.70	0.85	0.37—1.96

NOTE: Hosmer and Lemeshow test for goodness-of-fit, $p = .42$.^a compared to mixed gender^b compared to no arrests^c compared to never married^d compared to income less than \$10,000^e compared to no previous treatment^f compared to all other funding sources^g compared to no children

Table 6

GEE model: Predictors of change in employment at 12 months post intake

	β Coefficient	SE	<i>p</i> value	95% Confidence Interval of Estimate
Group status (Women Only) ^a	-0.70	0.72	0.33	-2.11—0.70
Propensity score	-0.09	0.18	0.63	-0.43—0.26
Time	0.97	0.28	0.00	0.42—1.52
Years of education at baseline	0.14	0.07	0.05	-0.00—0.28
Ethnicity ^c				
African American	-0.51	0.33	0.12	-1.16—0.13
Hispanic	-0.02	0.38	0.97	-0.76—0.73
Multi/Other	-0.90	0.45	0.04	-1.77— -0.02
Married ^d				
Married/live tog	-0.11	0.33	0.74	-0.75—0.53
Prev marr/live tog	-0.25	0.33	0.44	-0.89—0.39
Income > \$10,000 at baseline ^e	1.09	0.28	0.00	0.54—1.65
Abused sexually before age 15 ^f	-0.29	0.27	0.27	-0.82—0.23
Criminal justice funding source ^g	0.68	0.48	0.16	-0.27—1.63
Had child at baseline ^h	-0.47	0.28	0.09	-1.03—0.08
BSI score	-0.01	0.01	0.02	-0.02— -0.000
Time \times Group	0.08	0.42	0.86	-0.77—0.90

NOTE:

^a compared to mixed gender^b compared to not employed^c compared to White^d compared to never married^e compared to income less than \$10,000^f compared to no childhood sexual abuse^g compared to all other funding sources^h compared to no children at baseline