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Gender disparities in utilization and outcome of comprehensive substance abuse treatment among racial/ethnic groups

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ABSTRACT

This study examined gender differences within Black, Latino, and White subgroups in the utilization of comprehensive services and their relation to posttreatment substance use. Survey data were collected during the National Treatment Improvement Evaluation Study (NTIES), a prospective, longitudinal, multisite study of substance abuse treatment programs and their clients in the United States. The analytic sample consisted of 1,812 Blacks (734 women and 1,078 men), 486 Latinos (147 women and 339 men), and 844 Whites (147 women and 339 men) from 59 service delivery organizations. Results related to service utilization indicated that compared to men, women in all racial and ethnic groups needed and received more services targeted to their needs and reported more positive relations with service providers. Gender was a significant moderator of the relationship between service receipt and treatment outcomes for all racial and ethnic groups, but especially for the Latino subsample. Findings point to the need to consider race-specific gender differences in the development of culturally competent, comprehensive substance abuse treatment.

1. Introduction

Research on racial/ethnic and gender disparities in the utilization and outcomes of comprehensive substance abuse treatment is limited despite the strong evidence base linking the provision of comprehensive health and social services to reductions in substance use and improved health and social functioning (Cao, Marsh, Shin, & Andrews, 2011; Ducharme, Knudsen, & Roman, 2006; Ducharme, Mello, Roman, Knudsen, & Johnson, 2007; Grella, Joshi, & Hser, 2000; Marsh, Cao, Guerrero, & Shin, 2009). Despite national concerns about health disparities (Smedley, Stith, & Nelson, 2003), very little research has compared Black, Latino, and White groups in terms of the relationship between use of comprehensive substance abuse services and outcomes. A major shortcoming of disparities research is that most analyses have focused on Black–White comparisons, leaving limited evidence related to Latino samples (Guerrero et al., 2013). Primarily due to a shortage of adequate Latino samples, little is known about what constitutes effective substance abuse treatment among Latinos (Alvarez, Jason, Olson, Ferrari, & Davis, 2007; Amaro, Arévalo, Gonzalez, Szapocznik, & Iguchi, 2006; Guerrero, Cepeda, Duan, & Kim, 2012).

A second major shortcoming is that racial/ethnic and gender comparisons have been conducted in isolation, providing little information about how the combination of race/ethnicity and gender affects substance abuse treatment (Alegría et al., 2006; Smith & Weisner, 2000). Although research has demonstrated that women tend to have more serious substance abuse treatment dependencies (Morgenstern & Bux, 2003; Wechsberg, Craddock, & Hubbard, 1998) and more health and social problems than men (Chatham, Hiller, Rowan-Szal, Joe, & Simpson, 1999; Marsh, Cao, & D'Aunno, 2004; Marsh & Miller, 1985; Wechsberg et al., 1998), it remains unclear how these challenges may differentially affect women across diverse racial and ethnic groups. As a result, there are significant knowledge gaps that can inform the design of services that are most beneficial and that are specific to men and women across racial and ethnic subgroups.

1.1. Comprehensive substance abuse treatment

Studies of comprehensive substance abuse treatment increasingly have identified the extent to which specific ancillary health and social services and service strategies are related to positive outcomes. In addition to substance abuse counseling, the provision of transportation assistance, child care, and health, mental health, and employment services have been associated with improved treatment outcomes (Friedmann, D'Aunno, Jin, & Alexander, 2000; Marsh, Cao, & Shin,

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2009; Marsh et al., 2004; McLellan et al., 1998). Studies also have found that when services are targeted or matched to specific client needs, outcomes improve (Cao et al., 2011; Marsh, Cao et al., 2009; McLellan et al., 1997). A positive relationship between client and provider has been connected to improved outcomes (Marsh, Shin, & Cao, 2010). Finally, length of time spent in treatment, or treatment duration, has been shown to be a very robust predictor of treatment outcome (Zhang, Friedmann, & Gerstein, 2003).

1.2. Gender and racial/ethnic differences in comprehensive substance abuse treatment

Little is known about gender differences within racial/ethnic groups. Studies on the use and effects of comprehensive substance abuse treatment across racial/ethnic and gender groups have indicated all groups benefit from treatment, but they have not revealed different benefits for specific subgroups (Marsh, Cao, Guerrero et al., 2009; Niv, Pham, & Hser, 2009; Schmidt, Greenfield, & Mulia, 2006). Further, few studies have examined the connection between use of specific components of comprehensive services and posttreatment substance use. Identification of service ingredients related to posttreatment reduction in drug use by racial/ethnic and gender subgroups would provide knowledge relevant to tailoring services to specific client needs to achieve the best outcomes, as well as the development of culturally competent treatment practices—that is, those designed to meet the specific needs of distinct groups (Campbell & Alexander, 2002; Guerrero, 2010; Guerrero, Campos, Urada, & Yang, 2012).

In light of these gaps in the literature, the purpose of this study was to examine gender disparities in substance abuse treatment service utilization and outcomes among racial/ethnic groups by addressing two research questions: (1) Are there gender differences in comprehensive substance abuse treatment service utilization and posttreatment substance use outcomes for Blacks, Latinos, and Whites? If so, (2) how does gender moderate the relationship between comprehensive service receipt and posttreatment substance use for Blacks, Latinos, and Whites? This study expanded on previous analyses of the association between racial/ethnic and gender differences and comprehensive services (Marsh et al., 2004) by examining gender differences in specific racial/ethnic subgroups. Gender was conceptualized as a moderator variable that may influence how receipt of specific services in substance abuse treatment affects posttreatment substance use for specific racial/ethnic groups (Baron & Kenny, 1986; Finney, 1995).

2. Methods

2.1. Research design and analytic sample

The National Treatment Improvement Evaluation Study (NTIES; Gerstein et al., 1997) was a prospective, longitudinal, multisite study of substance abuse treatment programs funded by the Center for Substance Abuse Treatment. NTIES data collection occurred between 1992 and 1997 and resulted in a unique data set in terms of (1) the amount of information collected about the type and amount of specific health and social services provided, (2) the size of the Black and Latino subsamples, and (3) the relatively high response rate (82%) achieved for data collected 12 months after treatment (Gerstein & Johnson, 2000). A primary objective of the study was to assess the provision of comprehensive services; that is, the type and amount of ancillary health and social services provided as part of substance abuse treatment. As a result, data were related not only to the characteristics of substance abuse services but also to ancillary health and social services received by individual clients. Additionally, data were collected about treatment organization and individual characteristics. At baseline, data were collected on client characteristics (including severity of substance abuse and previous substance abuse treatment experiences), and client perceptions of service needs were collected via interviews. At treatment exit, severity of substance use and service receipt data were collected. At 12 months posttreatment, data on severity of substance abuse (an outcome measure in this study) were again collected. Organizational data were obtained from interviews with treatment program administrators at two points during a 12-month period.

The sampling frame included two stages. The first sampling stage included all programs funded by the Center for Substance Abuse Treatment. Probability sampling of clients within programs was used during the second sampling stage. The treatment organizations in this sample were not representative of all substance abuse treatment organizations in the United States. Although clients were selected using probability sampling, they were only representative of clients entering programs funded by the CSAT during 1992–1997. Analyses by NTIES investigators indicated that the sample was largely comparable (e.g., in terms of gender distribution, education, prior drug treatment experience, criminal justice referrals) to other large-scale treatment studies, except the NTIES sample included higher proportions of Blacks and Latinos (Gerstein & Johnson, 2000). The analytic sample for this study was a subset of the 4,526 clients who completed all intake, treatment discharge, and follow-up interviews. After excluding clients from correctional facilities ($n = 1{,}384$), the final analytic sample consisted of 3,142 clients from 59 service delivery units. We excluded clients from correctional facilities because their treatment environments and treatment outcomes generally differ from those in noncorrectional facilities (e.g., clients have limited access to and use of drugs in correctional facilities based on restricted environment). The data set included measures of organizational, service, and individual characteristics for 1,812 Blacks (734 women and 1,078 men), 486 Latinos (147 women and 339 men), and 844 Whites (242 women and 620 men). The age range of the sample was 17–51.

2.2. Measures

2.2.1. Dependent variable

2.2.1.1. Posttreatment substance use. Approximately 12 months after completion of the program, respondents were asked how often during the last 30 days that they had used the five most frequently used legal and illicit substances; namely, marijuana, crack, cocaine powder, heroin, and alcohol. The dependent variable was a sum of the number of days respondents reported using each of the five drugs. This measure of substance use 12 months posttreatment was intended to measure sustained reductions in posttreatment substance use.

2.2.2. Explanatory variables

At treatment exit, clients reported on the health and social services they received as part of substance abuse treatment. The analysis included five measures related to service categories and retention in treatment.

(1) Access services. This service was operationalized as any receipt of transportation and child care services during the treatment period. A composite score was developed using these two dichotomous measures. At discharge, clients were asked whether they received either of these services.
(2) Substance abuse counseling services. This service was operationalized as receipt of any of three substance abuse treatment services: drug/alcohol counseling, 12-step meetings, and drug prescriptions for alcohol/drug problems. A composite score was developed using the three measures. Clients were asked whether they received each of these services at treatment discharge. Because each of these service categories was

constructed from a different number of services, the measurement of each category was normalized by its mean and standard deviation to allow for comparison of coefficients.

(3) Need–Service ratio was computed as the ratio of services that clients reported receiving to those they reported needing in the areas of family and life skills (parenting, domestic violence counseling, family services, assertiveness training, family planning, and nonmedical pregnancy services); mental health (mental health counseling or treatment); and concrete services (school, job skills, housing, assistance with collecting benefits, English training, and assistance receiving alimony/child support). To create the need–service ratio, we calculated the percentage of self-reported needs that were matched to services. Service need was measured during the intake interview with the question, "How important is help with (the problem)?" Service receipt was measured at discharge as whether they received service in each of the five areas. Clients who reported no need ($n = 115$) were excluded from analysis.

(4) Client–Provider relationship was assessed using an index of 10 items measuring in-treatment experiences: (1) whether clients had knowledge of a treatment plan, (2) helped develop a treatment plan, (3) agreed with treatment goals, (4) adhered to treatment goals, (5) interacted with a primary provider, (6) time spent with primary provider, (7) length of sessions with primary provider, (8) overall agreement with primary provider about treatment, (9) whether clients perceived their primary provider as understanding of clients' needs, and (10) whether each client's primary provider spoke their preferred language (Marsh, Cao et al., 2009).

(5) Treatment duration was measured as a continuous variable. This variable indicated length of treatment in weeks, from the first to last day of treatment.

2.2.2.1. Moderating variable. Gender was the moderator variable, with women as the referent. Effects were examined separately for each racial/ethnic group (Black, Latino, and White, with the latter as the referent).

2.2.2.2. Control variables. Control variables were derived from both organizational- and individual-level data.

Organizational-level variables were items shown to be theoretically and empirically significant in previous research on substance abuse treatment. Studies have identified factors related to general organizational effectiveness and the provision of ancillary health and social services, including: (a) accreditation by the Joint Commission, (b) ownership (public or private), (c) location of services (on-site or off-site), and (d) counseling intensity (sessions per week; Campbell & Alexander, 2002; Friedmann, Alexander, & D'Aunno, 1998; Friedmann et al., 2000). Frequency of counseling was a measure of whether the typical patient was scheduled to receive individual counseling or therapy less than once per week, once per week, or more than once a week, using less than once per week as the reference category.

Client-level variables included age (years from date of birth), education (years in school), psychosocial characteristics of health status (whether health issues limit their work), whether they had ever been beaten by their partner, and mental health status (number of psychiatric visits during the last year). Respondents also were asked to describe their source of payment for services: private or public insurance or uninsured. They also reported on previous alcohol or drug treatment experiences and their pretreatment drug use, which measured how often (in days) during the last 30 days each respondent had used alcohol, marijuana, cocaine, cocaine powder, and/or heroin.

2.3. Statistical analysis

2.3.1. Descriptive analyses

Descriptive comparisons were made among organizational, individual, service, and outcome characteristics for each racial/ethnic group, and then between genders within the three racial/ethnic groups. Chi-square tests were used for categorical variables, and analysis of variance was used for continuous variables. Missing values were specified for these comparisons.

2.3.2. Missing data imputation

In the NTIES data set, 0% to 15% of data was missing (except for the accreditation variable, for which up to 60% of data was missing for Black participants). As a result, a multiple imputation procedure (Rubin, 1987) was used to fill in missing values by assuming that the data were missing at random (Little & Rubin, 1987). Each missing value was replaced with 5 plausible values using the Markov Chain Monte Carlo method (Schafer, 1997), and imputation was conducted for organizational and client variables independently. The resulting 5 imputed sets of organizational and client data were merged with an indicator for each data set for further statistical analysis for each racial/ethnic group, using mixed linear models to account for potential within-organization correlation of substance use. The modeling outputs from the 5 data sets were combined to evaluate the effects of services received and control variables regarding posttreatment substance use. Parameter estimates and the associated covariance matrix from the mixed linear models for each imputed data set were used to derive valid multivariate inferences. The combined point estimate was the average of the 5 estimates from the imputed data sets. The combined standard error was derived from the combined variance of the within- and between-imputation variance (Barnard & Rubin, 1999; Rubin, 1987).

2.3.3. Predictive analyses of effect of service use on treatment outcomes

To assess the effects of services received on 12-month posttreatment substance use for each subgroup, random intercept models (a special case of mixed linear models with an exchangeable variance–covariance structure) were fitted for each racial/ethnic group and for gender within each racial/ethnic group. In this model, the intercept was treated as random effect, whereas individual, organizational, and service variables were treated as fixed effects. The model investigated the main effects of the explanatory service variables (access, substance abuse counseling, ratio of matched services, client–provider relationship, treatment duration) and control variables of organizational characteristics (modality, accreditation/license, ownership, on-site service availability) and client characteristics (gender, race, age, education, health-related work limitations, history of domestic violence, mental health visit, prior drug use, prior alcohol/drug treatment, payment source), as well as the 2-way interactions between gender and service characteristics. During the gender subgroup analyses within each racial/ethnic group, the independent variables were the same but excluded interaction terms of gender and service characteristics. The outcome (posttreatment substance use) was slightly right skewed. As a result, we used a generalized linear mixed model assuming a Poisson distribution with a log link function and an overdispersion parameter.

2.3.4. Gender as a moderator variable

Gender was conceptualized as a moderator variable that could influence the direction and/or strength of the relationship between services received and 12-month posttreatment substance use (Kraemer, Wilson, Fairburn, & Agras, 2002). According to Baron and Kenny (1986), a moderator variable is an independent variable at the same level as other independent variables in terms of its role

as a causal variable that is antecedent or exogenous to an outcome variable. A hypothesis of moderation is supported when there is significant interaction between the moderator and explanatory variables (in this case, gender and services received). Although there may be main effects of interest for all independent variables, including moderator variables, these are not conceptually relevant to testing the moderation hypothesis. Thus, in this analysis, gender differences in how specific services affect treatment outcomes were evaluated in terms of 2-way interactions between gender and service characteristics calculated separately for each racial/ethnic group.

All analyses, including multiple imputation of missing values, mixed linear modeling, and combination of results, were conducted in SAS 9.1.

3. Results

3.1. Service utilization

In separate analyses, racial/ethnic and gender differences in organizational, client, and service characteristics have been documented using the NTIES data set (Marsh, Cao, Guerrero et al., 2009; Marsh et al., 2004). Table 1 displays results regarding gender differences within specific racial/ethnic groups for specific organizational, client, service, and outcome variables.

3.1.1. Characteristics of treatment organizations serving women and men

As shown in Table 1, gender differences in organizational characteristics varied little across racial/ethnic groups. Black and

Table 1
Organizational, service, and client characteristics by race and gender.

Variables	Latino			Black			White		
	Men	Women	*p*	Men	Women	*p*	Men	Women	*p*
	% or *M* (*SD*)			% or *M* (*SD*)			% or *M* (*SD*)		
n	339	147		1,078	734		602	242	
Organizational variables									
Accreditation (TJC)	20	18	.413	2	1	.561	9	7	.749
Missing	42	41		56	64		30	38	
Treatment modality			**<.001**			**<.001**			.052
Methadone	21	20		12	9		12	18	
Nonmethadone outpatient	43	33		46	29		37	32	
Short-term residential	25	16		25	22		31	26	
Long-term residential	11	31		17	40		20	24	
Ownership			**.009**			.051			.169
Private	51	65		79	70		80	74	
Public	45	33		9	11		16	19	
Missing	3	2		13	19		4	7	
On-site services	1.78 (1.15)	2.01 (1.23)	.055	2.18 (1.16)	2.10 (1.30)	.205	2.41 (1.53)	2.47 (1.43)	.600
Counseling frequency			.254			**<.001**			.419
Less than once a week	18	14		9	18		6	8	
Once a week	56	65		57	43		69	66	
More than once a week	23	20		22	20		22	21	
Missing	2	1		12	18		3	6	
Client Variables									
Age			.079			**<.001**			**.002**
≤20	23	22		7	2		19	10	
21–30	28	33		27	39		30	40	
31–40	33	38		45	46		33	34	
41+	16	7		22	13		18	16	
High school graduate	36	33	.479	51	48	.175	54	55	.714
Married	23	23	.933	22	19	.121	19	23	.237
Missing	0	0		0	0		0	0	
Live with child or pregnant	32	64	**<.001**	31	61	**<.001**	22	54	**<.001**
Full-time employment	60	50	.655	75	59	**<.001**	72	64	.057
Missing	17	29		10	16		13	17	
History of domestic violence	5	39	**<.001**	9	45	**<.001**	10	46	**<.001**
Missing	13	14		5	1		11	5	
Prior drug/alcohol treatment	47	46	.742	60	64	**.048**	72	68	.249
Missing	0	0		0	0		0	0	
Payment source									
Private/Self/Family	27	22	.212	25	16	**<.001**	33	31	.619
Missing	4	5		5	1		3	2	
Government	57	67	**.019**	67	74	**.047**	61	64	.583
Missing	4	5		5	2		3	2	
Uninsured	13	8	.116	5	10	**.001**	6	6	.738
Missing	4	5		5	2		3	2	
Prior psychiatric visit	0.21 (0.73)	0.22 (0.67)	.830	0.26 0.80)	0.34 (0.88)	**.045**	0.39 (0.99)	0.48 (0.97)	.219
Prior drug use	16.76 (17.15)	16.80 (18.82)	.982	16.38 (19.05)	14.93 (16.85)	.097	14.45 (16.50)	13.24 (16.91)	.340
Service Variables									
Access services	47	64	**.001**	39	49	**<.001**	37	45	**.027**
Substance abuse counseling	74	80	.158	87	92	**.001**	80	83	.194
Client–Provider relationship	8.06 (1.56)	8.12 (1.56)	.689	8.25 (1.68)	8.29 (1.67)	.650	8.12 (1.70)	8.19 (1.56)	.572
Need–Service ratio	0.34 (0.30)	0.38 (0.27)	.173	0.31 (0.29)	0.38 (0.03)	**<.001**	0.40 (0.32)	0.46 (0.32)	**.014**
Outcome variables									
Treatment duration (weeks)	14.50 (14.42)	14.88 (14.23)	.793	14.53 (13.49)	14.71 (15.06)	.789	18.71 (15.87)	19.19 (16.15)	.694
Post-treatment drug use	10.38 (15.34)	7.07 (13.32)	**.024**	8.66 (13.73)	7.76 (13.55)	.172	6.81 (11.29)	6.32 (11.95)	.577
Prior minus post drug use	6.39 (19.12)	9.73 (19.16)	.077	7.72 (20.23)	7.17 (19.38)	.562	7.64 (18.08)	6.92 (16.02)	.589

Note. Figures in bold are statistically significant at the given *p*-value. TJC = the Joint Commission.

Latino women in this sample were less likely to be served in outpatient settings and more likely to be served in long-term residential settings than Black and Latino men. Additionally, Latino women were more likely to be served in privately supported organizations than Latino men. Significant gender differences in the number of services offered on-site existed only for Latinos. Latino men were served by organizations that offered significantly fewer on-site services than organizations serving Latino females. There also were gender differences in the intensity of counseling for Blacks but not the other two groups; Black women were more likely to have a less intense counseling schedule (meeting less than once a week) than Black men.

3.1.2. Client characteristics

There were few significant gender differences in terms of age, education, or marital status within any group. Women in all groups were much more likely to be living with a minor child and to have a history of domestic violence. Men were much more likely to have a history of full-time employment. Among Blacks, there were significant gender differences in sources of payment for substance abuse treatment services; men were significantly more likely to have insurance and significantly less likely to depend on government sources or to be uninsured than women. Black and Latino women were significantly more likely than Black and Latino men to rely on government sources. Black women were more likely to have experienced a recent overnight psychiatric visit.

3.1.3. Services received by women versus men

There were several significant gender differences in the types of services received by different racial/ethnic groups. Results supported findings in the literature that women in need of services received them more often than men, especially those related to their roles as partners and mothers. Women in all three groups received significantly more needed access services, measured as receipt of transportation and child care services. Women in all groups also received more substance abuse counseling and were more likely to receive services matched to their needs. Finally, women in all three groups tended to report more positive relationships with their providers and remained in treatment somewhat longer than men, although these differences were not statistically significant.

In sum, gender differences consistent across groups included the type and amount of services received. Women in all three groups received more services overall than men, especially services related to their roles as partners and mothers such as transportation and child care. Further, they received more targeted services that met their specific needs.

3.2. Race-specific gender differences in service factors predicting posttreatment substance use

How gender moderates the relationship between services received and outcomes for Blacks, Latinos, and Whites was a central concern of this study. Table 2 presents the results of the mixed linear model for posttreatment drug use as related to service variables. Our analyses indicated that gender functions as a moderator for all three groups, especially for Latinos. The interaction between gender and service receipt was significant among Latinos for all 5 service characteristics: access, substance abuse counseling, ratio of matched (needed to received) services, client–provider relationship, and treatment duration. For the Black group, gender was a significant moderator only for substance abuse counseling. For the White group, gender was a significant moderator for substance abuse counseling, ratio of matched services, and treatment duration.

To depict these interactions, Fig. 1 shows differences between women and men (solid vs. dotted line) for each race/ethnic group for posttreatment substance use (the number of days of drug use during the last 30 days) as a function of access, substance abuse counseling, ratio of matched services, client–provider relationship, and treatment duration, assuming all other control factors were equal. Fig. 1 is informative because it is possible to compare women and men with regard to the magnitude and direction of change in posttreatment substance use. For example, the magnitude of the difference between women and men—as indicated by the slope gradients—was consistently greater for Black and Latino women compared with men, regardless of the amount of specific services received. Put simply, Black and Latino women who accessed these services achieved greater reductions in substance use than their male counterparts who received the same level of service. Fig. 1 also shows how differences in direction as indicated by the slope of the lines were particularly striking for Latinas, who showed marked reductions in posttreatment drug use as measures of need–service ratio, client–provider relationship, and treatment duration increased. Overall, the findings revealed that gender was an important moderator of the relationship between services and outcomes, especially for the Latino subsample.

4. Discussion

To evaluate racial/ethnic and gender disparities in service utilization and outcomes, this study addressed the following questions: (1) What are the gender differences in service utilization and outcomes of comprehensive substance abuse treatment for Blacks, Latinos, and Whites? and (2) How does gender moderate the relationship between

Table 2
Generalized linear mixed models for posttreatment drug use by race/ethnicity.

Parameter	Latino			Black			White		
	Coeff.	*SE*	*p*	Coeff.	*SE*	*p*	Coeff.	*SE*	*p*
Gender (men)	0.635	0.101	.001	0.098	0.038	.028	0.266	0.083	.014
Access services	0.073	0.041	.087	0.013	0.017	.460	−0.073	0.036	.055
Substance abuse counseling	−0.090	0.042	.050	−0.122	0.018	<.001	0.220	0.035	<.001
Need–service ratio	−0.474	0.074	<.001	−0.091	0.026	.012	−0.312	0.046	.001
Client–provider relationship	−0.230	0.033	<.001	−0.102	0.019	<.001	0.071	0.039	.097
Treatment duration	−0.012	0.003	<.001	−0.015	0.002	<.001	0.008	0.002	.004
Men × access services[a]	−0.120	0.044	.013	0.001	0.021	.945	0.051	0.037	.183
Men × substance abuse counseling[a]	0.122	0.045	.015	0.109	0.023	<.001	−0.115	0.040	.013
Men × need–service ratio[a]	0.614	0.074	<.001	−0.038	0.033	.291	0.177	0.058	.032
Men × client–provider relationship[a]	0.142	0.039	<.001	−0.018	0.022	.436	−0.070	0.044	.138
Men × treatment duration[a]	0.012	0.003	<.001	−0.002	0.002	.197	−0.014	0.002	<.001

Note. The three regression models included control variables of organizational characteristics (modality, accreditation, ownership, and on-site service availability) and client characteristics (gender, race, age, education, health-related work limitations, history of domestic violence, prior psychiatric visit, prior drug use, prior alcohol/drug treatment, and payment source).

[a] Women is the reference category.

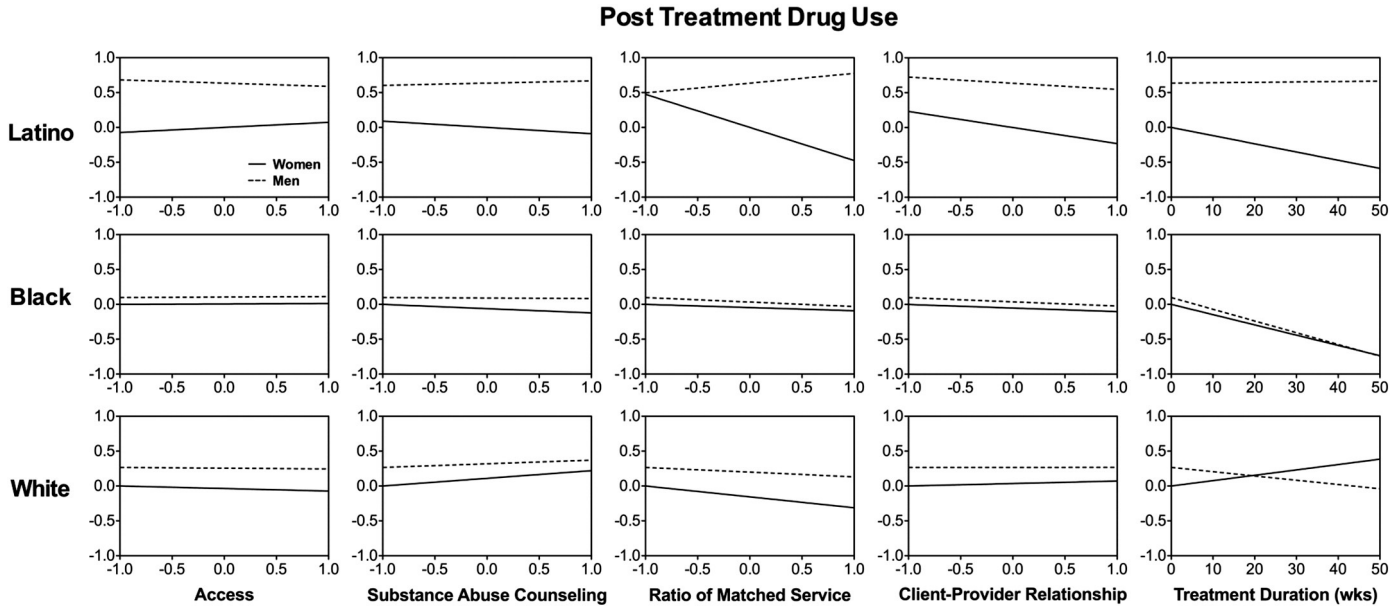

Fig. 1. Estimated posttreatment drug use as a function of service among women and men by race/ethnicity. Posttreatment drug use (the number of days of use of five major drugs during the last 30 days) as a function of access services, substance abuse counseling, ratio of matched services, and duration for women and men in Black, Latino, and White subgroups. The estimated lines for women and men were based on the fitted coefficients of the main effect and interaction in Table 2, assuming all other controlling variables were equal. In each panel of the figure, the slope was determined by the main effect of service as well as the interaction term, whereas the intercept at X = 0 was determined by the main effect of gender, which was coded as 1 for men and 0 for women. For instance, for Latinos (top panel), the main effect of ratio of matched services was −0.474, the main effect of gender was 0.635, and the interaction term between ratio of matched services and gender was 0.614. Therefore, the estimated slope of the ratio of matched services for Latinos was −0.474 for women and 0.140 (−0.474 + 0.614) for men. The value at X = 0 was 0 for women and 0.635 for men. The value at X = −1 was 0.474 [−(−0.474) × (−1)] for women and 0.495 [0.635 + 0.14 × (−1)] for men. Note that the units in the X and Y axes are real-world units, because access services, substance abuse counseling, ratio or matched services, and client–provider relationship were not standardized in the model fitting.

receipt of service and outcomes in comprehensive substance abuse treatment for Blacks, Latinos, and Whites?

Results were consistent with previous research showing that outcomes resulting from comprehensive substance abuse treatment were positive for both women and men in Black, Latino, and White subgroups (Marsh, Cao, Guerrero et al., 2009; Marsh et al., 2004). All groups showed consistent reductions in substance use at 12 months posttreatment. The data examined were collected in 1992–1997, yet findings were similar to other recent studies (Niv et al., 2009; Schmidt et al., 2006).

When gender and race were combined to examine race-specific gender differences in service need and utilization, the primary gender differences across all three groups involved the number of services received. Women received more services, especially services such as transportation and child care, related to their social roles. They also received more substance abuse counseling and were more likely to receive services matched to their needs. Most importantly, results showed that specific services have different effects on posttreatment substance use for race-specific subgroups based on gender, and gender is a particularly influential factor for the relationship between utilization and outcomes for Latino subgroups. Thus, race-specific gender differences in utilization and outcomes of comprehensive services were consistent with results found in other studies (Grella et al., 2000; Lundgren, Amaro, & Ben-Ami, 2005).

Research on comprehensive substance abuse treatment is characterized by the definition and availability of various components of comprehensive care (Ducharme et al., 2006, 2007). In this study, components of comprehensive care included ancillary health and social services (e.g., transportation and child care) as well as substance abuse services (counseling, 12-step programs, pharmacological treatment). It is noteworthy that although there was some variability in how gender served as a moderator for specific health and social services and outcomes, it consistently moderated substance abuse services and outcomes in all three racial/ethnic subgroups. Compared with Black and Latino men, Black and Latino women receiving substance abuse services reported higher posttreatment drug use. In contrast, White women receiving these services reported lower posttreatment drug use compared to White men. This finding is consistent with other studies reporting outcome disparities among racial/ethnic groups (Marsh, Cao, Guerrero et al., 2009). The contribution of this paper is documentation of the consistent role of gender as a factor moderating the relation among services and outcome among racial/ethnic groups.

This study also examined service strategies—specifically, those related to matching services to needs, quality of client–provider relationship, and length of time spent in treatment. It could be argued that the service strategies examined here related to the quality of comprehensive services provided. It is worth noting that Latinas in the sample were particularly responsive to these measures of comprehensive care.

Given the paucity of substance abuse services research specifically targeted to Latinos, it is important to highlight what this analysis indicates about the design and development of effective services for Latinos. The influence of culture on response to substance abuse treatment has been of significant interest (Amaro et al., 2006), and our findings from a national sample may provide valuable empirical evidence of gender differences among Latinos in terms of response to treatment (Vega & Sribney, 2005). Women in the Latino sample, like women in all groups, received more health and social services and more services targeted to their needs than men. The significant moderation effect of gender for all groups, but especially for Latinos, indicates that program investments in access strategies (transportation and child care) designed to facilitate attendance, strategies designed to tailor specific services to needs, and strategies focused on improving the client–provider relationship may improve treatment outcomes.

4.1. Study limitations

Both the limitations and strengths of this study were related to characteristics of the NTIES data set. The NTIES is unique because it is

one of few large-scale, observational follow-up studies in the United States that collected a significant amount of service utilization data to evaluate substance abuse treatment effects. The NTIES is known for its prospective design, its high client response rate, its measurement of organizational- and client-level variables, and its oversampling of race and ethnic subgroups. A limitation of this data set, however, involves the age of the data and the significant heterogeneity within racial/ethnic groups that exists in the United States. NTIES was collected between 1992 and 1997, and may not be representative of the current patient population. However, at present, there is no other study that provides data regarding organizational characteristics, service utilization, and client-level outcomes in substance abuse treatment. Regarding heterogeneity within groups, although survey respondents self-identified their racial/ethnic status, few additional subgroup characteristics were measured (e.g., nativity, language, geography). Thus, the conclusions that can be drawn about race/ethnicity-specific services were limited by the significant within-group heterogeneity.

A further limitation of the study was related to the measures of both the dependent and explanatory variables. The dependent variable or outcome measure was limited to a single, self-reported 30-day measure of substance use collected 12 months posttreatment. However, treatment effectiveness research has indicated that substance abuse treatment, especially when it includes health and social services, can result in not only reduced drug use but also improved health and social functioning (McLellan, Arndt, Metzger, Woody, & O'Brien, 1993; McLellan et al., 1997, 1998). Limitations regarding the measurement of independent or service variables resulted from a lack of standardization in the definition and measurement of comprehensive health and social services (Ducharme et al., 2007). Comprehensive services can include a broad range of health and social services. This study organized 22 services measured in the NTIES into 5 categories of service experiences—i.e., access, substance abuse counseling, ratio of matched service, client–provider relationship and treatment duration—that have been used to predict outcomes in previous studies (Ducharme et al., 2007; Friedmann, Hendrickson, Gerstein, & Zhang, 2004). Although findings regarding the relationships of these service categories with outcomes were consistent with previous studies, different definitions of services could alter these relationships. Another study using the NTIES data set (Friedmann et al., 2004) examined the provision of vocational and housing services and found that these services (compared with health, mental health, and substance abuse counseling services) reduced substance use. As more studies examine the effects of specific services, standardization in the measurement of services will permit greater understanding of how they are related to reduced substance use and other outcomes. This information will have great value for the development of cultural and gender-specific protocols and for tailoring of specific services to meet individual client needs.

4.2. Implications

Findings from this study have important implications for future substance abuse treatment research and program development. Several decades of large-scale treatment outcome studies have led to the conclusion that substance abuse treatment can be effective in not only reducing alcohol and/or drug use but also enhancing individual functioning and ameliorating public health and safety problems. This research also has revealed gaps in knowledge of strategies for tailoring treatment services to specific client needs. The need to tailor services has become especially important given that the Patient Protection and Affordable Care Act will require the dissemination of culturally responsive care as a means of reducing health disparities among ethnically and racially diverse groups (Andrulis, Siddiqui, Purtle, & Duchon, 2010; Guerrero, Campos et al., 2012; Guerrero, Cepeda et al., 2012; Guerrero et al., 2013). Findings from this study contributed to a growing body of evidence suggesting that attending to the social service and relational needs of racial/ethnic and gender groups may contribute to their engagement in treatment (Guerrero, 2013), as well their reduction of substance use (Marsh, Cao, Guerrero et al., 2009). The findings reinforced the value of research on the treatment process and its ability to illuminate which groups are helped by which treatment ingredients and processes. Future research should build on this evidentiary base by tailoring program services to the specific needs of racial/ethnic and gender groups and investing in the provider–client relationship, which continue to show significant positive effects on the treatment process and outcomes.

In summary, this analysis of gender differences within Black, Latino, and White subgroups in the NTIES sample indicated that different groups remain in treatment for comparable periods of time and similarly benefit from treatment. Women across all subgroups received more services, but still similarly benefited compared to men in terms of treatment outcomes. Further, gender served as a moderator influencing the capacity of specific services to affect posttreatment drug use for each racial/ethnic group. However, White women did not benefit as much as White men who received substance abuse treatment services and stayed in treatment longer. Programs should tailor comprehensive social services based on clients' gender and racial/ethnic background in addition to their substance use problems to improve treatment relevance and adherence and potentially reduce posttreatment substance use. Only through these concerted efforts will treatment providers be able to enhance the quality and influence of substance abuse treatment services for all groups.

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