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Gender differences in the impact of comprehensive services in substance abuse treatment

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Abstract

This study examines the impact of comprehensive services on treatment outcomes for women and men. The study uses data collected from 1992 to 1997 for the National Treatment Improvement Evaluation Study, a prospective, cohort study of substance abuse treatment programs and their clients. The analytic sample consists of 3,142 clients (1,123 women and 2,019 men) from 59 treatment facilities.

The results show that substance abuse treatment benefits both women and men. Further, both women and men benefit from comprehensive services provided as part of substance abuse treatment: specifically, the receipt of educational, housing and income support services is related to reduced post-treatment substance abuse for both women and men. Gender differences are revealed by the fact that, overall, greater proportions of women receive services and, when individual, service, and treatment organizational characteristics are controlled, women show greater reductions in post-treatment substance use. Further, women and men differ in their responsiveness to organizational characteristics: the availability of on-site services and the frequency of counseling significantly predict reduced post-treatment substance use for men but not for women.

Keywords: Substance abuse; Treatment services; Women; Comprehensive services

1. Introduction

Substance abuse treatment is beneficial to both women and men. Indeed, women and men who remain in treatment derive comparable benefit from it (Gerstein & Johnson, 2000a; Gerstein, Johnson, & Larison, 2003; Kosten, Gawin, Kosten, & Rounsaville, 1993). Nonetheless, gender difference studies indicate women come into treatment with more problems co-occurring with substance use, have less access to treatment, and, at the same time, are more actively engaged in treatment (Fiorentine, Anglin, Gil-Rivas, & Taylor, 1997; Marsh & Miller, 1985; McLellan & McKay, 1998). Some researchers suggest that it is the differential amounts and components of service received by women compared with men that explains the lack of difference in outcome (Fiorentine et al., 1997). It is the purpose of this paper to assess the differential impact of comprehensive services on reductions in drug use for women and men.

1.1. Gender comparisons of service comprehensiveness

Gender comparison studies indicate women often have more severe and diverse problems at treatment intake than men do. They enter treatment with more psychological, health, AIDS/HIV risk, family and employment problems (Chatham, Hiller, Rowan-Szal, Joe, & Simpson, 1999; Halikas, Crosby, Pearson, & Nugent, 1994; Marsh & Miller, 1985; Rowan-Szal, Chatham, Joe, & Simpson,

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2000; Wechsberg, Craddock, & Hubbard, 1998). Further, they are more likely to express concerns related to children and to report higher levels of past and current physical and sexual abuse (Gerstein & Johnson, 2000a). Treatment entry for men seems to be facilitated by social institutions such as employers or the criminal justice system whereas, for women, treatment entry more often results from social work referral, suggesting contact with social agencies eases women's entry into treatment (Grella & Joshi, 1999). Studies vary in documenting whether greater treatment retention is achieved for women or men. Some studies find women remain in treatment longer (Chou, Hser, & Anglin, 1998; Magura, Laudet, Kang, & Whitney, 1998); others find no difference (Kosten et al., 1993). Women clients report that services such as health care, domestic violence counseling, transportation and child care, along with relationships with individual counselors, are the primary reasons they remain in treatment (Nelson-Zlupko, Dore, Kauffman, & Kaltenbach, 1996; Strauss & Falkin, 2000).

The argument supporting comprehensive services for women is based on the evidence that women come into treatment with more problems than men and with gender-specific problems related to mental health and family relations including domestic violence, child custody, and child care problems. Fundamentally, the expectation is that women enter treatment with more problems and use more services related to those specific problems. It is well-documented that women enter treatment with more problems than men, but it is not known how service utilization patterns differ for women and men. For example, it is not known whether women use more mental health and child care services when they are available. It also is not known whether the impact of these services may differ for women and men.

The preponderance of research on comprehensive services focuses on women. Studies indicate that ancillary health and social services improve treatment outcomes for women—both in women-only and in mixed-gender programs (Grella, Joshi, & Hser, 2000; Marsh, D'Aunno, & Smith, 2000; McLellan et al., 1997, 1998; Rowan-Szal et al., 2000). Early studies were motivated by the expectation that since women enter treatment with more problems, they will use more services related to those specific problems. And, early studies provided consistent evidence of the relation between availability of comprehensive health and social services and retention in treatment for pregnant and parenting women (for review, see Marsh & Miller, 1985). Recent studies show the provision of comprehensive services results in both greater retention and better outcomes for women in women-only and mixed-gender programs (Grella et al., 2000; Grella, Polinsky, Hser, & Perry, 1999; McLellan et al., 1997, 1998). Although these studies of comprehensive services point to their value for increasing retention in treatment and improving outcomes by reducing substance use for women and men, no study to date has examined gender differences in the impact of comprehensive services.

1.2. Impact of specific health and social services

Studies of comprehensive services have begun to indicate specific service characteristics related to treatment outcome, especially reduced drug use. For example, McLellan et al. (1994) found that for 649 male and female clients dependent on alcohol, opiates, and cocaine, programs that provided a greater number of psychiatric, medical, employment, and family services resulted in significantly better social adjustment at followup. A greater number of psychiatric and medical services was weakly associated with less substance use at followup. McLellan et al. (1998) conducted a quasi-experimental study comparing publicly-supported programs providing standard outpatient drug abuse treatment with enhanced treatment consisting of case managers who coordinated and expedited the use of medical screenings, housing assistance, parenting classes and employment services. They showed that male and female patients in the enhanced programs had significantly fewer physical and mental health problems, better social functioning, and less substance use 6 months after treatment admission than did those in the comparison programs. Several other researchers show that the value of social services is maximized when combined with linkage services such as transportation and child care (Friedmann, D'Aunno, Jin, & Alexander, 2000; Marsh et al., 2000; McLellan et al., 1997). Further, the use of a large number of services was related to reduced drug use in two studies (Broome, Simpson, & Joe, 1999; Smith & Marsh, 2002). Finally, in a study of specific services provided in therapeutic communities, Messina, Nemes, Wish, and Wraight (2001) found that the use of a greater number of services overall, as well as vocational education, specifically, was related to treatment completion for a sample of women and men. In general, studies of specific service characteristics point to psychiatric, medical, and vocational services as important contributors to post-treatment substance use. Also, treatment intensity, i.e., the absolute number of health and ancillary services received, emerges as important to treatment completion and reductions in post-treatment substance use. However, despite the growing evidence of how specific services are related to treatment effectiveness, there is little evidence of the differential impact of these services for women and men.

1.3. Organizational factors influencing the effectiveness of comprehensive services

Several setting or organizational characteristics have been examined for their relation to the availability of comprehensive services. Public or private ownership has been the subject of a growing number of studies. At least one study (Friedmann, Alexander, & D'Aunno, 1998) found that

publicly-owned units provide more ancillary services. Accreditation, availability of on-site services, and frequency of counseling also are related to organizational effectiveness. In a study examining organizational correlates of primary care and mental health services in drug treatment units, Friedmann et al. (1998) found JCAHO-accredited units, publicly-owned, and well-resourced units are more likely to provide ancillary health and mental health services. Friedmann, Alexander, Jin, and D'Aunno (1999) and Friedmann et al. (2000) found that whether services were provided on-site or off-site also was positively related to clients' use of services. Further, a set of studies by Fiorentine and Anglin (1996, 1997) show that increasing the intensity of substance abuse counseling increases organizational effectiveness. Taken together, these studies show factors related to organizational effectiveness generally and the provision of ancillary services more specifically include (1) accreditation, (2) ownership (whether an agency is public or private), (3) location (whether services are provided on-site or off-site), and (4) counseling intensity.

1.4. Trends in the availability of comprehensive services

Despite the evidence of the benefits of comprehensive services in substance abuse treatment, data from several national studies of drug treatment indicate that the availability of ancillary health and social services declined in the 1980s (D'Aunno & Vaughn, 1995; Etheridge, Craddock, Dunteman, & Hubbard, 1995) and has changed little since (Friedmann, Lemon, Durkin, & D'Aunno, 2003). A study examining comprehensive services including physical exams, routine medical care, mental health care, financial counseling and employment counseling using data from the National Drug Abuse Treatment System Survey indicated a modest increase in physical exams, a decrease in financial counseling and otherwise little change in the provision of comprehensive services between 1990 and 1995 (Friedmann et al., 2003).

The overall purpose of this study is to examine (1) gender differences in the impact of comprehensive services on substance abuse outcomes as well as (2) the organizational and service factors related to reduced substance use for women and men. The study represents an implementation analysis that seeks to unlock the "black box" of substance abuse treatment, i.e., to identify gender differences in the organizational and service characteristics predicting successful outcome. In a shrinking service environment, understanding the differential effectiveness of specific services for women and men will facilitate the development of more effective services overall. This research uses data from the National Treatment Improvement Evaluation Study (NTIES), a prospective cohort study of substance abuse treatment programs and their clients. A secondary analysis of the NTIES data compares the organizational and service characteristics that are related to reduced substance use for both women and men.

2. Methods

2.1. Design and sample

The study is a secondary analysis of data collected as part of NTIES (Gerstein et al., 1997). NTIES is a longitudinal multi-site study of organizational, service, and client characteristics of substance abuse treatment programs conducted between 1992 and 1997 by the National Opinion Research Center with assistance from Research Triangle Institute. The study was designed to evaluate the implementation and effectiveness of drug treatment programs in major metropolitan areas of the United States receiving funding from the Center for Substance Abuse Treatment of the Substance Abuse and Mental Health Services Administration. Individuals served in programs were from vulnerable and underserved populations including minorities, pregnant women, youth, public housing residents, welfare recipients, and those involved in the criminal justice system. NTIES employed a pre/post panel design to measure the outcome of treatment. Two data collection strategies were used. Client and service data were collected from client interviews obtained at treatment intake, treatment exit, and 12 months after treatment exit. Organizational data were collected from interviews with treatment program administrators that occurred at two points in time during a twelve-month period.

The sampling procedure employed purposive sampling at the first sampling stage of programs and probability sampling of clients within programs at the second sampling stage. Thus, the treatment organizations in this sample are not representative of the population of substance abuse treatment organizations in the U.S. Although clients were selected in the study with probability sampling at the second stage, they are representative only of clients entering programs funded by the Center for Substance Abuse Treatment during a specific time period. Nonetheless, NTIES investigators report that this sample is largely comparable (e.g., in terms of distributions by gender, educational levels, prior drug treatment experience, criminal justice referrals) with other large scale treatment followup studies, except that the NTIES sample contains higher proportions of Blacks and Hispanics (Gerstein et al., 1997). They conclude that findings from NTIES studies are relevant to public sector programs that serve lower income groups, but may not be as informative about programs serving upper income populations.

NTIES represents one of the most extensive multi-level data sets available to examine effectiveness of substance abuse treatment and services. The response rate at the client level is one of the highest achieved in large-scale addiction studies (Gerstein & Johnson, 2000b). The analytic sample for this study was a subset of the 4,526 clients who completed all intake, treatment, discharge, and followup interviews. After excluding clients from correctional facilities ($N = 1,384$), the final analytic sample consisted of 3,142 clients from 59 service delivery units (1,123 female and 2,019 male clients).

2.2. Measures

Prior to the availability of the NTIES data, few substance abuse data sets have included client outcome data along with both organizational- and service-level data. The NTIES data, however, include prospective data on organizational, service and individual client characteristics and, as such, provide the opportunity to examine the relation of organizational, service and client factors to client outcome.

2.2.1. Dependent variable

Post-treatment substance use was the primary dependent variable. Respondents were asked to report their use of the five most frequently used licit and illicit substances. Approximately twelve months after completion of the program, they were asked the number of days in the last 30 that they had used marijuana, crack, cocaine powder, heroin, or alcohol. The dependent variable was a sum of the number of days respondents reported using the five drugs. This overall measure reflects the significant polydrug use in this sample and combines information on the five most frequently used substances. Half of all respondents in the NTIES sample report using more than one primary substance and the majority mentioned using at least one of five included in the dependent variable.

2.2.2. Explanatory variables

Service comprehensiveness, the primary explanatory construct, was measured at both the individual and the organizational levels. Receipt of services was measured at the individual level and availability of services was measured at the organizational level. At the individual level, the service comprehensiveness measure consisted of six categories of service: *access services* (including transportation and child care), *substance abuse counseling services* (including drug/alcohol counseling, 12-step meetings, drug prescription for alcohol/drug problems), *family and life skills services* (parenting, domestic violence counseling, family services, assertiveness training, life skills, family planning, non-medical pregnancy services), *health services* (health services, AIDS prevention services, family planning, medical pregnancy services), *mental health services* (mental health counseling or treatment), and *concrete services* (school, job skills, housing, help collecting benefits, help getting alimony/child support). These six service categories were developed from the 22 specific services measured in NTIES. Respondents were asked specifically whether they had received each of these services. The six categories were developed for their pragmatic utility to services providers. They are consistent with previous work of the authors and other research on ancillary health and social services in substance abuse treatment (Friedmann et al., 2000; Marsh et al., 2000; Smith & Marsh, 2002). In each service category, the number of services utilized by each individual was calculated as the measure of receipt of that service category. At the organizational level, service comprehensiveness was based on administrator reports of whether one of five services was offered on-site: academic training, vocational training, medical, psychiatric, or pregnancy services. Program administrators were asked whether each of the services were available on-site. The number of the five on-site services offered at the treatment center was calculated as the measure of on-site service availability.

2.2.3. Control variables

Control variables also were measured at the individual and organizational levels. Client-level control variables included *race* (Non-Hispanic Black, Hispanic, Non-Hispanic Non-Black, where Non-Black was the referent category), *age* (years from date-of-birth), education (years in school). Respondents also reported on psychosocial characteristics: *health status* (whether health limits the work they can do), whether they had *ever been beaten*, and *mental health status* (measured in terms of 24-h psychiatric visits in the last year). Respondents also were asked to describe their source of *payment* for services: private, public, or uninsured. They also reported on *previous alcohol or drug treatment* experience and their *pre-treatment drug use*. The pre-treatment drug use variable was constructed in exactly the same way as the dependent variable, post-treatment drug use, by summing the number of days in the last 30 days that each respondent used the five most frequently use substances: alcohol, marijuana, cocaine, cocaine powder and heroin. Along with the service comprehensiveness, *treatment duration* was measured as a continuous variable indicating the length of treatment in weeks between first and last day of treatment.

Organizational-level control variables were included that were theoretically and empirically significant in previous research in substance abuse treatment. These variables, derived from administrative interviews, included accreditation, modality, ownership, on-site services, and frequency of counseling. For *accreditation*, administrators reported whether their program was JCAHO-accredited. Lack of accreditation was the referent category. For *treatment modality*, administrators indicated whether a program was a methadone, outpatient non-methadone, short-term residential, or long-term residential program. Outpatient non-methadone program was the referent category. *Ownership* was a dichotomous variable in which administrators indicated whether a facility was private (either private for-profit or private not-for-profit) or public (local, state, federal, or tribal government) where public was the referent category. *On-site service availability* measures the number of on-site services (academic training, vocational training, medical, psychiatric or pregnancy services) provided by the treatment center. *Frequency of counseling* was a measure of resource allocation in which the administrator indicated whether the typical patient is scheduled to receive individual counseling or therapy less than once per week, once per week, or more than once a week. Less than once per week was the referent category.

2.3. Statistical analysis

2.3.1. Gender comparison

For descriptive comparisons of organizational variables, service characteristics, individual variables, and outcome variables between genders, chi-square tests were used for categorical variables; *t*-tests were used for continuous variables. Missing values were excluded from these simple comparisons.

Gender was examined both as a main effect and as interaction effect in a model examining the relation of organizational and service factors to post-treatment substance abuse for women and men. Since interaction terms can be difficult to detect in field studies (McClelland & Judd, 1993), gender also was analyzed as a moderator variable in a subgroup analyses of women only and men only (Baron & Kenny, 1986).

2.3.2. Missing data imputation

In this dataset, some variables had missing values for some records. Typical statistical procedures exclude records with missing values. Analyses excluding records with missing data can provide biased estimates by using less information and by ignoring possible systematic differences between complete and incomplete records. Larger *SE*s result when less information is utilized, and biased estimates will be obtained when the data are not missing completely at random (Little & Rubin, 1987). To avoid these problems, a multiple imputation procedure (Rubin, 1987) was conducted to fill in the missing values by assuming the data were missing at random (Little & Rubin, 1987). Unlike single imputation for missing values, which tends to over-estimate sample size but underestimate variance and *SE*s, multiple imputation represents uncertainty about the right value to fill in and thus overcomes the problem with single imputation. In the multiple imputation procedure, each missing value was replaced with five plausible values using Markov Chain Monte Carlo method (Schafer, 1997). The resulting five imputed datasets were analyzed separately, using standard statistical procedures for complete data. Then, the analyses resulting from the imputed data sets were combined.

2.3.3. Mixed linear models

To account for potential within-service delivery unit correlation of substance use, random intercept models (a special case of mixed linear models) were fitted. The outcome variable was post-treatment substance use. In the model investigating the main effect of gender and the interaction effect between gender and client-level service variables, the independent variables included organizational characteristics (modality, JCAHO accreditation/license, ownership, on-site service availability), specific service categories (access, substance abuse counseling, family/life skills, health, mental health, concrete services), client characteristics (gender, race, age, education, whether health limits work, whether ever beaten, mental health visit, prior drug use, prior alcohol/drug treatment and payment source) and the interactions between gender and specific service characteristics. In the subgroup analysis of women only and men only, the independent variables were the same but excluded gender and interaction terms. Since each service category was constructed from a different number of services, the measurement of each category was normalized by its mean and *SD* to allow for comparison of coefficients.

For the separate analyses of the female and male samples, the corresponding coefficients of each individual-level service variable were compared using a *Z*-test. Multicollinearity was evaluated for all variables in the model with special attention given to the possible lack of independence between organizational- and individual-level variables. Given that services must be available at the organizational level to be received at the individual level, we examined gender differences in the effect of comprehensive services on treatment outcome in a model with and without the on-site service availability variable. The relation between individual level service variables and outcome held with and without the inclusion of the organizational level variable indicating minimal effects of multicollinearity.

All the analyses, including multiple imputation of missing values, mixed linear modeling and combination of fitted results, were conducted in SAS 8.2.

3. Results

3.1. Gender comparison of organizational, service and individual characteristics

The gender comparison in Table 1 shows differences we would expect in the distribution of women and men across organizational characteristics of the 59 service delivery units included in this sample. Only a small percentage of programs had achieved JCAHO accreditation (6% for women and 8% for men).[1] In terms of modality, the majority of women were served in non-methadone outpatient and long-term residential while most men were served in non-methadone outpatient and short-term residential programs. The vast majority (more than 70%) of programs serving both men and women are private, either private for-profit or private not-for-profit. Further, the programs were not significantly different in terms of on-site provision of ancillary health and social services. Both women and men were equally likely to be served in programs offering academic training, vocational training and medical services. About 40% of each group received services in programs offering academic training and medical

[1] The missing rate for each variable is provided in Table 1. While the missing rate overall averaged 18%, the missing rate for JCAHO accreditation was close to 50%.

Table 1
NTIES Organizational, service and client characteristics by gender (N = 3142)

	Women (N = 1123)		Men (N = 2019)		
Organization Level	*N*	Percentage	*N*	Percentage	Significance
Accreditation/JCAHO	53	5.5%	143	7.6%	n.s.
Missing	619	55.1%	926	45.9%	
Treatment Modality					***
Methadone	137	12.2%	273	13.5%	
Non-Methadone Outpatient	337	30.0%	863	42.7%	
Short-term Residential	249	22.2%	549	27.2%	
Long-term Residential	400	35.6%	334	16.5%	
Ownership					n s
Private	788	70.2%	1502	74.4%	
Public	175	15.6%	345	17.1%	
Missing	160	14.3%	172	8.5%	
Onsite Services					
Academic Training	463	41.2%	860	42.6%	n.s.
Missing	151	13.5%	149	7.4%	
Vocational Training	199	17.7%	428	21.2%	n.s.
Missing	151	13.5%	149	7.4%	
Medical Service	442	39.4%	838	41.5%	n.s.
Missing	151	13.5%	149	7.4%	
Psychiatric Service	426	37.9%	1089	53.9%	***
Missing	151	13.5%	149	7.4%	
Pregnancy Service	584	52.0%	867	42.9%	***
Missing	151	13.5%	149	7.4%	
Frequency Counseling					***
Less than Once A Week	174	17.9%	194	10.4%	
Once A Week	572	58.6%	1226	65.6%	
More Than Once A Week	226	23.3%	450	24.1%	
Missing	151	13.5%	149	7.4%	
Service Level					
Service Access	567	50.5%	802	39.7%	***
Substance Abuse Counseling	992	88.3%	1665	82.5%	***
Family Counseling	875	77.9%	1419	70.3%	***
Health Counseling	1068	95.1%	1882	93.2%	*
Mental Health Counseling	305	27.2%	488	24.2%	n.s.
Concrete Service	559	49.8%	846	41.9%	***
	Mean	*SD*	Mean	*SD*	Significance
Service Duration (wks)	15.7	15.3	15.8	14.5	n.s.
Client Level	*N*	Percentage	*N*	Percentage	Significance
Race					***
Non-Hispanic Black	734	65.4%	1078	53.4%	
Hispanic	147	13.1%	339	16.8%	
Non-Hispanic Non-black	242	21.6%	602	29.8%	
Age					*
20 or Younger	74	6.6%	266	13.2%	
21–30	430	38.3%	565	28.0%	
31–40	473	42.1%	795	39.4%	
41 or older	146	13.0%	393	19.5%	
Graduate High School	532	47.4%	996	49.3%	n.s.
Married	420	37.4%	758	37.6%	n.s.
Live with Minor Child or Pregnant	669	59.6%	568	28.1%	***
Missing	6	0.5%	0	0%	
Worked Full Time	663	59.0%	1442	71.4%	***
Missing	198	17.6%	247	12.2%	
Ever Beaten	496	44.2%	170	8.4%	***
Missing	44	3.9%	163	8.1%	
Prior Drug/Alcohol Treatment	702	62.5%	1236	61.2%	n.s.
Missing	2	0.2%	0	0%	

(*continued on next page*)

Table 1 (*continued*)

Client Level	*N*	Percentage	*N*	Percentage	Significance
Payment Source					
Private Ins/Self/Family	226	20.1%	559	27.7%	***
Missing	22	2.0%	84	4.2%	
Government	794	70.7%	1282	63.5%	***
Missing	22	2.0%	84	4.2%	
Uninsured	97	8.6%	142	7.0%	n.s.
Missing	22	2.0%	84	4.2%%	
	Mean	*SD*	Mean	*SD*	Significance
Prior Mental Visit	0.354	0.879	0.290	0.851	*
Prior Drug Use	14.83	17.14	15.89	18.01	n.s.
Outcome Variable					
Post-treatment Drug Use	7.39	13.22	8.67	13.36	*

Notes: n.s. not significant.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

services on-site; about 20% receive services in programs offering vocational training. However, men were more likely to be served in programs offering psychiatric services (54% for men and 38% for women); and, women were more likely to be served in programs offering pregnancy services (52% for women and 43% for men). Finally, programs serving men on average scheduled more frequent counseling than programs serving women. Eighty-one percent of programs serving women and 89% of programs serving men reported the typical client was offered individual counseling or therapy once per week or more.

The gender comparison of service characteristics shows that women and men remained in treatment for a similar duration, about 16 weeks. In each service category (service access, substance abuse counseling, family and life skills counseling, health counseling, mental health counseling and concrete service), a significantly larger percentage of women received services than men except mental health counseling service. The majority (more than 70%) of women and men received substance abuse counseling, family and life skills counseling and health counseling services. About 40–50% of women and men received access services and concrete services. Only about 25% of women and men received mental health counseling.

Overall, the findings indicate differences in settings and services received by this sample of women and men. All programs offer health and social services on-site to women and men although men are more likely to be served in programs offering psychiatric services and women are more likely to be served in programs offering pregnancy services. Men also are more likely to be served in programs offering a more intense counseling schedules, i.e., once per week or more. Overall, women are more likely to receive more services than men.

The gender comparison of client characteristics showed that female and male respondents in this sample are comparable to other samples of clients in the U.S. substance abuse treatment system (Wechsberg et al., 1998). This sample is approximately one third women and two thirds men. The majority of clients are non-Hispanic Blacks (65% women and 53% men) and Hispanic (13% women and 17% men). The differences in racial composition between women and men are significant with more non-Hispanic Blacks existing in the female sample. Overall, women clients are significantly younger than men clients. A larger proportion of female clients are age 40 or younger (87% women vs. 81% men). About half of each group has graduated from high school. Marital status is comparable for women and men: about two thirds of each group had never married. However, work and family situations are quite distinct. A significantly larger proportion of men are working full time (71% vs. 59%). And, a larger proportion of women (60% vs. 28% of men) are living with a child under 18 years of age. More women have been beaten than men (44% for women and 8% for men). More women pay for services through government sources while men are more likely to pay through private sources. Drug use prior to treatment is less severe for women than men. However, the mental health status prior to treatment is significantly more precarious for women than men when measured in terms of number of psychiatric hospitalizations in the last year (an average of .35 for women and .29 for men). Prior drug use is comparable for women and men. Finally, compared to drug use prior to treatment, post-treatment substance use is substantially reduced for both women and men, indicating the treatment was effective for both. The mean reductions in substance use (i.e., *post-treatment drug use* less *prior drug use*) was 7.4 for women and 7.2 for men (paired *t*-test, $p < .001$).

Overall, the descriptive data indicate the gender differences in the sample are comparable to gender differences found in other samples of substance abuse treatment clients. Women come into treatment with more mental health

problems and more significant histories of physical abuse. They are more likely to be living with minor children and less likely to be working full-time. Both women and men reduce their post-treatment drug use.

3.2. Relation of service comprehensiveness to post-treatment substance use for women and men

The results of the random intercept models are shown in Table 2. Overall, the results show a main effect of gender indicating that after controlling for organizational, service and all other individual characteristics, men on average have higher post-treatment drug use than women. Further, there is a gender × mental health interaction effect showing mental health services have a positive effect (i.e. reducing post-treatment drug use) for women but not for men. Finally, when male and female samples are analyzed separately, women and men differ in the relation of organizational and service factors related to post-treatment reductions in substance use.

3.2.1. Total sample analysis

The relevance of gender in this treatment effectiveness study is revealed in the main effect for gender as well as the gender × mental health interaction. When all other factors are controlled, the gender coefficient of 1.94 indicates that men (coded in the regression as 1) have more post-treatment drug use than women (coded as 0). The gender × service interactions provide some indication of how gender affects outcomes in relation to specific services. The significant gender × mental health interaction can be understood by examining the slopes of the coefficients in the separate analyses for women and men in Table 2. The slope for women is negative, indicating the receipt of mental health services is related to reduction in post-treatment substance use for women. The positive slope indicates receipt of

Table 2
The estimated parameters and their standard errors for random intercept models with total sample, women only and men only

	Total ($N = 342$)			Women ($N = 1123$)			Men ($N = 2019$)		
Independent variables	Coef	*SE*	*p*-value	Coef	*SE*	*p*-value	Coef	*SE*	*p*-value
Client Characteristics									
Gender	1.98	0.80	0.01	n/a	n/a	n/a	n/a	n/a	n/a
Non-Hispanic Black	1.18	0.56	0.04	1.40	0.94	0.14	1.14	0.66	0.09
Age	−0.12	0.03	<0.01	−0.13	0.06	0.02	−0.12	0.04	<0.01
Education	−0.51	0.12	<0.01	−0.51	0.20	0.01	−0.50	0.15	<0.01
Health Limited Work	0.58	0.53	0.28	0.21	0.84	0.81	0.94	0.68	0.17
Ever Beaten	0.19	0.63	0.77	−0.14	0.79	0.86	0.58	1.02	0.57
Mental Health Visit	0.60	0.27	0.03	0.90	0.44	0.04	0.41	0.35	0.24
Prior Drug Use	0.15	0.01	<0.01	0.14	0.02	<0.01	0.15	0.02	<0.01
Prior Drug/Alcohol Treatment	0.49	0.49	0.31	1.46	0.81	0.07	−0.04	0.61	0.94
Paid by Private Ins./Self/Family	1.46	1.42	0.30	2.85	3.13	0.36	1.03	1.73	0.55
Paid by Government	2.56	1.41	0.07	3.77	3.17	0.24	2.14	1.70	0.21
Uninsured	3.52	1.58	0.03	4.43	3.43	0.20	3.38	1.93	0.08
Service Characteristics									
Service Access	−0.02	0.39	0.96	−0.05	0.41	0.90	−0.06	0.35	0.87
Substance Abuse Counselling	−0.57	0.45	0.20	−0.66	0.48	0.17	0.30	0.35	0.39
Family/Life Skill Counselling	−0.47	0.46	0.32	−0.45	0.46	0.34	−0.35	0.47	0.47
Health Service	0.42	0.46	0.37	0.34	0.49	0.48	−0.44	0.37	0.23
Mental Health Service	−0.42	0.39	0.27	−0.45	0.39	0.25	0.51	0.31	0.10
Concrete Service	−1.15	0.43	0.01	−1.11	0.44	0.01	−0.74	0.39	0.06
Treatment Duration	−0.04	0.03	0.15	−0.04	0.03	0.18	−0.10	0.02	<0.01
Organization Characteristics									
Accreditation/License-JCAHO	0.55	1.26	0.67	1.03	1.97	0.61	0.65	1.30	0.62
Methadone	6.35	1.34	<0.01	6.68	1.94	<0.01	5.84	1.45	<0.01
Short-term Residential	1.33	1.31	0.31	1.64	1.92	0.40	2.07	1.53	0.18
Long-term Residential	1.80	1.06	0.09	1.66	1.59	0.29	2.67	1.32	0.04
Private Ownership	−1.28	1.21	0.31	−1.95	1.57	0.23	−0.37	1.13	0.75
Organizatio Onsite Service Availability	−0.60	0.32	0.06	−0.47	0.46	0.30	−0.82	0.40	0.04
Frequency of Counseling	−1.55	0.70	0.03	−1.13	1.05	0.29	−2.58	0.92	0.01
Interaction									
Gender × Serrvice Access	−0.02	0.49	0.96	n/a	n/a	n/a	n/a	n/a	n/a
Gender × Substance Abusing Counseling	0.73	0.52	0.16	n/a	n/a	n/a	n/a	n/a	n/a
Gedner × Family/Life Counseling	0.09	0.56	0.87	n/a	n/a	n/a	n/a	n/a	n/a
Gender × Health Service	−0.94	0.55	0.09	n/a	n/a	n/a	n/a	n/a	n/a
Gender × Mental Health Service	0.93	0.48	0.05	n/a	n/a	n/a	n/a	n/a	n/a
Gender × Concrete Service	0.43	0.55	0.44	n/a	n/a	n/a	n/a	n/a	n/a
Gender × Treatment Duration	−0.05	0.03	0.12	n/a	n/a	n/a	n/a	n/a	n/a

mental health services is related to increases in post-treatment substance use for men. Meanwhile, the other gender × service interactions are not significant, indicating the gender difference in the impact of other individual-level service variables on post-treatment drug use are weak in the total sample analysis.

Another significant finding in the total sample analysis is that concrete services including educational services, housing and help collecting benefits, alimony, and child support are related to reduced post-treatment drug use. Further, the organizational variable of on-site provision of services and frequency of counseling is significantly related to a decrease in post-treatment drug use.[2]

Thus, from the total sample analysis we learn that gender is an important factor to consider in substance abuse services research. The gender variable itself is predictive of substance use outcome. And, the significant gender × mental health service interaction indicates that one way gender affects outcome is by differentially influencing the way mental health services affect women and men. These services help women reduce their substance use but not men. The receipt of comprehensive services in the form of education, housing and income support services has a direct and significant relation to reductions in substance use and the positive effect of these service operates similarly for women and men. Finally, clients who receive treatment in substance abuse programs where services are provided on-site and where counseling is scheduled once a week or more are more likely to reduce their substance abuse treatment.

3.2.2. Analyzing gender as a moderating variable

In addition to helping us understand the nature of the gender × service interactions, analyzing the relation of organizational and service factors separately for women and men provides additional information about factors that differentially influence reductions in substance abuse use. For both women and men, the receipt of concrete services was significantly related to reduced substance use.[3] This finding reinforces the expectation that comprehensive services in the form of education, housing, and income support are important for both women and men. Further, for women only, no organizational variables were related to reductions in substance abuse. But for men, the organizational variables of on-site services and frequency of counseling continue to be important predictors of reductions in substance use. Further, duration of treatment is an important predictor for men. When the coefficients of each client-level service variable for the female and male samples were compared using a Z test (analysis not shown), the results reveal that the coefficients of mental health service for the male sample is significantly larger than for the female sample ($p = .02$), a finding consistent with the significant interaction between gender and mental health service in the total sample analysis. Both findings indicate that receipt of mental health services is more closely related to reductions in post-treatment substance use for women than for men.

3.2.3. Analysis of client-level control variables

The relation of client-level control variables to post-treatment substance use also reflects what is known in the literature about the differences in etiology and risk for substance abuse among women and men. For both women and men, older clients and those with more education show lower post-treatment substance use. For both women and men, severity of pre-treatment drug use is significantly related to greater post-treatment drug use.

Overall, the findings indicate that women and men respond differently to substance abuse treatment. And, the differential response is not related to differences in receipt of or response to comprehensive services. Both women and men receive comprehensive services in the form of education, housing and income support services and receipt of those services is significantly related to reductions in post-treatment substance use. However, there are differences in the way men and women respond their treatment environments. When the total sample is analyzed, the availability of on-site services and the intensity of the counseling schedule is related to positive outcomes. But, when men and women are analyzed separately, the availability of on-site services and intense counseling schedules (once per week or more), is helpful to men, but not women.

4. Discussion

Comprehensive services have been advocated for some time for women (Marsh & Miller, 1985; McLellan & McKay, 1998), but their impact on men has been less clear. More than a decade ago in a review of substance abuse treatment for women, Marsh and Miller (1985) stated that, “Although the evidence is not available, it is probably true that programs providing a range of services are the most attractive and successful for men and for women.” Marsh & Miller (1985) refer both to the expectation that comprehensive services are beneficial for women and men and that they operate in similar ways to help both groups reduce their use of substances. The findings of this comparative analysis indicate comprehensive services are indeed valuable for men and women, but different organizational factors affect substance abuse outcomes for the two groups.

The impact of comprehensive services on women and men provides insight into the gender paradox that has been identified in substance abuse treatment. Fiorentine et al. (1997) suggest that the reason women and men derive comparable benefits from substance abuse treatment (despite different etiologies and levels of pre-treatment substance use) results from women’s greater engagement in treatment.

[2] It should be noted the p-value of onsite provision of services was .06 only marginally significant.

[3] The P-value of concrete services for men was .06, only marginally significant.

Specifically, these authors found that women compared with men participated more frequently in group counseling and were less likely to relapse to drug use. Although women compared with men spent more time in group counseling, they did not spend more weeks in treatment, participate more frequently in individual counseling, family counseling or attend more 12-step meetings. Thus, Fiorentine and colleagues define engagement narrowly in terms of group counseling and find this service characteristic predicts reductions in relapse. In contrast, this study does not find evidence in support of a gender paradox in substance abuse treatment. NTIES data show that a greater proportion of women than men receive services. And, although both women and men benefit from treatment, women experience a greater absolute reduction in drug use at post-treatment. Thus, the data show that women come into treatment with more psychosocial problems, receive more services, and evidence greater benefits of treatment in terms of reductions in post-treatment substance use.

Results show evidence of gender differences in the influence of organizational or setting characteristics on treatment outcome. The provision of on-site services and the frequency of counseling was predictive of reductions in post-treatment substance use for women and men analyzed together and for the sample of men only. Thus, service providers can understand that men more than women are sensitive to the way services are structured on an organizational level, specifically, that they are responsive to on-site service and counseling that is scheduled once per week or more.

There are a number of strengths of this analysis that stem from the data set used. First, the large sample of female and male clients made possible a gender comparison. The large sample along with the methods used to adjust for missing data enhanced the precision and reduced the bias in the estimates. Second, the multi-level nature of the data permitted simultaneous examination of service and organizational factors in relation to client outcomes using methods to adjust for the clustering of clients within organizations. Third, the prospective nature of the data, i.e., the fact that organizational and service characteristics were examined in relation to substance use pre-, post- and 12 months post-treatment, strengthened the causal inferences that could be drawn. Finally, the NTIES data set included measures that were both gender-sensitive and gender-specific. *Gender-sensitive* measures are those that are relevant to both women and men but are related more strongly to outcome for males or females. An example in this study were the organizational factors which were significantly related to outcome for men but not for women. *Gender-specific* measures are those that apply only to women or men. Examples in this study were the individual and service characteristics related to child care, pregnancy and domestic violence. Too often in previous studies these factors have been omitted as explanatory or control variables. For example, the inclusion of gender-specific variables in this study enabled us to determine that the different service needs of women and men at intake did not significantly influence the relation of specific services to outcome.

One limitation in the analysis derives from the fact that the treatment facilities are not a representative sample of treatment organizations in the substance abuse service system. Rather, the sample was drawn purposively from providers receiving funding from the Center for Substance Abuse Treatment. This sampling procedure limits generalizability of study findings (Gerstein & Johnson, 2000b). A further limitation of the study results from the lack of standardization in the way in which comprehensive services have been defined in substance abuse treatment research. Comprehensive services can include a broad range of health and social services. This study organized twenty-two services measured in the NTIES study into six categories of services, i.e., access, substance abuse counseling, family/life skills counseling, health, mental health and concrete services—categories that have been used in previous studies. While the findings regarding the relation of these service categories to outcomes are consistent with previous studies, different definitions of services received could alter the relationships found. For example, Smith & Marsh (2002) defined concrete services as housing, job training, and legal services and determined that when these services were matched to client needs in these areas, clients were more satisfied with services, but did not necessarily reduce their substance use. Another study using the NTIES data set (Friedmann et al., 2004) examined the provision of vocational and housing services individually and found that these services (compared with health, mental health and substance abuse counseling services) had the effect of reducing substance use. As more studies examine the impact of specific services, understanding of those services most closely related to reduced substance use and other outcomes will become clear. This information will have great value for the development of gender-specific protocols and for tailoring specific services to individual client needs.

The results of this study document the value of comprehensive services for both women and men in substance abuse treatment. Although both women and men benefit from treatment overall, women receive more services and have less post-treatment drug use than men do. And, although there are no gender differences in the benefits derived from comprehensive services, gender does influence the way in which other services and organizational factors influence service outcomes. Specifically, there is a significant gender × mental health service interaction where the receipt of mental health services is related to reduced post-treatment substance use for women but not for men. Further, organizational factors, such as the availability of on-site services and the frequency with which counseling is available significantly predict reduced post-treatment substance use for a men-only sample but not for a women-only sample. Overall, the results show

that both women and men benefit from educational, housing, and income support services, but they may be differentially responsive to other service and organizational characteristics. This study documents gender differences in responsiveness to treatment and reinforces the need to develop gender-specific treatment protocols to optimize treatment effectiveness.

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