
Closing the Need–Service Gap: Gender Differences in Matching Services to Client Needs in Comprehensive Substance Abuse Treatment

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Despite the broad recognition in social work that services are more effective when they are tailored to individual client needs, we have only limited evidence of the impact that services matched to client needs have on treatment outcomes. This study examines gender differences in the impact of matched services, access services, and outcome-targeted services on substance abuse treatment outcomes by using data collected from 1992 through 1997 for the National Treatment Improvement Evaluation Study, a prospective, cohort study of substance abuse treatment programs and clients. The analytic sample consists of 3,027 clients (1,105 women and 1,922 men) who reported needed services from 59 treatment facilities. Findings from the study indicate that overall programs have only limited success in targeting services to client needs, but when they do, receipt of substance abuse counseling and matched services predicts both remaining in treatment and reduced posttreatment substance use for both women and men, but especially for women.

KEY WORDS: *comprehensive services; gender; need–service matching; substance abuse treatment*

Research indicates that treatment approaches that provide comprehensive services to address the numerous problems that co-occur with substance abuse are most effective in reducing problematic substance use, particularly when services are targeted to meet specific client needs. These findings result from evaluations of comprehensive service programs that provide substance abuse services as well as ancillary health and social services designed to address client-identified needs (Friedmann, Hendrickson, Gerstein, & Zhang, 2004; Smith & Marsh, 2002). Although women enter substance abuse treatment with more co-occurring problems than men, it is unclear whether they benefit disproportionately when services are tailored to their needs. The purpose of this study was to examine the fundamental social work practice principle that treatment is more effective when tailored to meet client-identified needs (Berlin & Marsh, 1993; Rosen, Proctor, & Livne, 1985).

Practitioners, policymakers, and researchers have observed that medical, psychiatric, economic, family, vocational, and legal problems contribute to the development of substance abuse problems and serve as impediments to their reduction. The argument for

comprehensive substance abuse services is based on the premise that substance abuse treatment is more effective when health, mental health, parenting, vocational, housing, and legal issues are addressed, along with substance abuse issues (Marsh, Cao, & D'Aunno, 2004; Marsh, D'Aunno, & Smith, 2000; McLellan & McKay, 1998). Furthermore, although the data are not consistent, a number of studies indicate that specifically matching services to clients' diverse medical, psychological, and social needs contributes positively to client retention in treatment, satisfaction, and outcome (Friedmann et al., 2004; Smith & Marsh, 2002). In studies that have not found the matching effect, researchers explained the finding by suggesting that the overall effectiveness of substance abuse treatment may be reduced if limited resources are diverted from primary substance abuse treatment activities to ancillary health and social services (Fiorentine, 1998).

Components of a Comprehensive Service Model

Studies have focused on specific types of comprehensive service strategies that contribute to improved outcomes. Among the service strategies studied are

the following three: (1) outcome-targeted services, (2) access services designed to increase linkage to substance abuse services, and (3) matched services—that is, services received by clients that match their descriptions of need. In this article, in which we are concerned with the impact of substance abuse services on the outcome of reduction in substance use, we refer to substance abuse services as “outcome-targeted” services. If we were concerned with a mental health outcome, then mental health services would become the outcome-targeted service. In the present study, substance abuse counseling is the outcome-targeted service specifically related to the outcome of interest—posttreatment substance use.

Linkage or access services also have been the focus of significant research on comprehensive services. Access or linkage services are designed to increase the likelihood that a client will be able to reach or obtain the service. D’Aunno (1997) included referrals, case management, and co-located services as linkage services. McLellan et al. (1998) demonstrated the value of case managers for increasing access to services and improving service outcome. Smith and Marsh (2002) showed that access services in the forms of transportation, child care, and intensive outreach are valuable for increasing the number of services received for women with children. In this study, transportation and child care are the access services designed to link clients to health and social services.

Evidence indicates that when services are matched to specific client-identified needs, comprehensive services are most effectively delivered (Friedmann et al., 2004; Smith & Marsh, 2002). In practice, client identification of needs typically occurs as part of an assessment process. In practice research, client identification of needs often is measured by a research instrument. For example, in a randomized study of matching, McLellan et al. (1997) identified client needs using the Addiction Severity Index (ASI), an assessment interview conducted by a provider in which clients are asked to report their level of functioning in seven major areas, including alcohol and substance use. Clients in McLellan et al.’s (1997) matched group were then assigned three individual sessions in the areas of employment, family and social relations, or psychiatric health if these were identified as a need on the ASI. Matched clients were more likely than standard clients to complete treatment and to show improvement in psychiatric and employment areas. In addition, both groups

showed significant reductions in substance use, but matched clients were significantly less likely to be treated again for substance abuse problems during the six-month follow-up period. In another treatment evaluation study, Hser, Polinsky, Maglione, and Anglin (1999) defined client service needs as explicit client requests for services. Their study emphasized the importance of client-identified needs and found that services meeting the needs for vocational training, child care, transportation, and housing showed beneficial effects. Smith and Marsh (2002) defined client-service matching in terms of the proportion of client-identified needs that were addressed or matched in the course of substance abuse treatment. They defined *counseling services* as domestic violence services and family counseling services and *concrete services* as housing, job training, and legal services. They also found that matched counseling services significantly predicted reduction in substance use and that matched concrete services predicted improvement in client satisfaction. Ultimately, they found that the total number of services received (matched or unmatched) had the strongest relation to treatment outcome. Overall, there has been some variability in the measurement of need-service matching across studies, but services that respond to client-specified needs appear to be related to outcome.

Service Duration as a Component of Treatment and as a Treatment Outcome

Numerous studies have shown that treatment duration is a consistent and reliable predictor of positive substance abuse treatment outcomes (Price, 1997; Simpson, 1979; Simpson, Joe, & Brown, 1997; Zhang, Friedmann, & Gerstein, 2003). Using National Treatment Improvement Evaluation Study (NTIES) data, Zhang et al. (2003) found a linear relation between duration and drug use improvement for typical treatment stays in methadone maintenance, outpatient, and long-term residential modalities. Friedmann et al. (2004) explored the relation between duration and need-service matching on the basis of the possibility that clients whose needs are met may be inclined to stay longer in treatment. There is some support for this relation in the literature. For example, Hser et al. (1999) found a significant relation between the proportion of needs matched and duration in a treatment program. Friedmann et al. (2004) found partial support for duration as a

factor mediating the relation between need–service matching and drug use improvements—that is, for the possibility that individuals are more inclined to remain in treatment when their treatment needs are being met.

Measures of client retention are common proximal outcomes in social services research. A necessary condition for effective service provision is clients remaining in service long enough to benefit from treatment elements. Proximal outcomes are instrumental or intermediate variables whose attainment contributes to desired end states for clients—in this case, to reduced posttreatment substance use (Rosen & Proctor, 1981). In substance abuse treatment services research, a number of factors have been examined as predicting treatment duration, including specific client characteristics such as age, gender, race, education, employment status, being pregnant, or having minor children (Choi & Ryan, 2006; Grella, Joshi, & Hser, 2000; McCaul, Svikis, & Moore, 2001; Sayre et al., 2002) and the number and types of services, such as transportation, vocational training, and housing (Ashley, Marsden, & Brady, 2003; Chou, Hser, & Anglin, 1998; Hser et al., 1999).

Gender Differences in Need–Service Matching

Research on women in the substance abuse service system indicates that although women have less access to services overall (Substance Abuse and Mental Health Services Administration, 1997), when they enter treatment, they do so with more serious dependencies (Boyd & Meiczkowski, 1990; Halikas, Crosby, Pearson, & Nugent, 1994; Kosten, Gawin, Kosten, & Rounsaville, 1993; Morgenstern & Bux, 2003; Wechsberg, Craddock, & Hubbard, 1998) and with more health and social problems than do men (Chatham, Hiller, Rowan-Szal, Joe, & Simpson, 1999; Marsh et al., 2004; Marsh & Miller, 1985; Wechsberg et al., 1998). Furthermore, although women and men remain in treatment for comparable periods of time, women are more likely than men to use services available in comprehensive programs (Ashley et al., 2003; Grella et al., 2000; Marsh et al., 2004; McLellan & McKay, 1998) and are more likely to benefit from them (Greenfield et al., 2007). Although the research indicates that women compared with men have greater health and social needs coming into substance abuse treatment and use more services, it is less clear whether

women are more likely than men to receive tailored services and to benefit from them.

A summary of existing research on needs–service matching indicates the potential benefit of incorporating matching as a component in a comprehensive service delivery strategy. Yet the research leaves many questions unanswered. It is unclear whether the inclusion of matched services is a critical component in comprehensive substance abuse treatment. It is unknown what specific treatment outcomes, including duration and posttreatment substance use, are consistently related to matched services. It also is not clear whether tailoring services to needs is more important for women, who, compared with men, enter treatment with more serious dependencies and identify greater needs for health and social services. Thus, this study addresses the following research question: What are gender differences in the impact of matching client-identified health and social services needs on the outcomes of duration and substance use when controlling for other service characteristics such as access services and outcome-targeted services? By identifying the relation of needs–service matching and other specific service components to outcomes, the study examines the ingredients of substance abuse treatment related to impact for women and men.

METHOD

Study Design

The study used data collected as part of the NTIES, a prospective substance abuse treatment effectiveness study of programs serving vulnerable and underserved populations, including minorities, pregnant women, youths, public housing residents, welfare recipients, and those involved in the criminal justice system (Gerstein et al., 1997). The study was designed to evaluate the implementation and effectiveness of the specialty substance abuse service systems in major metropolitan areas in the United States and was funded through the Center for Substance Abuse Treatment (CSAT). NTIES data are publicly available through the Inter-university Consortium on Political and Social Research (ICPSR 2884). Nearly half of the participating programs were nonmethadone outpatient programs, one-third were residential, and the remainder were distributed between methadone programs and correctional programs. One objective of all programs was to emphasize comprehensive services, including vocational counseling and support, housing assistance, integrated

health and mental health services, coordinated social services, and culturally directed services. The data set is multilevel in that data were collected at both the treatment organization and client levels. The organizational data were collected from interviews at two points in time one year apart; the client-level data were collected at treatment intake, treatment exit, and 12 months posttreatment exit and included several different measures of outcome.

Sample and Procedure

The sampling procedure used was purposive sampling of treatment programs funded by CSAT during a particular time period at the first sampling stage and probability sampling of clients within the program at the second sampling stage. As a result, the treatment organizations in the sample are not representative of the population of treatment organizations in the United States. Clients were selected for the study with probability sampling at the second stage, resulting in a client sample that is representative of clients entering CSAT-funded programs during a particular period. NTIES investigators reported that the sample is largely comparable (for example, in terms of distribution by gender, education level, prior treatment experience, criminal justice referrals) with other large-scale treatment follow-up studies, except that the NTIES sample contains higher proportions of black and Latino clients (Gerstein et al., 1997). They concluded that findings from NTIES data are relevant to public sector programs, but are not as informative about programs serving upper income individuals.

The NTIES data set represents one of the most extensive data sets available to examine the treatment and service components related to successful substance abuse treatment outcomes. With an 82% response rate at follow-up, the client-level response rate is one of the highest achieved in large-scale addiction studies (Gerstein & Johnson, 2000).

The analytic sample for this study was a subset of 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 3,027 clients from 59 service delivery units (1,105 female and 1,922 male clients). Variables analyzed included client, service treatment, organizational, and outcome characteristics. The average rate of missing data across all variables was 7.8%. Descriptions of all variables, as well as missing rates for all variables, have been

provided in detail elsewhere (Marsh et al., 2004). For multivariate analysis, the percentage of needed service that was received by each client was used as a measure of matched service. Therefore, clients who reported no need ($n = 115$; 18 female and 97 male clients) were excluded from multivariate analyses.

Given the large sample size in this analysis, a small effect size could have a significant p value in null-hypotheses testing. Therefore, we computed the odds ratios and the associated 95% confidence intervals as the measure of effect size in comparing the proportions of needing and receiving services between women and men. Unlike the effect size for comparing means between groups, there is no boundary for odds ratios in determining the effect size to be small, medium, or large (Grissom & Kim, 2005). In practice, however, an odds ratio of 1.5 is not considered small.

Measurement

NTIES data include prospective data on organizational, service, and individual client characteristics and, as such, provide the opportunity to examine the relation among specific service delivery characteristics like client need-service matching and treatment outcome while controlling for client and organizational variables.

Independent Variables: Services Received. In this longitudinal study, data were collected at treatment intake, treatment discharge, and 12 months post-treatment discharge. At treatment discharge, clients reported on services they received during treatment. Reports included six types of service: (1) access services (including transportation and child care); (2) substance abuse counseling services (including drug and alcohol counseling, 12-step meetings, drug prescription for alcohol/drug problems); (3) family and life skills services (parenting, domestic violence counseling, family services, assertiveness training, life skills, family planning, nonmedical pregnancy services); (4) health (health services, AIDS prevention services, medical pregnancy services); (5) mental health services (mental health counseling or treatment); and (6) vocational, housing, and financial services (help collecting benefits, help getting alimony and child support). For this study, we were interested in *access* or linkage services that enable clients to get to treatment, the outcome-targeted service of *substance abuse counseling* (that is, the service expected to most directly affect the outcome of reduced posttreatment substance use), and the

matched service ratio constructed by taking the ratio of services clients reported receiving to those they reported needing in the six areas mentioned earlier. Service need was measured as a response to a question in the intake questionnaire as to "how important" (very, somewhat, not at all) would be the receipt of service in each of these areas. Service receipt, measured on the discharge questionnaire, asked clients whether they had received service in each of these areas. In each service category, the number of services used by each individual was a continuous variable calculated as the sum of the services received in that category. To create the needs-service ratio, we computed the percentage of self-reported needs in each area in which services were received.

Independent Variable. Treatment duration was used as both an independent variable and a dependent variable serving as a proximal measure of outcome. The *duration* variable was collected at discharge as a continuous variable defined as the number of weeks elapsed between the first and last day of treatment.

Dependent Variable. Posttreatment substance use was a continuous variable measured approximately 12 months after completion of the program, when respondents were asked the number of days in the last 30 that they used the five most frequently used licit and illicit substances: marijuana, crack, cocaine powder, heroin, and alcohol. The dependent variable was continuous, a sum of the number of days respondents reported using the five drugs. The distribution of this variable was right-skewed, reflecting the Poisson nature of counting data.

Control Variables. Individual client characteristics collected at treatment intake served as control variables and included gender, race and ethnicity, age, education, whether health limits work, whether there is a history of physical abuse, prior inpatient mental health stays, prior drug use, prior drug or alcohol treatment, and insurance source. Organizational control variables, derived from administrative interviews conducted at two points during the study, included Joint Commission on Accreditation of Healthcare Organizations accreditation, modality (methadone, outpatient, short-term residential, long-term residential), ownership, on-site service availability, and frequency of scheduled counseling. Control variables were included that were theoretically and empirically significant in previous research using the NTIES data set (Marsh et al., 2004).

Statistical Analysis

Missing Data Imputation. Multiple imputation was conducted by filling in missing values by assuming the data were missing at random (Little & Rubin, 1987; Rubin, 1987). Unlike single imputation for missing values, which tends to inflate sample size and underestimate variance and standard errors, multiple imputation represents uncertainty about the right value to fill in and overcomes the problems related to single imputation. In the multiple imputation procedure used in this analysis, each missing value was replaced with five plausible values using the Markov Chain Monte Carlo method (Schafer, 1997). Imputation was conducted independently for the organizational-level variables and client-level variables. The resulting five imputed data sets for each level were merged for further statistical analysis. The analytic results from the five data sets were combined for the final statistical test results.

Descriptive Analyses of Need-Service Gap. The percentages of matched services were computed to evaluate the need-service gap in women and men. Chi-square tests were used to compare the difference in the percentages between genders.

Predictive Analyses of the Impact of Services on Treatment Outcome. Generalized linear mixed models (GLMMs) were used to assess the relation of service variables to outcome. GLMMs are extensions of linear mixed models for non-Gaussian distributed outcome variables. GLMMs were fitted to address two issues in the data. First, both outcome variables—treatment duration and posttreatment substance use—were count data and had skewed distributions. As a result, a Poisson distribution was assumed with a log link function and an overdispersion parameter in the models. Second, to account for potential correlation within service delivery units, a risk in multilevel data sets like NTIES, an exchangeable covariance structure was assumed among clients within the same service delivery organization. The explanatory service variables for the treatment duration were access services, substance abuse counseling, and the need-service ratio. Treatment duration was included as an explanatory variable for the posttreatment substance use outcome, along with access services, substance abuse counseling, and the need-service ratio. Because access services and substance abuse counseling services were constructed from a different number of services, the measurement of each category was

normalized by its mean and standard deviation to allow for a comparison of coefficients.

RESULTS

Need-Service Gap

The percentages of women and men reporting needs for substance abuse counseling and six health and social services are presented in Table 1. It is not surprising that nearly 100% reported needing substance abuse and alcohol counseling. More than 60% of both women and men reported needs for ancillary health and social services, including health care; mental health care; and family, vocational, housing, and financial services. Both women and men reported high levels of need, although women reported higher levels of need for all six services. The only services in which there were no significant gender differences in need were substance abuse treatment services and financial services. Furthermore, it is notable that after substance abuse services, family services were identified as the service most needed—for both women and men. The percentages of those who received a service among those reporting a need is reported in Table 1. Clients who received services for which they identified needs are the clients most successfully closing the need-service gap. In almost every service category, a higher proportion of women than men received services

they needed, although differentials were significant only for family, housing, and financial services. Thus, women were somewhat more successful than men in closing the need-service gap, significantly so for family, housing, and financial services. Overall, a substantial proportion of clients—both women and men—were not receiving the ancillary health and social services they needed in the course of substance abuse treatment (see Table 1).

Matched Service Needs and Substance Abuse Treatment Outcomes

The results of fitting a GLMM controlling for clustering within treatment units and for client and organizational characteristics and examining the relation of specific service components—access services, outcome-targeted services (substance abuse treatment), and need-service matching—to treatment duration and posttreatment substance abuse for women and men are reported in Table 2. This analysis provides a picture of the relation of gender and specific service components to outcome after controlling for other factors, such as client and treatment organizational characteristics, that could influence outcome.

Effect of Service Components on Proximal and Distal Outcomes. As indicated in Table 2, receipt of all three service categories—access, substance abuse

Table 1: Reported Service Needs and Service Receipt (N = 3,027)

| Service Category | Women | | Men | | Odds Ratio | 95% CI | p* |
|--|-------|------|-------|------|------------|--------------|-------|
| | n | % | n | % | | | |
| Needing service | | | | | | | |
| Substance and alcohol abuse counseling | 1,081 | 97.8 | 1,873 | 97.5 | 1.15 | (0.69, 1.98) | .515 |
| Medical service | 833 | 64.6 | 1,156 | 60.2 | 1.21 | (1.03, 1.41) | <.001 |
| Mental health service | 783 | 70.9 | 1,205 | 62.7 | 1.45 | (1.23, 1.70) | <.001 |
| Family service | 932 | 84.3 | 1,521 | 79.1 | 1.42 | (1.17, 1.74) | <.001 |
| Vocational service | 713 | 64.5 | 1,204 | 62.6 | 1.09 | (0.93, 1.27) | .003 |
| Housing service | 788 | 71.3 | 1,182 | 61.5 | 1.56 | (1.32, 1.83) | <.001 |
| Financial service | 793 | 71.8 | 1,339 | 69.7 | 1.10 | (0.93, 1.30) | .223 |
| Needing and receiving service | | | | | | | |
| Substance and alcohol abuse counseling | 1,050 | 97.1 | 1,815 | 96.9 | 1.10 | (0.70, 1.77) | .726 |
| Medical service | 538 | 64.6 | 728 | 63 | 1.80 | (1.46, 2.23) | .461 |
| Mental health service | 247 | 31.6 | 391 | 32.5 | 0.96 | (0.79, 1.17) | .674 |
| Family service | 582 | 62.5 | 730 | 48 | 1.80 | (1.52, 2.13) | <.001 |
| Vocational service | 206 | 28.9 | 324 | 26.9 | 1.10 | (0.89, 1.36) | .348 |
| Housing service | 230 | 29.2 | 188 | 15.9 | 2.18 | (1.74, 2.73) | <.001 |
| Financial service | 190 | 24 | 262 | 19.6 | 1.30 | (1.04, 1.61) | .017 |

Notes: The bolded p values denote statistical significance. CI = confidence interval.

*Based on chi-square tests.

Table 2: Effects of Services on Treatment Duration and Posttreatment Substance Use

| Independent Variable | Outcomes | | | | | |
|-------------------------------------|--------------------|-------|-------|------------------------|-------|-------|
| | Treatment Duration | | | Posttreatment Drug Use | | |
| | Coeff. | SE | p | Coeff. | SE | p |
| Gender | 0.169 | 0.026 | <.001 | -0.015 | 0.046 | .758 |
| Treatment duration | | | | -0.009 | 0.001 | <.001 |
| Access | 0.036 | 0.015 | .026 | -0.010 | 0.026 | .714 |
| Substance abuse counseling | 0.104 | 0.012 | <.001 | -0.074 | 0.010 | .001 |
| Ratio of matched service | 0.744 | 0.033 | <.001 | -0.623 | 0.065 | <.001 |
| Gender × treatment duration | | | | -0.003 | 0.001 | .018 |
| Gender × access | 0.031 | 0.019 | .116 | -0.015 | 0.030 | .622 |
| Gender × substance abuse counseling | -0.101 | 0.014 | <.001 | 0.067 | 0.024 | .021 |
| Gender × ratio of matched service | -0.151 | 0.034 | <.001 | 0.310 | 0.068 | .001 |

Notes: Data are from generalized linear mixed models controlling for individual and organizational characteristics. Client characteristics included gender, age, education, health-limited work, ever beaten, number of mental health visits, pretreatment drug use, pretreatment drug or alcohol treatment, and pay source. Organizational characteristics included accreditation, treatment modality, ownership, organizational onsite service availability, and frequency of counseling. The bold p values denote statistical significance. coeff. = coefficient.

counseling, and matched services—is related to the proximal outcome, treatment duration. Then, when treatment duration is treated as an independent variable, it, along with substance abuse counseling and matched services, is significantly related to the distal outcome, reduced posttreatment substance use. Thus, receipt of all three service categories is related to enabling clients to remain in treatment. And remaining in treatment, along with receipt of substance abuse counseling and matched services, is related to reduced posttreatment substance use.

Effect of Gender on Proximal Outcome Variable.

The results of the regression models for treatment duration are reported in Table 2. The effect of gender on treatment duration is revealed by the significant gender × service component interactions, which indicate how gender affects outcome in relation to service components. The negative values of the interactions reflect the arbitrary coding for gender (0 for women, 1 for men). They imply that substance abuse counseling increases treatment duration more for women than for men and that receiving matched services increases duration more for women and men. Thus, the significant gender × service interactions reveal that gender influences the relation between service components and treatment duration. Although receipt of substance abuse counseling and matched services are positively related to treatment duration for both women and men, the effect is stronger for women.

Effect of Gender on Ultimate Outcome Variable.

The result of the regression models for the ultimate outcome variable of reduced posttreatment substance use is reported in Table 2. Again, the effect of

gender is revealed by the gender × service interactions, which indicate that gender affects the relation between various service components and posttreatment substance use. The negative sign reveals the arbitrary coding for gender (0 for women, 1 for men), but in this case, because the well-established relation between treatment duration and posttreatment substance use is negatively correlated, the negative sign here indicates that treatment duration reduces posttreatment substance use more for men than for women. The significant gender × substance abuse counseling interaction and the gender × ratio of matched service interaction indicate that receipt of substance abuse counseling and higher ratio of matched services reduce posttreatment substance use more for women than for men. Thus, gender moderates the relation between service components and posttreatment substance use. Treatment duration is related to posttreatment substance use more for men. And receipt of substance abuse counseling and matched services are related to posttreatment substance use more for women.

DISCUSSION

Findings from this analysis provide information relevant to the design of effective substance abuse treatment programs for women and men. The study is one of a small number to examine empirically the impact of specific service components, specifically tailored services, in substance abuse treatment. It provides evidence indicating that despite a growing recognition of the value of comprehensive service delivery in substance abuse treatment, programs are limited in their capacity to provide clients

with the health and social services they need. The need-service gap remains significant, particularly for mental health, vocational, housing, and financial services. Although the majority of both female and male clients identify a need for these services, a third or fewer indicate they actually receive the services. Given the studies showing that mental health, vocational, and housing services are significantly related to reduced substance use (Friedmann et al., 2004; Marsh et al., 2004), the design of programs to include these components is indicated.

Findings from this research also indicate the impact of specific service components on substance abuse treatment outcomes. Research on social work practice and addiction services provides useful conceptual guidance for examining components of comprehensive substance abuse treatment service models (D'Aunno, 1997; Proctor, 1990; Rosen & Proctor, 1981; Rosen et al., 1985). Increasingly, research has identified the specific components of service delivery related to the proximal outcome of treatment duration and the ultimate outcome of reduced posttreatment substance use. Findings from this study show that access or linkage services, outcome-targeted services (in this case, substance abuse counseling), and matched services are all relevant to helping clients remain in treatment, whereas receipt of substance abuse and matched services are related to reduced posttreatment substance use. Access or linkage services (defined here as transportation and child care) enabled clients to remain in treatment but had less direct impact on the ultimate outcome of reduced posttreatment substance use. Findings point to the value of designing services that include access services to enable clients to remain in treatment and health and social services, especially those matched to client needs, to enable clients to reduce posttreatment substance use.

A particular focus of this study was the impact of tailored or matched services. Addiction services research increasingly shows that treatment programs are effective not only when they provide an array of ancillary health and social services, but also when they specifically target the services to client-identified needs. It is likely that clients experience treatment programs as more relevant and responsive when the programs provide service matched to needs and, as a result, are more likely to remain in the program and ultimately reduce their drug use. Although the value of tailored or matched services might be expected to be especially beneficial for

women, with their multiple and extensive health and social problems, for this sample, matched services are a predictor of positive treatment outcomes for both men and women.

Finally, potential gender disparities in treatment effect are a significant concern in the design of substance abuse treatment services. Although recent reviews of the literature have found that gender is not a consistent predictor of treatment retention, completion, or outcome (Greenfield et al., 2007), in this study we found that women come into substance abuse treatment with high levels of health and social service needs and, more than men, are able to take advantage of ancillary health and social services when they are available. Gender also was a significant mediator of the relation between services and treatment outcomes resulting in a stronger relation between services and outcome for women than for men. Nonetheless, the need-service gap remains large for both women and men, indicating the need for substance abuse treatment programs to address the health and social service needs of all clients. Furthermore, substance abuse counseling and tailored service are valuable service components for both women and men and can usefully be included in the design of comprehensive substance abuse treatment programs.

Study Limitations

Both the strengths and limitations of this study derive from the NTIES data set. An important limitation resulted from the NTIES sample selection procedure, which used purposive sampling of treatment programs at the first sampling stage and probability sampling of clients within programs at the second sampling stage. With purposive sampling, the characteristics of the treatment organizations are not representative of the population of substance abuse treatment organizations in the United States. Furthermore, purposive sampling at the first stage eliminates the capacity to assess nonresponse bias—that is, the extent to which study participants and nonparticipants differed. However, some information about response bias is provided by Gerstein and Johnson (2000), who compared the NTIES response rate with the response rates of other large-scale follow-up studies and determined the bias introduced at the first sampling stage of NTIES was limited.

In summary, despite the broad recognition that substance abuse treatment is more effective when

ancillary health and social services are tailored to individual client needs, we have had only limited evidence of the impact of matched services on treatment outcomes. Findings from this study indicate that overall programs have only limited success in targeting services to client needs, but when they do, receipt of matched services predicts both remaining in treatment and reduced posttreatment substance use for both women and men. Linkage or access service, in this case transportation and child care, are important for helping clients remain in treatment, whereas substance abuse counseling and matched services help clients reduce posttreatment drug use. Findings point to the need for more research identifying the active ingredients of treatment and developing models that tailor services to client-identified needs. **SWR**

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