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Impact of Program Services on Treatment Outcomes of Patients with Comorbid Mental and Substance Use Disorders

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Abstract

Objective: This study examined the outcomes of individuals with co-occurring disorders who received drug treatment in programs that varied in their integration of mental health services. Patients treated in programs that provided more on-site mental health services and had staff with specialized training were expected to report less substance use and better psychological outcomes at follow-up.

Methods: Participants with co-occurring disorders were sampled from 11 residential drug abuse treatment programs for adults in Los Angeles County. In-depth assessments of 351 patients were conducted at treatment entry and at follow-up six months later. Surveys conducted with program administrators provided information on program characteristics. Latent variable structural equation models revealed relationships of patient characteristics and program services with drug use and psychological functioning at follow-up.

Results: Individuals treated in programs that provided specific dual diagnosis services subsequently had higher rates of utilizing mental health services over six months and, in turn, showed significantly greater improvements in psychological functioning (as measured by the Brief Symptom Inventory and the RAND Health Survey 36-item short form) at follow-up. More use of psychological services was also associated with less heroin use at follow-up. African Americans reported poorer levels of psychological functioning than others at both time points and were less likely to be treated in programs that provided mental health services.

Conclusions: Study findings support continued efforts to provide specialized services for individuals with co-occurring disorders within substance abuse treatment programs as well as the need to address additional barriers to obtaining these services among African Americans.

General population surveys and clinical studies have demonstrated that a majority of individuals with drug abuse problems have a co-occurring mental disorder (1-3). Individuals with co-occurring mental and substance use disorders have higher rates of treatment use compared with individuals with only one disorder (4-6), although most individuals with co-occurring disorders do not receive adequate treatment for either or both disorders (7-9). National survey data show that over half of adults with co-occurring disorders received neither substance abuse nor mental health treatment in the past year (10).

Several studies have demonstrated that patients with serious mental disorders are prevalent within substance abuse treatment programs (ranging from about one-fifth to one-half) (11-13). Yet access to mental health services among individuals in substance abuse treatment is often problematic because of persistent administrative, funding, and structural barriers (14,

15). However, there is increasing recognition of the need to provide integrated treatment that combines mental health and substance abuse treatment in one setting with a unified treatment plan (16-18).

A growing body of literature has examined the treatment outcomes of individuals with co-occurring disorders in substance abuse treatment programs. In general, research has shown that these individuals have lower rates of completing treatment, shorter stays in treatment, and higher rates of relapse and rehospitalization after treatment (19-25). Longer stays in residential treatment and participation in aftercare services, including outpatient mental health treatment, have been associated with better posttreatment functioning among individuals with co-occurring disorders for up to five years after treatment (26-33).

A critical component of service delivery to individuals with co-occurring disorders in substance abuse treatment is the provision of mental health care and other comprehensive services. An accumulating body of evidence shows that individuals who receive a greater number of comprehensive services while in treatment, particularly if the treatment is targeted to their specific needs, show improved outcomes (34-37). Yet regional (38), state-level (39), and national (40) surveys of treatment providers have shown that most drug treatment programs do not provide specialized services for patients with co-occurring disorders. Moreover, there has been little change in the availability of these services in publicly funded programs in the past decade (41,42), and privately funded substance abuse treatment programs are increasingly referring patients who have co-occurring mental disorders to external providers, rather than providing these services on site (43).

This article reports on a study of treatment outcomes of individuals with co-occurring disorders who received residential drug treatment from programs that varied as to whether they provided services specifically for individuals with co-occurring disorders. We examined the independent effects of preexisting patient characteristics, relevant program characteristics, and services received on treatment outcomes six months after patients were admitted for treatment. We hypothesized that patients who were treated in programs that provided more specialized services for individuals with co-occurring disorders would have higher rates of service use and better posttreatment outcomes, compared with those treated in other programs.

Methods

Procedure

Participants were sampled from 11 residential drug abuse treatment programs that provided publicly funded treatment to adults within Los Angeles County from August 1999 to April 2002. Follow-up assessments were conducted through April 2003. Upon admission, individuals were screened by program staff for study inclusion by asking them whether they had a history of mental health or emotional problems or had ever received treatment or were currently seeking treatment for a mental health or emotional problem. Eligible patients were referred to research staff who then conducted study intake procedures, which included obtaining patients' informed consent for study participation.

Baseline assessments were conducted at least 48 hours after treatment admission to allow patients to stabilize. These interviews took approximately six hours to complete and usually were conducted in multiple sittings. Participants received payment of \$40 for the interview in the form of noncash vouchers for local stores or restaurants. Face-to-face follow-up interviews (lasting an average of two to three hours) were scheduled with all participants at six months after admission for treatment; participants were paid \$50 in noncash vouchers for completion of these interviews.

All study procedures were reviewed and approved by the University of California, Los Angeles (UCLA), Institutional Review Board. A federal Certificate of Confidentiality to protect subject confidentiality was obtained from the National Institute on Drug Abuse.

Study programs

Study programs were selected from among those that had participated in a countywide initiative to improve service delivery to individuals with co-occurring disorders by designating “partnerships” between addiction and mental health providers in the same geographic areas (44). Static capacity of the programs ranged from 30 to 309 (mean \pm SD=119 \pm 89), and estimates of the proportion of patients who had co-occurring disorders ranged from 10 to 100 percent (.40 \pm .34). All programs provided a minimum of 90 days of residential treatment and generally adhered to an eclectic treatment approach that emphasized 12-step recovery principles along with varying degrees of emphasis on counseling and rehabilitation services (45).

Information on program characteristics was obtained between May 2000 and March 2001 through in-person surveys (including a self-administered portion) conducted with the administrators of the 11 participating programs. The surveys contained items regarding treatment services provided on site, staff qualifications and training, therapeutic approaches, and other organizational characteristics. The survey instrument and characteristics of the study programs are described in detail elsewhere (44-46).

Participants

Participants were 400 adult men and women recruited from 11 residential drug treatment programs. The mean \pm SD age of participants was 36 \pm 8.4 years. There were 213 men (53 percent) and 187 women (47 percent). Of the total, 140 participants (35 percent) were African American, 176 (44 percent) were white, 52 (13 percent) were Hispanic, and 32 (8 percent) were of other ethnicities. Over half of the sample (211 patients, or 53 percent) had never been married, and one-third (133 patients, or 33 percent) had less than a high school education. Most of the sample (328 patients, or 82 percent) had been homeless, and most (236 patients, or 59 percent) had been under legal supervision in the past.

Participants were assessed on the Structured Clinical Interview for the DSM-IV Axis I Disorders–Patient Edition (SCID-I/P, version 2.0) (47) for mood, psychotic, posttraumatic stress, and substance use disorders. Interviewers were trained to conduct the SCID by diagnosticians from the Diagnosis and Psychopathology Unit of the UCLA Center for Research on Treatment and Rehabilitation of Psychosis. Interviewers were required to achieve a minimum overall kappa of .75, a minimum sensitivity kappa of .75, and a specificity kappa of .75 on symptom agreement, and 90 percent accuracy of agreement on diagnosis (48). Of the 400 participants, 255, or nearly two-thirds (64 percent) had a diagnosis of mood disorder (major depression, dysthymia, bipolar disorder, or mood disorder not otherwise specified [NOS]), and the remaining 143 (36 percent) were diagnosed as having a psychotic disorder (schizophrenia, schizoaffective disorder, or psychosis NOS). In addition, 208 (52 percent) were given a diagnosis of posttraumatic stress disorder.

Regarding lifetime substance use, 278 participants (70 percent) had a diagnosis of alcohol dependence; 260 (65 percent), cocaine dependence; 176 (44 percent), cannabis dependence; 168 (42 percent), amphetamine dependence; 115 (29 percent), opioid dependence; and 99 (25 percent), sedative dependence. Background characteristics of the study sample have been described in depth previously (49).

Out of the total sample, 361 (90 percent) were located for follow-up; 351 (88 percent) completed the follow-up interview; five (2 percent) did not complete the follow-up because

they refused, three were deceased, and two could not be scheduled; and the remainder (39 patients, or 10 percent) were not located for follow-up. Comparisons between those who did and did not complete the six-month follow-up interview revealed no significant differences in background characteristics or in follow-up rates by program where they were treated.

Measures

Baseline patient-level measures—Background patient characteristics included in the analyses consisted of ethnicity (African American: 1, yes, 0, no), two measures of psychological functioning, and substance use frequency. Other demographic characteristics, including Hispanic or white ethnicity, gender, age, marital status, and education, were examined as possible predictors but were not significantly associated with the outcome measures and thus were dropped from the analyses.

The Brief Symptom Inventory (BSI) (50) was used to assess psychological distress at the time of treatment admission. The BSI is a 53-item questionnaire derived from the Symptom Checklist-90; respondents rate on a 5-point scale how much a symptom distressed them during the previous week (0, not at all; 4, extremely). Eight subscales from the BSI were used as indicators of an overarching latent variable representing psychological distress. The sub-scales included somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, and paranoid ideation.

The second measure of psychological distress was a latent variable indicated by three composite parcels formed from the means of nine items from the RAND Health Survey 36-item short form (SF-36) (51) that constitute the mental health subscale of energy and emotions. Items were combined randomly to form three separate indicators because of the high coefficient alphas among the items at baseline (.83) and follow-up (.94) (52). The items assess depressed mood in the previous four weeks. Scores range from 1, all of the time, to 6, none of the time, and were reverse-scored where appropriate so that higher scores indicated more distress.

Four items assessed frequency of use of specific substances in the 30 days before treatment admission. Heroin, marijuana, cocaine or crack, and heavy use of alcohol (alcohol use to intoxication) were included. Each variable was assessed on an 8-point scale: 0, no use; 1, one to three times per month; 2, once or twice per week; 3, three to four times per week; 4, five to six times per week; 5, daily or almost every day; 6, two to three times per day; and 7, four times per day.

Baseline program-level measures—Three program-related variables from the administrator survey were included in the current analysis: first, whether the programs provided “dual diagnosis groups” (meaning self-help or group counseling specifically for this population); second, the total number of psychological services provided on site, summed from a list of 15 specific services; and third, the percentage of counselors and case managers who had obtained certificates or specialized training in dual diagnosis treatment.

Follow-up measures—Psychological service use consisted of the number of family, psychological, and social service counseling sessions the patient attended during the six-month follow-up period and was assessed with the Treatment Services Review (53). Services included those received in the initial drug treatment episode as well as services received in after-care or other treatment settings. Each sum was a separate indicator of a latent variable representing service use. This variable was positioned as a mediator of the outcomes. Time in drug treatment (measured in days) was included as a control variable predicting service use and the outcomes, because time in treatment alone could have affected the observed outcomes rather than use of specific services.

Psychological distress and substance use were assessed in exactly the same fashion at the six-month follow-up as they had been at baseline (BSI, RAND SF-36 Mental Health subscale, and frequencies of substance use).

Analytic method

The EQS structural equations program was used to perform the latent variable analyses (54). Goodness of fit of the models was assessed with the maximum likelihood chi square statistic, the comparative fit index (CFI), the Satorra-Bentler chi square test (S-B chi square test), the robust comparative fit index (RCFI), and the root-mean-squared error of approximation (RMSEA) (54,55). The robust S-B chi square test was used in addition to the maximum likelihood chi square test because it is more appropriate when the data depart from multivariate normality. The CFI and RCFI range from 0 to 1 and reflect the improvement in fit of a hypothesized model over a model of complete independence among the measured variables. The RCFI adjusts for sample size; values at .95 or greater are desirable, indicating that the hypothesized model reproduces 95 percent or more of the covariation in the data (55). The RMSEA is a measure of fit per degrees of freedom, controlling for sample size, and values less than .06 indicate a relatively good fit between the hypothesized model and the observed data (55). The 90 percent confidence intervals (CIs) are also provided for the RMSEA.

An initial confirmatory factor analysis assessed the adequacy of the measurement model and the associations among the latent variables. Correlated error residuals were allowed between the same measured variables at baseline and at six months. Suggestions from the Lagrange Multiplier Test, which reports modifications to the original model that will improve the fit, were evaluated (56). Modifications were allowed only if they made sense theoretically and logically.

We also assessed intraclass correlation coefficients (ICCs) among the patient characteristics and outcome variables in the model to ascertain whether a multilevel model would be appropriate given that the patients were nested within different programs. When ICCs for a dependent variable are negligible across organizational units and cluster size is small, multilevel models are not appropriate or necessary (57,58). The ICCs were small for all dependent variables, with a mean of .03. The only large ICC was .19 for African Americans, indicating that individuals of similar ethnicity tended to cluster within programs.

We then tested a predictive path model that positioned baseline patient and program characteristics as predictors of psychological service use as well as the outcome variables reflecting psychological distress and substance use. Program characteristics also predicted time in drug treatment, which was used as a further predictor of psychological service use. Time in drug treatment was also tested as a direct predictor of the outcomes to avoid a possibly spurious relationship between psychological service use and improvement in the outcome variables as a result of a longer drug treatment episode. Relationships that were significant among the predictive background variables were also included in this model as covariates. Nonsignificant paths and correlations in this model were trimmed gradually by following the recommended model-evaluation procedure of MacCallum (59).

Results

Confirmatory factor analysis

The initial confirmatory factor analysis had an acceptable fit and required only minor modifications in order to improve the fit further: maximum likelihood $\chi^2=882.31$, $df=511$; CFI=.95, RMSEA=.046 (RMSEA CI=.040 to .051); S-B $\chi^2=830.84$, $df=511$; RCFI=.94; RMSEA=.042 (RMSEA CI=.037 to .047). All hypothesized factor loadings were significant

($p < .001$). Table 1 presents the factor loadings, means, and standard deviations of the measured variables. As shown in this table, substance use and psychological distress scores decreased over time. Table 2 reports the correlations among all of the latent variables and the demographic and single-item variables.

There were highly significant associations among some of the latent and measured variables in the model. In general, the various substance use items were significantly correlated among themselves, as were the mental health latent variables. These relationships were stronger within time than they were across time, although marijuana use at the two time points was correlated strongly (.41, $p < .001$).

Among the more notable associations were significant correlations between African-American ethnicity and cocaine use at baseline (.29) and also at follow-up, although the relationship had lessened over the follow-up period (.15). African Americans were more likely to be in programs with fewer psychological services available to them and were less likely to use psychological services during the follow-up period. Higher BSI and RAND SF-36 scores at baseline were generally associated with programs with fewer services and fewer dual diagnosis groups. Not surprisingly, time in drug treatment was associated most strongly with service use (.26) and also with less heavy use of alcohol at follow-up (-.20).

All of the program characteristics were significantly correlated with more use of psychological services by the patient. Furthermore, greater service use was associated with better psychological outcomes as evidenced by its negative association with scores on the BSI and the RAND SF-36 at follow-up. Program characteristics themselves were not directly related to the individual outcome variables except that dual diagnosis certification was significantly related to improved (lower) BSI scores at follow-up. Time in treatment was associated with the program characteristics of more psychological services and dual diagnosis certification of counselors at the facility.

Predictive path model

Figure 1 presents the final trimmed path model in which the background variables and time in treatment predicted psychological service use and the psychological and substance use outcome variables. Standardized regression coefficients are included in the figure. This model had acceptable fit statistics: maximum likelihood $\chi^2=975.98$, $df=625$; CFI=.95, RMSEA=.04 (RMSEA CI=.035-.045); S-B $\chi^2=909.03$, $df=625$; RCFI=.95, RMSEA=.036 (RMSEA CI=.031-.041). Correlations among the predictors are included on the left side of the figure. Psychological service use was significantly predicted by two of the program characteristics: providing on-site dual diagnosis groups and having more staff with dual diagnosis certification. However, service use was not significantly influenced by individual characteristics at baseline or the number of available psychological services provided by the program. As expected, greater time in drug treatment predicted more service use.

All outcome variables were predicted significantly by their earlier analogous variables, thus demonstrating stability over time. The stability coefficients for heroin and cocaine or crack were rather low, indicating less stability in those variables from before to after treatment, whereas marijuana demonstrated stronger stability over time. Heavy alcohol use showed moderate stability (.22). Less alcohol use at follow-up was predicted by longer time in treatment.

More psychological service use predicted lower scores on both the RAND SF-36 mental health scale and the BSI at follow-up. In addition, psychological service use modestly but significantly predicted less heroin use.

African-American ethnicity predicted more cocaine and crack use at follow-up and higher BSI scores. As seen in the confirmatory factor analysis, African Americans reported higher BSI scores, less heroin use, and more cocaine and crack use at baseline, and they were treated in programs with fewer on-site psychological services.

Indirect effects

Although the indirect standardized regression coefficients were somewhat small, several indirect effects were significant. There was a significant indirect effect of availability of dual diagnosis groups and more staff with dual diagnosis certification on lower mental distress scores mediated through psychological service use ($p \leq .05$). Furthermore, there were significant indirect effects of less time in treatment on higher RAND SF-36 mental health scale scores and BSI scores at follow-up ($p \leq .05$). There were also significant indirect effects of the program characteristics of number of psychological services and staff with dual diagnosis certification on less heavy alcohol use, mediated through time in treatment ($p \leq .05$).

Discussion

Research on substance abuse treatment outcomes has shown that program and organizational characteristics, in addition to patient attributes, are related to treatment outcomes (60). Our study contributes to this growing area of research by identifying several programmatic attributes that are associated with improved outcomes among individuals with co-occurring disorders. Specifically, patients treated in residential substance abuse programs that provided on-site dual diagnosis groups and that had more counselors trained in treatment of co-occurring disorders had higher rates of utilizing mental health services, which in turn predicted greater improvements in mental health status and reductions in heroin use after treatment. Patients treated in programs with more on-site mental health services also spent more time in treatment, which was similarly related to higher rates of service use and improved outcomes.

This study was conducted with publicly funded substance abuse treatment programs within one urban county. This contrasts with previous research on treatment for patients with co-occurring disorders, which has often focused on highly specialized programs, such as those for veterans or demonstration studies of innovative or enhanced programs. Furthermore, the programs in this study varied in the degree to which they provided an environment consistent with the concept of a dual diagnosis treatment orientation as described by Moos and colleagues (28). Although the overall study findings may be limited in generalizability to the unique characteristics of the treatment system within the county we studied, the programs showed sufficient variability to enable us to differentiate relationships between program-level attributes and patient outcomes.

In contrast with the variability in service profiles among the study programs, patients in this sample were relatively homogeneous with regard to prior treatment history, perceived quality of life, motivation for treatment, and socioeconomic status (49). We attribute this homogeneity to the relatively high threshold of severity that is typically required for admission to residential treatment (61). Thus some variables that may normally differentiate treatment outcomes were not included in our model because of a lack of variability within this sample.

A noteworthy exception to this homogeneity is the finding that African Americans had greater levels of psychological distress both before and after treatment, yet were less likely to be treated in programs that provided on-site mental health services. This finding concurs with other recent research showing higher levels of psychiatric symptoms among nonwhite patients in treatment for co-occurring disorders and yet less access to appropriate services (62) and generally greater unmet needs for mental health services (63-66). Moreover, it suggests that African Americans with co-occurring disorders face additional obstacles to obtaining mental health services; future

research needs to address strategies for delivering services to this population, including whether culturally competent interventions can improve use of needed services (67).

Although the time frame for patient- and program-level data collection overlapped, the program characteristics reflected in the administrator surveys may have changed over the period when patients received treatment from these programs. Yet all programs were relatively stable in funding and operation over the period of study, and we have no reason to suspect a history effect on the basis of our observations. Also, interpretation of findings should consider that the predictive model does not differentiate between psychological services utilized by patients in the initial substance abuse treatment episode and those received in aftercare or elsewhere in the community. We note that patients averaged 93 days in treatment and that fewer than 5 percent were still in residential treatment at the time of the follow-up assessment. Moreover, our intent was to examine whether certain program characteristics facilitated use of services, either through the provision of on-site services or collaboration with other service providers. Last, because we sampled a subgroup of patients from the study programs (those who met the study inclusion criteria over the study recruitment period) and hence did not collect data from all other patients in these programs, we were unable to describe how the study sample differed from the patients who were treated within these programs.

Conclusions

Substance abuse programs are increasingly called upon to provide treatment for individuals with co-occurring psychiatric disorders (68,69), particularly those with less severe mental disorders (70). Yet, at present, national survey data show that only about half of outpatient and residential substance abuse treatment providers offer specialized dual diagnosis services (71). Innovative service configurations are required to meet the needs of these patients; further research should investigate the various permutations of service delivery models for patients with co-occurring disorders (72). Our findings indicate that the addition of several specialized services and staff expertise aimed at treating this population can increase use of needed services among patients with co-occurring disorders and thereby positively affect their treatment outcomes. This is especially the case given the finding that service use was not affected by preexisting characteristics of the individuals in this study. Rather, it was the availability of dual diagnosis groups and certified staff that increased their service use, which in turn led to more positive outcomes.

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Summary statistics and factor loadings from a confirmatory factor analysis for 351 patients at baseline and six months after admission to a drug abuse treatment program

Table 1

Variable	Baseline			Follow-up (six months)			Factor loading ^d
	Mean	SD	Factor loading ^d	Mean	SD	Factor loading ^d	
African American (1, yes; 0, no)	.34	.47	na				
SF-36 mental health ^b							
Composite 1	3.77	1.01	.83	3.48	.94	.94	.94
Composite 2	3.93	1.08	.71	3.85	1.03	.96	.96
Composite 3	3.67	1.11	.85	3.51	.97	.98	.98
Brief Symptom Inventory ^c							
Somatization	1.07	.84	.56	.81	.78	.68	.68
Obsessive-compulsive	1.82	1.04	.72	1.35	.92	.81	.81
Interpersonal sensitivity	1.63	1.10	.83	1.27	.98	.82	.82
Depression	1.79	1.01	.83	1.34	.98	.83	.83
Anxiety	1.57	1.01	.84	1.13	.88	.90	.90
Hostility	1.06	.93	.67	.84	.78	.66	.66
Phobic anxiety	.99	.99	.74	.82	.84	.76	.76
Paranoid ideation	1.58	1.00	.77	1.22	.95	.79	.79
Heroin ^d	.40	1.48	1.00	.09	.72	1.00	1.00
Marijuana ^d	.82	1.92	1.00	.49	1.53	1.00	1.00
Cocaine or crack cocaine ^d	.87	1.59	1.00	.28	.88	1.00	1.00
Heavy use of alcohol ^d	1.68	2.73	1.00	.81	1.96	1.00	1.00
Time in treatment ^e (days)				93.13	51.54	1.00	1.00
Psychological service utilization ^f							
Family							
Psychological							
Social services							
Program characteristics							
Dual diagnosis groups (%)				13.28	56.53	.54	.54
Number of psychological services offered				48.79	113.99	.83	.83
Staff with dual diagnosis certification (%)				17.73	36.21	.48	.48
				.46	.50	na	na
				8.21	1.37	na	na
				.04	.07	na	na

^a All factor loadings were significant ($p \leq .001$).

^b RAND Health Survey 36-item short-form mental health subscale. Scores on items that assess mood range from 1, all the time, to 6, none of the time.

^c Subscale scores measuring psychological distress range from 0, not at all, to 4, extremely.

^d Use was scored as 0, no use; 1, one to three times per month; 2, once or twice per week; 3, three to four times per week; 4, five to six times per week; 5, daily or almost every day; 6, two to three times per day; and 7, four times per day.

^e Square-root transformed in analyses

^f Square-root transformed in analyses. Values indicate the number of counseling sessions patients attended.

Table 2
 Correlations among latent variables and program characteristics at baseline and follow-up six months after admission to a drug abuse treatment program for 351 patients

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Baseline measure																	
1. African American health	—	—															
2. RAND SF-36 mental health	-.06	—															
3. Brief Symptom Inventory	.08	.69 ^a	—														
4. Heroin	-.11	.21 ^a	.12 ^b	—													
5. Marijuana	.04	.01	.12 ^b	.03	—												
6. Cocaine or crack	.29 ^a	.10 ^b	.12 ^b	.19 ^a	.15 ^c	—											
7. Heavy use of alcohol	.08	.15 ^c	.14 ^c	.13 ^b	.27 ^a	.38 ^a	—										
Follow-up measure																	
8. Psychological services utilization	-.12 ^b	-.02	-.07	-.01	-.07	-.08	-.04	—									
9. RAND SF-36 mental health	-.01	.39 ^a	.31 ^a	.05	.11 ^b	-.02	.08	-.17 ^c	—								
10. Brief Symptom Inventory	.13 ^b	.27 ^a	.49 ^a	.06	.10 ^b	-.01	.12 ^b	-.17 ^c	.57 ^a	—							
11. Heroin	-.09 ^b	-.10 ^b	-.09 ^b	.12 ^b	-.04	-.01	-.08	-.10 ^b	.02	-.06	—						
12. Marijuana	-.01	-.01	.06	.00	.41 ^a	.01	.06	-.09 ^b	.17 ^a	.11 ^b	-.04	—					
13. Cocaine or crack	.15 ^c	-.01	.10 ^b	.03	.04	.15 ^c	-.01	-.10 ^b	.17 ^a	.24 ^a	.17 ^a	.21 ^a	—				
14. Heavy use of alcohol	-.06	-.01	.08	-.05	.13 ^b	.01	.18 ^a	-.12 ^b	.21 ^a	.20 ^a	.05	.33 ^a	.34 ^a	—			
Program characteristic																	
15. Dual diagnosis groups	-.05	-.06	-.11 ^b	.10 ^b	-.05	-.03	-.02	.18 ^c	-.02	-.06	-.05	.07	.02	.02	—		
16. Number of psychiatric services offered	-.16 ^c	-.08	-.15 ^c	.05	-.03	-.11 ^b	-.07	.17 ^c	.02	-.03	.02	.09	.08	.03	.64 ^a	—	
17. Staff with dual diagnosis certification (%)	-.09	.04	-.12 ^b	.02	-.01	-.08 ^b	.05	.19 ^a	-.03	-.12 ^b	.03	-.01	.02	.02	-.04	.20 ^a	—
18. Time in drug treatment	-.08	.05	-.06	.05	-.09	-.14 ^c	-.06	.26 ^a	-.07	-.08	.04	.11 ^b	-.09	.20 ^a	.07	.16 ^a	.18 ^a

^a p<.001

^b p<.05

^c p<.01