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Service Utilization Patterns as Predictors of Response to Trauma-Informed Integrated Treatment for Women With Co-occurring Disorders

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Abstract

Objective—The current study examined whether clinical responses to an integrated treatment intervention among women with co-occurring disorders and histories of abuse varied according to their service use patterns at baseline.

Methods—Data were from a national, multi-site, integrated treatment intervention study in 1998-2003. Analyses included 999 study participants assigned to the integrated treatment group and who were symptomatic at baseline. Participants' baseline service use activity was characterized according to five distinct baseline service use clusters. Logistic regression models estimated study participants' odds of good clinical responses to integrated treatment at 12 months across the five service clusters.

Results—Participants with high levels of psychotropic medication and medical care use at baseline had significantly lower odds than low-intensity service users of having a good response to integrated treatment at 12 months on mental health, alcohol addiction, and posttraumatic stress measures. A majority of women in this group had serious medical illness or disability and were more likely than their counterparts with other service use patterns to have used homeless or domestic violence shelters.

Conclusions—Women who used high levels of medication and medical services appear to have faced especially difficult barriers in responding well to integrated treatment. Careful assessments of their mental health, trauma, and medical treatment needs may be required as part of integrated treatment in an effort to improve their response to integrated treatment, clinical outcomes and well-being. This information can also be used to target integrated treatment to women who are likely to respond positively and achieve meaningful improvements in their functioning.

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Keywords

co-occurring disorders; PTSD; integrated treatment; interventions; service utilization

Women with substance use disorders and women with mental health disorders are at high risk for physical and/or sexual abuse, with reports of lifetime victimization ranging from 40 percent to nearly 100 percent (Gearon et al., 2003; Goodman et al., 1997; Hanson et al., 2002; Watkins et al., 2001, Alexander, 1996; Fullilove et al., 1993). Women with co-occurring substance use and mental health disorders are at even greater risk, including for ongoing or future victimization (Alexander, 1996; Gearon et al., 2003; Goodman et al., 2001, Mueser et al., 1998).

A growing body of evidence suggests that an integrated approach to treatment for women with co-occurring mental health and substance use disorders who also have histories of abuse victimization may be associated with better outcomes than usual care (SAMHSA, 2002; Najavits et al., 1998; NASMHPD & NASADAD, 1998, Drake et al., 2004). Further, women in this population may demonstrate more marked improvements if treated by providers who are trained in working with trauma survivors and who take incremental steps in treating their co-occurring disorders and trauma symptoms (Harris, 1994; CSAT 2005).

The Women, Co-occurring Disorder and Violence Study (WCDVS) in 1998-2003 implemented an integrated treatment intervention that provided integrated, coordinated, and trauma-informed counseling and other services. Evaluations of WCDVS have demonstrated promising results, indicating better improvements in mental health, substance abuse, and posttraumatic stress outcomes among women at integrated treatment sites as compared to those at comparison sites (Cocozza et al., 2005, Morrissey et al., 2005a, Morrissey et al., 2005b). Moreover, analyses estimating six- and 12-month follow-up service use and costs among WCDVS participants found no significant differences in total average costs between participants in the integrated treatment and comparison groups (Domino et al., 2005a, Domino et al., 2005b).

Given the positive effects of integrated treatment, Cusack and colleagues (2008) used cluster analysis to determine whether women who had different symptom profiles at baseline on mental health, substance abuse, and trauma indicators responded differently to integrated treatment in this large, heterogeneous sample. The investigators determined that women with the most severe posttraumatic stress disorder (PTSD) and drug addiction symptoms who received integrated treatment had the greatest outcome improvements in PTSD symptoms as compared to their counterparts in usual care; whereas those with predominating PTSD and alcohol addiction showed no significant response (Cusack et al., 2008).

Factors other than baseline symptomatology also play important roles in how an individual responds to treatment. Theories of service utilization suggest that a variety of factors such as predisposing characteristics and enabling resources drive people to seek, access, and engage in services differently (Andersen, 1995; Goldberg and Huxley, 1980). These factors driving service utilization may have important predictive effects on how someone engages in, and responds to, treatment. In the case of this study population, service utilization may be a biased indicator of need—some women with high utilization have low need, and some women with high need have low utilization. Where service utilization may not accurately reflect need, it may predict how existing utilization patterns affect the way an individual responds to a service-based intervention. Remaining study questions include: Regardless of symptomatology, did women in the WCDVS who used fewer services at the outset benefit

most from integrated treatment? Did women who were already established in residential or outpatient treatment show the most improvement? How did women who had been using high levels of medical care respond to integrated treatment, given that medical care is often used intensively in this population (Clark et al., 2007; Kessler et al., 1997; Becker et al., 2005)?

This study seeks to determine if women's clinical responses to integrated treatment varied by their different patterns of service use prior to study entry. Understanding which types of service users responded well to the intervention—as well as those who did not—has important implications for practice and policy.

Methods

Study setting

The WCDVS implemented an integrated treatment protocol to serve the complex needs of women with co-occurring disorders and histories of abuse victimization at nine intervention sites with varying programs and treatment modalities (McHugo et al., 2005; Cocozza et al., 2005; Morrissey et al., 2005a, Morrissey et al., 2005b). The interventions were required to be comprehensive, provide trauma-informed care, be integrated clinically and organizationally, and involve women from this population who were in recovery (McHugo et al., 2005).

Using a quasi-experimental design, each of the nine study sites contributed an intervention program and a comparison program that provided usual care in the same or an adjacent community. Women recruited into both programs were followed for 12 months. There was no prescribed “dose” of integrated treatment services.

Sample

There were 2,729 study participants at baseline, each of whom had mental health and substance use disorders (of which one was currently symptomatic, the other within the previous five years) and a lifetime history of abuse victimization (McHugo et al., 2005). At baseline, participants were, on average, high-intensity users of addiction treatment, and over half were living in residential substance abuse treatment facilities (Becker et al., 2005). WCDVS participants faced other challenging life circumstances as well: most had not finished high school, very few worked full time, a disproportionate number had recently been in jail prior to enrollment, and nearly half had lost custody of their children (Becker et al., 2005).

Measures

Outcome variables—Heterogeneous clinical responses to integrated treatment according to participants' established service use patterns were measured for four symptom domains—mental health, alcohol, drugs, and PTSD. Mental health symptoms were measured at baseline and 12 months using the Global Severity Index (GSI) from the Brief Symptom Inventory (Derogatis, 1993), a validated survey instrument for assessing mental health status, functioning, and symptoms. The GSI consists of 53-items, each with a response range of 0 – 4 to reflect symptom severity in the past seven days. Given that no established cutpoints exist to distinguish clinical threshold for this measure, we included in this analysis only the integrated treatment group participants who were symptomatic as indicated by baseline GSI scores of greater than 0.30, the mean score for a non-patient, normative study sample that was used in validating this instrument (Derogatis, 1983). As a sensitivity test of this inclusion criterion, we re-estimated the GSI model raising the inclusion cutpoint to .50 and again to 1.0, which was the sample median score. We defined good treatment response

as a reduction (i.e., improvement) of greater than or equal to 20 percent on GSI score between baseline and 12-month assessments, among integrated treatment participants who were symptomatic at baseline.

Substance abuse behavior was measured using the Addiction Severity Index, separately for alcohol (ASI-A) and drugs (ASI-D), which assesses self-reported substance use and perceived problem seriousness in the past 30 days. Each composite score ranges from 0 – 1 as severity increases (McLellan, 1992). Cutpoints have been established for the ASI-A and ASI-D according to thresholds at which they predict Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) diagnoses (Rikoon et al., 2006). We applied those cutpoints for this study, and defined being symptomatic for alcohol at baseline as an ASI-A score above 0.17, and for drugs as an ASI-D score above 0.16. We defined good treatment response for alcohol and drug symptoms at 12 months, respectively, as an ASI-A score at or below 0.17 and an ASI-D score at or below 0.16, among women who were symptomatic on the respective dimensions at baseline and in the integrated treatment group.

Posttraumatic stress symptoms were measured among WCDVS participants with the Posttraumatic Stress Diagnostic Scale (PSS), which rates 17 predominant symptoms associated with PTSD, each item ranging from 0 – 3 for increasing severity (Foa, 1995; Foa et al., 1997). Established categories of severity exist for the PSS (Mild = 1-10, Moderate = 11-20, Moderate-Severe = 21-35, and Severe = 36-51). For this study, we defined women as being symptomatic at baseline if they had scores greater than 20 on the PSS scale. Among women who were symptomatic at baseline and in the integrated treatment group, good treatment response was defined as having a score of 20 or less at 12 months, a threshold that has been used in other analyses of these study data (Cusack et al., 2008).

Independent variables—WCDVS participants were categorized into sub-groups according to four baseline service dimensions: two utilization measures—(1) outpatient individual and group counseling, and (2) residential treatment; and two cost measures—(3) psychotropic medication costs, and (4) external medical service costs. These four dimensions reflect a broad scope of mental health, substance abuse, and medical services that participants may have used prior to the study period. Cost weights (Domino et al., 2005a, b) were used for the medication and medical-related services as a natural measure of intensity of use, capturing important variation that simple counts of utilization could not. Cost weights reflected geographic variation in cost by state, region, or city of the study site as available in the source data.

Service use variables were measured as participants' self-reported frequency of individual or group counseling visits and number of days spent in a residential treatment facility in the three months prior to study entry.

A set of clusters was constructed as part of previous analyses of the WCDVS (Gilbert, et al., submitted) using hierarchical and k-means clustering methods (Khattree and Naik, 1999; Milligan and Cooper, 1985), organizing study participants into distinct subgroups according to their baseline utilization and cost patterns for the four service variables. Cluster analysis uses statistical algorithms that group individuals who are most alike on the four dimensions. A hierarchical method was used to identify the number of distinct service clusters that existed in the baseline WCDVS study sample, and then k-means cluster analysis to iteratively assign each individual to one of the derived clusters until the within-cluster differences were minimized and the between-cluster differences were maximized. Reliability of the cluster solutions was assessed using Cohen's kappa statistic. The clustering methods are described in more detail elsewhere (Gilbert et al., submitted).

The cluster analysis identified five distinct baseline service patterns among study participants. Forty-one percent of participants were characterized by low service use and low costs (C1) in the three months prior to baseline (**Table 1**). Approximately 15 percent of participants were characterized as primarily having used high levels of outpatient counseling (C2) before baseline. Approximately nine percent of women were characterized as being very high users of residential treatment (C3), having spent most of the pre-baseline period in that setting; while another 12 percent of participants were moderately high users of residential treatment (C4), having spent an average of about half of the pre-baseline period in residential treatment. Finally, about 23 percent of participants were characterized primarily by having high costs for psychotropic medication and external medical services (C5) in the three months before baseline.

Control variables—Covariates that may have affected treatment engagement and symptom severity outcomes were included in the regression analyses. Each model controlled for baseline symptom severity in the four respective symptom domains. Age, race, education, and having a serious physical illness or disability were controlled for as predisposing factors for treatment engagement. A control variable for current risk for abuse as a disabling factor was included, defined as a participant having given a positive response to at least one of the following: currently being a victim of physical or emotional abuse (within past six months), feeling unsafe with someone she knows well, or feeling afraid of someone with whom she lives or who lives nearby. Current health insurance and court-ordered treatment participation in treatment, both considered enabling factors for service utilization, were included. Having a perceived unmet need for care was included, indicated by participants reporting having felt they needed services but hadn't received them in the past three months for at least one service type—ranging from mental health, substance abuse, or trauma services, to case management services or medical services. All covariates were operationalized as dichotomous dummy variables except age and baseline symptom scores, which were continuous measures.

These study analyses included only the women in WCDVS who were in the integrated treatment group and who were symptomatic on at least one symptom domain at baseline. Of the 1,415 women assigned to the intervention at baseline, 1,018 completed 12-month interviews. A small number of observations were dropped due to missing data on race (n=1), education (n=1), court-ordered treatment (n=3), and perceived need for care (n=15), yielding an analysis sample of 999 women who were assigned to the integrated treatment group at baseline and who completed follow-up interviews at 12 months. Varying numbers of participants in the integrated treatment group were symptomatic at baseline according to our defined cutpoints and thereby included in the respective models estimating the integrated treatment effect on clinical outcomes at 12 months by service cluster membership: GSI outcome (n=930), ASI-A outcome (n=332), ASI-D outcome (n=433), and PTSD outcome (n=615).

Analyses

We generated baseline descriptive statistics by service cluster membership for the full sample of 999 women who were assigned to the intervention group, using ANOVA and Chi-square to test for statistically significant differences across baseline service clusters (**Table 1**). We then used logistic regression models—one each for GSI, ASI-A, ASI-D, and PTSD measures—to estimate the odds of having a good treatment response at 12 months as a function of the five baseline service clusters and described covariates. The Wald test was conducted for each model to jointly test the significance of the cluster coefficients and determine if there were differences in treatment response generally by cluster. The low service use cluster was the referent condition for all models.

This study used de-identified, secondary data from WCDVS and was approved by the Duke Medicine Institutional Review Board at Duke University (IRB# Pro00020800) and the Public Health-Nursing Institutional Review Board at University of North Carolina (IRB# 07-0406). The study participants were consented as part of the original WCDVS protocol approved by the School of Medicine IRB at the University of North Carolina (IRB# 00-SHEPS-663).

Results

Women in the integrated treatment group varied significantly across the baseline service clusters on several characteristics measured at baseline (**Table 1**). Women who had high psychotropic medication and medical costs at baseline were older, more likely to be White, insured, physically ill or disabled, had achieved higher levels of education than their counterparts, and were the least likely to have been court-ordered to treatment. They also had higher baseline GSI and PSS scores than women in the other service clusters. Women in the two clusters characterized by moderate and high residential treatment use had higher substance abuse symptom severity than women in the other service clusters. There was no difference in perceived unmet need for care across service clusters, even for low service users as compared to women with high psychotropic medication and medical costs. There were also no statistically significant differences in current risk for abuse victimization according to baseline service clusters.

The odds of having had a good response to integrated treatment in terms of global mental health symptoms at 12 months were 40 percent lower (OR=0.61, df=24, p=0.01) among women characterized by high baseline psychotropic medication and medical costs as compared to women who had low-intensity baseline service use (**Table 2**). There were no differences in odds of responding well to treatment on GSI scores between women in the three remaining service groups and women in the low-service cluster (Wald test of joint significance $X^2=2.94$, df=3, p=0.40). The effect estimates for the sensitivity tests in which the inclusion cutpoint was raised to .50 and 1.0, respectively, were similar to the study model in direction and magnitude of effect, as well as statistical significance.

With regard to alcohol addiction severity, the odds of having a good response to the intervention were 52 percent lower (OR=0.479, df=24, p=0.049) for women characterized by high baseline psychotropic medication and medical costs as compared to women who were low-intensity service users (**Table 2**). Wald test of joint significance indicated that there were no differences between the remaining service clusters in the effect of integrated treatment on alcohol severity at 12 months ($X^2=3.30$, df=3, p=0.34). For drug addiction severity, the Wald test indicated that there were no differences across service clusters in the effect of integrated treatment on drug severity at 12 months ($X^2=9.03$, df=4, p=0.06) (**Table 2**). Women who used residential treatment intensively at baseline were more than twice as likely (OR=2.32, df=24, p=0.09) to respond to integrated treatment well on drug addiction at 12 months as compared to women who were low-intensity service users, but this effect was not statistically significant. Given that there were relatively few women in this service cluster who maintained diagnostic criteria for drug addiction at 12 months, the treatment effect for this group may have reached statistical significance if there had been a larger sample.

Finally, for PTSD symptoms, the odds of having a good response to the intervention were almost 50 percent lower for women with high baseline psychotropic medication and medical costs (OR=0.53, df=24, p<0.01) as compared to women characterized by low intensity service use at baseline (**Table 2**). Wald test of joint significance indicated that there were

otherwise no statistically significant differences across remaining three service clusters in the effect of integrated treatment on PTSD severity at 12 months ($X^2=3.40$, $df=3$, $p=0.33$).

There were some notable covariate effects on clinical responses to the intervention as well (results not shown). Women who reported having a serious physical illness or disability at baseline had lower odds of having a good response in their GSI score for mental health functioning at 12 months (OR=0.71, $df=24$, $p=0.02$). Women who had a perceived unmet need for care had significantly lower odds of responding well to integrated treatment on alcohol and drug addiction severity (OR=0.54, $df=24$, $p=0.02$; OR=0.49, $df=24$, $p=0.04$) as compared to women who did not. On the other hand, women who were court ordered to treatment had twice the odds (OR=1.92, $df=24$, $p=0.04$) of having significant improvement in drug addiction symptoms at 12 months as compared to those who were not mandated to treatment. Finally, women who reported being currently at risk for abuse victimization had significantly lower odds of responding well to integrated treatment on PTSD symptoms at 12 months than those who did not (OR=.59, $df=24$, $p=0.03$).

Discussion

The results of this study suggest that, after controlling for baseline symptom severity, participants' clinical responses to integrated treatment also varied according to their service use patterns at the time they entered the study. A principal finding of this study is that women with high levels of baseline psychotropic medication use and medical care (i.e., hospitalizations, emergency department visits, and outpatient medical visits) had lower odds of having good responses to integrated treatment than women in the low service use cluster on three dimensions—global mental health symptoms, alcohol addiction, and PTSD symptoms. These effects were evident after controlling for a range of relevant person-level characteristics, including baseline symptom severity. This suggests that the way women were using services at the time they started integrated treatment was associated with how well integrated treatment worked to improve their clinical functioning.

The women who had high levels of psychotropic medication use and medical care may not have responded well to integrated treatment for several reasons. One possible explanation could be that they continued to use medical services intensively instead of engaging sufficiently in the targeted services associated with the intervention, primarily outpatient individual and group counseling. The data on their service use over the 12 months of follow-up did not support this hypothesis, however, instead indicating reductions in average use of medical care. Specifically, women in the high psychotropic medication and medical care cluster had, on average, approximately half as many hospital days and emergency department visits in each of the four quarters of follow-up as compared to baseline, and had about 25 percent lower costs for psychotropic medication. On the other hand, their average frequency of outpatient counseling visits did not increase in the four quarters of follow-up as compared to the quarter prior to baseline, which may indicate less than optimal engagement in intervention services. (Interestingly, their aggregated frequency of counseling visits over the 12 months of follow-up was approximately 40 percent higher than among women in the other four service groups).

Another explanation for poor clinical response to integrated treatment among women with high levels of baseline medication use and medical care may lie in the reasons for their having used those treatment services intensively at the outset. Among this group of women at baseline, 100 percent had some (defined as more than zero) psychotropic medication costs, 70 percent had some costs for outpatient medical visits, 30 percent had some inpatient hospital costs, and 37 percent had some emergency department costs. While relatively few women in this cluster had any hospital costs, as a group their average hospital costs were 2.5

times higher than the rest of the women in the study sample. Intensive use of both of psychotropic medication and outpatient medical care—paired with higher GSI and PTSD severity than their counterparts in the four other service groups—may indicate that these women faced especially difficult barriers to fully engaging in and benefiting from treatment, perhaps in part related to co-morbid serious medical conditions. For instance, nearly two-thirds of women in this group reported having a serious illness or disability at baseline, and so for many of them co-occurring medical problems may have impeded their ability to achieve improvements in clinical symptoms.

Other possible explanations exist for the poor clinical response to integrated treatment among the women with high baseline psychotropic medication and medical costs that may relate to their service use patterns at the time they entered the study. It may be that women in this cluster were overmedicated, which could have complicated co-morbid medical problems or substance abuse behavior and inhibited learning in treatment and recovery from co-occurring disorders and trauma. Another possibility is that women in this cluster may have tended to somatize their problems, lessening their likelihood to respond well to behavioral health interventions.

There are important limitations and strengths of this study. First, the integrated treatment intervention was not a standardized set of prescribed services in terms of type, frequency, or duration of use, which means the intervention experience was not uniform among participants. While all of the women in the present analysis were assigned to integrated treatment, some may have used intervention services intensively during the year of follow-up, while others may have used none at all. The quasi-experimental design of WCDVS also provided an important opportunity in this analysis to identify how women's service use patterns affected their response to the intervention. A shortcoming of cluster analysis is that the groupings of a particular study sample may not generalize to other samples/populations. This limitation was partly mitigated by having a large starting study population to categorize into like subgroups, which increased the precision and reliability of the clustering process.

Cutpoints to indicate whether participants demonstrated good clinical responses to the intervention are ultimately arbitrary and so must be interpreted with some caution. As a sensitivity analysis, we generated a second set of estimates of treatment response in symptom scores for ASI-A, ASI-D, and PTSD in the same way we did for the GSI mental health measure, where a good treatment response was operationalized as a 20 percent or greater improvement between baseline and 12 months. None of the cluster coefficients were statistically significant in either of the 20-percent-improvement models for the two ASI outcomes; however the Wald test for the ASI-D model indicated that there were generally differences across service clusters ($X^2=10.90$, $df=4$, $p=0.03$). These results for the drug outcome were consistent with study models. The results for the alcohol model did not detect a unique effect for the women with high psychotropic medication and medical care costs as in the study model, which was likely due to insufficient variation in the distribution of alcohol outcomes in the 20-percent response model. The 20-percent model for PSS produced an effect consistent with the reported model, such that the women with high baseline psychotropic medication and medical costs had lower odds of a good clinical improvement. While cutpoints are a coarse approach to capturing meaningful clinical change, these sensitivity results were largely consistent with our study results, indicating that there were robust differences in treatment effects across service clusters. Furthermore, the poor response to integrated treatment among women with high levels of psychotropic medication and medical care on three of the four symptom domains also suggests that a strong pattern of treatment effect exists for this sub-group of women.

Two other caveats regarding effect measurement are important to consider. Given that these study analyses were exploratory in nature, it is possible that applying the .05 level of significance may have captured some spurious results in treatment effect across groups. Although a more stringent threshold for statistical significance in future research may be prudent, the findings presented here are compelling nonetheless given the patterns of effect found for women with high psychotropic medication and medical care costs on three of the four symptom domains. Also, it is possible that interaction effects between clusters and covariates may have been present in this study sample that were not measured due to relatively small sample sizes in baseline and outcomes conditions across the service clusters.

These study results have important implications for programs providing integrated treatment to women with co-occurring disorders and histories of abuse victimization. Careful assessments of treatment needs and engagement in targeted services should be conducted for women in integrated treatment programs who have used especially high levels of psychotropic medication and medical care, as it may be that high use of medical care is due to insufficient or non-use of mental health services. Special efforts may be required to address circumstances surrounding their high-intensity use of medical care, ranging from co-morbid medical conditions, to untreated mental health, substance abuse and trauma, to current victimization, that may keep them from fully engaging in treatment and achieving improvements in their mental health and posttraumatic stress symptoms. Further, women who were low-intensity service users appeared to respond well to integrated treatment in comparison, and so identifying the women in this population who may be underutilizing treatment services and targeting integrated treatment to them could improve its cost-effectiveness.

Integrated treatment for women with co-occurring disorders and histories of abuse has been demonstrated to significantly improve their clinical outcomes above and beyond usual care. In addition to these important population-level outcomes, this study provides new evidence that integrated treatment may work differently depending on participants' prior service use patterns. This information can be used to target integrated treatment interventions to women who are likely to respond positively and achieve meaningful improvements in their functioning.

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TABLE 1

Baseline Sample Characteristics for Study Participants in IT Group

	Cluster 1: Low service use <i>n</i> = 397	Cluster 2: High counseling use <i>n</i> = 147	Cluster 3: High residential Tx use <i>n</i> = 100	Cluster 4: Moderate residential Tx use <i>n</i> = 126	Cluster 5: High drug and medical costs <i>n</i> = 229	Full IT sample <i>n</i> = 999
Mean age (<i>SD</i>)**	35.46 (8.62)	35.37 (8.47)	37.00 (8.72)	34.65 (8.58)	40.39 (8.52)	36.63 (8.82)
Race						
White**	48.61%	53.74%	48.00%	57.14%	64.63%	54.05%
African American**	36.78%	28.57%	43.00%	27.78%	23.58%	32.03%
Hispanic	17.88%	19.05%	15.00%	17.46%	12.66%	16.52%
Other	17.63%	19.05%	19.00%	15.87%	15.72%	17.32%
Education						
Less than high school**	51.26%	44.24%	48.86%	43.70%	35.65%	45.33%
High school	23.36%	29.91%	25.57%	25.21%	27.85%	25.89%
At least some college**	25.38%	25.86%	25.57%	31.09%	36.50%	28.79%
Physical illness or disability**	45.84%	40.82%	50.00%	47.62%	65.50%	50.25%
Currently at risk for abuse	69.77%	69.39%	78.00%	80.95%	75.11%	73.17%
Any health insurance**	56.17%	78.23%	79.00%	65.87%	85.59%	69.67%
Court-ordered treatment**	45.59%	44.90%	37.00%	42.86%	18.78%	38.14%
Perceived unmet need for care	38.79%	44.22%	45.00%	48.41%	40.61%	41.84%
<i>Clinical symptoms</i>						
Global Severity Index–MH**	1.21 (0.75)	1.22 (0.75)	1.33 (0.69)	1.43 (0.82)	1.71 (0.76)	1.37 (0.78)
Addiction Severity Index–Alcohol**	0.17 (0.28)	0.17 (0.26)	0.29 (0.38)	0.28 (0.37)	0.16 (0.26)	0.19 (0.30)
Addiction Severity Index–Drugs**	0.15 (0.15)	0.12 (0.13)	0.24 (0.18)	0.21 (0.16)	0.13 (0.14)	0.15 (0.16)
Posttraumatic Symptom Scale**	22.19 (11.35)	21.66 (11.65)	22.73 (10.96)	24.70 (12.06)	29.08 (10.63)	24.06 (11.63)
<i>Service use and costs</i>						
Outpatient counseling visits**	6.15 (8.74)	59.73 (17.65)	0.56 (1.34)	5.97 (10.37)	16.19 (13.98)	15.75 (22.16)

	Cluster 1: Low service use <i>n</i> = 397	Cluster 2: High counseling use <i>n</i> = 147	Cluster 3: High residential Tx use <i>n</i> = 100	Cluster 4: Moderate residential Tx use <i>n</i> = 126	Cluster 5: High drug and medical costs <i>n</i> = 229	Full IT sample <i>n</i> = 999
Residential treatment days**	7.05 (9.19)	4.73 (8.59)	87.00 (6.93)	45.60 (11.06)	3.41 (8.16)	18.74 (27.73)
Psychotropic medication costs**	\$135 (169)	\$336 (348)	\$394 (366)	\$328 (319)	\$816 (309)	\$371 (381)
External medical costs**	\$2,118 (4,684)	\$3,265 (7,399)	\$1,848 (2,748)	\$3182 (6,845)	\$5,104 (12,553)	\$3,118 (7,793)

Note. Differences in means tested with ANOVA; differences in proportions tested using χ^2 test statistic.

* $p < .05$.

** $p < .001$.

TABLE 2

Effect of Service Cluster Membership on Odds of Good Treatment Response to IT^{a,b}

	GSI	ASI-A	ASI-D	PTSD
	<i>n</i> = 930 OR (SE)	<i>n</i> = 332 OR (SE)	<i>n</i> = 433 OR (SE)	<i>n</i> = 615 OR (SE)
<i>Cluster 1: Low service use (referent)</i>	—	—	—	—
Cluster 2: High-intensity counseling use	0.837 (0.184)	1.790 (0.816)	0.709 (0.320)	0.943 (0.278)
Cluster 3: High-level residential treatment use	0.862 (0.216)	1.121 (0.557)	2.319 (1.157)	1.400 (0.464)
Cluster 4: Moderate-level residential treatment use	0.674 (0.158)	0.679 (0.292)	1.452 (0.610)	0.704 (0.128)
Cluster 5: High psychotropic drug and external medical costs	0.609* (0.121)	0.479* (0.179)	0.597 (0.233)	0.533** (0.128)
Wald test of joint significance ^b	2.940 <i>p</i> = .401	3.30 <i>p</i> = .347	9.03 <i>p</i> = .061	3.400 <i>p</i> = .333

^a All models controlled for site-level fixed effects and person-level characteristics, including demographics, illness/disability, insurance, current victimization, perceived need for treatment, mandated treatment, and baseline symptom severity.

^b GSI, ASI-A, and PTSD model tested for joint significance of coefficients for clusters 2, 3, and 4; ASI-D model tested for joint significance of all model coefficients.

* Significant at 5%.

** Significant at 1%.