

This work was written as part of one of the author's official duties as an Employee of the United States Government and is therefore a work of the United States Government. In accordance with 17 U.S.C. 105, no copyright protection is available for such works under U.S. Law. Access to this work was provided by the University of Maryland, Baltimore County (UMBC) ScholarWorks@UMBC digital repository on the Maryland Shared Open Access (MD-SOAR) platform.

Please provide feedback

Please support the ScholarWorks@UMBC repository by emailing scholarworks-group@umbc.edu and telling us what having access to this work means to you and why it's important to you. Thank you.



Short communication

Factors associated with substance use treatment completion in residential facilities



Ryan Mutter*, Mir M. Ali, Kelley Smith, Alex Strashny

Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, 1 Choke Cherry Road, Rockville, MD 20857, United States

ARTICLE INFO

Article history:

Received 16 April 2015

Received in revised form 1 July 2015

Accepted 5 July 2015

Available online 16 July 2015

Keywords:

Substance use

Residential treatment

Treatment completion

ABSTRACT

Purpose: Individuals in residential treatment often face many challenges, which can include limited education, unstable housing, difficulty participating in the workforce, and severe substance use problems. We analyzed factors associated with substance use treatment completion. We focused on factors that can be influenced by health care system changes resulting from the Affordable Care Act (ACA).

Data and methods: We used the 2010 Treatment Episode Data Set – Discharges (TEDS-D), which is made available by the Substance Abuse and Mental Health Services Administration (SAMHSA). We analyzed factors associated with substance use treatment completion using logistic regression.

Results: Individuals in residential treatment were often unemployed or not in the labor force, had prior substance use treatment episodes, used more than one substance, and were uninsured. Factors associated with treatment completion included older age, greater education, employment, criminal justice referral, not being homeless, and private insurance.

Conclusion: The expansion in private insurance coverage as a result of the ACA may result in more treatment completion in residential settings. Changes to the Medicaid program resulting from the ACA, including coverage of substance use treatment as an essential health benefit and greater support for housing, education, and employment, may also contribute to more residential discharges ending in treatment completion.

Published by Elsevier Ireland Ltd.

1. Introduction

Residential treatment has been characterized as a last resort option for individuals with challenging substance use (SU) problems (Staiger et al., 2014). Remaining in SU treatment for the clinically recommended amount of time is associated with fewer readmissions, less criminal involvement, and better employment outcomes (Evans et al., 2009; Garnick et al., 2009; Arndt et al., 2013). In addition to the vast majority of individuals with SU problems not receiving any treatment (Ali et al., 2015), approximately one-third of SU treatment episodes nationally end in drop out or are pre-maturely terminated by the facility (SAMHSA, 2012). Mandell et al. (2008) report an even higher dropout rate, 40 percent, at residential centers during the first five weeks of treatment.

A 2009 report released by the Substance Abuse and Mental Health Services Administration (SAMHSA, 2009) identified

individual demographic and socioeconomic characteristics, including race (non-Hispanic White), gender (female), age (over 40 years), education (more than 12 years), and employment status, as factors associated with a higher likelihood of completing SU treatment. The literature on treatment completion has also identified the use of heroin, cocaine, or methamphetamine (as opposed to alcohol) as the primary substance of abuse (i.e., the first substance reported for an admission by the treatment facility), severity of drug intake, prevalence of mental illness, and homelessness as factors that may lower the odds of completing treatment (Guerrero et al., 2013). Referral methods, in particular criminal justice referral, have been shown to be positively associated with treatment completion (Arndt et al., 2013). The association of organizational factors with treatment completion has been explored in the literature (Woodward et al., 2006, 2008). Also, an emerging literature has examined racial and ethnic disparities in treatment completion (Bluthenthal et al., 2007; Arndt et al., 2013; Guerrero et al., 2013; Saloner and Lê Cook, 2013). Individuals entering residential settings for SU treatment often have characteristics that are associated with not completing treatment (Staiger et al., 2014). However, a comprehensive examination of factors that are associated with treatment

* Corresponding author.

E-mail address: Ryan.Mutter@samhsa.hhs.gov (R. Mutter).

completion in residential settings using large discharge data has not been undertaken.

The purpose of the current study is to undertake a comprehensive analysis of the factors associated with substance use treatment completion from residential facilities using a large, geographically diverse dataset of discharges. This study contributes to the literature by examining not only discharge-level factors (e.g., prior history of substance abuse treatment, primary substance of abuse, employment status) that may be correlated with treatment completion, but also by focusing on the role of health insurance and the impact that changes to the behavioral health treatment system following the implementation of the Affordable Care Act (ACA) could have on treatment completion for a population with challenging SU problems. This is especially important given the shifts in insurance coverage that will occur under the ACA, with an expected increase in access to and utilization of substance abuse services (Ali et al., 2014; Buck, 2011).

2. Data and methods

We used the 2010 Treatment Episode Data Set – Discharge (TEDS-D), which is maintained by SAMHSA, for this analysis. The TEDS-D is a national dataset of annual discharges from substance use treatment facilities (SAMHSA, 2014). Treatment programs receiving any public funds (from State and/or Federal sources) are requested to provide discharge-level data on publicly and privately funded clients for the dataset. The TEDS-D captures a significant share of all discharges from treatment facilities across the United States, especially those that reflect public spending.

Health insurance status was one of our main independent variables of interest; therefore, we confined our analyses to the 31 states and jurisdictions that reported health insurance status for 75% or more of their discharges.¹ We analyzed 104,999 treatment episodes by adult patients (i.e., individuals 18 years old and older).

We used a binary dependent variable indicating whether the patient completed treatment. We regarded patient transfer to another facility and treatment completion as the completion of treatment at a particular facility. We categorized episodes with the “reason for discharge” classification of (1) left against medical advice or (2) whose treatment was terminated by the facility as not having completed treatment. There are a number of reasons why a facility might terminate an individual’s treatment, which may include the person acting violently or refusing to adhere to the facility’s rules (SAMHSA, 2009). We excluded 5468 episodes where the disposition was incarceration, death, unknown, other, or missing from the analysis (SAMHSA, 2012).

The independent variables we used have been shown in the literature to be associated with treatment completion and included demographic characteristics, such as age, gender, race and marital status. We included indicators for patient education, employment status, whether the patient had previous substance use treatment episodes, and whether the patient was referred for treatment by the criminal justice system. Our model included binary variables for primary substance of abuse (i.e., cocaine, marijuana, opiates, stimulants, or other drugs) with alcohol being the reference category. We also included a variable for whether the

patient used two or more substances. We also included binary variables for the patient’s living arrangements. Patient insurance was captured by mutually exclusive binary variable for private, Medicaid, and Medicare. The TEDS-D does not distinguish among Medicare, Tricare, Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), and other related programs. Uninsured was the reference category in the analysis. We also included state fixed effects in our analysis to account for unobserved state-level heterogeneity that might be correlated with treatment completion.

We distinguished between short- (i.e., 30 days or fewer) and long-term (i.e., more than 30 days) treatment in the model by including a binary indicator for long-term treatment (SAMHSA, 2014). We also included a binary variable for medication-assisted opioid therapy. We conducted all of the analyses using logistic regression in Stata 13.

3. Results

Table 1 provides descriptive statistics for the discharges we analyzed. The vast majority of discharges were by individuals who were either unemployed or not in the labor force (88%). Many of the individuals had prior substance use treatment episodes (68%) and a significant portion was referred for treatment by the criminal justice system (31%). Alcohol was the most common primary substance of abuse (35%), followed by opiates (28%). Approximately two thirds of those receiving treatment (67%) had more than one substance on the record. Slightly more than half of discharges were by people who lived independently (56%). Most of the encounters were by people who were uninsured (67%); Medicaid was the most common insurance type (19%). Less than 10% of the episodes had private health coverage. Slightly more than one third of discharges came from long-term treatment (35%). Medication-assisted opioid therapy was infrequently used (2.0%). Treatment was completed in 71% of encounters.

We report odds ratios from a multivariate logistic regression model for factors associated with treatment completion in Table 2. The coefficients on the age variables indicate the odds of treatment completion increase with age. Blacks and Native Americans had lower odds of completing treatment than Whites, whereas Asian/Pacific Islanders had higher odds of completing treatment. Being married was associated with lower odds of completing treatment.

Compared to not completing high school, high school graduation, having some college education, and having a college degree were associated with higher odds of completing treatment, with odds ratios increasing slightly for each successive level of educational attainment. Being employed (either full or part-time) was also associated with higher odds of treatment completion compared to being unemployed.

Criminal justice referral was associated with higher odds of completing treatment. Prior substance use treatment and the presence of two or more substances on the record were associated with lower odds of treatment completion. Also, compared to alcohol, all other primary substances of abuse were associated with lower odds of treatment completion.

Compared to homelessness, dependent living and independent living were associated with higher odds of completing treatment. Medicaid coverage was statistically indistinguishable from being uninsured. Medicare was associated with lower odds of completing treatment. Private insurance, however, was associated with higher odds of completing treatment.

Medication-assisted opioid therapy was associated with higher odds of completing treatment; care in a long-term residential setting was associated with lower odds of completing treatment.

¹ The 31 states were Alabama, Alaska, Arkansas, Colorado, Delaware, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, North Dakota, Oklahoma, Oregon, Puerto Rico, South Carolina, South Dakota, Tennessee, Texas, Utah, and Wyoming. The 75% threshold is commonly used by SAMHSA statisticians when analyzing TEDS and other SAMHSA databases. See, for example, Appendix Table 3 in SAMHSA (2014).

Table 1
Descriptive statistics.

| Variable | Mean (percentage) | s.d. |
|------------------------------------|-------------------|------|
| Age | | |
| 18–20 | 7.0 | 25.6 |
| 21–24 | 14.3 | 35.0 |
| 25–29 | 19.0 | 39.2 |
| 30–34 | 14.3 | 35.0 |
| 35–39 | 11.7 | 32.1 |
| 40–44 | 11.7 | 32.2 |
| 45–49 | 11.0 | 31.2 |
| 50–54 | 6.9 | 25.3 |
| ≥55 | 4.1 | 19.8 |
| Male | 61.1 | 48.8 |
| Race | | |
| Native American | 3.6 | 18.5 |
| Asian/Pacific Islander | 0.4 | 6.5 |
| Black | 19.1 | 39.3 |
| Other | 4.2 | 20.0 |
| White | 72.8 | 44.5 |
| Hispanic ethnicity | 8.1 | 27.2 |
| Married | 13.4 | 34.1 |
| Education | | |
| Did not graduate high school | 30.1 | 45.9 |
| High school graduate | 44.8 | 49.7 |
| Some college | 20.0 | 40.0 |
| College graduate | 5.1 | 22.0 |
| Employment | | |
| Full time | 8.3 | 27.6 |
| Part time | 3.7 | 18.8 |
| Unemployed/not in labor force | 87.7 | 32.9 |
| Criminal justice referral | 30.6 | 46.1 |
| Prior treatment | 67.8 | 46.7 |
| Primary substance problem | | |
| Alcohol | 35.4 | 47.8 |
| Cocaine | 13.3 | 33.9 |
| Marijuana | 9.2 | 28.9 |
| Opiates | 27.9 | 44.8 |
| Stimulants | 10.6 | 30.8 |
| Other drugs | 3.6 | 18.7 |
| Two or more substances on record | 66.9 | 47.1 |
| Living arrangements | | |
| Independent living | 55.6 | 49.7 |
| Dependent living | 27.1 | 44.4 |
| Homeless | 17.3 | 37.8 |
| Insurance | | |
| Private | 7.4 | 26.2 |
| Medicaid | 19.3 | 39.5 |
| Medicare | 6.5 | 24.6 |
| Uninsured | 66.8 | 47.1 |
| Medication-assisted opioid therapy | 2.0 | 13.9 |
| Long-term treatment | 34.5 | 47.5 |
| Completed treatment | 70.6 | 45.5 |

Table 2
Predictors of rehabilitation treatment completion.

| Variable | Odds ratio | 95% Confidence interval |
|--|------------|-------------------------|
| Age (≥55 reference) | | |
| 18–20 | 0.47*** | 0.42–0.52 |
| 21–24 | 0.51*** | 0.47–0.56 |
| 25–29 | 0.59*** | 0.54–0.64 |
| 30–34 | 0.64*** | 0.58–0.70 |
| 35–39 | 0.66*** | 0.61–0.73 |
| 40–44 | 0.75*** | 0.68–0.82 |
| 45–49 | 0.84*** | 0.77–0.92 |
| 50–54 | 0.93 | 0.85–1.03 |
| Male | 1.02 | 0.99–1.05 |
| Race (White reference) | | |
| Native American | 0.88** | 0.80–0.96 |
| Asian/Pacific Islander | 1.26* | 1.00–1.58 |
| Black | 0.92*** | 0.88–0.96 |
| Other | 0.97 | 0.89–1.04 |
| Hispanic ethnicity | 0.97 | 0.92–1.03 |
| Married | 0.95** | 0.91–0.99 |
| Education (no high school reference) | | |
| High school graduate | 1.22*** | 1.18–1.26 |
| Some college | 1.32*** | 1.26–1.37 |
| College graduate | 1.41*** | 1.31–1.52 |
| Employment (unemployed/not in labor force reference) | | |
| Part time | 1.35*** | 1.25–1.46 |
| Full time | 1.42*** | 1.33–1.51 |
| Criminal justice referral | 1.76*** | 1.70–1.83 |
| Prior treatment | 0.94*** | 0.91–0.97 |
| Primary substance problem (alcohol reference) | | |
| Cocaine | 0.78*** | 0.74–0.82 |
| Marijuana | 0.82*** | 0.78–0.87 |
| Opiates | 0.64*** | 0.62–0.67 |
| Stimulants | 0.80*** | 0.75–0.84 |
| Other drugs | 0.84*** | 0.78–0.91 |
| Two or more substances on record | 0.91*** | 0.88–0.94 |
| Living arrangements (homeless reference) | | |
| Dependent living | 1.14*** | 1.09–1.19 |
| Independent living | 1.19*** | 1.14–1.24 |
| Insurance (uninsured reference) | | |
| Medicaid | 0.97 | 0.93–1.01 |
| Medicare | 0.92* | 0.87–0.98 |
| Private | 1.48*** | 1.38–1.58 |
| Medication-assisted opioid therapy | 1.38*** | 1.24–1.53 |
| Long-term treatment | 0.48*** | 0.47–0.50 |

Note: The model also includes state fixed effects.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

4. Discussion

The population receiving SU treatment in the residential setting faces many challenges. Many of the discharges in our analysis were people who were unemployed or not in the labor force, had a prior history of SU treatment, used more than one substance, and were uninsured. Limited education and housing issues were also challenges faced by a substantial percentage of individuals in residential SU treatment.

Over two thirds of discharges in this analysis were by people who did not have insurance. Since the analysis was conducted using data from before the full enactment of the ACA, many of these individuals will become eligible for Medicaid or private insurance as a result of health reform. The result that Medicaid coverage has an

effect that is statistically indistinguishable from no insurance may be a reflection of the fact that SU treatment was an optional benefit under Medicaid prior to the full implementation of the ACA (Boozang et al., 2014). The ACA mandates that the Medicaid expansion population receive a set of benefits known as an Alternative Benefit Plan (ABP), which has to meet the requirements of the Mental Health Parity and Addiction Equity Act (MHPAEA). A minimum requirement of ABPs is that they have to provide the ten essential health benefits (EHBs), which include treatment for mental health and SU conditions. States have the option of providing ABPs to their entire Medicaid population (Families, 2013). The increase in SU treatment services provided by ABPs to the expansion population could result in Medicaid becoming associated with increased treatment completion. The Medicaid population not receiving ABP benefits may not experience an association with treatment completion different from what we report.

Residential treatment for SU has been limited by restrictions on Medicaid payment for care delivered in institutions of mental disease (IMDs), which are facilities with more than 16 beds. Medicaid does not cover SU treatment in IMDs and does not cover the costs of room and board in smaller residential facilities under the IMD bed limit (Buck, 2011). However, a recent proposed rule from the Centers for Medicare & Medicaid Services (CMS) would permit Medicaid managed care plans to pay for up to 15 days of SU treatment for adults in IMDs (CMS, 2015). If it is finalized, the rule could increase the use of residential programs for SU treatment by Medicaid beneficiaries.

The finding that private insurance is associated with treatment completion is important given the expansion in private insurance taking place through the ACA's health insurance exchanges. As more people get private insurance coverage, our finding suggests that residential treatment completion will increase.

Our analysis indicates the importance of education, employment, and housing to SU treatment completion in residential programs. Medicaid can provide support for employment and education under waivers or through amendments to the state plan. Additionally, Medicaid cannot pay for housing costs directly, but it can help with referrals to housing providers and provide coordination with them. A challenge to Medicaid recipients who would benefit from these services is that providers cannot bill for the time spent on some forms of informal assistance (e.g., making phone calls to social services). That can deter providers from providing that assistance (Boozang et al., 2014). As the role of Medicaid in the provision of SU treatment services increases, states may wish to explore ways they can support services associated with increased treatment completion.

We found that criminal justice referral is associated with higher odds of treatment completion. In fact, it had the largest odds ratio of any variable in the model. Over two-thirds of incarcerated individuals abuse or are dependent on substances (James and Glaze, 2006). Many former inmates will be eligible for Medicaid under the expansion. States that have coordinated efforts that connect the criminal justice system with treatment facilities, Medicaid, and social services can potentially improve the rate of substance use treatment completion.

Although the study utilized a large, geographically diverse administrative dataset of annual discharges, it has several limitations. Facility-level characteristics, such as type of ownership, size of the facility, patient-to-provider ratio, service offerings, and other characteristics can play an important role in influencing treatment completion (Arndt et al., 2013). However, these facility-level variables were not available in the TEDS-D. There could also be variations across facilities in the number of sessions required for treatment to be considered complete. Another limitation is that the analysis is at the episode- as opposed to the person-level. It is possible an individual could appear in the dataset more than once. The generalizability of the results may be limited by the exclusion of states that did not meet the 75% non-missing threshold for health insurance.

This analysis of factors associated with treatment completion establishes an association between health insurance, individual characteristics that can be influenced by health insurance, specifically the Medicaid program, and other socioeconomic and demographic characteristics. It indicates a path states may wish to pursue. Further research is needed to inform specific interventions and policy and payment designs that will be most effective in encouraging treatment completion for SU.

Role of funding source

None declared.

Contributors

Ryan Mutter created the analytic file, conducted the empirical analysis, and contributed to the writing of the manuscript.

Mir Ali assisted with study design, reviewed the findings, and contributed to the writing of the manuscript.

Kelley Smith assisted with study design and contributed to the writing of the manuscript.

Alex Strashny assisted with study design and contributed to the writing of the manuscript.

All authors have approved the final article.

Conflict of interest

None declared.

Acknowledgements

The views expressed in this article are those of the authors and do not necessarily represent those of the Substance Abuse and Mental Health Services Administration (SAMHSA) or the US Department of Health and Human Services (DHHS).

References

- Ali, M., Teich, J., Mutter, R., 2015. The role of perceived need and health insurance in substance use treatment: implications for the Affordable Care Act. *J. Subst. Abuse Treat.* 54, 14–20.
- Ali, M., Teich, J., Woodward, A., Han, B., 2014. The implications of the Affordable Care Act for behavioral health services utilization. *Adm. Policy Ment. Health*, <http://dx.doi.org/10.1007/s10488-014-0615-8> (in press).
- Arndt, S., Acion, L., White, K., 2013. How the states stack up: disparities in substance abuse outpatient treatment completion rates for minorities. *Drug Alcohol Depend.* 132, 547–554.
- Bluthenthal, R., Jacobson, J., Robinson, P., 2007. Are racial disparities in alcohol treatment completion associated with racial differences in treatment modality entry? Comparison of outpatient treatment and residential treatment in Los Angeles County, 1998 to 2000. *Alcohol Clin. Exp. Res.* 31, 1920–1926.
- Boozang, P., Bachrach, D., Detty, A., 2014. Coverage and delivery of adult substance abuse services in Medicaid managed care. Medicaid Managed Care Information Resource Center. Technical Assistance Brief Number 2. Centers For Medicare & Medicaid Services, Baltimore, MD.
- Buck, J., 2011. The looming expansion and transformation of public substance abuse treatment under the Affordable Care Act. *Health Aff.* 30, 1402–1410.
- Centers for Medicare & Medicaid Services, 2015. 80 FR 31097 (proposed May 26, 2015). <https://federalregister.gov/a/2015-12965>
- Evans, E., Li, L., Hser, Y., 2009. Client and program factors associated with dropout from court mandated drug treatment. *Eval. Program Plann.* 32, 204–212.
- Families USA, 2013. Medicaid alternative benefit plans: what they are, what they cover, and state choices. Medicaid Issue Brief, www.FamiliesUSA.org (accessed 10.03.2015).
- Garnick, D., Lee, M., Horgan, C., Acevedo, A., 2009. Adapting Washington Circle Performance Measures for public sector substance abuse treatment systems. *J. Subst. Abuse Treat.* 36, 265–277.
- Guerrero, E., Marsh, J., Duan, L., Oh, C., Perron, B., Lee, B., 2013. Disparities in completion of substance abuse treatment between and within racial and ethnic groups. *Health Serv. Res.* 48, 1450–1467.
- James, D., Glaze, L., 2006. Mental Health Problems Of Prison And Jail Inmates. Bureau of Justice Statistics Special Report. U.S. Department of Justice, Washington, DC.
- Mandell, W., Edelen, M., Wenzel, S., Dahl, J., Ebner, P., 2008. Do dimensions of therapeutic community treatment predict retention and outcomes? *J. Subst. Abuse Treat.* 35, 223–231.
- Saloner, B., Lê Cook, B., 2013. Blacks and Hispanics are less likely than Whites to complete addiction treatment, largely due to socioeconomic factors. *Health Aff.* 32, 133–145.
- Substance Abuse and Mental Health Services Administration, 2009. The TEDS Report: Predictors of Substance Abuse Treatment Completion or Transfer to Further Treatment, by Service Type. SAMHSA, Rockville, MD.
- Substance Abuse and Mental Health Services Administration, 2012. Treatment Episode Data Set (TEDS), 2009. Discharges from Substance Abuse Treatment. Substance Abuse and Mental Health Services Administration, Rockville, MD (DASIS Series S-60, HHS Publication No. (SMA) 12-4704).

- Substance Abuse and Mental Health Services Administration, 2014. [Treatment Episode Data Set \(TEDS\): 2002–2012. National Admissions to Substance Abuse Treatment Services](#). Substance Abuse and Mental Health Services Administration, Rockville, MD (BHSIS Series S-71, HHS Publication No. (SMA) 14-4850).
- Staiger, P., Kyrios, M., Williams, J., Kambouropoulos, N., Howard, A., Gruenert, S., 2014. [Improving the retention rate for residential treatment of substance abuse by sequential intervention for social anxiety](#). *BMC Psychiatry* 14, 43.
- Woodward, A., Das, A., Raskin, I., Morgan-Lopez, A., 2006. [An exploratory analysis of treatment completion and client and organizational factors using hierarchical linear modeling](#). *Eval. Program Plann.* 29, 335–351.
- Woodward, A., Raskin, I., Blacklow, B., 2008. [A profile of the substance abuse treatment industry: organization, costs, and treatment completion](#). *Subst. Use Misuse* 42, 647–679.