Published in final edited form as:

Drug Alcohol Depend. 2013 July 1; 131(0): 162–165. doi:10.1016/j.drugalcdep.2012.11.017.

Predictors of Stimulant Abuse Treatment Outcomes in Severely Mentally Ill Outpatients

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Abstract

Background—Severe mental illness is often exclusionary criteria for studies examining factors that influence addiction treatment outcome. Therefore, little is known about predictors of treatment response of individuals receiving psychosocial treatments for addictions who suffer from co-occurring severe mental illness.

Methods—The impact of demographic, substance abuse severity, psychiatric severity, and service utilization variables on in-treatment performance (i.e., longest duration of abstinence) in a 12-week contingency management (CM) intervention for stimulant abuse in 96 severely mentally

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Contributors

Mr. Angelo oversaw the study design, conducted statistical analysis, and writing of the manuscript. Dr. McDonell contributed to the design, statistical analysis, and writing of the manuscript. Ms. Lowe, Drs. Lewis Srebnik, Short, Roll and Ries all contributed to study design the writing of the manuscript. All authors have approved the final manuscript.

Conflict of Interest

Mr. Angelo and Ms. Lowe: no disclosures to report.

Dr. McDonell is currently a Principal Investigator on a National Institute on Alcohol Abuse and Alcoholism (R01AA02024801A1; PI McDonell) grant as well as a Department of Defense grant. No other disclosures.

Drs. Lewin, Srebnik, and Short have no disclosures to report.

Dr. Roll is currently funded or has been funded in the last three years by the National Institutes of Health, the Department of Justice, Washington State, as well as funding for research months from Bristol-Myers Squibb.

Dr. Ries received funding to conduct the current study from the National Institute on Drug Abuse (5R01DA022476-07; PI Ries). : Dr. Ries has been on the speaker bureaus of Lilly, Bristol-Myers Squibb, Pfizer, Janssen, Astra-Zeneca, and Suboxone in the past five years.

This research was funded by grants from the National Institute on Drug Abuse (5R01DA022476-07; PI Ries) and the National Institute on Alcohol Abuse and Alcoholism (R01AA02024801A1; PI McDonell) and presented, in part at the Association for Behavior Analysis International's 38th Annual Convention in Seattle, WA, May, 2012. Additional acknowledgments extend to Seattle Washington's Community Psychiatric Clinic, their patient's, and their staff.

ill adults was investigated. A 4-step linear regression was used to identify independent predictors of in-treatment abstinence.

Results—This model accounted for 37.4% of variance in the longest duration of abstinence outcome. Lower levels of stimulant use (i.e., stimulant-negative urine test) and psychiatric severity (i.e., lower levels of psychiatric distress), as well as higher rates of outpatient treatment utilization at study entry were independently associated with longer duration of drug abstinence.

Conclusion—These data suggest that individuals with low levels of stimulant use and psychiatric severity, as well as those actively engaged in services are most likely to succeed in a typical CM intervention. For others, modifications to CM interventions, such as increasing the value of reinforcement or adding CM to evidence based psychiatric interventions may improve treatment outcomes.

Keywords

contingency management; treatment outcomes; predictors; mental illness; co-occurring disorders

1. INTRODUCTION

The co-occurrence of substance use disorders (SUD) and severe mental illness (i.e., schizophrenia, schizoaffective, bipolar, and re-occurring major depressive disorders) is a pervasive problem, complicating the treatment of both conditions (Bellack et al., 2006; Bennett et al., 2001; Dixon, 1999; Drake, 2001). Approximately 50% of adults with these severe mental illnesses suffer from a substance use disorder (Reiger et al., 1990). Compared to individuals with either condition alone, patients with co-occurring disorders have a variety of poorer outcomes (Dixon, 1999) including lower rates of treatment adherence (Bennett et al., 2001), increased psychotic symptoms (RachBeisel et al., 1999), higher rates of inpatient psychiatric care (Haywood et al., 1995), incarceration (Abram and Teplin, 1991), and more frequent use of acute medical care (Bartels et al., 1993).

Despite the development of evidence-based co-occurring disorders interventions, including individual (Baker et al., 2006; Barrowclough et al., 2010), group (Weiss et al., 2009), case management based (Drake et al., 1998), behavioral (Petry, 2005), and comprehensive (Bellack et al., 2006; Drake et al., 2001) treatments, only 8% of adults with co-occurring disorder receive treatment for both conditions (Watkins et al., 2001).

In non- severely mental ill populations, lower substance use severity (Knight et al., 2001; Reiber et al., 2002), negative urine-drug test at intake (Hillhouse et al., 2007), current employment, and lack of injection drug use (Roll et al., 2005) are associated with positive response to addictions treatment. However, little is known about variables that predict addictions treatment outcomes in persons with co-occurring disorders.

Brown and colleagues (2011) examined predictors of initial engagement to a behavioral substance abuse treatment for adults with co-occurring disorders. Male participants and those with a schizophrenia spectrum diagnosis were less likely to finish intake procedures. Participants with recent arrests or current drug dependence were less likely to persist with treatment beyond two weeks. Other research suggests psychiatric disorders impact addictions treatment outcomes differentially by gender: men with anti-social personality disorder, or major depressive disorder had worse drug use outcomes than men with other psychiatric disorders, women with phobic disorders had better addictions outcomes than women with other psychiatric disorders (Compton et al., 2003).

Further data are needed to better understand how patient characteristics predict addictions treatment performance in adults with co-occurring disorders. Understanding predictors of treatment outcomes will help better tailor interventions to match patient needs, by allowing us to target patients with the highest likelihood of success, and by helping us identify patients who may be at risk of treatment failure and adapting interventions to meet their needs (Bradizza et al., 2006). Towards that end, the current study identified independent demographic, substance use, psychiatric, and service use predictors of in-treatment abstinence during a 12-week contingency management (CM) intervention targeting psycho-stimulants and other drugs in a sample of adults with co-occurring disorders. We hypothesized that female gender, employment, lack of criminal history, lower levels of pretreatment psychiatric and substance use severity, and greater adherence to other treatments would be independently associated with positive treatment response, as defined by longest duration of psycho-stimulant abstinence. We further hypothesized that variables unique to the study (lower levels of pretreatment psychiatric severity and greater adherence to other treatments) would be independently associated with positive treatment response, accounting for predictors that have previously been associated with positive treatment response.

2. MATERIALS AND METHODS

2.1 Participants

Data from 96 participants assigned to the CM condition in a randomized, controlled trial of CM for stimulant use in severely mentally ill adults (McDonnell et al., In press) were analyzed for the current study. Participants were recruited from a large urban community mental health and addiction treatment agency (CMHC) in Seattle, Washington where medication management, case management and intensive outpatient group and individual substance abuse services were available. Treatment status and services utilized by participants depended on the individual participants' needs and available funding. All participants met Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) criteria for current methamphetamine, amphetamine, or cocaine dependence, and for a schizophrenia-spectrum disorder ($n=38$, 39.6%), bipolar disorder ($n=30$, 31.3%), or recurrent major depressive disorder ($n=28$, 29.2%). Other inclusion criteria were self-reported stimulant use during the previous thirty days, and age 18–65 years. Exclusion criteria included: dementia, organic brain disorder, and psychiatric, medical or other condition that precluded safe study participation.

Participants were 50% ($n=48$) non-White, and had a median age of 43.5 ($SD=9.31$) years. All participants provided signed informed consent. Study procedures were approved by the University of Washington's Institutional Review Board.

2.2 Instrumentation and procedures

Independent measures were assessed at intake interview and included demographics (age, gender, ethnicity), criminal history (arrests in the last 30 days), current employment, and addiction severity (self-reported days of stimulant drug use, injection drug use in the last 30 days, and drug composite score), from the Addiction Severity Index-Lite 5th edition (ASI-Lite; McLellan et al., 1992). Urine drug tests measured stimulant (i.e., cocaine, methamphetamine, amphetamine), as well as, marijuana and opioid use were conducted at the intake interview using onsite immunoassays (Integrated E-Z Split Key Cup, Innovacon, Inc, San Diego, CA.). Cutoff for positive tests were d-amphetamine = 1,000 ng/mL (amphetamine), d-methamphetamine = 1,000 ng/mL (methamphetamine), benzoylecgonine = 300 ng/mL (cocaine), morphine = 2,000 ng/mL (opiates), and THC-COOH = 500 ng/mL (tetrahydrocannabinol; THC). Psychiatric symptoms at intake were measured using the

global severity score from the Brief Symptom Inventory (BSI; Derogatis and Melisaratos, 1983) and the total composite score from the Positive and Negative Symptom Scale (PANSS; Kay et al., 1987). Psychiatric diagnosis was also assessed using the MINI Neuropsychiatric Interview and recoded into schizophrenia spectrum versus mood disorder to allow for comparison of these diagnostic categories. Service utilization during the week prior to study entry was obtained via self-report using the Self-Report Service Utilization instrument (SRSU) a brief, self-report form assessing outpatient psychiatric and substance abuse treatment utilization developed for this study.

Consistent with previous CM research (Peirce, et al., 2006) we defined treatment success as the longest duration of continuous abstinence (defined as the highest number of consecutive stimulant-negative urine drug tests). The continuous abstinence count was reset if the participant provided a psycho-stimulant positive urine sample or failed to provide a sample. Participants provided samples for urine testing three times per week during the 12-weeks of treatment.

2.3 Contingency Management Intervention

When participants tested negative for amphetamine, methamphetamine, and cocaine they were invited to engage in the variable magnitude of reinforcement procedure (VMRP; Petry et al., 2005). VMRP consists of making “draws” from a bowl of tokens representing different prize magnitudes (50% “good job,” 41.8% \$1, 7.2% \$20, 0.2% \$80). Tokens were exchanged for gift cards or tangible prizes. For every week of sustained abstinence participants received one extra draw. Draws were reset to zero when a positive drug test occurred or when a participant failed to provide a sample. Participants received an additional draw at each study visit if their urine and breath samples were negative for other drugs and alcohol. Participants received 12 weeks of VMRP. Participants also received treatment-as-usual at the CMHC consisting of case management, psychiatric medications, and outpatient addiction treatment.

2.4 Data analyses

The relationship between independent variables and the dependent variable was first investigated using bivariate correlations. Variables that appeared to have no relationship ($r < 0.1$ and not statistically significant) with the dependent variable were not entered into regression analyses. Remaining variables were ‘forced’ into a four-step hierarchical linear regression analysis in the following order: demographics, substance use, psychiatric severity, and service utilization variables. The order of blocks was based on our study hypothesis. Statistical significance was set at alpha, $p < 0.05$.

3. RESULTS

Table 1 summarizes results of the regression analysis. The model accounted for 37.4% ($R^2 = .374$) in the longest duration of stimulant abstinence. Demographic variables accounted for 0.1% of the variance on the outcome. No demographic variables were significant predictors. Drug use severity variables accounted for 13.5% of variance. Stimulant-negative urine test at intake was associated with longer duration of abstinence ($B = -.35, p < .05$). Psychiatric severity variables accounted for 10.9% of the variance in the outcome variable. Lower BSI scores were associated with longer duration of abstinence ($B = -.28, p < .05$). Service use variables accounted for 12.9% of variance in the outcome variable. Attendance of outpatient psychiatric group treatment the week prior to study entry was associated with longer duration of abstinence ($B = .42, p < .05$).

4. DISCUSSION

The current study examined predictors of treatment outcome in a behavioral intervention targeting stimulant dependence in adults with co-occurring severe mental illness, a population often excluded in drug treatment outcome research. Consecutive stimulant-negative urine tests were significantly predicted by stimulant-negative urine test at intake, lower self-reported psychiatric distress at intake, and more frequent utilization of outpatient psychiatric services.

Consistent with previous investigations in people without SMI (Peirce et al., 2009) drug-negative urine results at intake predicted longer duration of abstinence in adults with co-occurring disorders. Use of drugs just prior to treatment seeking may be a proxy for lack of commitment to attain abstinence and/or a marker of the drug use severity. Strategies such as higher magnitudes of reinforcement for cocaine-positive individuals at treatment entry are associated with increased abstinence in people without severe mental illness (Petty, 2012) and might have applications to adults with severe mental illness.

The predictors of psychiatric severity and prior mental health service utilization are unique to our sample of adults with severe mental illness. Interestingly, self-reported psychiatric distress rather than particular psychiatric diagnosis (schizophrenia spectrum vs. mood disorder), or clinician-rated symptoms (PANSS Composite Score) predicted shorter duration of abstinence. In contrast to Brown and colleagues (2011) who found that schizophrenia spectrum disorders predicted poorer engagement (as opposed to longest duration of abstinence) in treatment that included CM; our findings suggest that it is severity of psychiatric distress rather than diagnosis that predicts treatment outcome.

Service utilization immediately prior to study entry predicted longer duration of in-treatment abstinence. Therefore, those who were interested and able to attend treatment-as-usual were more likely to persist and succeed in CM treatment. Patients who are active in treatment-as-usual, but struggling with SUD could therefore be targeted for CM treatment. Indeed, Donlin and colleagues (2008) were able to increase in-treatment CM attendance by reinforcing pre-treatment attendance for a period of 4-weeks. Adding reinforcement for pre-treatment attendance may have similar success in COD patients who are not already engaged in treatment.

The study has implications for the practice of CM and other types of behavioral treatments for stimulant use disorders. Though CM was regarded by our participants as a highly desirable treatment (Srebnik et al., in press), some individuals did not have successful outcomes. Strategies such as increasing the magnitude of reinforcement for individuals with pre-treatment positive drug tests, delaying enrollment in a CM treatment until a drug-negative urine test is submitted, providing reinforcement for attendance prior to CM treatment, and adding CM to evidence-based mental health treatments targeting psychiatric distress, might increase the likelihood of treatment success. While it would be ideal if all individuals responded to CM, a unique advantage of CM is that treatment resources (e.g., cost of reinforcers, urine testing) are allocated to those who respond to the intervention rather than those who do not, as is the case in intensive outpatient or inpatient treatments.

4.1 Study limitations

While the current study population and setting was similar to most CMHCs, recruitment was from only one CMHC. Variability in patients, practices, and resources at this site might differ from other CMHCs. Also, the focus on a particular behavioral treatment and a particular class of drugs strengthened the internal validity of our findings, it also limited their generalizability.

4.2. Conclusion

Treatment success in CM for adults with co-occurring disorders is predicted by recent drug abstinence, lower self-reported psychiatric distress, and recent outpatient mental health service utilization. Given the limited resources allocated to the treatment of COD, future research should seek ways to adapt CM either by increasing the value of reinforcement, reinforcing pre-treatment attendance, or adding CM to other evidence-based interventions.

Acknowledgments

Role of Funding Source

This research was funded by grants from the National Institute on Drug Abuse (5R01DA022476-07; PI Ries) and the National Institute on Alcohol Abuse and Alcoholism (R01AA02024801A1; PI McDonell). These funding agencies did not participate in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

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Table 1

Results of linear regression model used to predict longest duration of abstinence Adjusted B (SE) p-value

	Adjusted B	(SE)	p-value
Demographics			
Female Gender	−0.01	(2.36)	0.899
Age	0.10	(0.12)	0.311
Minority status	−0.01	(2.19)	0.963
Drug Use Severity			
Stimulant Positive Urine Test	−0.36	(2.50)	0.002
Addiction Severity Lite Drug Composite Scale Score	0.03	(12.18)	0.784
Psychiatric Symptom Severity			
Positive and Negative Syndrome Scale Composite Score	−0.07	(1.51)	0.530
Brief Symptom Inventory Global Severity Score	−0.35	(1.68)	0.003
Schizophrenia-spectrum disorder	0.07	(2.47)	0.527
Outpatient Service Utilization			
Number of Mental Health Visits	0.42	(0.62)	0.001
Number of Substance Use Treatment Visits	−0.11	(0.75)	0.360

Note: statistical significance set at $p < 0.05$