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Examination of Contingency Payments to Dually-Diagnosed Patients in a Multi-faceted Behavioral Treatment

Joanna Strong Kinnaman, Ph.D., Eric Slade, Ph.D., Melanie E. Bennett, Ph.D., and Alan S. Bellack, Ph.D.

VA Capital Network Mental Illness Research, Education, and Clinical Center (MIRECC), University of Maryland School of Medicine, Baltimore, Maryland

Abstract

Contingency management (CM) may be a promising component of treatment to help dually-diagnosed patients reduce their substance use. However, most prior studies examining CM with these patients have not examined the relationships among patient variables and contingency rewards received. This study examined whether characteristics of dually-diagnosed patients were related to CM payments received in a multi-faceted program. Fifty-nine dually-diagnosed patients participated in a multimodal behavioral therapy for illicit substance use involving CM. Baseline demographic and clinical characteristics were examined as they related to receipt of payments. Demographic characteristics generally were not related to receipt of payments. Several clinical variables, including diagnosis of schizophrenia, current substance dependence, and co-morbid alcohol dependence were related to payment receipt. These results provide an important step toward understanding the characteristics of dually-diagnosed patients that predict their response to CM.

Keywords

dual-diagnosis; contingency management; individual characteristics

1. Introduction

Contingency management (CM) programs have demonstrated effectiveness in reducing substance use in individuals with primary substance use disorders (Higgins, Heil, & Lussier, 2004). CM may also be an important component of integrated treatment programs for patients with severe mental illnesses (SMI) that abuse substances (Sigmon, Steingard, Badger, Anthony, & Higgins, 2000). Studies that have examined CM programs with SMI patients have generally demonstrated their feasibility in reducing cigarette smoking (Tidey, O'Neill, & Higgins, 2002), alcohol (Peniston, 1988), marijuana (Sigmon et al., 2000), and cocaine use (Roll, Chermack, & Chudzynski, 2004) in patients with SMI. However, most previous work has not examined dually-diagnosed patient characteristics as they relate to receipt of CM rewards.

In this study we examined characteristics of patients that participated in the CM component of a multi-faceted behavioral treatment for SMI patients. We first examined demographic (race,

Correspondence should be addressed to Melanie E. Bennett, Ph.D., Department of Psychiatry, Administration Building, 737 West Lombard St., Baltimore, MD 21201. Electronic mail can be sent to mbennett@psych.umaryland.edu

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gender), socioeconomic (education, income), and amount of family contact to delineate if any of these variables were related to CM reward payments. We also examined if psychiatric diagnosis and symptomatology, substance use, cognitive functioning, and motivation to change were related to reward receipt.

2. Methods

2.1 Participants

A total of 175 patients participated in the parent study, a randomized controlled trial examining the efficacy of a multi-faceted intervention designed for treating substance dependence in patients with SMI called Behavioral Treatment for Substance Abuse in SMI (BTSAS) versus a supportive treatment (Bellack, Bennett, Gearon, Brown, & Yang, 2006). Participants were outpatients recruited from community clinics and a Veterans Administration Medical Center and were followed by a clinical treatment team during study participation. Individuals enrolled in the parent study at baseline: (1) had substance dependence on heroin, cocaine, or marijuana during past 6 months; (2) self-reported use in the last 30 days or had a urinalysis test positive for heroin, cocaine, or marijuana; (3) met criteria for severe and persistent mental illness (Lehman, Dixon, Kernan, DeForge, & Postrado, 1997), including a diagnosis of schizophrenia or schizoaffective disorder or other severe mental disorder, worked 25% or less of the past year, and/or received payment for mental disability.

One-hundred seven patients were randomized to BTSAS. Patients were not eligible to receive CM payments until their third BTSAS session: 61 attended at least the first three sessions (engagers) and 46 attended less than 3 sessions (non-engagers). Engagers and non-engagers did not differ in on age, gender, race, or primary diagnosis. Individuals in this report include the 59 that were randomized to BTSAS, attended at least three sessions, and identified either heroin or cocaine as their goal drug at baseline.¹ Patients in the final sample had diagnoses of schizophrenia/schizoaffective disorder (33.9%), major affective disorder (61.0%), and severe anxiety disorder and other diagnoses (5.1%). Nearly two-thirds (64.4%, $n = 38$) were male with an average age of 43.8 ($SD = 6.28$). Sample racial/ethnic composition was 76.3% African-American ($n = 45$), 20.3% Caucasian ($n = 12$), and 3.4% Hispanic ($n = 2$). Also, 55.9% of the 59 patients ($n = 33$) in this report completed the 6-months of BTSAS treatment. We found no differences between completers and non-completers on age, gender, race, or primary diagnosis.

2.2 Intervention

BTSAS group sessions were held twice per week for 6-months and included: (1) contingency management (see below), (2) motivational interviewing, (3) social skills training; (4) psychoeducation; and (5) relapse prevention. A recent study (Bellack et al., 2006) showed that BTSAS was more effective than a supportive manualized control treatment in reducing substance use in SMI patients.

Each BTSAS session began with CM, in which patients earned rewards for abstinence from a goal drug self-selected at baseline.² Positive tests and/or self-report of use since the last group were followed by a discussion of the situation in which the use occurred and problem-solving to help avoid future use. Negative tests were followed by praise and monetary payment. Patients earned \$1.50 for their first clean test. The amount increased by \$.50 for every two consecutive clean tests, up to a maximum of \$3.50. Payments dropped to \$0 if a patient had a positive result or was absent, and returned to \$1.50 after their first subsequent negative result.

¹Two patients with marijuana as their goal drug were excluded because the urinalysis tests used were able to detect marijuana use for up to four weeks. Therefore, reinforcement payments or lack thereof were not necessarily an accurate reflection of recent patterns of marijuana use.

²Positive results for other drugs besides the goal drug did not affect reward receipt.

2.3 Measures

Psychiatric diagnosis, current substance use disorder, and alcohol dependence were evaluated with the Structured Clinical Interview for DSM-IV. Psychiatric symptomatology was assessed via the Positive and Negative Syndrome Scale (PANSS; Opler, Kay, Lindenmayer, & Fiszbein 1992). Family contact and monthly income were assessed using the Brief Quality of Life Interview (Lehman, 1988). Frequency of goal drug use was assessed using the Addiction Severity Index. Motivation to change was assessed using the University of Rhode Island Change Assessment Scale (URICA; DiClemente & Hughes, 1990), which was modified to include only 24 items and some wording was simplified (see Strong Kinnaman, Bellack, Brown, & Yang, 2006). Cognitive functioning was assessed with the Repeatable Battery for the Assessment of Neuropsychological Status (Randolph, Tierney, Mohr, & Chase, 1998). Patients completed these baseline assessments in about a week and then were randomly assigned to BTSAS or to the supportive manualized control.

2.4 General Procedures

All study procedures were approved by the University of Maryland Institutional Review Board. All potential subjects participated in a standardized informed consent process and were advised that a Federal Certificate of Confidentiality would protect the information they provided.

2.5 Analyses

CM payment variables were defined in three ways: (1) the first session in which patients had an opportunity to receive a reward and they received one; (2) the average payment received per negative result; (3) the total number of payments received, divided by opportunities to receive a reward (i.e., proportion of payments). Relationships between the three CM variables and predictors were estimated using Spearman-Rank correlations. Non-parametric statistics were used because the CM variables did not meet the assumption of normality.

3. Results

Gender, race, education, and income were not related to CM payments (Table 1). Greater family contact (more than one family visit a month) was related to more sessions before first payment ($r = .30$) and to lower proportion of rewards ($r = -.27$). Table 2 lists clinical and substance use characteristics as they relate to CM payments. A schizophrenia diagnosis was associated with a greater number of sessions to first payment ($r = .30$) and related to lower proportion of payments ($r = -.34$). Higher psychiatric symptom severity (i.e., PANSS scores) was not related to CM rewards. A diagnosis of cocaine or heroin dependence in the past one month was related to a higher number of sessions before first payment ($r = .40$) and lower proportion of payments ($r = -.37$). Goal drug was not a predictor of payments. Number of days of goal drug use in the past month was positively related to the number of sessions before first payment ($r = .46$) and to lower proportion of payments ($r = -.29$). Alcohol dependence was negatively related to proportion of payments ($r = -.29$) and higher motivation to change at baseline was related to fewer sessions to first reward ($r = -.28$). Cognitive functioning was not related to CM payments.

4. Discussion

This study examined characteristics of dually-diagnosed patients as they relate to receipt of CM payments in a multi-faceted behavioral treatment. All results must be interpreted in light of the fact that CM was only one component of a multi-faceted treatment and we cannot be certain of the effects of the CM versus the effects of the other components. However, results suggest several possible relationships between patient characteristics and CM payments. First, a schizophrenia diagnosis was related to lower CM payments. This may be related to a posited neurobiological vulnerability to substance use in patients with schizophrenia (Chambers,

Krystal, & Self, 2001). Second, greater severity of drug use seemed to be an important predictor of CM payments. Patients with acute use may find it more difficult to reduce use, leading to a longer time to engage and fewer rewards. Third, alcohol dependence was associated with lower proportion of rewards received suggesting that concurrent drug and alcohol use is a predictor of poor treatment response. Fourth, severity of general psychiatric symptomatology (i.e., PANSS scores) was not related to payments. Fifth, higher motivation to change at baseline was related to fewer sessions prior to initial payment, supporting motivation as an important pre-treatment consideration with this population. Finally, it may seem surprising that more family contact received was related to a lower proportion of payments. However, family contact in this study does not provide information on the quality of familial support.

Results only provide evidence on unadjusted associations between predictors and payment measures. Multivariate regressions were not feasible in this study due to limitations on sample size. Future research should examine the relative importance of factors in predicting receipt of CM rewards. Also, given the exploratory nature of the study we did not control for multiple comparisons. Finally, we cannot be sure of the relative importance of the treatment components or the different forms of reinforcement (i.e., praise versus monetary reward) in influencing change. Further delineation of the relative impact of these components will be necessary to optimize the design of CM approaches.

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Table 1
Receipt of contingency payments by demographic, socioeconomic, and family contact.

Total sample	Opportunities before first payment ^d		Mean payment per clean urine ^b		Percentage received payment ^c	
	r	p	r	p	r	p
Gender						
Male (n = 38)	.21	.13	-.07	.61	-.20	.13
Female (n = 21)						
Race						
African-American (n = 45)	-.09	.51	-.04	.80	-.06	.65
Non African-American (n = 14)						
Years of Education	-.02	.89	.19	.17	.22	.10
Family Contact ^d	.30*	.03	-.18	.21	-.27*	.04
Less than once a month (n = 24)						
One time a month or more (n = 32)						
Monthly Income	.17	.22	-.16	.26	-.20	.14

Note. N's ranged from 51 to 59.

*

$p < .05$. r = Spearman Rank correlation coefficient.

^a Twelve individuals inadvertently received their first payment on session two. For these individuals session two was considered their first opportunity to receive a payment.

^b Two clients received no payment following a negative test result because they self-reported recent use of their goal drug.

^c Represents the total number of sessions client received any payment divided by the total number of opportunities (number of sessions that patient was in study), multiplied by 100. Six patients never received a contingency payment so they are only included in analyses with percentage received payments.

^d Self-report of how often individual gets together with a family member.

Table 2

Receipt of contingency payments by clinical and substance use characteristics.

	Opportunities before first payment ^d		Mean payment per clean urine ^b		Percentage received payment ^c	
	r	p	r	p	r	p
Psychiatric						
Primary Diagnosis	.30*	.03	-.21	.13	-.34*	.01
Schizophrenia/Schizoaffective						
Other Psychiatric Diagnosis ^d						
PANSS total	.25	.07	-.06	.70	-.18	.17
Substance use						
Diagnosis for SUD in past month	.40*	.00	-.26 [†]	.06	-.37*	.00
Goal Drug	.09	.52	.22	.11	.08	.56
Heroin						
Cocaine						
Goal drug day total ^e	.46*	.00	-.08	.57	-.29*	.03
Co-morbid Alcohol Dependence	.13	.38	-.24	.09	-.29*	.03
Other						
Baseline Motivation to Change ^f	-.28*	.05	.17	.24	.17	.22
Cognitive Functioning ^g	.03	.85	.02	.90	.09	.49

Note. Ns ranged from 51 to 59.

* $p < .05$.

[†] $p < .10$. r = Spearman Rank correlation coefficient.

^a Twelve individuals inadvertently received their first payment on session two. For these individuals session two was considered their first opportunity to receive a payment.

^b Two clients received no payment following a negative test result because they self-reported recent use of their goal drug.

^c Represents the total number of sessions client received any payment divided by the total number of opportunities (number of sessions that patient was in study), multiplied by 100. Six patients never received a contingency payment so they are only included in analyses with percentage received payments.

^d Includes other SMI (major depression, bipolar disorder, severe anxiety disorder, and psychosis NOS).

^e Number of days of use of goal drug in the past month. Goal drug defined by patient at the beginning of treatment as the drug they would like to reduce or stop using.

^f Motivation to change from modified University of Rhode Island Change Assessment (URICA).

^g Total score on the Repeatable Battery Repeatability Battery for the Assessment of Neuropsychological Status (RBANS) at baseline.

PANSS = Positive and Negative Syndrome Scale. SUD = Substance Use Dependence.