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Diffusion of Contingency Management and Attitudes Regarding Its Effectiveness and Acceptability

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Abstract

Substance abuse counselors are critical as the key arbiters of clients' acceptance and use of innovative treatment techniques, with their potential support embedded in their knowledge of and attitudes towards particular innovations. In this analysis we examine the role of substance abuse counselors in the adoption of a psychosocial treatment innovation, contingency management (CM). Using data collected from 1140 counselors employed in a national sample of 318 public treatment centers, we examine theoretical predictors of counselors' knowledge of CM, and their attitudes regarding CM's effectiveness and acceptability. Findings suggest that lack of exposure to CM through program use and innovation-specific training is the most salient barrier to CM adoption and diffusion. The study also highlights the importance of social networks in the diffusion and acceptance of treatment innovations.

Keywords

contingency management; motivational incentives; diffusion; counselor attitudes; evidence based practice

Introduction

A number of effective approaches for the treatment of substance abuse are presently available for implementation in community-based substance abuse treatment centers. Treatment innovations are however slow to diffuse (1,2,3,4). To narrow this research-practice gap, researchers have identified factors that influence the adoption of evidence based practices (EBPs) in substance abuse treatment settings (5,6,7,8).

This body of research has focused on organizational factors associated with the adoption of pharmacological treatments. Substance abuse counselors are critical as the key arbiters of clients' acceptance and use of innovations, with their potential support embedded in their knowledge of and attitudes toward particular innovations. Though there have been a handful of studies that examine the role of counselors in the adoption process, they are focused on the adoption of pharmacological rather than psychosocial treatments (i.e., 9, 10). In this analysis we examine the role of substance abuse counselors in the adoption of a psychosocial treatment innovation, contingency management (CM).

CM, identical to motivational incentives (MI) and voucher-based reinforcement therapy (VBRT), is consistently shown as effective in promoting abstinence and increasing treatment attendance among substance abusers (11,12). CM is an approach based on the principles of behavior modification in which tangible reinforcers are provided whenever a target behavior (i.e., abstinence, treatment attendance) is demonstrated and withheld when the target behavior is not observed. Reinforcers take the form of a token, clinic privilege, or a voucher exchangeable for retail goods or services (13).

CM is effective in increasing treatment retention and abstinence in a variety of populations, including alcohol dependent individuals (14), cocaine dependence (15), methamphetamine dependence (16), opioid dependence (17), and stimulant abuse (18). With 30 years of copious research documenting its effectiveness, there has been opportunity for counselors to have learned about and formed opinions regarding CM.

When a new technology is developed it undergoes a process of diffusion that spreads information about the innovation throughout the field (19). Despite widespread endorsement of CM as an EBP by the research community, its adoption and implementation in community based treatment programs are not widespread (20,21). One possible obstacle to widespread adoption of CM is inadequate diffusion of knowledge within the substance abuse treatment workforce (22). Negative attitudes among substance abuse counselors regarding CM may be another obstacle (22). Indeed, counselors' perceptions of a treatment's effectiveness and its acceptability are important factors in the adoption of pharmacological innovations (9).

Little research has been published that addresses the role of diffusion and counselor perceptions regarding CM. Only three studies have documented counselors' knowledge, use, or attitudes related to CM. McGovern and colleagues (21) surveyed a small sample of counselors (n = 89) in public treatment centers in New Hampshire about their use of and readiness to adopt various EBPs. Among six behavioral interventions, only one (Behavioral Couples Therapy) was used less often by counselors than CM. Indeed 48% of the counselors surveyed stated that they were not familiar with CM. Using a larger sample (n = 253), Kirby, Benishek, Dugosh, and Kerwin (23) found that counselors endorsed a range of positive statements regarding CM. However, they also identified a number of objections to CM, the most prevalent being that CM is too costly; that it fails to address the underlying problems of addiction; and that it does not address multiple behaviors. Only about half (46%) of the counselors indicated that they would be in favor of adding a CM intervention in their program. Lastly, Herbeck, Hser, and Teruya (24) surveyed front-line staff (n = 294) in community-based substance abuse treatment programs in 13 counties in California. Nearly half (43%) lacked knowledge regarding the effectiveness of CM. Among those counselors that were knowledgeable, CM was rated as the least effective of 6 psychosocial interventions. Further, CM was the least used of the 6 psychosocial interventions, with only about a quarter (27%) of programs reporting any use of CM and only 7% reporting that CM is used "frequently" or "always."

The purpose of this study was to expand knowledge about counselors' reactions to CM in a large national sample. Specifically, we examine theoretical predictors of counselors' knowledge of CM, and their attitudes regarding CM's effectiveness and acceptability. We follow an approach utilized by Knudsen and colleagues (9) in a parallel examination of the diffusion of buprenorphine.

Methods

Sampling and data collection procedures

This study examines data from a nationally representative sample of 318 publicly funded treatment programs collected in 2005 and 2006 as part of the National Treatment Center Study. Treatment centers were considered to be publicly funded if at least 51% of their operating budgets were derived from relatively stable governmental sources such as block grants and contracts. Additional inclusion criteria required programs to offer treatment for substance abuse, be community-based, and offer at least a structured outpatient level of care in accordance with American Society of Addiction Medicine (ASAM) guidelines (25). Centers that only offered detoxification services, private practices, halfway houses, and centers whose sole modality was methadone maintenance were thus excluded. In addition, treatment centers located in Veterans Administration facilities or correctional settings were ineligible because they are not accessible to the general public.

A two-stage sampling process was used to identify a nationally representative sample. The first stage involved assigning all counties in the United States to 1 of 10 strata based on population and then randomly sampling within strata to insure that treatment centers located in urban, suburban, and rural areas would be included in the study. The second stage involved the enumeration of all substance abuse treatment facilities in the sampled counties using published national and state directories. Treatment centers were then proportionately sampled across strata, with telephone screening used to establish eligibility for the study. Centers screened as ineligible were replaced by random selection of alternative centers from the same geographic stratum. Eighty percent of contacted treatment centers agreed to participate in the study.

Face-to-face interviews were conducted with the administrator and clinical director of each eligible public-sector addiction treatment program. At the time of the on-site interview, clinical directors were asked to provide a list of all addiction counselors employed in the program. All listed counselors were mailed a packet including a questionnaire, consent form, study description, and a self addressed stamped envelope. Those who completed and returned the survey received a US\$40 incentive payment. A total of 1140 questionnaires were completed and returned, representing a 61% response rate. Study procedures were approved by the Human Subjects Committee of the Institutional Review Board at the University of Georgia. The analyses in this report utilized the counselor-level data only.

Measures

Dependent variables—Three dependent variables were measured: diffusion of information, perceived effectiveness, and perceived acceptability. To measure diffusion of information about CM, a binary variable was constructed by counselors response to the question: “Based on your knowledge and personal experience, to what extent do you consider the following treatment techniques to be effective?” Among 28 treatment techniques presented to counselors was “motivational incentives (vouchers).” A “don't know” response was considered to indicate a lack of diffusion of information, congruent with Rogers' (19) assertion that diffusion consists of a communication process where information about an innovation's effectiveness spreads. Thus counselors who recorded a “don't know” response to this question were coded 1 for the dependent variable *diffusion of information about CM*. The second dependent variable, *perceived effectiveness* was measured by counselors' responses on the Likert rating scale to the above question. Response options included “don't know” or a 7 point Likert-type rating of 1 (not at all effective) to 7 (very effective). Counselors who responded “don't know” were excluded from the analysis of the perceived effectiveness variable. A third dependent variable was

perceived acceptability of contingency management. Counselors were asked to respond to the question, “To you as a treatment professional, how acceptable is the use of each of the following as treatment techniques for substance abuse?” Motivational incentives (vouchers) was among a list of 28 interventions. Responses were recorded on a 7-point Likert scale with response categories ranging from completely unacceptable (1) to very acceptable (7). As in the effectiveness models, counselors responding “don't know” were excluded from the regression analyses.

Independent variables—Independent variables included in these analyses fell into three categories: counselor characteristics, caseload characteristics, and CM exposure.

Lower educational levels are a barrier to adoption of EBPs (26). In regards to CM, having an advanced degree has been found to be associated with more positive beliefs regarding CM (23). As such, we included educational level as an independent variable by creating a dummy coded variable to distinguish counselors without and with a *masters degree or higher*. In addition, experience is related to adoption of innovations in the addiction field generally (6). This has also been found to be the case with CM; counselors with more *experience* have more positive attitudes towards the use of incentives (23). Thus we included the number of years counselors have been working in the substance abuse treatment field as an independent variable.

Counselors who identify themselves as “in recovery” hold more favorable attitudes towards 12-Step approaches (27). Further, counselors who identify the 12-Step model as their primary treatment approach report less current use of CM (21). These findings suggest a relationship between being in recovery and/or holding a 12-Step treatment orientation and knowledge and attitudes towards CM. However, more recently, Kirby and colleagues (23) found no effect of recovery status on attitudes towards CM and noted that only 11.5% of counselors believed that CM was inappropriate because it is inconsistent with a 12-Step approach.

To explore this further, we included counselors' recovery status and 12-Step orientation as independent variables. First, counselors reported if they were personally *in recovery* from substance abuse (1 = in recovery). Second, counselors indicated their *endorsement of a 12-step orientation to treatment* by responding to three items developed by Kasarabada et al. (28). Specifically counselors indicated the extent to which they agreed that clients need to accept a lack of control over their addiction while placing faith in a higher power, that clients need to reach out to others in recovery, and that treatment should have the goal of clients working the 12-steps. Responses to these items ranged from strongly disagree (1) to strongly agree (7). Responses to these three items were summed to create a single composite indicator (Mean=4.42; Cronbach's alpha= .80).

Two independent variables related to counselor caseloads were included. Given that a significant amount of CM research has been conducted in methadone clinics or otherwise with opiate-dependent individuals, it follows that counselors who work with more opiate addicted clients should have more knowledge of and more favorable attitudes towards CM. As such, the *percentage of opiate dependent clients* on counselors' caseloads was included as an independent variable. *Size of caseload* (truncated at 50) was included to control for the possibility that counselors with more clients have less time to seek out knowledge related to innovative treatment approaches. *Hours worked per week* was also included to control for potential differences between full- and part-time counselors.

Three independent variables related to counselors' access to information regarding CM were also included. First is *contingency management training*. Counselors were asked to what

extent their program had provided them with specific training regarding CM, either in-house or off-site. Responses were coded on a 7-point scale ranging from 1 (no extent) to 7 (very great extent). The second was a measure of *contingency management exposure* in the treatment program. Since counselors may also receive informal training or acquire indirect knowledge of innovations by working in a program where the innovation is used with at least some clients, we included data about the actual use of CM in the program. CM use is a dummy variable that was coded 1 if the center where the counselor was employed currently used CM and 0 if the CM was not currently used at the center. The third was a measure of environmental scanning that has been found to be related to the adoption of pharmacological treatments (29) but has not been examined in terms of CM or other psychosocial interventions. Counselors were asked to indicate the extent of their *internet use* to learn about new treatment techniques. Responses to this item ranged from no extent (1) to very great extent (5), with counselors who did not have a computer available to them at work coded 0.

Lastly, we included a variable which measures general counselor attitudes toward the use of evidence-based practices in addiction treatment, given that this variable has been found to be associated with use of EBPs in mental health services (30). Counselors were asked, "Thinking about the field of substance abuse treatment, to what extent do you agree or disagree with the following statement? Scientifically supported treatments can be useful." Responses were coded on a seven-point scale ranging from strongly disagree (1) to strongly agree (7).

Analytic strategy

Both logistic regression and ordinary least squares regression models were estimated to assess the effects of independent variables on diffusion, perceived effectiveness, and perceived acceptability of contingency management. First, logistic regression was used to model the *diffusion of information* about CM (9,31). The pseudo R^2 measure of McKelvey and Zavoinia (1975) is reported as a measure of logistic regression model fit (32). Second, OLS regression was used, in separate models, to model counselors' perceptions of the *effectiveness* and *acceptability* of CM for use in substance abuse treatment. Models were estimated using Stata 10.0 software package.

Results

Sample Characteristics

Descriptive statistics for the variables included in the multivariate regression models are shown in Table 1 along with the results of the logistic regression. In terms of demographic characteristics, the sample was largely female (65%), Caucasian (64%), and had a mean age of about 45 years. Less than half of the sample had an advanced degree (42%) and 45% were in recovery. The average years of experience working in substance abuse treatment was 9.4 and the average caseload was 20 clients. The percentage of counselors' caseloads that was comprised of persons who abuse or were dependent on opiates was relatively low (16.1%).

Counselors indicated relatively low levels of CM specific training; the mean of the 7-point scale was 2.386 (SD=1.94). Approximately 32% of counselors reported working in a treatment program that currently used CM. Overall, counselors' supportive attitudes toward the use of EBPs in addiction treatment were high, as the mean score of the EBP attitude variable was 5.650 (SD=1.42). Counselors rated the effectiveness of CM (mean=4.543, SD=1.63), lower than their rating of the acceptability of CM as a treatment technique (mean=5.05, SD=1.76).

Diffusion of CM

Turning to the dependent variables, 33.25% of counselors in these public sector treatment programs reported they “did not know” the effectiveness of CM as a treatment technique, indicating incomplete diffusion of this EBP. Logistic regression models predicting the log odds of a “don't know” response to the effectiveness of CM are presented in Table 1. In terms of counselor characteristics, both ethnicity and experience showed significant relationships with diffusion. Counselors with more years in the addiction treatment field were significantly less likely to give a “don't know” response (OR=.978), as were nonwhite counselors (OR=.716). Other counselor characteristics were not associated with the diffusion of CM including gender, recovery status, 12-Step orientation, percentage of opiate clients, and hours worked per week.

Two of the variables measuring access to information regarding CM were significantly associated with diffusion. Extent of CM training was a significant negative predictor of diffusion. The log odds of counselors reporting they “did not know” the effectiveness of CM were lower for counselors with greater CM specific training. Use of CM in their treatment program was also a significant negative predictor of diffusion; working in a treatment program currently using CM decreased the log odds of a “don't know” response by 78.8%. Neither counselor attitudes toward the use of evidence-based practices in addiction treatment nor counselor use of the internet to learn about new treatment techniques were associated with diffusion.

Perceived Effectiveness of CM

Next, we used multivariate regression to predict counselors' perceptions of effectiveness of CM as a treatment technique. The results of this model are presented in Table 2. Again, effectiveness was measured on a 1 to 7 scale with a higher score indicating a higher degree of perceived effectiveness of CM as a treatment technique. Counselors who answered “don't know” to the effectiveness question were excluded from these analyses. Two counselor characteristics were found to be associated with perceived effectiveness - gender and ethnicity. Female counselors were more likely than male counselors to rate CM as effective, as were nonwhite counselors. Caseload size showed a significant positive relationship with effectiveness as well – the higher the caseload, the more likely the counselor would rate CM as effective. As would be expected, the CM training variable was also significantly related to perceived effectiveness. As CM specific training increased, counselors were more likely to rate the treatment technique as effective. Contrary to expectations, working in a center currently using CM was not associated with perceptions of the treatment techniques' effectiveness, nor was internet use. On the other hand, general attitudes toward the use of EBPs in addiction treatment were positively associated with counselor perceptions of CM effectiveness. As counselor endorsement of scientifically supported treatments increased, CM effectiveness ratings increased.

Attitudes Toward Acceptability of CM

Finally, we examined counselors' attitudes toward the acceptability of CM for use in addiction treatment. The results of this model are presented in Table 3. Two counselor characteristics were significantly related to perceived CM acceptability. Female counselors were significantly more likely to view CM as acceptable for use, as compared with male counselors. In addition, recovering counselors were more likely to have a positive perception of the acceptability of CM. Extent of CM specific training, use of CM in the program, and general EBP attitudes all showed a significant positive relationship with perceived acceptability of CM. Counselors with greater CM specific training, counselors working in a treatment center currently using CM, and counselors holding more favorable

attitudes toward the use of scientific treatments were significantly more likely to rate the treatment technique as acceptable for use in the treatment of addiction.

Discussion

Drawing on a nationally representative sample of specialty addiction treatment facilities supported by public funding, this study examined counselors' attitudes toward the use of CM. Not only do counselors deliver a majority of addiction treatment services to clients in the US addiction treatment system, they play a key role in the dissemination of information about new treatment techniques to their clients by their degree of knowledge and expression of support for innovative practices. Our data showed that two-thirds of counselors had enough knowledge of CM to express an opinion regarding its effectiveness. While this indicates that dissemination efforts have certainly had some success, a full third (33.25%) of counselors report having little or no knowledge of CM or its effectiveness. With counselors playing an integral role in the transfer of EBPs from research to everyday practice, these findings suggest that alternative dissemination strategies for CM must be considered.

While prior research indicates that an orientation that appears heavily supportive of traditional substance abuse treatment practices (e.g., adherence to a 12-step philosophy and recovery status) may be a key staff-level barrier to the diffusion of EBPs, we found no strong evidence of such a barrier. Instead, our research points to *lack of exposure* to CM, through use in the program and innovation-specific training, as the most salient barrier to CM adoption and diffusion. Only one-fourth of counselors reported working in a treatment program currently using CM. This experience was potent however, for counselors with program-level exposure to CM reported receiving greater CM training and rated CM as more effective and more acceptable for use in treatment as compared with counselors with no such program-level exposure.

Given the association of CM use in the treatment program with increased diffusion and more positive perceptions of CM's acceptability, this study highlights the importance of social networks in the diffusion and acceptance of treatment innovations. More research should be conducted into the use of social dissemination strategies (30). Social network analysis can be used to examine how social relations may be sources of information regarding treatment innovations, as well as sources of influence in the adoption process.

Our results also underline the importance of CM *training* in the diffusion of and attitudes towards treatment innovations. Counselors reported low levels of CM-specific training. Multivariate models also highlight the importance of exposure to CM via training. CM-specific training was associated with both diffusion and counselors' perceptions of effectiveness. Additionally, CM-specific training was positively associated with perceived acceptability, regardless of whether CM was in use in the treatment program. Taken together, these findings suggest targeted efforts to increase innovation-specific training for clinicians are warranted.

Though not associated with diffusion, the role of counselors' general attitude towards scientifically supported treatments is an important factor in their perceptions of CM's effectiveness and acceptability. Having a positive attitude towards EBPs likely increases activities related to environmental scanning and decreases resistance to adoption. Given the diffusion of other psychosocial EBPs (e.g., CBT and MET) and counselors' positive attitudes toward the use of these treatment techniques, more research is needed to determine why the diffusion of CM remains low.

Although most counselors report that they use the internet to learn about new treatment techniques, internet use was not associated with any of the three dependent variables. This

finding suggests that expecting counseling staff to educate themselves through access to websites containing information regarding CM and its effectiveness may not be fruitful. The attractiveness and accessibility of such websites is unknown, nor do we know why some counselors are motivated to engage in self-education. Further research is needed to determine why counselors' internet use has not had an effect on knowledge acquisition and attitudes towards CM.

Finally, it should be noted that the data used for this study were collected in late 2005 and early 2006. In 2007, the NIDA/SAMHSA Blending Initiative released the Promoting Awareness of Motivational Incentives (PAMI) products, designed to inform the field about motivational CM. It is too early to determine the effectiveness of the Blending Initiative in disseminating CM information. However, this study provides a baseline for future research examining this question. Several limitations of the current study should be noted. First, all data derived from counselors are self-report data and therefore subject to response bias. However, data collected during the clinical director interviews were used as a means to assess response bias in the counselor surveys. Each clinical director reported the socio-demographic characteristics of the program's counseling staff. These figures were aggregated across all participating treatment programs and compared to the aggregate data from the completed surveys. These comparisons revealed no significant differences between the responding counselors and the pool of potential respondents in terms of gender, age, race, education, tenure, or recovery status. Second, the data analyzed are cross-sectional which limits our ability to determine causality between variables. Third, as a result of the large number of counselors who replied "don't know" to the effectiveness and acceptability items, the corresponding regression models have reduced N's. However, these N's were sufficient to generate statistically meaningful results. Fourth, these data are representative of counselors in the public sector treatment programs, not the counseling workforce as a whole. As discussed above, the NTCS sampling frame excludes several types of treatment programs (e.g., Veterans Administration programs and detox only programs).

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TABLE 1

Logistic Regression Results for the Diffusion of CM (N=1107).

Variable	Descriptive Statistics	Logistic Regression Results	
	% or Mean (SD)	b (SE)	OR (95% CI)
Female	65.40	.017 (.161)	1.017 (.741, 1.394)
Nonwhite	36.40	-.334 (.156)*	.716 (.527, .971)
Master's	42.37	.054 (.162)	1.056 (.768, 1.50)
Recovering	44.89	-.113 (.168)	.894 (.642, 1.243)
Opiate clients	16.01	-.006 (.003)	.994 (.988, 1.00)
Age	45.43(11.52)	.014 (.008)	1.015 (.999, 1.03)
Tenure	9.41 (7.39)	-.023 (.011)*	.978 (.956, .999)
12-step orientation	4.41 (1.56)	-.015 (.048)	.985 (.897, 1.082)
Caseload size	20.69 (14.89)	.004 (.005)	1.004 (.994, 1.013)
Hours/week	39.46 (9.65)	-.008 (.007)	.992 (.978, 1.007)
Internet use	2.81 (1.38)	-.099 (.053)	.906 (.817, 1.004)
CM training	2.40 (1.95)	-.367 (.061)**	.693 (.615, .780)
CM used in program	0.32 (0.47)	-1.59 (.229)**	.204 (.130, .320)
EBP attitudes	5.65 (1.42)	-.023 (.053)	.977 (.881, 1.083)
M&Z R ²	.361		

Notes:

*
p<.05**
p<.01

Table 2

Descriptive Statistics and OLS Regression Results for Perceived Counselor Effectiveness of CM (N=732).

Predictor	% or Mean (SD)	β (SE)
Female	64.75	.176 (.123) **
Nonwhite	39.75	.152 (.119) **
Master's Degree	41.53	.043 (.125)
Recovering	45.36	.028 (.130)
Opiate clients	16.99	.034 (.002)
Age	45.01 (11.31)	.031 (.006)
Tenure	9.59 (7.34)	.008 (.009)
12-step orientation	4.43 (1.58)	.014 (.037)
Caseload	20.82 (14.81)	.071 (.004) *
Hours/week	39.89 (9.39)	.023 (.006)
Internet use	2.90 (1.36)	.016 (.042)
CM training	2.87 (2.12)	.244 (.031) **
CM used in program	0.44 (0.50)	.074 (.133)
EBP attitudes	5.66 (1.44)	.118 (.041) **
R^2	.1675	

Notes:

*
p<.05**
p<.01

Table 3

Descriptive Statistics and OLS Regression Results for Perceived Counselor Acceptability of CM (N=796)

Predictor	% or Mean (SD)	β (SE)
Female	66.20	.159 (.127) **
Nonwhite	37.06	.023 (.125)
Masters Degree	43.47	.019 (.130)
Recovering	43.84	.077 (.133) *
Opiate clients	16.65	.023 (.002)
Age	44.90 (11.29)	-.055 (.006)
Tenure	9.52 (7.29)	-.034 (.009)
12-step orientation	4.37 (1.57)	-.025 (.039)
Caseload size	20.64 (14.88)	.016 (.004)
Hours/week	39.52 (9.71)	-.013 (.006)
Internet use	2.80 (1.38)	.010 (.043)
CM training	2.76 (2.07)	.245 (.033) **
CM used in program	0.40 (0.49)	.090 (.142) *
EBP attitudes	5.10 (1.51)	.184 (.043) **
R^2	.1566	

Notes:

*
p<.05**
p<.01