

Regular article

Increasing program capability to provide treatment for co-occurring substance use and mental disorders: Organizational characteristics

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Abstract

The Dual Diagnosis Capability in Addiction Treatment and the Dual Diagnosis Capability in Mental Health Treatment indexes were used to document change in the capability of 14 substance abuse and mental health agencies to provide services to clients with co-occurring substance use and mental disorders (COD). COD capability significantly increased over 2 years, with the largest improvements seen in client assessment and staff training for COD. The role of agency structural characteristics and organizational readiness for change was also investigated. The study found modest evidence that some structural characteristics (e.g., agency size) and organizational readiness for change were related to increased COD capability. Further study is needed of how these factors affect implementation and fidelity to evidence-based practices, including how programs might compensate for or modify the effects of organizational factors to enhance implementation efforts. © 2010 Elsevier Inc. All rights reserved.

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1. Introduction

Co-occurring substance use and mental disorders (COD) are increasingly recognized as prevalent, difficult to treat, and requiring specialized treatment services (e.g., Clark, Power, Le Fauve, & Lopez, 2008; Drake et al., 2001; Substance Abuse and Mental Health Services Administration [SAMHSA], 2002). For substance abuse treatment programs, consensus and evidence-based practices (EBPs) have been outlined in *Substance Abuse Treatment for Persons With Co-Occurring Disorders, Treatment Improvement Protocol 42* (Center for Substance Abuse Treatment [CSAT], 2005) and include integrating into standard programming psychiatric medication services, psychoeducation, counseling, and specialized COD self-help groups. For

mental health treatment programs, EBPs include integrated dual disorders treatment (IDDT; Drake et al., 2001; Mueser, Noordsy, Drake, Fox, & Barlow, 2003), which uses an integrated team of psychiatric, substance abuse, and other staff to provide assertive outreach, motivational interventions, and stage-based treatment primarily to clients with a severe mental illness.

Several fidelity scales have been developed to measure a treatment program's capability to provide services to individuals with COD. The Dual Diagnosis Capability in Addiction Treatment (DDCAT) index (McGovern, Matzkin, & Giard, 2007) is based on the American Society of Addiction Medicine taxonomy that categorizes substance abuse treatment programs into three levels of capability: Addiction Only Services programs serve clients with no or minimal COD; Dual Diagnosis Capable programs serve clients with low severity, stable mental illness; and Dual Diagnosis Enhanced programs treat clients with more severe, unstable mental illness (Mee-Lee, Shulman, Fishman, Gastfried, & Grifith, 2001). For mental health programs,

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there is an IDDT fidelity measure (Mueser et al., 2003; SAMHSA, 2003), and the Dual Diagnosis Capability in Mental Health Treatment (DDCMHT) index (Gotham, Brown, Comaty, & McGovern, 2007), a parallel instrument to the DDCAT, was designed for use in mental health programs that are not specifically implementing IDDT. In addition, agency self-assessment tools have been developed by Minkoff and Cline (2004), and one study used a conceptual framework that allowed comparison across substance abuse and mental health treatment programs (Timko, Dixon, & Moos, 2005).

This study contributes to growing research on the DDCAT and the DDCMHT by assessing their use in measuring change in capability to provide services for COD over time. The development of psychometrically sound fidelity and capability measures that are sensitive to change is essential to accurately characterize treatment effectiveness. Moreover, in this study, we examined organizational factors that affect the implementation process or how agencies, programs, and clinicians move a treatment into practice. Results of this study could further the emerging field of implementation science, which examines factors that affect or predict the ability of treatment programs to implement practice changes.

1.1. Measuring capability to provide co-occurring disorders treatment

The DDCAT was first developed in 2004 through a process of item construction, expert review, and pilot testing (McGovern, Matzkin, et al., 2007). The DDCMHT was developed as a parallel version of the DDCAT for use in mental health treatment programs. Clearly, the IDDT fidelity scale is the gold standard for measuring fidelity in programs implementing IDDT; however, a measure was needed to assess more generally the COD capability of mental health programs that were not specifically implementing IDDT. The DDCMHT was developed to assess COD capability in general mental health treatment programs and to provide a parallel version of the DDCAT, such that some comparison of capability could be made across the two types of primary treatment programs (mental health and substance abuse).

The DDCAT and DDCMHT each include 35 items across seven dimensions. Program Structure (4 items) measures the organizational structure of the program, including certification/licensure to provide mental health, substance abuse, or both types of treatment and coordination/collaboration with mental health or substance abuse treatment providers. Program Milieu (2 items) measures the extent to which the program expects and welcomes clients with COD. Clinical Process: Assessment (7 items) measures screening and assessment procedures for both disorders. Clinical Process: Treatment (10 items) measures treatment planning and treatment services, such as individual/group counseling and psychoeducation, that are specific to COD. Continuity of Care (5 items) assesses a program's ability to monitor both

types of disorders during the treatment episode, changes to other levels of care, and discharge planning. Staffing (5 items) assesses the presence of a licensed prescriber, substance abuse and mental health treatment certified/licensed staff, and arrangements for supervision related to COD. Lastly, Training (2 items) measures the extent to which staff have received basic and advanced training in COD. Items are scored on a 5-point scale: 1 = *addiction or mental health services only*, 2 = *only/capable* (an intermediate point between addiction or mental health services only and COD capable), 3 = *COD capable*, 4 = *capable/enhanced* (an intermediate point between COD capable and COD enhanced), and 5 = *COD enhanced*. Items in each dimension are averaged into dimension scores, and the mean of the dimension scores is the Total Score.

The DDCAT (and to a lesser extent the DDCMHT) is being used in approximately 28 states and internationally (M.P. McGovern, personal communication, April 12, 2009), and studies are underway to further refine the instrument and to test the relation of COD capability and organizational and client characteristics. The DDCAT has shown good reliability (overall $r = .81$, range = .73–.93; McGovern, Becker, & Lambert-Harris, 2007). Construct validity was demonstrated by moderate positive correlation with the IDDT fidelity scale (McGovern, Matzkin, et al., 2007). Brown and Comaty (2007) conducted reliability analyses of the DDCAT and DDCMHT as used by rater pairs across 38 sites in Louisiana and found an overall intraclass correlation coefficient of .84 across raters and items. Lee, Cameron, and Harney (2008) found that changes in DDCAT scores over 6 months were related to level of implementation of a COD screening and assessment package at treatment agencies in Australia. Mangrum (2007) found that agencies with higher COD capability enrolled/served clients with higher psychiatric severity. Our research group is conducting a longitudinal study of COD capability and staff, leadership, and organizational factors (Claus, Gotham, Harper-Chang, Selig, & Homer, 2007).

1.2. Factors affecting implementation of EBPs

A number of theoretical frameworks that model treatment program implementation have been developed (e.g., Aarons & Carmazzi, 2005; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Frambach & Schillewaert, 2002; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Simpson & Flynn, 2007). Although differing in specifics, each approach acknowledges that implementation is influenced by individual (clinicians, administrative staff), organizational, and external factors (Gotham, 2004, 2006). This study focused on organizational factors, including structural characteristics and organizational attributes.

1.2.1. Structural characteristics

Several structural characteristics are related to dissemination and implementation of innovative technologies or

EBPs, including organization age (Miller, 2001; Roman & Johnson, 2002) and funding source (Ducharme, Knudsen, Roman, & Johnson, 2007; Roman & Johnson, 2002; Teague et al., 2002). Relevant to this study, agency size and location have been linked to implementation of EBPs or medical technologies, although research findings are somewhat mixed. Several studies have found that larger organizations are more likely to implement EBPs (e.g., Knudsen & Roman, 2004; Oser, Tindall, & Leukefeld, 2007; Roman & Johnson, 2002). However, a few studies have found that smaller agencies are more likely to implement EBPs (e.g., Delany, Broome, Flynn, & Fletcher, 2001; Miller, 2001), and some studies have found no effect of organization size (e.g., Ducharme et al., 2007; Grella et al., 2007). Evidence for program location is limited, but a few studies suggest that urban programs are more likely than rural programs to implement EBPs or innovative technologies (Fendrick, Escarce, McLane, Shea, & Schwartz, 1994; Poulsen et al., 2001). Biegel et al. (2003) noted that rural agencies implementing IDDT encountered difficulties, such as clinicians having significant non-COD caseloads (and thus having to split their focus on different types of clients), few housing resources, travel distances that limited outreach and engagement, and agency financial stress.

1.2.2. Organizational attributes

Several organizational attributes also affect implementation (e.g., Greenhalgh et al., 2004). For example, institutional resources should include adequate equipment and physical space (Simpson & Flynn, 2007) and high-quality, effective training opportunities (Fixsen et al., 2005; Greenhalgh et al., 2004). Also found to be important are staff factors such as staff motivation, competence, and attitudes toward using EBPs (Aarons & Sawitzky, 2006; Fixsen et al., 2005; Greenhalgh et al., 2004). Organizational climate and culture have also been shown to affect adoption and implementation of treatment practices (e.g., Glisson, 2007; Glisson & Green, 2006; Hemmelgarn, Glisson, & James, 2006). One widely used measure of organizational attributes is the organizational readiness for change (ORC) assessment (Lehman, Greener, & Simpson, 2002), which appraises program and training needs, institutional resources, staff attributes, and organizational climate.

1.3. Current study

This study was part of the COSIG Missouri project, a SAMHSA-funded Co-Occurring State Incentive Grant (COSIG), administered by the Missouri Department of Mental Health. COSIG Missouri was designed to develop state and program infrastructure and implement services for clients with COD, and it included a pilot study conducted from 2004 to 2006. The pilot study worked with selected treatment agencies to implement standardized screening and assessment instruments for substance use and mental health

disorders, train supervisors and frontline staff regarding basic principles of COD, and provide funding for COD treatment practices not normally covered in their contracts (e.g., medication management at substance abuse treatment programs, substance abuse counseling at mental health programs). As part of the pilot study, DDCAT/DDCMHT site visits were conducted at participating treatment agencies in 2004 and again in 2006.

The goals of this study were threefold: (a) to use the DDCAT/DDCMHT to document change in agency capability to provide COD services over a 2-year period; (b) to examine whether organizational structure characteristics, such as agency size, program location (rural/urban), and program type (primary substance abuse or mental health program), and whether the umbrella agency provided a single service (mental health or substance abuse) or multiple services (mental health and substance abuse) predicted change in COD capability; and (c) to examine whether organizational readiness to change predicted change in COD capability. Strengths of this study include the longitudinal measurement of implementation of EBPs and the examination of organizational factors' effects on EBP implementation, both of which have been rarely studied.

2. Materials and method

2.1. Participating agencies

This study included seven substance abuse and seven mental health state contracted treatment programs located at private, nonprofit agencies. All of the substance abuse treatment programs provided residential, intensive outpatient, and regular outpatient services to adult men and women. All of the mental health treatment programs provided intensive case management and psychiatry services to adult men and women. To enhance the potential for collaboration, participating programs were chosen in pairs such that there was a substance abuse program and mental health program in the same town or city. In addition, programs were chosen in a 2×2 design to assess differences in rural and urban locations and the state-level separation of services into mental health and substance abuse treatment systems. Thus, programs represented rural or urban locations and were part of parent agencies that had state contracts to provide either mental health or substance abuse treatment only (single-service umbrella agency) or both types of services (multiple-service umbrella agency; these programs did not necessarily provide integrated treatment). Programs were fairly equally split across these dimensions (see Table 1).

2.2. Participating staff

During the 2004 DDCAT/DDCMHT visits, program staff (including clinicians, residential technicians, nurses, recre-

Table 1
Characteristics of substance abuse and mental health programs

Characteristic	Substance abuse (<i>n</i> = 7)	Mental health (<i>n</i> = 7)
Mean (range) 2003 client admissions	774 (148–1876)	1200 (292–1883)
Program location (rural/urban)	4/3	4/3
Single-service/ Multiple-service agency	4/3	4/3
Services provided		
Residential	7	0
Intensive outpatient	7	0
Regular outpatient	7	0
Intensive case management	0	7
Psychiatry	3	7

ational therapists, etc.) were asked to complete the staff version of the ORC assessment (Lehman et al., 2002), a self-report measure of personal and organizational readiness to change. The ORC was completed by 66 staff at 13 programs (1 program failed to return any surveys). Of the 66 staff members, 63% were female and 24% were male; 87% were White and 13% were African American. The average age of staff members was 41 years, with a range from 22 to 75 years. Regarding highest level of education obtained, 31% had a graduate degree, 54% had a bachelor's degree, 11% had an associate's degree or some college experience, and 4% had a high school diploma or general equivalency diploma. Twenty-three percent of the respondents had a substance abuse treatment certification, and 18% were licensed to provide mental health services (e.g., licensed professional counselor, licensed clinical social worker, psychologist). Staff members reported a range of job titles, including mental health or substance abuse counselor, case manager/community support worker, employment specialist, program technician, nurse, and trainee. On average, staff members had 9 years of experience working in the substance abuse or mental health treatment field, with a range from 1 to 25 years. They reported working an average of 4 years in their current jobs, with a range of 1 to 15 years.

2.3. Procedure

In 2004 and 2006, two researchers conducted a half-day visit to each program. Each visit included three main activities: ethnographic observations, semistructured interviews, and document reviews. The ethnographic observations were made of the milieu and physical settings, with particular attention to whether posters, signs, and client literature included information on COD. The semistructured interviews were conducted with agency directors, clinical supervisors, clinicians, and support personnel. This always included one meeting with the clinical director/supervisor and at least one group meeting with staff (clinicians, residential technicians, nurses, recreational therapists, etc., without supervisors present). If possible, an interview with a psychiatrist or prescriber was also

conducted. Document reviews included examination of client records, program manuals, brochures, program schedules, and screening and assessment forms. More specifically, the program director was asked to select 8–10 charts or records of clients with COD, including charts for clients who had been discharged recently. After informed consent was obtained, staff members completed the ORC. The two raters independently rated each program using the DDCAT or DDCMHT and then met to reach consensus on all items. This study was approved by the Health Sciences Institutional Review Board at the University of Missouri-Columbia.

2.4. Measures

2.4.1. Dual diagnosis capability in addiction treatment/mental health treatment

To measure the capability of programs to provide treatment for COD, the DDCAT (McGovern, Matzkin, et al., 2007) was used at the substance abuse treatment programs, and the DDCMHT (Gotham et al., 2007) was used at the mental health treatment programs. In this study, coefficient alphas at baseline were moderate to good for the seven DDCAT dimensions (Cronbach's $\alpha = .61-.81$) and good to excellent for the DDCMHT ($\alpha = .77-.95$). Intercorrelations among dimensions ranged from .39 to .91 (DDCAT and DDCMHT data together).

2.4.2. Organizational structure characteristics

Agency size was defined by the total number of client admissions in 2003. The average number of admissions was 988 ($SD = 609.62$), with a range from 148 to 1,883. Given the skewed distribution of the data, the natural log was used in analyses. Dichotomous variables were created for the other structure variables (program location: 0 = rural, 1 = urban; program type: 0 = substance abuse, 1 = mental health; single-service vs. multiple-service agency: 0 = single-service agency, 1 = multiple-service agency). Table 1 presents the descriptive statistics for the organizational structure characteristics for substance abuse and mental health programs separately. The four characteristics were largely independent ($p > .05$), except for the association between program size and program type ($r = .40$, $p < .05$), which indicated that mental health programs tended to be larger than substance abuse programs.

2.4.3. Organizational readiness for change

During the 2004 program visits, 66 staff at 13 programs completed the ORC assessment (1 program failed to return any surveys). The 115 ORC items use 5-point response categories from *disagree strongly* to *agree strongly* and are combined into 18 scales. Scale scores are calculated by multiplying the mean rating per scale by 10, yielding a range from 10 to 50. Individual staff scores were averaged to generate program scores (2 to 9 staff per program contributed to the program scores).

Following Greener, Joe, Simpson, Rowan-Szal, and Lehman (2007), the ORC scales were combined into four indices previously reported to have high reliability ($\alpha = .69-.88$). The Needs and Pressures Index consists of three scales reflecting overall Program Needs, staff Training Needs, and organizational Pressures for Change (α in this study = .56). The Institutional Resources Index consists of five scales: Offices, Staffing, how much the program values Training, computer Equipment, and Internet access ($\alpha = .85$). The Staff Attributes Index includes four scales measuring staff perceptions of how much the agency encourages professional Growth, staff perceptions of their own Efficacy, staff ability to Influence decision making in the agency, and Adaptability of staff to make programmatic changes when needed ($\alpha = .78$). The Organizational Climate Index consists of six scales related to clarity of the agency Mission, staff Cohesion, staff Autonomy to make treatment-related decisions, Communication between clinical directors and staff, staff job Stress (reverse scored), and how open the management is to Change ($\alpha = .47$). Intercorrelations among the indices were moderate to high (r 's = .39–.81) and were higher than those reported by Greener et al. (r 's = .30–.59).

2.5. Data analysis

Change in DDCAT/DDCMHT Total Score and seven dimension scores over time was tested using paired t tests. To describe the magnitude of the mean differences from 2004 to 2006, Cohen's d effect sizes were also computed. Following guidelines proposed by Cohen (1988), 0.20 was regarded as a small effect size, 0.50 a medium effect size, and 0.80 a large effect size. The ability of structural characteristics to predict change in DDCAT/DDCMHT scores over time was tested using repeated-measures regression. Correlations between the ORC indices and change in COD capability between 2004 and 2006 were calculated, with a correlation of .10 regarded as small, .30 as medium, and .50 as large (Cohen, 1988). To explore whether the addition of the organizational structure characteristics or ORC indices predicted a significant amount of variance in COD capability in 2006 above and beyond that predicted by the 2004 capability, hierarchical multiple regression analyses were

conducted for the Total Score and each dimension. Step 1 included the 2004 DDCAT/DDCMHT score, and Step 2 added either the four organizational structure characteristics or the four ORC indices.

Very few missing values were found in the data. There were no missing data on the DDCAT/DDCMHT. On the individual ORC assessments, there were very few missing data at the item level, and scale scores were computed for all respondents (no respondent completed less than half of the items in a scale; if a scale included missing data, the scale score was calculated as the mean of available items). However, no ORC assessments were completed at one of the programs; thus, analyses using ORC data include 13 of 14 programs.

3. Results

3.1. Change over time in capability to serve clients with COD

Change in COD capability over time was examined for each DDCAT/DDCMHT dimension score and the Total Score. Table 2 shows the results of paired t tests and the corresponding Cohen's d effect sizes for the Total Score and dimensions. The Total Score and five of seven dimensions showed statistically significant ($p < .05$) increases in capability from 2004 to 2006. The Clinical Process: Treatment and Continuity of Care dimensions did not show statistically significant changes. Because of the relatively low statistical power of this study, it is helpful to examine the effect sizes to better show the magnitude and direction of the changes. The change in the Total Score had a medium effect size. Among the dimensions, two had large effect sizes, Clinical Process: Assessment and Training; two dimensions had medium effect sizes, Program Structure and Staffing; and two dimensions had small effect sizes, Program Milieu and Clinical Process: Treatment. The effect size for Clinical Process: Treatment was 0.28, and the p value approached significance ($p = .14$), suggesting a trend toward an increase in capability from 2004 to 2006 that may have been significant with higher statistical power.

Table 2

Paired t tests and Cohen's d effect sizes for changes in COD capability from 2004 to 2006 ($n = 14$)

DDCAT/DDCMHT score	2004 M (SD)	2006 M (SD)	t	p	Cohen's d
Total Score	2.23 (0.55)	2.56 (0.50)	5.74	.000	0.63
Program Structure	1.93 (0.93)	2.57 (0.81)	6.62	.000	0.74
Program Milieu	2.71 (0.85)	3.04 (0.86)	3.80	.002	0.38
Clinical Process: Assessment	2.67 (0.38)	3.09 (0.32)	4.83	.000	1.19
Clinical Process: Treatment	2.07 (0.45)	2.19 (0.41)	1.57	.140	0.28
Continuity of Care	2.34 (0.62)	2.36 (0.59)	0.17	.865	0.02
Staffing	2.03 (0.68)	2.33 (0.64)	2.16	.050	0.46
Training	1.86 (0.53)	2.36 (0.46)	5.51	.000	1.01

Note. Cohen's d calculations are based on the pooled standard deviation. Similar results were obtained with nonparametric tests.

3.2. Predictors of change in COD capability

3.2.1. Structural characteristics

Next, we examined whether organizational structure characteristics, including agency size, program location, program type (substance abuse or mental health), and single- versus multiple-service agency, may have differentially affected changes in COD capability over time. For example, would COD capability at programs from multiple-service agencies increase more than at single-service agency programs?

Table 3 presents the correlations between the structural characteristics and change in capability (DDCAT/DDCMHT 2006 scores minus DDCAT/DDCMHT 2004 scores, so that a positive change score indicates increased COD capability). Given the small sample size, only correlations higher than .55 are statistically significant at $p < .05$; however, practical significance is suggested by a number of correlations that are at least of medium effect size. Agency size showed medium to large negative correlations with change in overall COD capability and with Program Structure, Clinical Process: Assessment, and Staffing, suggesting that smaller agencies showed more change over time. For program type, there were medium to large negative correlations with Program Structure, Clinical Process: Assessment, and Staffing. On these three DDCAT/DDCMHT dimensions, primary substance abuse programs changed more than mental health programs. Correlations between DDCAT/DDCMHT change scores and program location were relatively low, except for the large positive correlation with Program Milieu, suggesting that urban programs showed more positive change in their level of expectation and welcoming of clients with COD. Correlations between COD change and single- versus multiple-service agencies were all negative and mostly in the medium range; single-service agencies improved more rapidly in provision of COD services than agencies that housed both mental health and substance abuse programs.

To explore whether the addition of the organizational structure characteristics predicted a significant amount of

variance in COD capability in 2006 above and beyond that predicted by the 2004 DDCAT/DDCMHT score, hierarchical multiple regression analyses were conducted in which Step 1 included the 2004 capability score and Step 2 added the set of four structural characteristics (agency size, program type, program location, and service type; see Table 4). The addition of the organizational structure characteristics resulted in a significant increase in R^2 for the Total Score and Clinical Process: Assessment dimension. The contribution of specific structural characteristics was considered for these two areas. For the Total Score, program size and single- versus multiple-service agency were both negative and significant ($p < .001$), suggesting that smaller agencies and those that provided either mental health or substance abuse treatment services showed greater change in capability. For Clinical Process: Assessment, program size was the only significant structural characteristic ($p < .05$), suggesting that smaller agencies showed greater change in assessment practices. Although a significant increment in variance was found only for the Total Score and one DDCAT/DDCMHT dimension, conversion of increments in R^2 to correlations (not shown) revealed that five of the eight tests had at least a medium effect (e.g., correlations of .30 or higher; Cohen, 1988).

3.2.2. Organizational readiness for change

Table 3 also presents the correlations between the ORC indices and the change in COD capability from 2004 to 2006. Generally, the Needs and Pressures Index had medium to large positive correlations with change in COD capability from 2004 to 2006, suggesting that programs with more program and training needs and/or pressures to make programmatic changes showed more change in COD capability. The Institutional Resources Index showed little relation to change in COD capability. The Staff Attributes Index was not related to change in capability except for Clinical Process: Treatment and Continuity of Care ($r = -.61$ and $-.59$, respectively). Correlations between the Organiza-

Table 3

Correlations of COD capability change from 2004 to 2006 with structural characteristics ($n = 14$) and ORC indices ($n = 13$)

DDCAT/DDCMHT score	Structural characteristics				ORC indices			
	Agency size (log)	Program type (substance abuse/mental health)	Program location (rural/urban)	Single- vs. multiple-service	Needs and pressures	Institutional resources	Staff attributes	Organizational climate
Total Score	-.58 *	-.29	.16	-.59 *	.73 **	-.22	-.21	-.40
Program Structure	-.47	-.31	.16	-.46	.61 *	.07	-.07	-.31
Program Milieu	.12	-.12	.51	-.44	.49	-.35	.10	-.43
Clinical Process: Assessment	-.74 **	-.56 *	.23	-.30	.49	-.16	.00	-.34
Clinical Process: Treatment	-.21	.23	-.07	-.43	.53	-.18	-.61 *	-.10
Continuity of Care	-.13	.24	-.04	-.33	.44	-.16	-.59 *	-.20
Staffing	-.67 **	-.49	.11	-.23	.36	-.14	.05	-.33
Training	-.18	.00	-.22	-.44	.04	.02	.08	.22

* $p < .05$ (two-tailed).

** $p < .01$ (two-tailed).

Table 4

Results of hierarchical multiple regression analyses predicting 2006 COD capability from Step 1: 2004 COD capability and Step 2: structural characteristics ($n = 14$) or Step 2: ORC indices ($n = 13$)

DDCAT/DDCMHT score	Structural characteristics		ORC indices	
	Step 1 R^2	Step 2 increment in R^2	Step 1 R^2	Step 2 increment in R^2
Total Score	.84 ***	.13 **	.88 ***	.07
Program Structure	.85 ***	.05	.87 ***	.10 *
Program Milieu	.87 ***	.06	.88 ***	.06
Clinical Process: Assessment	.34 *	.44 *	.32 *	.17
Clinical Process: Treatment	.60 ***	.12	.63 ***	.26 *
Continuity of Care	.76 ***	.08	.76 ***	.12
Staffing	.48 **	.25	.42 *	.12
Training	.60 ***	.10	.67 ***	.16

Note. The significance of the increment in R^2 is not solely based on the size of the increment but is affected by the standard error of the estimate in each analysis.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

tional Climate Index and change in COD capability were mostly of medium size and negative, suggesting that lower levels of staff cohesion, autonomy, management openness to change, and other measures of organizational climate in 2004 led to more changes in COD capability.

To explore whether the addition of the ORC indices predicted a significant amount of variance in COD capability in 2006 above and beyond that predicted by the 2004 DDCAT/DDCMHT score, hierarchical multiple regression analyses were conducted in which Step 1 included the 2004 capability score and Step 2 added the ORC indices (see Table 4). The addition of the ORC indices resulted in a significant increase in R^2 for only two capability dimensions, Program Structure and Clinical Process: Treatment. However, conversion of increments in R^2 to correlations (not shown) revealed that six of the eight tests produced at least a medium effect (e.g., correlations of .30 or higher; Cohen, 1988).

4. Discussion

Our results show the utility of the DDCAT and DDCMHT for assessing change in COD capability over time. In a sample of 14 programs, total COD capability and five of seven dimension scores showed statistically significant increases over 2 years, with the largest increases for the Clinical Process: Assessment and the Training dimensions. Given the targeted but relatively low intensity of technical assistance provided by the COSIG pilot study (e.g., basic cross training on COD for staff, a mandate to implement screening and assessment tools, and funds for COD services) and the lack of ongoing state funding for COD services at the time, it is not surprising that the programs showed only modest increases in COD capability. Moreover, training and assessment were specifically targeted by the pilot study, and other changes require more resources, more time to bring

about, or system-level changes, such as improving continuity of care.

We also examined whether changes in COD capability were related to organizational structure characteristics. Addition of the organizational characteristics resulted in increased predictive power for change in overall COD capability and the assessment-related dimension. However, organizational structure characteristics showed moderately strong associations with most of the COD dimensions. Previous research on the structural characteristics has offered conflicting findings. Our results suggest that smaller agency size was associated with greater change in COD capability and that single-service agencies showed greater improvement than multiple-service agencies, although they generally began at a lower level of COD capability. Anecdotal evidence from our visits also suggests that, paradoxically, larger programs may face greater challenges entailed in initiating change despite the greater resources they have at hand. It may be that smaller agencies and agencies that have one main treatment focus are more able to quickly implement significant program change when they decide to do so because there is less bureaucracy and institutional inertia (Hovmand & Gillespie, 2007). These characteristics are worthy of further investigation.

Organizational readiness for change was also related to change in COD. Perhaps paradoxically, there were several medium-size negative correlations between the ORC Staff Attributes and Organizational Climate Indices and COD capability change. We expected that relations between organizational readiness for change and COD capability would be positive, suggesting that a more positive organizational climate would lead to better treatment for COD. These negative correlations may suggest a more complex effect of organizational readiness for change on implementation of treatment practices. This may reflect greater stress and more negative organizational climate at those agencies that were more aggressively working to

increase COD capability. Alternatively, less capable programs may have found initial system changes easier to bring about than their more capable peers.

The moderate-to-strong associations among ORC indices as well as the limited sample size in this study make it difficult to identify the specific contributions of a particular readiness for change dimension. However, the ability of the ORC indices to predict change in COD capability on two DDCAT/DDCMHT dimensions suggests that elements of organizational readiness for change may enhance or hinder attempts to implement EBPs. The modest findings in this area highlight the complexity of the implementation process and suggest that other intervening factors may play a role. In particular, previous research has identified the contributions of leadership commitment and behaviors (Claus et al., 2007) and the presence of an opinion leader or champion (Valente & Davis, 1999) as factors.

4.1. Limitations

Several limitations of this study need to be mentioned. The sample size of 14 programs is small for studying organizational effects. Gaining sufficient statistical power is an obstacle faced in implementation studies, where programs are the unit of analysis. Although the small sample size may limit the ability to generalize these results to treatment agencies nationally, the use of effect sizes as an additional guide to practical differences allowed important relationships to be identified. Another limitation is the high intercorrelations among the DDCAT/DDCMHT dimensions and among the ORC indices, such that we did not single out the impact of a particular aspect of organizational readiness for change. Work is currently underway to further study the psychometrics of the DDCAT and DDCMHT by combining data from multiple states (McGovern, Becker, et al., 2007). Given the small sample size and exploratory nature of this study, we still found modest support for our hypotheses, suggesting the need for further studies with larger samples of treatment programs.

4.2. Implications

The implementation of EBPs, especially those for COD that involve program-level change, is a complex, time- and resource-intensive process often requiring 2–4 years (Fixsen et al., 2005). In this study, agencies were recruited to fill out the quasi-experimental design, resulting in considerable variation in agency leadership motivation to change, a variable we did not measure. By participating in the study, the programs agreed to implement standardized screening and assessment instruments for substance use and mental health disorders, were provided training for supervisors and frontline staff regarding basic principles of COD, and were allowed to bill for COD treatment practices not normally covered in their contracts (e.g., medication management at substance abuse treatment programs, substance abuse

counseling at mental health programs). Our finding of modest change in COD capability suggests the need for more intensive implementation strategies and state-level enhancements to drive program-level change in COD capability (see Gotham, 2006 for further discussion). Relatively basic training and availability of funding do not necessarily produce significant program change (Blase, Fixsen, Duda, Naoom, & Van Dyke, 2008).

An example of more intensive implementation coaching is the COSIG Missouri Phase II pilot study, which provided a small number of highly committed programs with intensive technical assistance and coaching directed at the implementation process. This approach drew upon the Mid-America Addiction Technology Transfer Strategy—Stages of the Implementation Process (Baehni, Harmon, & Stilen, 2006), Fixsen et al.'s (2005) stages of implementation and work by the Ohio Substance Abuse and Mental Illness Co-Occurring Center of Excellence (Biegel et al., 2003; Ronis, 2004). It included a program change agent, bimonthly implementation coaching, intensive training on specific EBPs for COD, and fidelity visits by outside evaluators that supported the development of an implementation plan. These types of intensive strategies are needed to accelerate the rate of implementation of EBPs. States and other payers who mandate the use of EBPs should consider providing funding or incentives for these resource-intensive implementation strategies.

Organizational readiness for change appears to affect implementation. Agencies may find it helpful to examine organizational readiness factors before starting an implementation project. For example, Glisson, Dukes, and Green (2006) and Glisson and Schoenwald (2005) developed an organizational intervention model called ARC (availability, responsiveness, continuity), which uses change strategies at the organization level to assist in implementing EBPs and has been shown to positively affect staff turnover and organizational climate. ORC assessment results can be used as an organizational intervention, such as in a workshop format that encourages agencies to examine their results in the context of national norms and plan for a change process (Courtney, Joe, Rowan-Szal, & Simpson, 2007). In our own work with the COSIG Phase II pilot study, we conducted an agency readiness assessment, during which we surveyed organizational readiness for change, staff attitudes toward EBPs, leadership factors, and staff practices related to the specific EBPs themselves. Agency results were then used as a springboard toward discussing organizational factors in need of change or improvement prior to implementation of the EBPs.

This study is one in the nascent field of Implementation Science, and it points to several areas for future research. Clearly, more research on the longitudinal process of implementation is needed, including effects of organizational factors on implementation of EBPs. Hopefully, research will lead to the development of evidence-based implementation strategies. Moreover, further study is needed of how

preimplementation change processes, such as providing feedback on organizational readiness for change or other organizational change strategies (e.g., Glisson & Schoenwald, 2005), affect later organizational readiness for change, as well as implementation and fidelity to EBPs. Finally, we need to understand how organizational change is ultimately related to improvements in clients' treatment outcomes.

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