

COGNITIVE BEHAVIORAL THERAPY IN SUBSTANCE ABUSE TREATMENT:
ORGANIZATIONAL CORRELATES OF ADOPTION AND FIDELITY

by

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ABBREVIATIONS

AIDS- Acquired Immune Deficiency Syndrome

ASAM- American Society of Addiction Medicine's

CBT-Cognitive Behavioral Therapy

HIV- Human Immunodeficiency Virus

NIDA- National Institute on Drug Abuse

NIH- National Institutes of Health

NTCS- National Treatment Center Study

TAPS- Technical Assistance Publications

TIPS- Treatment Improvement Protocols

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ABSTRACT

The adoption and implementation of evidence-based practices for the treatment of drug and alcohol abuse have received little research. While outcome studies are important, the organizational factors that are associated with adoption and fidelity remain unknown.

The purpose of this study is to determine which organizational factors are associated with the adoption and fidelity of implementation of cognitive behavioral therapy in substance abuse treatment centers. Data from a sample of 268 centers and their counselors was used to create two outcomes; adoption and fidelity of CBT.

In this study, the adoption of cognitive behavioral therapy was associated with an increase in the amount of training new counselors receive, the use of medications, centers where the counselors rated CBT as more acceptable as a treatment for substance abuse. Fidelity of implementation in CBT was also associated two elements of training; the use of TIPS and TAPS and staff familiarity with CBT.

BACKGROUND AND SIGNIFICANCE

Substance abuse and dependence are enormous public health problems with detrimental effects reaching across race, culture, educational, and socioeconomic status. In the United States, the lifetime prevalence of substance-related disorders in adults is estimated to be 10.3%, or over 23 million people.¹ The cost of substance abuse in the U.S. is estimated to be over \$144 billion annually in both healthcare and job loss.² Substance abuse is considered an important factor in a variety of social problems, affecting rates of crime, domestic violence, sexually transmitted diseases (including HIV/AIDS), unemployment, and homelessness. Despite research into the causes and treatments of substance-related disorders, and considerable societal investment in prevention, drug-use in the United States is still widespread.

Once efficacious treatments are identified, there is little research developed to determine how those treatments might best be transferred to and administered effectively in clinical settings. The purpose of this study is to determine which organizational factors are associated with the adoption and fidelity of implementation of cognitive behavioral therapy in substance abuse treatment centers.

Appropriate assessments and research designs are basic requirements for testing and refining theories of how different kinds of treatment innovations can best be implemented. However, when studies document that a treatment can be successfully implemented in a clinical setting, the challenge of actually transferring

the intervention to clinical application is often daunting. The National Institute on Drug Abuse (NIDA), which has central responsibility within the National Institutes of Health (NIH) for generating new knowledge regarding drug abuse treatment, has a long history of research dissemination activities. The National Institute on Drug Abuse (NIDA) has invested substantial resources into the development of evidence-based behavioral and pharmacological therapies for the treatment of substance-related disorders.³ Many programs have been developed and tested, and in general, prevention and treatment are considered most effective when programs are designed in accordance with evidence-based principles.⁴ However, the fundamental principles or core components of effective treatment programs need to be studied in greater detail.

While there has been a great deal of development and research in new substance abuse treatments, natural diffusion of these treatments has produced a widely acknowledged gap between research and community practice. Although many new treatments have proven efficacy, the transfer of these treatments to community practice has been slow and unpredictable.⁵ In fact, there seems to be a difference in the culture of research and substance abuse treatment that may be a barrier for the use of evidence-based practices.⁶ Most behavioral therapy trials for substance abuse have been conducted in academic-affiliated settings, and there has been limited evaluation of training and supervision strategies used in controlled experimental settings.⁷ Models to transfer new technology or interventions have been created but there is still little empirical tracking of how this occurs, and in particular, how it happens in the field of addiction treatment.^{8,9,10}

This paucity of research on implementation is especially true in publicly-funded community practices. Treatment research often does not address problems relating to the attitudes and skills of treatment providers and treatment providers often do not apply research-based interventions in their practice.¹¹ Research in clinical efficacy trials is usually geared toward highly trained and experienced clinicians with basic familiarity of underlying principles of the treatment. However, clinicians who work in community-based settings have varied educational backgrounds.¹² Before prevention programs can be successfully adopted, the mechanisms which result in satisfactory outcomes in controlled studies must be identified and assessments made in community agencies to determine how to facilitate this adoption.

Research has shown that use of manuals for training in publicly-funded practices has resulted in good outcomes.^{15,16} A major development in the field has been an effort to rigorously evaluate approaches similar to those widely used in clinical practice. Researchers have specified the elements of drug counseling approaches in detailed manuals for therapists and have evaluated these approaches in clinical trials.¹³ Treatment manuals, which describe the treatment, summarize strategies, and offer guidance, have become important tools in clinical trials. Adherence scales have also been developed to use in conjunction with treatment manuals to allow researchers to assess whether therapists followed the treatment techniques specified in the manual.¹⁴ In many cases, treatment manuals facilitate the introduction and sustained use of evidence-based practices. Manuals can standardize content and promote consistent implementation of practices that have

been clinically proven. In drug abuse prevention studies, high fidelity of implementation has been associated with improved outcomes.^{15,16}

Cognitive Behavioral Therapy

Cognitive Behavioral Therapy (CBT) is an empirically supported treatment that focuses on patterns of thinking that are maladaptive and the beliefs that motivate that thinking. Studies of CBT have demonstrated its usefulness for a wide variety of problems, including mood disorders, anxiety disorders, personality disorders, eating disorders, substance abuse disorders, and psychotic disorders.¹⁷ CBT is among the most rapid in terms of results obtained, and is considered to be an effective short-term treatment, but its effects are also sustained long-term.¹⁸

Cognitive Behavioral Therapy is one of the most frequently evaluated psychosocial approaches to treat substance use disorders. Meta-analyses and extensive reviews of the literature have established that cognitive behavioral approaches have strong empirical support for use in treatment of alcohol use disorders¹⁹ and that cognitive behavioral treatments have been found to be superior or comparable to pharmacotherapy²⁰ and other psychotherapies.²¹ CBT is one of the most successfully adopted evidence-based behavioral therapies. It is flexible and can be adapted to a wide range of settings and patients, and it is compatible with many different treatments such as pharmacotherapy or an additional psychotherapy.¹⁸ These characteristics of CBT are likely related to its widespread use and the ease with which it has been adopted across settings, disorders, a range of client populations and in combination with other interventions.

Despite the emerging empirical support for use of CBT in drug-dependent populations, additional research is needed to address its limitations. CBT is a comparatively complex approach, and training clinicians to implement this approach effectively can be challenging. One of the strategies for understanding the difficulties in implementation is to understand the mechanisms of training of cognitive behavior therapy so that ineffective components can be removed and the delivery can be simplified.¹⁸ Part of effective training in CBT requires assisting clinicians with knowing when to remove or extend components or activities. Strategies for enhancing acceptance and effective implementation of cognitive behavior therapy by the clinical community are also needed. Adherence to the manuals has not been determined, and information about which program characteristics lead to success or failure of implementation is needed.

There is growing consensus that problems in transferring research to practice are more likely to be due to organizational factors such as leadership attitudes, staff resources, organizational stress, regulatory and financial pressures, management style, than how materials are disseminated.¹⁰ The explicit goals of the organization may support innovation in treatment, but the organizational structure and culture affects its outcome. Organizational culture is the pattern of behaviors developed by groups to solve work-related problems and function effectively in their work environment.²² It is manifested in the organization's beliefs and values, and in its structure.²³ Organizational environments can affect the outcomes of empirically supported treatment in ways that may or may not be desirable.²⁴ Within the clinical field, links have been found between organizational level

variables and fidelity of implementation of interventions.²⁵ Although methods for training clinicians in manual-guided therapies, such as CBT, for clinical efficacy trials are well established^{26,27,28} it is not known whether standard methods of training therapists will be effective when applied to community-based settings. Training alone does not ensure the adoption of a new practice. New practices are most likely to be repeated with elements of organizational structure.²⁹ These elements can include larger center size, greater number of counselors, use of medications, research-based center philosophy, and participation in research-based activities. However, efforts to develop assessments to capture these constructs have been scarce. Currently there is limited evidence about which training, supervision and accreditation processes are associated with improved outcomes.³⁰ Some researchers have begun to assess the importance of organizational characteristics on the adoption of behavioral therapies, however the newness of some of these methodologies indicates that different models may be necessary based on the stage of diffusion and type of innovation.¹²

This thesis research examined which organizational factors were associated with the adoption of manualized CBT, as well as the fidelity of implementation of this intervention in a sample of publicly-funded addiction treatment centers. In the constructed statistical models, took into account, or controlled for, the organizational characteristics that have a known or suspected role in adoption and implementation of innovations. Our analysis also identified additional factors at the organizational and counselor levels which may influence adoption and implementation of CBT.

RESEARCH DESIGN AND METHODS

Study Design

This study was a secondary analysis of data from a national cross-sectional study. Data were collected as part of the University of Georgia's National Treatment Center Study (NTCS), a family of projects designed to document and track changes in the organization, structure, staffing, and service delivery patterns of substance abuse treatment programs throughout the U.S. The data were collected in face-to-face interviews with program administrators and clinical directors during 2005 and using self-completed questionnaires from counselors between late 2004 and early 2006.

Participants

Data were collected from eligible, publicly-funded centers identified by enumerating the population of treatment facilities in sampled counties. An initial panel of treatment facilities was selected from a random selection of counties, in 35 states, based on population. All counties in the U.S. were assigned to one of 10, relatively equal sized, geographical strata based on population. A random sample of the counties within each geographical stratum was selected. Next, all substance abuse treatment facilities sampled within these counties were enumerated using published directories, federal and state provider listings, and other resources such

as the Yellow Pages. From this, treatment centers were randomly selected proportionate to the total number of centers in the sampled counties.

Centers selected through this sampling procedure were contacted by telephone for a brief screening interview with an NTCS employee to establish eligibility for the study. Several key criteria determined eligibility (Table 1). Eligible centers were community-based and provided treatment for drug and alcohol dependence at a level equivalent to structured outpatient programming as defined by The American Society of Addiction Medicine’s (ASAM) patient placement criteria. Ineligible centers and those refusing to participate were replaced with centers randomly selected from the same geographic stratum.

Table 1: Inclusion and exclusion criteria

| Inclusion Criteria | <i>Description</i> | Exclusion Criteria | <i>Description</i> |
|---|--|---|--|
| Community-based | Available to the general public | Private practice counselors Correctional facilities Veteran’s Health Administration programs Halfway houses Driving-under-the-influence services Assessment programs | Not available to the general public |
| Providing treatment for drug and/or alcohol dependence | Provided treatment at the level equivalent to outpatient programming as defined by ASAM’s patient placement criteria | Exclusively providing methadone maintenance services Exclusively providing psychiatric services | Not providing treatment at a level equivalent to structured outpatient programming |

The publicly funded centers include both government-owned facilities and privately-owned nonprofit centers that rely primarily on government funding sources. Centers were classified as publicly funded if they received over 50% of their operating revenues from government grants or contracts. During the study period, the clinical directors and administrators of 318 publicly funded treatment centers were interviewed for the administrator/clinic director survey. In addition, 1199 counselors from these addiction treatment centers were surveyed with a different self-completed questionnaire that was exchanged by mail. Patient data were not collected.

Surveys

The data were obtained using two surveys created by the NTCS study. The on-site interview with the program director or clinic administrator lasted approximately two hours and was face-to-face. Information collected during the administrator/clinic director interview included: organizational structure, organizational culture, organizational management, treatment inputs, treatment/clinical process and management, staffing, sources of referral, sources of reimbursement, financial information, census and organizational performance. Approximately 80% of eligible programs agreed to be in the study and completed interviews.

Administrators provided the names of counselors employed at their centers, and from this list a mailed questionnaire was used to survey the counseling staff. Information collected during this interview included: counselor's caseload,

treatment services, therapeutic beliefs, efficacy of innovations, acceptability of innovations, training on innovations, implementation of innovations, coworker support, and counselor training.

Human Subjects

This study was a secondary analysis of existing data on the organizational adoption of CBT and structural variables that may affect organizations' capacity to adopt and implement CBT in the delivery of treatment for alcohol and drug dependence. Data were abstracted from administrative and counselor level data sets, and were de-identified before being transmitted to the investigators at OHSU. The Institutional Review Board of the Oregon Health & Science University (Portland, Oregon) reviewed the study protocol and determined that it did not involve data from identified human subjects, and therefore met criteria for exemption from continuing review.

Variables Used in Analysis

During the study period, the clinical directors or administrators of 318 publicly funded treatment centers were interviewed and 1199 counselors from 268 of those 318 addiction treatment centers were also surveyed. Each center was given a unique identifier. For this analysis, the results from the counselors were aggregated according to each center. The median scores from each of the variables for the counselors from each center were merged with data obtained from their

respective administrator or clinic director using the unique center identification number. Because the unit of analysis was the center itself, the merge was done in STATA as a many-to-one merge. If no counselor questionnaires were available from a treatment program,, that center’s data was removed from analysis. Sixteen percent of the centers were excluded from analysis, and in the remaining 268 centers, the number of counselors interviewed ranged from 1 to 57.

Dependent/Outcome Variables

Two dependent variables were modeled in this analysis. The first outcome, *Center Adoption* of CBT was measured as a dichotomous variable where 0=no adoption and 1=adoption of CBT as measured by current usage. During the initial set of interviews with the clinic director/administrator, they were asked directly if their center currently used CBT. A dichotomous measure of current CBT usage was generated such that centers reporting current use of CBT were coded 1, while 0 indicated the center did not currently use CBT.

The second outcome variable was a measure of the fidelity of implementation of manualized CBT. *Fidelity* was measured as a dichotomous variable where 0= low fidelity of implementation, and 1= high fidelity of implementation. The fidelity outcome variable was created by constructing two distinct clusters, *High Fidelity* and *Low Fidelity*. The clustering variables were the 13 questions in the clinic director survey specifically relating to the implementation and emphasis of various CBT “skills” based on the NIDA manual (Table 2). Items relating to CBT “skills” were scored on a 6-point Likert-like scale where 0= no

emphasis and 5= heavily emphasized. These clusters were formed using a nonhierarchical clustering technique (k-means approach) using Euclidian distances.³¹ This entirely data-driven technique creates cluster centers and places the variables into the clusters based on their distance from the center of the cluster.³¹ Centers that answered that they were not currently using CBT were not included in the analysis.

Table 2: Two Cluster Variables

Interview questions posed to clinic directors and administrators to assess how CBT was used, and to rate the extent to which their delivery of CBT emphasized the following skills on a Likert-like scale where 0 = no emphasis and 5 = heavily emphasized.

| Item |
|---|
| 1) The use of functional analysis to identify clients' thoughts and feelings before and after substance use. |
| 2) The identification of "triggers" of substance use |
| 3) Routine discussions of encounters with "high-risk" situations for substance use and the coping skills used in those situations |
| 4) The use of role-playing in learning new skills |
| 5) The assigning of "homework" through which clients practice new skills |
| 6) Reviewing "homework" in terms of what clients learned |
| 7) Continued monitoring of clients' current level of functioning and motivation for treatment |
| 8) Discussions of "craving" as normal |
| 9) The development of concrete strategies for coping with craving |
| 10) Learning drug refusal skills |
| 11) Creating an "all-purpose coping plan" of emergency contacts, safe places, and reliable distracters |
| 12) Learning how to recognize and interrupt "Seemingly Irrelevant Decision" chains before relapse occurs |
| 13) Developing problem-solving skills |

Independent Variables

Two groups of independent variables were included in these models. The first was a selection of potential confounders, which due to their known or suspected role in an organization's adoption or implementation of innovations, were forced into the model. Because larger programs are more likely to have greater personnel resources to aid the implementation of new treatments, both models were controlled for *center size*, as measured by the number of full-time equivalent (FTE) employees (natural log-transformed to adjust for skew). The models also controlled for education as measured by the *percentage of counselors with a Master's-level degree or higher*. An indicator of program quality was also controlled for, *accreditation*, such that 1 = program is accredited by JCAHO or CARF and 0 = not accredited by either organization. Both models also controlled for treatment center philosophy based on a 12-step model of recovery (1 = 12-step model; 0 = other treatment model), and a *measure of faith-based treatment philosophy* (1=faith-based; 0=other). Since treatment programs have opportunities for involvement in research, we also included a variable indicating whether the treatment center had participated in a clinical research activity involving its patients (1 = yes; 0 = no). While this is not a direct measure of exposure to any evidence-based practices, it was used to capture some exposure to research, quality of care and use of innovation. The *use of the NIDA manual in training of CBT* was also controlled for in the fidelity of implementation model, since the outcome was based on the skills in the NIDA manual.

The second group, the potential primary independent variables, included variables from both the center and counselor questionnaires. Those primary independent variables that were at least moderately associated (a p -value greater than or equal to 0.25) with the two separate outcomes were identified with univariate analysis. We looked at the contingency tables for all the categorical variables, and those with small cell sizes were rescaled into two categories, *High* and *other*. The scaling of continuous variables was also checked, and adjusted when necessary (Table 3). All of the variables that had a p -value of greater than or equal to 0.25 in a simple logistic regression model were to be included in the model along with those potential confounders identified earlier.

Table 3: Independent and the control variables considered in multivariate analysis.

| Variable | Coding | Action Taken |
|--|-------------------|--|
| *†Is this center accredited? | 1=yes 0=no | None |
| *†How many full time equivalents (FTE'S) are employed by the center? | Continuous number | Log transformed |
| *†How many master level or higher counselors are employed by the center? | Continuous number | Percentage of masters counselors out of total counselors |
| *†In the past 2 years, has this center been involved in any research projects that directly involved the clients of the center? | 1=yes 0=no | None |
| *†Is this center considered to be faith-based? | 1=yes 0=no | None |
| *†Is this center's program based on a 12-step model? | 1=yes 0=no | None |
| †Is the NIDA manual on CBT used for training? | 1=yes 0=no | None |
| *How many counselors are assigned to each supervisor? | Continuous number | None |
| †Emphasis on use of TIPS and TAPS | 0-5 Likert Scale | High versus other |
| †Are the clinical supervisor's main responsibilities, direct observation of counseling sessions and/or groups? | 1=yes 0=no | None |
| *Are clinical supervisors given a reduced caseload in order to devote time to supervisory duties? | 1=yes 0=no | None |
| *†During the first year, approximately how many hours of clinical supervision per week does a new/junior counselor receive? | Continuous number | None |
| †On average, the hours of in-service training counselors receive each year | Continuous number | None |
| * Use of medications | 1=yes 0=no | None |
| *Percentage of patients with co-occurring psychiatric disorders | Continuous number | None |
| *Acceptability of CBT as a treatment for substance abuse | 1-7 Likert Scale | Continuous number |
| †On average, how familiar is staff with CBT techniques | 0-5 Likert Scale | High versus other |

Bold: potential confounder, *: Adoption model, †: Fidelity model

Statistical Analysis

To determine the effects of the organizational variables on the two outcomes, we performed logistic regression with STATA 10. Prior to estimating the multivariate logistic regression model we assessed whether the individual independent variables of interest were associated with the two outcomes. We used chi-squared tests for the categorical variables and t-tests for the continuous variables to identify differences in center characteristics by outcome. Logistic regression was then performed to determine the independent effect of each variable on the outcome. Those variables identified as potential confounders were forced into the model first. Multivariate logistic regression was then used to determine the individual and combined effect of the significant variables, controlling for potential confounders. The variables that had an unadjusted p -value = 0.25 in the simple logistic models were included in the multivariable model.³² Once in the model, variables with the highest Wald statistics were removed until the primary independent variables in the model were all significant at the $p = 0.05$ level. Those cases with complete data varied by regression model (n=170 for *adoption* and n=105 for *fidelity*).

RESULTS

We observed differences in the views from treatment center directors/administrators on the acceptability of CBT as a treatment in centers that had adopted manualized CBT relative to those centers that had not adopted CBT (Table 4). In treatment centers that reported having adopted CBT, we observed fewer hours of clinical supervision, greater use of medications, and a higher level of education among counselors. There were not significant differences in center size, accreditation, use of the 12-step model philosophy, use of the faith-based model philosophy, or research participation.

Table 4: Table of descriptive statistics (t-tests for continuous data and χ^2 for categorical) for the outcome ADOPTION

| Variable | Adoption N=149 | Non-adoption N=21 | P-value |
|--|---------------------------|------------------------------|----------------|
| Acceptability of CBT as a treatment | Mean=6.62 | Mean=6.00 | P=0.0001 |
| Hours of clinical supervision | Mean=4.78 | Mean=10.67 | P=0.007 |
| Use of medications (y/n) | Yes=42.95% | Yes=9.52% | P=0.003 |
| Full time equivalents employed | Mean=26.11 | Mean=22.49 | P=0.577 |
| Percentage of counselors with Masters | Mean=0.44 | Mean=0.16 | P=0.0002 |
| Center accreditation (y/n) | Yes=49.66% | Yes=38.10% | P=0.321 |
| 12-step model (y/n) | Yes=47.65% | Yes=57.14% | P=0.415 |
| Faith-based model (y/n) | Yes=10.74% | Yes=19.05% | P=0.269 |
| Research participation (y/n) | Yes=29.53% | Yes=23.81% | P=0.588 |

* p-values are from t-tests or chi-square tests of significance

Differences were also observed between treatment centers characterized as *High Fidelity* versus Low (Table 5). Directors/administrators of *High Fidelity* centers reported emphasis on the use of Treatment Improvement Protocols (TIPS) and Technical Assistance Publications (TAPS), greater staff familiarity with CBT, higher education among counselors, and greater use of 12-Step model.

Table 5: Table of descriptive statistics (t-tests for continuous data and χ^2 for categorical) for the outcome FIDELITY

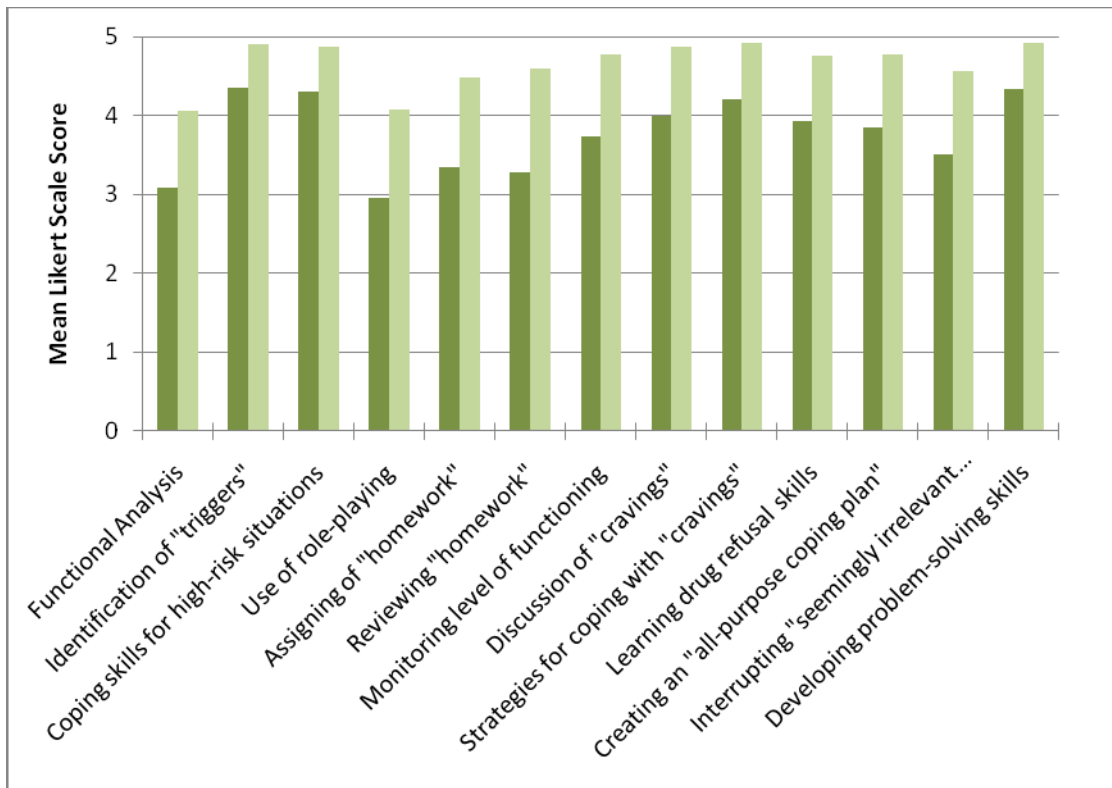
| Variable | High Fidelity | Low Fidelity | P-value |
|---|---------------|--------------|----------|
| | N=63 | N=42 | |
| Emphasis on use of TIPS and TAPS (high vs. other) | High=44.44% | High=4.76% | P<0.0001 |
| Staff familiarity with CBT (high vs. other) | High=80.95% | High=40.48% | P<0.0001 |
| Full time equivalents employed | Mean=26.97 | Mean=25.94 | P=0.853 |
| Percentage of counselors with masters or higher | Mean=0.52 | Mean=0.36 | P=0.015 |
| Center accreditation (y/n) | Yes=50.79% | Yes=47.62% | P=0.659 |
| 12-step model (y/n) | Yes=47.62% | Yes=28.57% | P=0.051 |
| Faith-based model (y/n) | Yes=9.52% | Yes=7.14% | P=0.669 |
| Research participation (y/n) | Yes=30.16% | Yes=35.71% | P=0.551 |
| Use of NIDA manual for training (y/n) | Yes=42.86% | Yes=42.86% | P= 1.00 |

* p-values are from t-tests or chi-square tests of significance

Mean scores from the Likert scale questions pertaining to CBT skills were consistently lower in those centers classified as *Low Fidelity* relative to those classified as High Fidelity (Figure 1). Certain skills were being rated lower by both Low and High Fidelity groupings. The *use of functional analysis, use of role-playing, assigning of homework, and reviewing of homework* were rated relatively lower within groups. This may be an indication that there are individual skills that may

lag in terms of fidelity of CBT. Similarly, there were skills that both High and Low Fidelity groups rated as higher. *Identifications of triggers, coping skills for high-risk situations, strategies for coping with cravings and developing problem-solving skills* were rated relatively high. This may be an indication that there are specific skills that are used more frequently regardless of overall fidelity of CBT.

Figure 1: Mean responses to each of the CBT Core Components by *low* and *high* fidelity grouping.



The final model for adoption of CBT contained three primary independent variables in addition to the potential confounders (Table 6). For the *adoption* model

the final variables were: *acceptability of CBT as a treatment, hours of supervision new counselors receive, prescription of medications, number of FTE'S, percentage of master's level or higher counselors, center accreditation, research involvement, 12-step model, and faith-based model.* In centers where the counselors rated the acceptability of CBT higher, the odds were 2.59 (unadjusted OR) higher to have adopted CBT versus those centers where counselors rated the acceptability of CBT lower. However, when the model was adjusted for the potential confounders this effect declined to 2.33, and in the full model the OR was 2.20 (95% CI 1.06, 4.59). The variable *use of medications*, where centers prescribed or dispensed medications specifically for the treatment of substance abuse treatment, was also significantly associated with the adoption of CBT. Centers had 7.15 (unadjusted OR) higher odds to have adopted CBT if they prescribed or dispensed medication. When controlling for the potential confounders this effect dropped to 5.65 and in the full model the *use of medications* was associated with an odds ratio of 6.64 (95% CI 1.27, 34.69). The unadjusted OR for a 1 hour increase in the number of clinical supervised training hours/week junior counselors received was 0.93, and this changed little when adjusted for by confounders (0.94) and in the full model (0.94 95% CI 0.89, 0.99).

Table 6: Organizational Factors Predicting the Adoption of CBT (n=170)

Results from the logistic regression models (unadjusted, confounder adjusted and multi-model adjusted) for the outcome ADOPTION.

| Primary Independent Variables | Unadjusted | | Confounder Adjusted | | Multi-model Adjusted | |
|--|------------|-------------|---------------------|-------------|----------------------|-------------|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Acceptability of CBT as a treatment | 2.59 | 1.49, 4.46 | 2.33 | 1.17, 4.63 | 2.20 | 1.06, 4.59 |
| Hours of clinical supervision | 0.93 | 0.89, 0.98 | 0.94 | 0.89, 0.99 | 0.94 | 0.89, 0.99 |
| Use of medications (y/n) | 7.15 | 1.61, 31.82 | 5.65 | 1.17, 27.15 | 6.64 | 1.27, 34.69 |
| Potential Confounders | | | | | | |
| Full time equivalents employed (log) | | | | | 0.78 | 0.34, 1.83 |
| Percentage of counselors with masters or higher (10% change) | | | | | 1.42 | 0.10, 19.80 |
| Center accreditation (y/n) | | | | | 0.51 | 0.15, 1.76 |
| 12-step model (y/n) | | | | | 1.79 | 0.55, 5.78 |
| Faith-based model (y/n) | | | | | 0.91 | 0.22, 3.76 |
| Research participation (y/n) | | | | | 2.51 | 0.63, 10.04 |

The final model for *fidelity* of CBT contained two primary independent variables: *use of TIPS and TAPS, staff familiarity with CBT, number of FTE'S, percentage of master's level or higher counselors, center accreditation, research involvement, 12-step model, use of the NIDA manual for training, and faith-based model*. The unadjusted OR for high emphasis on the use of Treatment Improvement Protocols (TIPS) and Technical Assistance Publications (TAPS) versus any other emphasis was 16.00. When this was controlled for by the potential confounders the OR was 28.59 and in the full model the OR was 20.47 (95% CI 3.73, 112.47). The wide confidence intervals were due to sparse data. Overall staff familiarity with

CBT was also significantly associated with the fidelity of implementation. The unadjusted OR for high staff familiarity versus any other familiarity was 6.25. In the model with the potential confounders the OR was 9.26, and was 6.39 (95% CI 2.05, 19.97) in the full model. Out of the potential confounders, the use of a 12-step model was significantly associated with the fidelity of CBT. The use of a 12-step model was associated with an OR of 5.54 (95% CI 1.74, 17.65).

Table 7: Organizational Factors Predicting the Fidelity of CBT (n=105)

Results from the logistic regression models (unadjusted, confounder adjusted and multi-model adjusted) for the outcome FIDELITY

| Primary Independent Variables | Unadjusted | | Confounder Adjusted | | Multi-model Adjusted | |
|--|------------|-------------|---------------------|--------------|----------------------|--------------|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Emphasis on use of TIPS and TAPS (high vs. other) | 16.00 | 3.55, 72.03 | 28.59 | 5.58, 146.54 | 20.47 | 3.73, 112.47 |
| Staff familiarity with CBT (high vs. other) | 6.25 | 2.59, 15.07 | 9.26 | 3.27, 26.22 | 6.39 | 2.05, 19.97 |
| Potential Confounders | | | | | | |
| Full time equivalents employed (log) | | | | | 1.68 | 0.78, 3.60 |
| Percentage of counselors with masters or higher (10% change) | | | | | 1.23 | 0.21, 7.07 |
| Center accreditation (y/n) | | | | | 0.97 | 0.32, 2.91 |
| 12-step model (y/n) | | | | | 5.54 | 1.74, 17.65 |
| Faith-based model (y/n) | | | | | 1.49 | 0.23, 9.90 |
| Research participation (y/n) | | | | | 0.56 | 0.18, 1.81 |
| Use of NIDA manual for training (y/n) | | | | | 0.62 | 0.20, 1.87 |

The overall goodness of fit was assessed for both models using the Hosmer-Lemeshow goodness-of-fit test. Hosmer-Lemeshow goodness-of-fit tests indicated that the *adoption* model fit the data adequately (p=0.34). The area under the ROC curve was 0.85 indicating this model had excellent discriminative ability. Hosmer-Lemeshow goodness-of-fit tests indicated that the *fidelity* model also fit the data

adequately ($p=0.84$). The area under the ROC curve was 0.88 indicating this model also had excellent discriminative ability.

DISCUSSION

In this study, the adoption of cognitive behavioral therapy was associated with an increase in the amount of training new counselors receive, the availability of medications to treatment addiction within the treatment program, and the counselors beliefs that CBT was acceptable as a treatment for substance abuse. This seems to indicate that important elements in creating an organization supportive of adoption of CBT may be related to the skills, training, and education of the counselors. These results are consistent with findings from Knudsen and Roman³³ where elements of center professionalism such as percentage of Master's level counselors, were associated with the adoption of evidence-based practices (EBP) in the private-sector. While this study did not find a significant association between the percentage of counselor's with a Master's degree and the adoption of CBT, the amount of training was significantly associated with adoption. This finding is also supported by Roman and Johnson,³⁴ who found that the adoption of naltrexone was related to higher levels of education in the counseling staff.

Surprisingly no other organizational factor was significantly associated with the adoption of CBT even though several have substantial theoretical support and other studies^{12,33,34} have found significant associations. Center size and accreditation have been found to be associated with adoption of EBP¹² yet in this study they were not. These findings are not consistent with findings from Ducharme et al¹² in which models for adoption of EBP included variables related to

organizational structure. The adoption of voucher-based incentives was significantly associated with profit-structure, funding sources (public versus private) and accreditation rather than elements of research involvement, though other organizational elements were suspected to have an explanatory nature. One reason for this may be that CBT is now widely accepted as a treatment for substance abuse and different analytic techniques were used to capture the tail end of CBT. The number of treatment centers that are not using CBT was quiet low, only 21 out of the 170 centers reported that they were not currently using CBT. Some of the differences seen in this study with previously published studies may be a result of the fact that CBT is being used in most centers, and organizational differences may no longer be as much of a factor in the use of CBT as a treatment for substance disorders. It is important to understand not only which center characteristics promote the use of evidence-based practice, but also why some centers may lag behind.

Fidelity of implementation in CBT was also associated elements of training; the use of TIPS and TAPS and staff familiarity with CBT. Again, important elements in fidelity of CBT seem to be those related to the education and training of the staff as a whole. It is important to note that a higher emphasis on the use of outside resources for information, such as TIPS and TAPS, has been noted in Knudsen and Roman.³³ Knowledge cannot come solely from within the treatment center, and as our results show, the use of outside resources is associated with higher fidelity. In Dusenbury et al³⁵, staff morale and support were found to be associated with higher fidelity in drug abuse prevention strategies. It is possible that a greater staff

familiarity with CBT creates a more supportive environment for fidelity. Again, since most centers are now using CBT organizational characteristics such as size, accreditation, and funding sources are not significant predictors as is the case with the use of outside resources.

Limitations

There are several potential limitations to this study. Many of the questions on the questionnaire required the clinical director to make statements about their staff as a whole. If the clinical director did not have a suitable assessment of their staff bias could be introduced into this study. The outcome variable was based solely on answers from the clinic director. Perceptions and opinions of the CBT “skills” in staff may be different from how program leaders see them. Directly surveying staff would be a necessary and important step to further assess the role of staff knowledge of fidelity in this study. However, when the counselor data was introduced, there was agreement between the two questionnaires on several different variables (data not shown), indicating that the clinic director/administrator has good knowledge of their staff as a whole. Finally, program characteristics, such as the type of services offered, and the numbers of patients receiving them, are estimates made by program leaders and were not directly measured.

Another potential limitation is the fact that one of the surveys was distributed to the clinical directors and administrators of community-based

treatment centers and their counselors. All of the responses were self-reported and the possibility of recall bias must be considered. However, the only way recall bias would be operating in our analysis would be if respondents' recall differed by level of adoption or fidelity. Since this was not likely occurring, it is unlikely that this type of bias would have accounted for the significant results seen. For any question that the clinic director/ administrator did not know the answer to a coding of missing was applied. In this case the entire center would be excluded from analysis. This resulted in a non-differential misclassification. Exclusion of centers with missing data may affect both the internal validity and generalizability of our findings. The missing values are not expected to have created a bias that would have affected the results and because the median value was used for the counselor questionnaire this type of missing value would not be an issue.

Summary and Conclusions

It is important to develop more research into the factors associated with evidence-based practice adoption and fidelity of implementation. It will be important to continue to document the reasons a center does not adopt or implement practices with fidelity just as it will be important to better understand how to influence adoption and implementation with fidelity. Additionally, while many factors may influence adoption and implementation, research should focus on interventions that are successful in creating organizational change and environments that can support evidence-based practices. Though methods for

training clinicians in manual-guided therapies, such as CBT, for clinical efficacy trials are well established^{26,27,28} questions remain as to whether these methods of training will be effective when applied to community-based settings. As we have seen in this thesis presentation, some of those methods may be more readily adopted and implemented than others, such as the CBT “skills”. Similarly, there are elements that may lag, even amongst the *High Fidelity* groups. Training alone does not ensure the adoption and proper implementation of a new practice.

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