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Clinician Attitudes, Social Norms and Intentions to use a Computer-Assisted Intervention

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Abstract

The National Drug Abuse Treatment Clinical Trials Network (CTN) works to bridge the gap between research and practice and tested a web-delivered psychosocial intervention (the Therapeutic Education System, TES) in ten community treatment centers. Computer-assisted therapies, such as web-delivered interventions, may improve the consistency and efficiency of treatment for alcohol and drug use disorders. Prior to the start of the study, we surveyed counselors ($n = 96$) in participating treatment centers and assessed counselor attitudes, perceived social norms and intentions to use a web-delivered intervention. Analysis of the intention to adopt a web-delivered intervention assessed the influence of attitudes and perceived social norms. Perceived social norms were a significant contributor to clinician intention to adopt web-based interventions while attitude was not. To promote successful implementation, it may be helpful to create social norms supportive of computer-assisted therapies.

1. Introduction

Computer-assisted treatments are promising adjuncts to clinician-delivered therapy for alcohol and drug use disorders (Budney et al., 2011; Bickel, Marsch, Buchalter, & Badger, 2008; Carroll et al., 2008; Brooks, Ryder, Carise, & Kirby, 2010). They have potential to improve the efficiency and fidelity of treatment and to reach people who would otherwise not seek care.

The Therapeutic Education System (TES), for example, is a well developed web-based intervention designed as a counselor support system. Based on the Community Reinforcement Approach (CRA) to behavioral therapy, 65 interactive multimedia modules teach cognitive behavioral strategies (i.e., drug refusal skills and self-management), educate clients on sexually transmitted diseases including HIV and hepatitis, and an array of psychosocial interventions. Voucher-based contingency management reinforces skill development (see the website for detail: <http://www.c4tbh.org/technology-in-action/program-reviews/substance-use-disorders/tes.html>). TES provides basic patient education and frees counselor time to address other patient needs.

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Study results are promising. An initial test randomized opioid dependent individuals ($n=135$) receiving buprenorphine medication to three therapy conditions: 1) standard methadone counseling ($n=45$), 2) therapist delivered CRA with vouchers, and 3) computer delivered CRA with vouchers (Bickel et al., 2008). Patient outcomes in the therapist CRA with vouchers group and the computer therapy group were both superior to the standard counseling – the CRA groups (therapist and computer therapy) achieved more weeks of continuous abstinence (therapist = 8.0 weeks; computer = 7.8 weeks) than standard counseling (4.7 weeks). Total therapist time per patient declined substantially within the computer-assisted therapy group suggesting that computer-assisted therapy can be more cost effective and efficient with equivalent effectiveness (Bickel et al., 2008).

Similarly, using a different computer-assisted therapy, investigators randomized individuals who met criteria for an alcohol or drug use disorder either to treatment as usual ($n=38$) or to computer-based training for cognitive-behavioral therapy (CBT4CBT) ($n=35$) (Carroll et al., 2008). Study participants receiving computer-assisted therapy had fewer positive urine tests and longer continuous periods of abstinence. Treatment involvement and completion of homework, moreover, improved outcomes within the CBT4CBT group (Carroll et al., 2008).

These studies illustrate the potential value of computer-assisted treatment. While computer-assisted SA treatment appears to be a cost-effective therapeutic adjunct that standardizes treatment delivery and offers greater confidentiality and accessibility (Bickel, Christensen, & Marsch, 2011; Moore, Fazzino, Garnet, Cutter, & Barry, 2011), counselor adoption and routine use of computer-assisted treatment is uncertain. A pilot study randomized 28 cocaine-using individuals either to TES ($n=14$) or to treatment as usual ($n=14$) (Brooks et al., 2010). Study participants in the TES group improved CRA learning and, at the conclusion of treatment, were less likely to select poor coping strategies (Brooks et al., 2010). However, when offered the opportunity, counselors appeared to be reluctant to incorporate TES into routine care (Brooks et al., 2010).

Adoption and widespread implementation of computerized therapeutic assistance is unlikely without more information on counselor attitudes and beliefs about using computer-assisted therapy. Identifying counselor characteristics and cognitive variables that influence adoption of computer-assisted SA treatment may allow programs to introduce the approach in ways that maximize counselor endorsement and adoption.

1.1 Theory of Reasoned Action

Effective education and persuasion campaigns toward adoption and use of clinical innovations like computer-assisted therapy need an empirical basis. Systematic investigation of the cognitive influences (attitudes, beliefs, norms, and intentions) on adoption and use may support adoption. The Theory of Reasoned Action (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) has guided development of health promotion interventions for more than three decades (Armitage & Conner, 2001) and provides a strong functional framework to identify and influence the attitudes, beliefs, and norms that support the use of a novel treatment delivery system in drug abuse treatment.

The Theory of Reasoned Action (TRA) holds that a person's behavior is directly influenced by the intention to perform the behavior (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Behavioral intention is, in turn, dependent upon the person's attitude about the behavior and their perceived social norms surrounding the behavior. Analyses of studies using the Theory of Reasoned Action find moderate predictive value of the attitude and perceived social norms; between 40 and 50% of the variance in behavioral intentions can be explained by these model constructs (Armitage & Conner, 2001; Sutton, 1998). The results of these meta-

analyses suggest that the Theory of Reasoned Action is useful for studies investigating adoption of new practices and innovations and facilitates understanding the influence of attitudes and perceived social norms on adoption.

Prior work using the Theory of Reasoned Action surveyed counselors ($n = 376$) and clients ($n = 1,083$) from outpatient, methadone, and residential treatment and examined the attitudes, beliefs, and perceived social norms associated with the use of medication for the treatment of opioid dependence (Rieckmann et al., 2007). As expected, patients and practitioners in methadone treatment had more positive attitudes toward the use of methadone than their peers in outpatient and residential settings. Attitudes toward buprenorphine were relatively neutral; outpatient clients and counselors had the most positive attitudes. Interestingly, perceived social norms ("what I thought colleagues thought I should do") were the dominant influence on intentions to use medication for treating opioid dependence (Rieckmann et al., 2007). Initiatives to promote the use of medication in treatment plans for opioid dependence, therefore, must change the perceived social norms that inhibit the use of medication. We anticipate similar findings when we examine the attitudes, beliefs and perceived social norms related to the use of computer-assisted therapy for alcohol and drug use disorders -- counselors who perceive that their colleagues think they should support and adopt computer-assisted therapy will have stronger adoption intentions.

1.2 Clinical Trials Network

The National Drug Abuse Treatment Clinical Trials Network (CTN) tested TES versus treatment as usual in 10 addiction treatment centers. Within the CTN, investigators and community-based treatment providers collaborate to develop, test, and implement new intervention options for patients in alcohol and drug treatment programs (Tai et al, 2010). As part of a multi-trial analysis to study the influence of organizational and workforce characteristics on study outcomes, we assessed attitudes, perceived social norms, and intentions to use web-delivered psychosocial interventions prior to counselor experience with the study intervention. The baseline data enable subsequent analyses assessing the influence of baseline staff attitudes, perceived social norms and adoption intentions on study outcomes and help to clarify results if study outcomes vary by site. The analysis used the Theory of Reasoned Action to investigate the relationship between counselor attitudes toward the TES intervention, perceived social norms surrounding the use of TES in substance abuse treatment, and intention to use the TES intervention. Data collection occurred during site visits completed prior to the initiation of the clinical trial. Collection of similar data post-trial completion is anticipated.

2.0 Methods

The Clinical Trials Network protocol CTN-0044 (Web Delivery of Evidence-based Treatment for Substance Use Disorders) tested 12 weeks of outpatient counseling (treatment as usual) versus 12 weeks of outpatient counseling plus the Therapeutic Education System. In conjunction with the CTN-0044 trial and prior to randomizing study participants, pre-implementation site visits surveyed counselors and program directors to record workforce characteristics, treatment staff attitude toward the intervention, perceived social norms, and intention to use the intervention (CTN-0044-A-1). The Institutional Review Board at Oregon Health & Science University reviewed and approved the study protocol. Participants read and signed an informed consent and received \$25.00 after completing the survey (in some cases, the treatment program received the payments).

2.1 Study Participants

Counselors, research staff, agency directors, and administrative staff ($n = 143$) in the 10 community treatment centers participating in the multi-site trial completed surveys and participated in interviews. We limited the analytic sample to counselors with complete data ($n = 96$) because clinicians were the primary group of interest.

2.2 Workforce Surveys

Surveys assessed counselor characteristics, organizational characteristics, and attitudes, perceived social norms and intentions to use TES following study completion.

Participant and Organizational Characteristics—Director surveys included items on clinic characteristics (e.g. annual admissions, accreditation, counselor caseloads, availability of computers). Workforce surveys collected data on demographic characteristics (e.g. gender, race, education) and experience (e.g. years of substance abuse counseling experience, years working for the agency, recovery status). Additional items assessed attitudes toward the use of computers, the Internet, and the attitudes, social norms and intentions used in the Theory of Reasoned Action.

Attitudes, Perceived Social Norms, and Intentions—Behavioral intention, attitude, and perceived social norms were assessed using 7-point scales scored -3 to $+3$ (Fishbein & Ajzen, 1975, Rieckmann, Daley, Fuller, Thomas, & McCarty, 2007). We assessed attitudes toward web-delivered interventions with three semantic differential items assessing affect (Web delivered interventions for substance abuse are: good/bad; useful/useless; happy/sad). The three items were summed for an attitude score that could range from -9 to $+9$. One item using a likely to unlikely scale assessed perceived social norms: “People who are important to me think that my outpatient program should use a web delivered intervention for treatment of substance abuse: likely/unlikely.” Similarly, one item using a likely to unlikely scale assessed behavioral intentions: “My program intends to use web delivered interventions for treatment of substance abuse: likely/unlikely.” Higher scores reflected more support for the use of web delivered interventions. Study items are similar to the items used in prior applications of the Fishbein and Ajzen theory of behavioral intentions. See Reickmann et al (2007) for more detail.

2.3 Analysis

Differences in intention, attitude, and perceived subjective norms between levels of workforce characteristics were assessed using ANOVA. Spearman correlations assessed the unadjusted correlations between the primary components of the Theory of Reasoned Action (intentions, attitude, and social norms). The primary outcome variable was clinician intention to use web-delivered psychosocial interventions for substance abuse treatment in their practices.

Workforce and organizational covariates—Workforce descriptive variables (e.g. age, job role, recovery status) were included as covariates in the regression models. The influence of organizational variables (e.g. counselor case load, annual client admissions) was also assessed.

2.4 Model Building

A manual multi-stage model building procedure began with univariate analyses to assess the association between attitude toward web-based interventions and perceived subjective norms with intentions. A multivariate base model included the core components of the Theory of Reasoned Action. Workforce and organizational covariates were added to the model and

were included as covariates in the final regression model if they reached an alpha level of 0.05. Finally, a hierarchical model was developed from the resulting multivariate regression model to control for site influences. Multicollinearity between attitude and perceived subjective norms was corrected using the residual of the attitude scores. Analyses were performed using SPSS software, Version 17 (SPSS, Inc., Chicago, IL, 2008) and Stata 11 (StataCorp, College Station, TX 77845).

3.0 Results

3.1 Study participants

Table 1 summarizes the characteristics of the study sample. Participants were mostly women (76%) and white (80%) with an average age of 49.3 (range 24-73). Overall, 59.4% of the participants had a Masters or Doctorate degree. About 3 in ten (35.2%) program staff reported being in recovery from drug or alcohol use. The mean attitude, perceived social norm and intention scores suggested weak positive attitudes toward the use of web-delivered interventions ($M = 1.83$ on a -9 to $+9$ scales), neutral perceptions of social norms ($M = -0.36$ on a -3 to $+3$ scale), and weak support for intentions to adopt web-delivered interventions at the completion of the trial ($M = 0.74$ on a -3 to $+3$ scale). Comparisons on the other descriptive characteristics did not differ significantly.

3.2 Organizational characteristics

The 10 study sites averaged 1000 client admissions (including readmits) per year with a range of 300 to 5000 admissions. Sites ranged between 7 and 180 counselors providing substance abuse treatment services with a mean of 63 employees. The mean caseload was 41 clients per counselor (range 15-70) and the mean productivity expectation was 25 direct service hours per week (range 20-30). All ten sites had personal computers with internet access for all program staff.

3.3 Attitudes, Social Norms and Intentions

Intention to implement web delivered psychosocial interventions was significantly and positively correlated with attitude ($r = 0.35$, $p < .01$), and perceived social norms ($r = 0.33$, $p < .01$). Perceived subjective norms and attitude also correlated significantly ($r = 0.45$, $p < .01$).

3.4 Multivariable Analysis

Attitudes and perceived social norms were significantly associated with intention to use web-delivered interventions in univariate models. Together, attitude and perceived social norms accounted for 11% of the variance in the regression model. Results, summarized in Table 2, suggest that perceived social norms were the primary influence on intention.

The covariate, number of employees providing treatment services, was included in the final regression model. After controlling for site differences in the hierarchical model, the number of employees providing direct care substance abuse treatment services was no longer significant. Perceived social norms remained significantly and positively associated with clinician intention to implement web-delivered psychosocial interventions in substance abuse treatment. The coefficient estimate indicated that a one unit increase on the perceived social norms response scale increased intention by 0.32 units after controlling for the effect of covariates. See Table 3 for a summary.

4.0 Discussion

Prior to the start of a multi-site clinical trial testing the web-based Therapeutic Education System (TES), counselors in participating sites were surveyed to assess baseline attitudes, perceived social norms and intentions to adopt TES following completion of the trial. Perceived social norms were significantly associated with behavioral intention to implement web-delivered psychosocial substance abuse treatment into clinical practices. This finding is consistent with prior research investigating clinician intentions to implement medical and behavioral interventions using the Theory of Reasoned Action. In prior research, perceived social norms were the primary contributor to substance abuse counselors' intentions to use medication-assisted therapy with substance abuse clients (Rieckmann et al., 2007). Similarly, perceived social norms played a significant role in predicting physician intention to educate adolescents about sexually transmitted diseases (Millstein, 1996). Overall, perceived social norms consistently affect intention as well as behavior in behavior change research (Jemmott & Jemmott, 1991; Ross, Kohler, Grimley, & Anderson-Lewis, 2007; Fisher, Fisher, & Rye, 1995) and practice implementation studies (Khanna et al., 2009; Natan, Beyil, & Neta, 2009). The current study extends these findings to the potential to adopt web-based interventions and reinforces the importance of social normative influences on organizational change.

Diffusion science also finds that social influences make significant contributions to the probability that individuals adopt an innovation; the compatibility of an innovation is heavily reliant on an individual's perception of his/her community's values and needs (Rogers, 2003) and reflects the immediate social normative environment of that community. The significant influence of perceived social norms suggests that clinician adoption of new practices could be improved through promoting, within treatment programs, a social normative environment conducive to innovations of drug abuse treatment interventions. Recognition of existing perceived social norms in a community treatment environment and adaptation of a treatment's proposed implementation based on these norms could also improve adoption. Treatment programs could "roll-out" the implementation process in a step-by-step manner that reflects the sequence of adoption (e.g. early adopters, laggards) (Rogers, 2003) to facilitate social normative support. Early adopters "pilot" the intervention and share their experiences with other clinicians, communicating and promoting positive social norms.

While supportive perceived social norms were associated with more positive intentions to adopt computer-assisted interventions, attitudes to adopt web-delivered psychosocial interventions did not affect intentions. Generally, efforts to introduce new therapies emphasize education and training and, consequently, can usually document attitude change (McCarty, Rieckmann, Green, Gallon & Knudsen, 2004). Education and training may improve clinicians' knowledge of a new intervention but training is not sufficient for implementation. Attention to the social normative climate is required to support routine use of computer-assisted treatment.

The lack of significant workforce and organizational covariates is also important to note. Gender, age, education, years counseling, recovery status, treatment center years in operation and annual admissions were not significant covariates in the statistical model. We controlled for these variables statistically because of their potential effect on the relationship between attitudes, perceived social norms, and intention. Neither counselor characteristics (e.g., experience with other treatment techniques and age) nor organizational characteristics (e.g., size, years of operation) influenced clinicians' intention to implement a web-assisted treatment.

4.1 Study Limitations

Several limitations suggest that the results of this study should be interpreted with caution. The first limitation is the applicable (“clinical”) significance of the model estimates. A one unit increase in perceived social norms increased intention by approximately one-half (0.41) of a unit on the 7-point response scale. It is unclear what the impact of this small increase in the intention outcome variable would be on true behavioral intention and behavioral action. The relationships between intention and social norm may have been weakened because the measure of intention focused on “program intention” rather than “counselor intention.” A better test of the model would have examined counselor intention. Despite this, the relationship is significant and provides insight into counselor thinking about the future use of TES within the treatment program.

Selection bias may also be of concern. The CTN chooses treatment sites based on their likelihood of successfully implementing a study protocol. Therefore, the clinicians who completed the workforce surveys may have had more positive attitudes and stronger perceived social norms surrounding computer-assisted interventions for substance abuse treatment compared to providers implementing novel practices in the general population of treatment programs. Nonetheless, significant variation in attitudes, perceived social norms, and intention existed within the sample. More detail on perceived barriers to computer-assisted interventions can also illuminate sources of counselor resistance and organizational impediments to the use of these innovations; however, these variables were not measured in the current study.

Finally, it was beyond the scope of this study’s cross-sectional design to model the behavioral outcome (adopt TES or not). A longitudinal design would allow measurement of the clinicians’ behavior as an outcome and further the applicable predictive value of attitudes and perceived social norms for adoption of practices by substance abuse clinicians.

4.2. Conclusion

Computer-assisted interventions have the potential to standardize treatment, offer greater confidentiality, reach a wider range of patients, and reduce program costs and staff workload. While TES has numerous possible benefits, adoption of computer technology, especially in a field that is based on human interaction, is slow. Perceived social norms were the dominant predictor of intention. More research is needed on strategies to change perceived social norms.

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Table 1

Intention, attitudes, and perceived social norm means by workforce characteristics

Characteristics	Total <i>n</i> =96	Intention ^b <i>M</i> (<i>SD</i>)	Attitudes ^b <i>M</i> (<i>SD</i>)	Perceived Social Norms ^b <i>M</i> (<i>SD</i>)
<i>Gender (%)</i>				
Male	23.9	.96 (1.87)	1.09 (3.45)	−0.17 (1.53)
Female	76.0	.67 (1.66)	2.04 (3.35)	−0.42 (1.61)
<i>F</i> (1)		0.49	1.40	.44
<i>Race (%)</i>				
White	80.0	.83 (1.60)	1.62 (3.20)	−0.45 (1.62)
Non-White ^a	20.0	.42 (2.14)	2.58 (4.10)	−0.11 (1.45)
<i>F</i> (1)		0.86	1.22	0.71
<i>Age (in years)</i>				
<i>M</i> (<i>SD</i>)	49.3 (13.1)	--	--	--
<i>Education (%)</i>				
No graduate Degree	40.6	.49 (1.97)	1.36 (3.53)	−0.51 (1.52)
Graduate Degree	59.4	.91 (1.49)	2.12 (3.27)	−0.26 (1.63)
<i>F</i> (1)		1.45	1.18	.57
<i>Years Counseling (%)</i>				
< 5 years	34.4	1.06 (1.69)	2.03 (3.64)	−0.45 (1.54)
> 5 years	65.6	.57 (1.70)	1.70 (3.26)	−0.32 (1.62)
<i>F</i> (1)		1.80	0.21	.16
<i>Recovery (%)</i>				
No	64.8	.86 (1.48)	1.98 (3.21)	−0.24 (1.52)
Yes	35.2	.59 (2.03)	1.56 (3.55)	−0.56 (1.63)
<i>F</i> (1)		0.53	0.33	0.90
Overall	--	0.74 (1.71)	1.81(3.38)	−0.36 (1.58)

^aNon-white includes Black, Asian, Pacific Islander, American Indian or Alaska Native, other, and multiple races.

^bTRA components were measured on a scale of -3 to 3. Summary scores range between −9 and 9.

Table 2

Base model with core components of the Theory of Reasoned Action

Variable	β	95% CI	t	R^2
Attitudes	0.07	-0.04, 0.18	1.28	0.11
Perceived Social Norms	0.33	0.12, 0.54	3.14**	

**
p < 0.01

Table 3

Mixed effects multi-level model of intention to implement web-delivered psychosocial interventions

Variable	β	95% CI	<i>t</i>	R ²
Attitudes	0.07	−0.04, 0.18	1.26	0.16
Perceived Social Norms ^a	0.32	0.11, 0.52	3.06 ^{**}	
Number of Employees Providing Services ^b	−0.005	−0.01, 0.004	−2.26 [*]	

^aWorkforce-level variable.^bOrganizational-level variable.^{*}
p < 0.05^{**}
p < 0.01