

CAN A MOTIVATIONAL-INTERVIEWING-BASED OUTPATIENT SUBSTANCE ABUSE TREATMENT ACHIEVE SUCCESS? A THEORY-BASED EVALUATION

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ABSTRACT

This study evaluated a South African outpatient drug counselling centre's motivational interviewing-based treatment programme from theory and outcomes-based perspectives. 142 participants were interviewed at admission to the programme and followed up 6 and 10 weeks later. Trajectories of substance use, substance dependence, self-efficacy, motivation (using SOCRATES sub-scales of Problem Recognition, Ambivalence and Taking Steps) and NA/AA affiliation were examined. Self-efficacy and SOCRATES Taking Steps scores increased and were significantly associated with substance use levels, which decreased significantly over time. Higher self-efficacy scores at end-of-treatment (6 weeks) predicted lower substance use scores at 10 weeks. More programme attendance was associated with lower levels of substance use/dependence. Abstinence was achieved by 47% of participants.

Key words: substance abuse, substance dependence, treatment outcomes, self-efficacy, motivation, evaluation.

Global estimates suggest that approximately 5.4% of the global burden of disease is attributable to alcohol and illicit drug use (World Health Organization, 2014), making substance abuse treatment an urgent priority world-wide. As in other low- and middle-income countries (World Health Organization, 2010), in South Africa many treatment centres, especially those operating in the non-profit sector, operate under severe budgetary

constraints (Myers and Parry, 2003), with the financial concerns of the population they serve typically creating significant barriers to treatment access (Myers et al., 2011).

Treatment based on motivational interviewing (Miller and Rollnick 1991) has shown promise as a shorter, more flexible treatment than traditional treatment programmes. Motivational interviewing (MI) helps people increase motivation

for changing substance use habits by exploring and resolving ambivalence about change (Lundahl and Burke, 2009). A feedback process using personal assessment results together with pure MI is termed motivational enhancement therapy (MET) (Burke et al., 2003; Cloud et al., 2006; Hettema, Steele, & Miller, 2005). MET is considered at least as effective as cognitive-behavioural therapy and Twelve Step programmes (Hettema et al., 2005), similar to them in terms of durability (Lundahl and Burke, 2009), and a cheaper option than other competing therapies due to its relative brevity (Lundahl and Burke, 2009). These findings, combined with MET's enduring effects (Burke et al. 2003; Lundahl et al., 2010; Lundahl and Burke 2009), offer good support for the use of MET in treatment centres. Previous research has focused on examining MET within the parameters of efficacy studies, but outcome studies of MET-based real-world treatment programmes under pragmatic conditions are rare.

The Cape Town Drug Counselling Centre offers a low-cost, outpatient treatment programme with MET as its basis, and serves a multicultural clientele drawn mainly from the lower socio-economic areas of Cape Town and surrounds. This makes it an ideal setting for a pragmatic effectiveness study exploring the possibility of the success of MET under the usual conditions of a non-profit treatment centre.

METHOD

The theory of change for the treatment provided by the Centre

Elaborating a theory of change for a programme includes mapping the desired responses of participants to programme

activities, as well as the mediating processes between programme services and the achievement of programme goals (Weis, 1998). Clients admitted to the Cape Town Drug Counselling Centre's programme are expected to attend six compulsory weekly sessions each of individual counselling, group therapy and psycho-educational lectures/discussions, and two family sessions. All are delivered using the key concepts of motivational interviewing techniques. The Centre also uses referral to Alcoholics Anonymous (AA) or Narcotics Anonymous (NA) groups, drug testing and family workshops as additional treatment resources.

Increased self-efficacy and motivation levels were identified by staff as key mediating processes in order to achieve abstinence. This was supported by the literature which postulates that both lead to positive behavioural change and resultant reduced substance use (Read, Kahler, & Stevenson, 2001). We were also interested in the relationship between levels of AA/NA attendance and affiliation and substance use outcomes. We hypothesized that self-efficacy levels, motivation levels and AA/NA affiliation would increase over time and would be associated with reduced substance use and substance dependence; that substance misuse would decrease over time; and that higher self-efficacy levels at end-of-treatment would be inversely associated with substance use outcomes four weeks after end-of-treatment. We further expected that programme "dose" - the number of sessions clients attended - would be negatively associated with levels of substance use.

Evaluation design

The Centre could not suspend normal operations during the evaluation,

eliminating the possibility of a controlled design. We therefore chose a theory-based approach (Weiss, 1998), with assessments at admission, immediately after the programme, and again at one month after the end of treatment, which allowed us to accomplish several goals: (1) assess whether self-efficacy, motivation and AA/NA affiliation would change over time and be related to outcomes, as predicted by the Centre's programme theory (Shadish et al., 2002) ; (2) assess whether the desired outcomes were achieved; and (3) assess whether those outcomes, if achieved, were sustained for at least a month post-treatment.

The study was approved by the University of Cape Town Humanities Faculty Research Ethics Committee.

Measures

Substance use. Substance use and substance dependence levels were determined by the Alcohol, Smoking and Substance Involvement Screening Test (WHO ASSIST v3.0; Humeniuk et al., 2008). Respondents were assessed for risk in respect of alcohol, cannabis, cocaine, methamphetamines, inhalants, sedatives, hallucinogens, opiates, and 'other drugs'. Scores measure whether respondents are at low, moderate or high risk of experiencing problems relating to substance abuse: These risk categories are good predictors of, respectively, substance use, substance abuse and substance dependence (Newcombe et al., 2005). The instrument has been tested for cross-cultural relevance (World Health Organization, 2013) and has been successfully utilized in a South African study involving substance abuse among South African primary care clinic patients (Ward et al., 2008).

Variables assessing mechanisms of treatment

AA/NA Anonymous Affiliation Scale.

This is a short and reliable assessment of participants' levels of affiliation with AA/NA and includes seven close-ended questions relating to number of meetings attended, service at meetings, literature read and sponsors obtained (Humphreys et al., 1998).

Socrates Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES).

This is a 19-item instrument designed to assess levels of motivation for change in substance users, with three sub-scales - Problem Recognition, Taking Steps (towards change) and Ambivalence (Miller and Tonigan, 1996). The Recognition sub-scale assesses respondents' self-perceptions of drinking problems. Recognition scores are positively associated with problem severity, with high scores indicating acknowledgement of problems related to excessive drinking or drug use, while low scores reflect little or no desire for change. The Ambivalence sub-scale assesses a "weighing up" attitude towards change. Ambivalence scores should be interpreted in conjunction with Recognition scores to avoid ambiguity of results (Miller and Tonigan, 1996). This is exemplified by a questionnaire statement, "I think that I am an addict", attracting misleading 'Disagree' scores because clients expressed that they 'knew' that they were addicts - they did not merely think it. Therefore Ambivalence variables were restructured and recoded as follows: If the ambivalence score was equal to 1 and the recognition score was either 4 or 5 then the ambivalence score was altered to 5. If the ambivalence score was equal to 2 and the recognition score was either 4 or 5 then the ambivalence score was

changed to 4. The Taking Steps sub-scale assesses the level of action being taken by respondents to make positive changes to their drinking or drug use. High scores may predict successful change and taking active steps toward change.

Drug-Taking Confidence Questionnaire-8 (DTCQ-8). This is an 8-item assessment of levels of self-efficacy to resist temptation to drink or use drugs, in a variety of situations. Compared against a 50-item drug-taking confidence questionnaire, global self-efficacy is evaluated with 95% accuracy, is appropriate for use before, throughout and after treatment, as well as being a particularly appropriate tool in telephone follow-ups (Sklar and Turner, 1999).

Programme “dosage” received by each participant. This was obtained through record review, by adding the number of individual counselling sessions, group sessions and psycho-education discussions attended by each participant.

Sample

The Centre operates on a rolling admission basis. A total of 261 participants were recruited between 24 May 2011 and 3 April 2012, and interviewed at their assessment visit after consenting to participate. Clients were followed by telephone immediately post-treatment (6 weeks from admission) and again four weeks later, with each follow-up having a “window period” of two weeks. As more than half of heroin users who relapsed after residential treatment did so within the first three days after discharge and 75% within one week (Gossop et al., 2002), and 56.5% of treatment-seekers in an outpatient Southern California methamphetamine treatment study were still using at discharge (Rawson et al., 2005), this was

considered an acceptable follow-up period for our study. Inclusion criteria were a minimum age of 18 years and active substance use or drinking during at least the three months before initial intake. Of the original 261 interviewees, 56 who did not begin the treatment programme were excluded, as were 47 who were referred by the Centre to in-patient facilities and 16 others, leaving 142 participants in our sample. Of these, 89 were interviewed at all three time points, 17 at only admission and 6 weeks after admission, and 98 at admission and 10 weeks after admission.

The demographic composition of our in-treatment sample ($N=142$) was: 61% Coloured, 24% White, 14% Black¹, 1% unknown; 75% male, 25% female; and mean age 30. These characteristics did not differ significantly in any way from the group who only stayed for the assessment. However, individuals using heroin at high-risk levels (according to their baseline ASSIST scores) were significantly less likely to enter the treatment programme than those not doing so (χ^2 (df=1) =11.938, $p=0.001$). Conversely, individuals using methamphetamines at high-risk levels were significantly more likely to enter treatment than those who did not (χ^2 (df=1) =4.289, $p=0.027$) and methamphetamine was the substance most used at high-risk levels in the group who stayed for treatment.

Analyses

Because of an assumption that drug users who cannot be contacted on follow-up

1 “Black”, “Coloured” and “White” are racial classifications used under Apartheid. While we reject the ideology associated with these pejorative terms, we note them here because of their continuing influence on access to healthcare, such as substance abuse treatment centres (Myers and Parry, 2005).

Table 1. Substance use history on admission (N=142)

Risk categories	Low	%	Medium	%	High	%
Methamphetamines	3	2%	34	24%	55	39%
Alcohol	54	38%	22	15%	27	19%
Cannabis	14	10%	50	35%	25	18%
Opioids	2	1%	8	6%	18	13%
Cannabis	14	10%	50	35%	25	18%
Sedatives	9	6%	32	23%	14	10%
Cocaine	8	6%	19	13%	11	8%
Other	1	1%	1	1%	2	1%
Inhalants	2	1%	2	1%	0	0%
Hallucinogens	2	1%	12	8%	0	0%

may have relapsed (Shadish et al., 2002) we performed an intent-to-treat analysis, with baseline data imputed for missing data on the full in-treatment sample at admission and 10 weeks post-admission (N=142). We also conducted an analysis without missing data on the group of 98 participants (69% of the sample) who completed questionnaires at admission and 10 weeks after admission, as 10-week data was considered a better barometer of success than 6-week data and our response rate fell marginally short of the 70% level recommended for feasibility of findings (Digiusto et al., 2006; Hubbard et al., 1997). An analysis was conducted on the group of 89 participants interviewed at all three time points to determine the trajectories of all variables as well as the impact of end-of-treatment self-efficacy levels on 10 weeks post-admission substance use levels. Each analysis included mixed effect simple regressions on every variable to observe independent changes over time as well as mixed effect multiple regression tests to establish the impact of covariates on the global ASSIST score in conjunction with time. Mixed effect multiple regression tests were run on

a final model, including only variables showing significance in the previous test, to calculate the relative contribution of each independent significant variable to global ASSIST scores. In addition a Spearman correlation test was performed on the three-time point group to ascertain whether higher self-efficacy levels at end of treatment (6 weeks after admission) were associated with lower global ASSIST scores four weeks later.

RESULTS

The results of all three analyses are summarized in Table 2.

Intent-to-treat analysis (N=142): Admission and 10 weeks post-admission

Changes occurred as expected for substance use, substance dependence and SOCRATES Ambivalence levels, which decreased significantly, while, also as expected, self-efficacy and SOCRATES Taking Steps levels increased significantly over time. There were no significant changes in either AA/NA affiliation or SOCRATES Recognition levels over time. Self-efficacy,

Table 2. Variables predicting global ASSIST scores

Variable	Full sample (intent to treat analysis; n=142)		Sub-sample with complete data (two time-points; n=98)		Sub-sample with complete data (three time-points; n=89)	
	(10 Weeks only)		(10 Weeks only)		(6 Weeks and 10 Weeks)	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Time (6 Weeks vs. Admission)	NA	NA	NA	NA	-1.33	(-5.71, 3.06)
Time (10 Weeks vs. Admission)	-32.7***	(-40.16, -25.24)	-34.55***	(-42.8, -26.3)	34.08***	(26.07, 42.1)
Dosage	-10.2*	(-18.52, -1.89)	-7.44	(-15.56, 0.68)	-10.27***	(-15.87, -4.67)
Self-efficacy	-0.03**	(-0.04, -0.01)	-0.02*	(-0.04, 0)	-0.02**	(-0.03, 0)
SOCRATES Taking Steps	-0.75*	(-1.51, 0)	-1.37**	(-2.3, -0.45)	-1.28***	(-1.94, -0.63)
SOCRATES Recognition	1.47***	(0.86, 2.08)	1**	(0.4, 1.6)	0.79***	(0.45, 1.12)
SOCRATES Ambivalence	-0.37***	(-0.47, -0.27)	NA	NA	NA	NA

* p<0.05, ** p<0.01, *** p<0.001

SOCRATES Taking Steps, Ambivalence and dosage were all significantly negatively associated with substance use over time, i.e., as the levels of these variables increased, the global ASSIST scores decreased. SOCRATES Recognition was positively associated with global ASSIST scores, while AA/NA Affiliation was not associated with any change in score.

Analysis across participants who provided data at admission and ten weeks after admission (n=98)

Results were similar in magnitude and direction to those found in the intent-to-treat-analysis although differences include that SOCRATES Recognition significantly decreased over time and SOCRATES Ambivalence levels did not change significantly. The global ASSIST score and specific substance use scores decreased significantly over time while self-efficacy levels and SOCRATES Taking Steps levels increased significantly. Self-efficacy and SOCRATES Taking Steps were significantly negatively associated with the global ASSIST score in conjunction with time, while SOCRATES Recognition was significantly

positively associated with the global ASSIST score. AA/NA affiliation did not individually change in any significant way nor was it associated with any change in the global ASSIST score. The association between programme dosage and the global ASSIST score approached significance (p=0.072), with 44% of participants attending at least 50% of required sessions and attendance figures ranging from one session to all possible sessions attended.

Substance use levels

At 10 weeks post-admission, 47% of participants reported abstinence from all substances while the remaining 53% reduced their substance use significantly. Alcohol was the one exception with the number of participants using alcohol 'once or twice' increasing by 50% (see Table 3) warranting further analysis: Of the 52 non-abstinent participants, 13 had used only alcohol once or twice in the follow-up period (none had reported only alcohol use at admission), resulting in 60% of participants either abstinent or having used alcohol only once or twice. A further 6 participants had used only alcohol

weekly at 10 weeks follow-up while the remainder of participants significantly reduced their substance use.

Analysis across participants who provided data at all three time points (n=89)

Tests showed the same magnitude and direction as the group of 98 participants. Figure 1 illustrates that self-efficacy and SOCRATES Taking Steps scores increased significantly from admission to 6 weeks post-admission; these increased levels were maintained in the month after treatment ended but not significantly further improved. Similarly, the global ASSIST and the substance use scores decreased significantly from admission to 6 weeks post-admission and maintained the downward trend between 6 weeks and 10 weeks post-admission, but not in a significant way. The remaining variables did not change significantly at any time point. The unique test on this group revealed that self-efficacy scores at 6 weeks post-admission had a significant effect on substance use scores at 10 weeks post-admission.

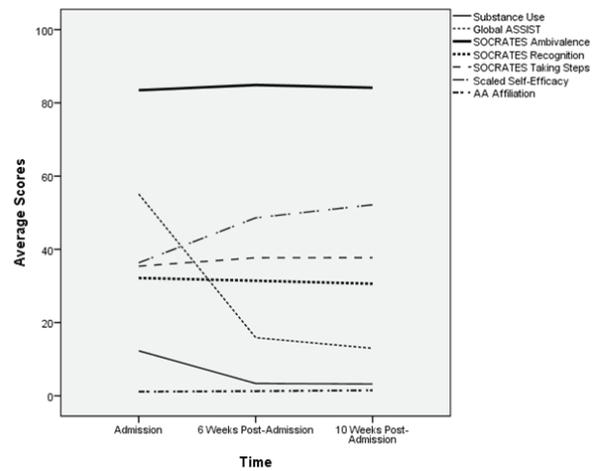


Figure 1. Variable trajectories over all three time points (n=89)

DISCUSSION

Substance use outcomes

In the group of 98 with no missing data our findings of 47% abstinence, a further 13% using alcohol only once or twice over the follow-up period, and significant reduction in substance use in the remainder of the participants, compared extremely favourably to Burke and colleagues’ (2003) findings that 54% of participants receiving adapted motivational

Table 3. Changes in substance use frequencies for all 98 Participants interviewed at admission and 10 weeks after admission

Substance	Using		Once/Twice		Weekly		Daily/Almost Daily					
	Number	% Change	Number	% Change	Number	% Change	Number	% Change				
	Ad	10 Weeks	Ad	10 Weeks	Ad	10 Weeks	Ad	10 Weeks				
Inhalants	2	0	-100%	2	0	-100%	NA	NA	NA	NA	NA	
Other	1	0	-100%	NA	NA	NA	NA	NA	1	0	-100%	
Sedatives	34	3	-91%	11	2	-82%	9	0	-100%	9	1	-89%
Opioids	18	2	-89%	2	2	0%	NA	NA	-100%	14	0	-100%
Hallucinogens	7	1	-86%	6	1	-83%	2	0	NA	NA	NA	NA
Cocaine	19	3	-84%	9	2	-78%	5	1	-80%	2	0	-100%
Amphetamines	55	15	-73%	10	9	-10%	12	3	-75%	26	3	-88%
Cannabis	56	18	-68%	13	9	-31%	11	4	-64%	25	5	-80%
Alcohol	68	40	-41%	16	24	50%	24	12	-50%	18	4	-78%

interviewing interventions experienced overall improvement in alcohol and drug use. Results for heroin use should be regarded with some caution as although 89% of participants reported abstinence from heroin use at follow-up, after-treatment abstinence from heroin is consistently significantly lower at up to one-year follow-up than that of any other drug (Gossop et al., 2002). Similarly, the 73% methamphetamine abstinence rate at follow-up compares favourably with outcomes of participants in an intensive 16-week out-patient programme, where findings include that 58.8% of methamphetamine users used both drugs and alcohol during treatment (Rawson et al., 2005).

Clearly, some participants replaced their illicit drug-of-choice with alcohol on occasion. This reduced drinking pattern of once or twice or weekly in the follow-up period may fall within moderate drinking limits (Whitlock et al., 2004) but not within the key outcome of abstinence of the Centre's programme theory.

Dosage

The significant impact of programme dose on the global ASSIST score, both in the group of 89 participants who were interviewed at all three time points and in the full in-treatment sample of 142 participants is encouraging. This suggests that the more exposure clients choose to have to the treatment programme, the more their substance dependence is reduced, thus suggesting that it is indeed the treatment programme that is leading to reduced substance use. This is consistent with findings that more time in treatment is associated with better outcomes (Simpson et al., 1997) and that there is a significant positive relationship between

higher treatment doses and better outcomes (Burke et al. 2003).

Self-Efficacy

The significant increase in self-efficacy scores from admission to 10 weeks post-admission, and the significant association of self-efficacy scores over time with the reduction of global ASSIST scores, imply successful application of programme theory. The significant association between self-efficacy levels at 6 weeks post-admission and 10 week post-admission substance use scores supports findings of Goldbeck and colleagues (1997) that end of treatment efficacy levels are predictive of reduced substance use levels at follow-up, and that higher levels of abstinence self-efficacy are associated with better short-term substance abuse outcomes (Moos and Moos, 2007; Morgenstern et al., 1997). As self-efficacy levels indicate who will be less or more likely to experience positive outcomes after treatment (Ilgen et al., 2005), this questionnaire may be a useful tool to assess the need for clients to participate in the Centre's aftercare programme.

SOCRATES subscales

The significant positive relationship between SOCRATES Recognition scores and global ASSIST scores is in keeping with Miller and Tonigan's (1996) assertions that higher levels of recognition of a drinking or drug problem imply greater problem severity and vice versa. This relationship remained stable over time, indicating that the recognition sub-scale could be a useful additional treatment tool for counsellors to determine and address problem severity. The significant increase in the SOCRATES Taking Steps score implies again the successful application of

programme theory, in keeping with Miller and Tonigan's (1996) findings that high scores on this subscale are associated with successful change, offering counsellors the opportunity to gauge motivation levels of clients before and during their treatment process. A possible explanation for the inconsistent results of the ambivalence variable between analyses is that ambivalence is a constantly fluctuating state (Cloud et al., 2006) and consequently is not expected to follow a linear path to resolution. It is also possible that the ambiguity of the ambivalence-related questions, as acknowledged by Miller and Tonigan (1996), and the restructure of the ambivalence variable did not accurately reflect levels of ambivalence.

NA/AA affiliation

Although most subjects drop out of, or sporadically attend, Twelve Step programmes after end-of-treatment (Cloud et al., 2006), our findings showed no significant change in NA/AA affiliation even during the treatment period. As Twelve Step programmes are affordable and effective post-treatment support options (Read et al., 2001) and attending Twelve Step self-help groups improves post-treatment outcomes as well as reduces the cost of continuing care to government (Humphreys and Moos, 2007), it is extremely important that this Centre's clients be introduced to the benefits of NA/AA affiliation before end of treatment. We therefore recommend that referral procedures to AA/NA be revised: A directive strategy, where therapists actively followed up clients' engagement with AA during treatment (Walitzer et al., 2009), and an 'intensive referral' approach, in which both client and counsellor were actively involved in initiating contact with

Twelve Step self-help groups (Timko et al., 2006), were both found to result in significantly more Twelve Step involvement and more improvement in alcohol and drug use after treatment than the treatment-as-usual condition.

As causal relations cannot be firmly inferred by data from a non-experimental study our findings remain tentative, and it is of course possible that it was the more motivated clients who were successful and completed treatment. Although reliance on self-report from participants is a methodological vulnerability, participants' self-reported substance use has been found to be consistent with the results of urine drug screens (Project MATCH Research Group, 1997a). The short duration of follow-up is also a limitation of this study as it is possible that findings may have differed after a longer period of time had elapsed. Although NA/AA affiliation did not increase as expected, this shortcoming increased confidence that changes found were due to the treatment programme rather than any other competing recovery mechanism. Possibilities for future research include investigating methods to optimize AA/NA attendance, particularly in poorly resourced communities, through the treatment community and beyond. Future studies should also include a control group, and follow participants over a longer period.

Despite these limitations this study provides good evidence of significant outcomes in the reduction of substance use and substance dependence and in the increase of motivational and self-efficacy levels. Findings support programme and motivational interviewing theory, which both postulate high levels of self-efficacy and motivation as beneficially impacting on substance use and substance

dependence, offering further evidence of programme efficacy. All of these programme effects are particularly encouraging in the context of the relative cost-effectiveness and short duration of the treatment programme.

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