Title

Achieving Drug and Alcohol Abstinence Among Recently Incarcerated Homeless Women: A Randomized Controlled Trial Comparing Dialectical Behavioral Therapy-Case Management With a Health Promotion Program.

Journal

Nursing research, 66(6)

ISSN

0029-6562

Authors

Nyamathi, Adeline M
Shin, Sanghyuk S
Smeltzer, Jolene
et al.

Publication Date

2017-11-01

DOI

10.1097/nnr.0000000000000249

Peer reviewed

HHS Public Access

Author manuscript

Nurs Res. Author manuscript; available in PMC 2018 November 01.

Published in final edited form as:

Nurs Res. 2017 ; 66(6): 432–441. doi:10.1097/NNR.0000000000000249.

Achieving Drug and Alcohol Abstinence Among Recently Incarcerated Homeless Women: A Randomized Controlled Trial Comparing Dialectical Behavioral Therapy-Case Management With a Health Promotion Program

Adeline M. Nyamathi, ANP, PhD, FAAN,
Founding Dean and Professor, Sue & Bill Gross School of Nursing, University of California, Irvine, Irvine, CA

Sanghyuk S. Shin, PhD,
Assistant Professor, Sue & Bill Gross School of Nursing, University of California, Irvine

Jolene Smeltzer, MSN, RN,
Student, Mervyn M. Dymally School of Nursing, Los Angeles, California, Charles Drew University of Medicine and Science, Los Angeles, CA

Benissa E. Salem, PhD, MSN, RN,
Assistant Adjunct Professor and Project Director, School of Nursing, University of California, Los Angeles

Kartik Yadav, MSCR,
Project Director, Sue & Bill Gross School of Nursing, University of California, Irvine

Maria L. Ekstrand, PhD,
Professor, School of Medicine, University of California, San Francisco

Susan F. Turner, PhD, and
Professor, Department of Criminology, Law & Society, University of California, Irvine

Mark Faucette, BS
Vice President, Amistad de Los Angeles, Los Angeles, CA

Abstract

Background—Homeless female exoffenders (homeless female offenders) exiting jail and prison are at a critical juncture during re-entry and transitioning into the community setting.

Objective—The purpose of the study was to compare the effect of a dialectical behavioral therapy-corrections modified (DBT-CM) program with a health promotion (HP) program on achieving drug and alcohol abstinence among female parolees/probationers residing in the community.

Corresponding author: Adeline Nyamathi, ANP, Ph.D., FAAN, Berk Hall, Room 252D, UCI, School of Nursing, Irvine, CA 92617 (anyamath@uci.edu).

Clinical Trial Registration: Clinical Trials.gov NCT02258425.

The authors have no conflicts of interest to report.

Methods—We conducted a multicenter parallel randomized controlled trial with 130 female parolees/probationers (aged 19–64) residing in the community randomly assigned to either DBT-CM (n = 65) or HP (n = 65). The trial was conducted in four community-based partner sites in Los Angeles (LA) and Pomona, California from February, 2015 to November, 2016. Treatment assignment was carried out using a computer-based URN randomization program. The primary outcome was drug and alcohol use abstinence at six-month follow up.

Results—Analysis was based on data from 116 participants with complete outcome data. Multivariable logistic regression revealed that the DBT-CM program remained an independent positive predictor of decrease in drug use among the DBT-CM participants at six months (p = .01) as compared with the HP program participants. Being non-White (p < .05) and having higher depressive symptom scores (p < .05) were associated with lower odds of drug use abstinence (i.e., increased the odds of drug use) at six months.

Discussion—DBT-CM increased drug and alcohol abstinence at six month follow-up, compared to a health promotion program.

Keywords

case management; dialectical behavior therapy; health promotion; incarceration; substance use; women

---

Despite a decline in the correctional population, more than 45% of California's offenders return to prison within the first year of release; strikingly, within three years, the rate climbs to 73% (California Department of Corrections and Rehabilitation, 2014). Among homeless parolees, multiple challenges with mental health issues, substance use addiction, unemployment, and unstable housing conditions impact successful re-entry (Binswanger et al., 2011). Illicit drug use is a contributing factor to incarceration as well as homelessness (McNeil & Guirguis-Younger, 2012; Tsai, Kasprow, & Rosenheck, 2013). However, recently released offenders continue to have unmanaged drug issues, with probationers and/or parolees affected four to nine times higher when compared to their non-supervised counterparts (Fearn et al., 2016). Successful drug treatment completion and drop-out rates are high with two-thirds not completing treatment programs (Zerger, 2002).

A myriad of factors may account for drug relapse and recidivism (Salem, Nyamathi, Keenan, et al., 2013). Among women, recidivism associated with drug-related violations is greater than those of male offenders (32% vs. 21%) (Leukefeld et al., 2009). Few gender-sensitive programs address drug and alcohol use and recidivism behaviors (Salem, Nyamathi, Idemundia, Slaughter, & Ames, 2013), which necessitates obtaining information about how to effectively address the unique needs of the homeless female exoffender following release.

Given these findings, it is critical for policymakers to engage homeless paroled adults in behavioral interventions that not only reduce risky behaviors, such as drug and substance use, but enable positive coping and communication skills in the continuity of their life course trajectory. In fact, there may be other potential alternatives to decreasing negative outcomes among recently released offenders with drug and alcohol addictions such as inclusion of behavioral interventions in treatment settings. Dialectical behavioral therapy

(DBT) is one effective behavioral intervention for recently released offenders who are engaged in risky behaviors because it addresses the behavioral and emotional barriers to successful completion of treatment programs.

Dialectical Behavioral Therapy

Dialectical behavioral therapy has been shown to decrease treatment dropout and risky behaviors among suicidal patients with borderline personality disorders (Linehan et al., 2006). In prison settings, the aim of DBT is to teach those who are incarcerated how to dialectically think through and problem-solve during conflicting situations (Berzins & Trestman, 2004). The DBT corrections-modified method (DBT-CM) includes four core modules: mindfulness, interpersonal effectiveness, distress tolerance, and emotion regulation. As formerly incarcerated persons undergo the process of addressing the four core modules of DBT-CM, a change in thoughts and emotions, and an increase in adaptive behaviors and cognitive abilities occur that will prevent the escalation of maladaptive behaviors (Shelton, Kesten, Zhang, & Trestman, 2011).

In the female offender population, DBT programs were evaluated for viability of the intervention in a prison setting for women with bipolar disorder, and the impact on criminogenic risk and self-harm (Nee & Farman, 2005). The findings revealed significant improvement in the women receiving the DBT program as compared to the control group in criminogenic risk (e.g., impulsivity, anger, locus of control, self-esteem and emotion regulation) and in the characteristics of the global bipolar disorder syndrome (Nee & Farman, 2005). A reduction in criminogenic tendencies such as self-harm—as well as improvement in the management and quality of life— resulted (Nee & Farman, 2005).

In this study, DBT-CM was implemented to assist homeless female offenders manage emotional dysregulation and maladaptive behaviors by combining mindfulness with structured cognitive-behavioral techniques. It was thought that once these women accept themselves and their past—as persons with a recent history of incarceration—they can start to reshape maladaptive cognitions and reduce the incidence of self-destructive behaviors as they work towards a successful future (Berzins & Trestman, 2004; Linehan, 1993), but data about efficacy is not available.

Theoretical Model

A nursing-orientated, theoretical framework, the comprehensive health seeking coping paradigm (CHSCP), derived from the schema of coping and adaptation (Lazarus & Folkman, 1984) and the health seeking and coping paradigm (Schlotfeldt, 1981) guided the development of the study and the selection of intervention and instruments for this study (Nyamathi, 1989). The CHSCP model guided the selection of the following factors: sociodemographic factors, situational, social, personal, and health seeking and coping behaviors.

Sociodemographic factors that may relate to study outcomes included age, race/ethnicity, education, and employment status. Social factors (social support), and health seeking and coping factors such as treatment readiness, and coping methods such as program attendance

and retention in program were also considered. Situational factors such as homelessness (Nyamathi et al., 2011) and history of criminal activities, as well as personal factors such as a history of depression and substance use, may be barriers for homeless ex-offenders in completing the community residential drug treatment (RDT) programs and successfully reentering the community.

Purpose

The primary purpose of this study was to determine the effect of a DBT-CM intervention program versus a health promotion (HP) program on drug use abstinence among homeless female parolees/probationers at six-month follow-up. We hypothesized that DBT-CM intervention will increase the odds of abstinence to drug use during the six-month study period compared to the HP program. As secondary objectives, we examined the effect of the intervention on abstinence from alcohol use and combined drug/alcohol use. Lastly, we aimed to identify baseline predictors of outcome success (abstinence).

Methods

Design, Sample and Site

In total, 130 homeless female offenders from four community-based partner sites, which included RDT programs, shelters and service centers in Los Angeles (LA) and Pomona, California were enrolled from February 2015 to November 2016. Eligibility criteria were: (a) having used drugs prior to their most recent incarceration; (b) ages 18–65 years; and (c) were considered homeless prior to discharge from incarceration. The CONSORT flow diagram is available (see Figure, Supplemental Digital Content 1). As shown in the figure, 176 homeless female offenders were screened and 46 homeless female offenders were excluded, of which 34 were ineligible based on screening criteria of homelessness, history of drug use or time since arrested. The remaining 12 were eligible but did not complete the second consent to be randomized in to the study; hence they were not enrolled. The study was approved by the University's Institutional Review Board and registered with Clinical Trials.gov.

Procedures

Potential participants were informed about the study using posted flyers and a brief information session by the research staff. Women who were interested in more details were invited to attend one-on-one sessions in a private location. If they were interested in continuing, a brief consent script was read and signed, and a screener administered by the research staff. Among eligible women who requested participation, a detailed informed consent was read, discussed, and questions were answered by the research staff. A 45-minute baseline survey was administered, followed by the request for a urine sample to assess for drug use.

After the baseline administration, the participants were randomized to the DBT-CM Behavioral or HP programs based on age strata and levels of Lifestyle Criminality Screening Form (LCSF) scoring using the URN randomization program (Stout, Wirtz, Carbonari, & Del Boca, 1994) 1994). Both the programs were delivered over three months. Cash

incentives in the amount of $3 for the initial screening, $15 for the baseline, and $35 for the follow-up surveys were provided. In addition, participants were provided $3 for each of the six group and six one-on-one sessions. Those who completed all 12 sessions received a $5 bonus. A 90% follow up completion rate was achieved.

Program Development

Development of the DBT-CM and the HP programs utilized elements of community-based participatory research which established a community advisory board (CAB) with community stakeholders, criminal justice experts, social service providers and academicians. The CAB modified a semistructured interview guide (SSIG) which had been developed based on previous research, the literature and in consultation with community and criminal justice experts. Subsequent to the CAB, focus groups were conducted among Homeless female offenders to understand their perspectives (Nyamathi et al., 2016). Thereafter, two manualized programs were developed for the DBT-CM and a HP program group and one-on-one sessions.

Research Staff Training-Competency Checklist

Six research staff which included community health workers (CHWs; $n = 4$) and nurses (RNs; $n = 2$) were intensively trained through a standardized procedure over ten days. In order to ensure provider skill acquisition and minimize “drift” in provider skills (Bellg et al., 2004), a competency checklist was developed uniquely for this study, which the project director utilized, to rate the research staff on a Likert-type scale of 4 = *excellent*, 3 = *good*, 2 = *okay*, and 1 = *needs improvement*.

Treatment Fidelity Monitoring

Both groups were monitored for fidelity in group and one-on-one sessions using a Likert-scale checklist—with response options of excellent, good fair, and poor—that assessed the following: (a) management of the session, (b) group content preparation, (c) clarity, and (d) environment. Treatment fidelity ensured the same treatment dose within conditions and ensured equivalent dose across conditions. The project director (PD) regularly observed and assessed fidelity by rating each core component for the DBT-CM and HP groups and one-on-one sessions.

Experimental Conditions

DBT-CM intervention—The program consisted of six weekly group sessions (with 5–7 individuals per group) and six weekly one-on-one sessions, each lasting on average 45–60 minutes, for a total of 12 weeks. Further, ongoing contact with the research staff was encouraged on a weekly basis over the six-month period. The six DBT-CM sessions were organized into the following topics: (a) avoiding and eliminating cues to use; (b) burning bridges to substance use, (c) building a life worth living; (d) observing urges; (e) adaptive denial; and (f) alternative rebellion. In addition, each session included signing in, mindfulness, and diary card/review of homework. The focus of the one-on-one sessions was on utilizing a diary card, organizing treatment targets, setting an agenda, chain analysis, and solution analysis. Furthermore, participants were assisted with referrals, and in identifying

risk factors that trigger use of substances and housing over the six-month program. For additional information, see Supplemental Digital Content 2.

HP program (comparator)—For participants assigned to the HP program, a dedicated nurse and two CHWs were trained to deliver a program focused on common chronic diseases that homeless women face and health promotion activities for these chronic diseases. Similar to the DBT-CM program, the women met in small groups of 5–7 at a time to discuss a particular chronic disease as well as in one-on-one sessions with the nurse or CHW to discuss more personalized strategies. The six HP sessions, conducted weekly, were focused on: (a) diabetes, (b) heart disease, (c) sexually transmitted infections, including HIV, (d) parenting skills, (e) community and family reintegration, and (f) other topics. The program was delivered over 12 weeks; there was no ongoing meeting of the participants in relation to referrals and support.

Variables and Measurement

Sociodemographic and situational factors—Site was noted; age, race/ethnicity, employment status, and education were self-reported. Incarceration history was obtained using the Lifestyle Criminality Screening Form (LCSF) (Walters, White, & Denney, 1991); the number of times in jail or prison and whether the participant was currently on probation or parole was obtained.

Social and personal factors—Social support was measured using the 19-item Medical Outcomes Study Social Support Survey (MOS-SSS); a 5-point Likert-type scale was used. Cronbach's alpha was = .97 in the development sample (Sherbourne & Stewart, 1991). Total scores were summed; higher scores meant higher social support. Relationship with family was self-reported using the Women's Risk Needs Assessment (WRNA; (Wright, Van Voorhis, Bauman, & Salisbury, 2008). A sample item is "*How is your relationship with your family*?" Response options ranged were 1 = *good* or 2 = *conflictual most of the time*. Emotional well-being was assessed using the Mental Health Index (MHI; Stewart, Hays, & Ware, 1988). Reliability estimates from .74 to .85 were reported among homeless and drug-using samples (Nyamathi, Leake, Longshore, & Gelberg, 2001). Item scores were summed and then linearly transformed to a 0 to 100 range; higher values indicated better emotional well-being. In this study, Cronbach's alpha was .87. Treatment readiness was measured using the 8-item Client Evaluation of Self and Treatment (CEST), using a five-point Likert scale (Joe, Broome, Rowan-Szal, & Simpson, 2002). A sample item is "*This treatment program can really help you*." Answers to items for each scale were averaged and then multiplied by 10. Scores ranged from 10 to 50, with scores above 30 indicating greater treatment readiness. Depressive symptomology was measured with the 10-item short form of Center for Epidemiologic Studies Depression Scale (CESD), which asks individuals how they felt or behaved in the last week (Andresen, Malmgren, Carter, & Patrick, 1994). Sample item included "*I was bothered by things that usually don't bother me*". Responses ranged from 0 = *rarely or none of the time (less than 1 day)* to 3 = *most of the time (5–7 days)*. Item scores were summed, resulting in a range for the total score from 0–30, with higher scores for greater depressive symptoms. The scale was dichotomized at the suggested cut point of ≥10 (Zhang et al., 2012) to indicate a need for psychiatric evaluation. In this sample,

Cronbach's α was .82. Anger and hostility were measured with questions on the Women's Risk Needs Assessment (WRNA; Wright et al., 2008); items addressed temper, trouble controlling temper, and anger/being upset when committing the last offense since last incarceration. Responses were 1 = *yes* or 0 = *no*. Cronbach's alpha for anger was .61. Post-traumatic stress disorder (PTSD) was assessed using the 4-item subscale of the WRNA (Wright et al., 2008); participants were asked about experiences in the last month which were frightening, horrible, or upsetting. Responses were 1 = *yes* or 0 = *no*. A score of "1" indicated a serious mental health problem. In this sample, Cronbach's α was .84

Coping behaviors—The Emotional Regulation Modes of Coping Scale, with 5-point Likert-type response options, was used to assess coping behaviors (Gratz & Roemer, 2004, 2008). Items ranging from 1 = *almost never* to 5 = *almost always*, with some reverse-scored items. Total score for the scale was calculated by adding keyed responses to all 36 items. The possible range was 40–140, with higher scores suggesting greater problems with emotional regulation. Sample subscales included Impulse Control Difficulties (six items, α = .86); Lack of Emotional Awareness (six items, α = .80); and Limited Access to Emotion Regulation Strategies (eight items, α = .88). Sample item included "*When I am upset, I become out of control.*"

Outcome variables—The primary outcome was drug use abstinence at the six-month follow-up visit. Abstinence was measured by self-report and urine analysis. Participants who reported being abstinent from drug use during the past six months but tested positive on urinalysis were coded as being not abstinent. Secondary outcomes were alcohol abstinence and abstinence for both drugs and alcohol combined during the past six months. For the combined abstinence outcome variable, anyone who had reported any alcohol or drug received a "0" and those who reported no use of drugs or alcohol received a "1".

Alcohol and drug use was self-reported using the Texas Christian University Drug History (TCU) form II (Institute of Behavioral Research, 2007). Frequency of alcohol and drug use in the last six months was addressed. Responses for frequency of use included "only a few times", "1–3 times a month," "1–5 times a week," and "about every day." The vast majority of the participants reported no use or "about everyday" (average of 94% at baseline and 90% at 6 months across drug and alcohol use variables). Thus, we used dichotomized responses as no use of drugs and alcohol (abstinent) or any use (not abstinent).

A 5-panel FDA-approved urine test cup (Phamatech, Inc.) was used at baseline and 6-month follow up. The test cup screened for metabolites of amphetamines, cocaine, methamphetamines, 3,4-methylenedioxy-methamphetamine (MDMA), opiates, and marijuana.

Data Analysis

Baseline characteristics were compared between the two programs using the Pearson's χ^2 test or the Fisher's exact test for categorical variables. The Wilcoxon rank-sum test was used for continuous variables instead of *t*-tests because many of variables were not normally distributed.

Logistic regression modeling with generalized estimating equation was used to compare changes in odds of drug use abstinence (primary outcome) during the study period between the programs (Zeger & Liang, 1986). Models were fitted with each outcome specified as the dependent variable and Program, Time, and a Program × Time interaction term specified as independent variables. The coefficient for the Program × Time interaction corresponds to the difference in change in abstinence among DBT participants compared to the change in abstinence observed among HP participants. This coefficient represents the effect of the DBT-CM intervention on improving abstinence during the study period compared to HP. We then repeated this analysis for the secondary outcomes: alcohol abstinence and abstinence to drugs and alcohol. The primary analysis used the complete case approach. Data from all participants randomized to either program with complete data for baseline and 6-month outcomes, regardless of the level of adherence to program activities were used. This approach was used given the relatively high proportion of participants with complete data for the outcome variable (89%).

We performed sensitivity analysis using the following approaches: (a) per-protocol analysis of only the participants who completed program activities; (b) imputation of missing six-month outcome data by carrying baseline values forward; and (c) multiple imputations under the missing at random assumption (Jolani, Frank, & van Buuren, 2014; Rubin, 1987). For multiple imputation, logistic regression modeling was used to impute missing outcome data sequentially with preceding data as predictors. Predictors included in the model were attendance completeness, baseline drug and alcohol use, baseline urinalysis results, and outcome variables (drug use and alcohol use at six months). Twenty five imputed datasets were generated, and analysis done on the imputed datasets was pooled using the method described by Rubin (1987). To assess the potential effect of confounding due to inadequate randomization, baseline characteristics that differed between the groups with $p < .2$ were evaluated in additional models.

We also used logistic regression modeling to identify baseline predictors of drug use abstinence at six months. First, separate bivariate logistic regression models were fitted with demographic or psychosocial measures as independent variables and abstinence at six months as the dependent variable. Predictors associated with the outcome with ($p < .10$) in the bivariate model were evaluated in multivariable logistic regression models in a forward stepwise manner. The final model included only the variables found to be statistically significant independent predictors of abstinence ($p < .05$). Confounding was assessed by determining changes in the effect of DBT on drug use abstinence after inclusion of the variable in the multivariable model (Greenland, 1989). All analyses were performed using R version 3.3.0 (R Core Team, 2013). Statistical tests were two-sided and nominal p-values of .05 were used to judge significance in the primary analysis.

Results

Participant Characteristics

Participant characteristics are summarized in Table 1. Sixty-five participants were enrolled into each group. There was no evidence of differences in baseline characteristics. Most participants were Black or Latina and the majority were unemployed. In total, 70% of the

participants were on probation at the time of enrollment. Participants reported moderate levels of social support and coping behavior. Likewise, participants reported moderate scores on the Mental Health Index (68 on a 100-point scale) and the PTSD score (M = 1.8 for HP group and1.5 for DBT-CM group; range 0–3); WRNA Relationship Scale scores were low (M = 5.1 for HP group and 4.8 for DBT-CM group; range 0–12). Nearly half (44.6%) reported depressive symptomology.

At baseline, 67.7% in the DBT-CM group and 69.2% of the HP group used any drugs during the past six months based on self-report with urinalysis (p = 1.00; Supplemental Digital Content 3). Marijuana and methamphetamines were the most frequently used drugs. Alcohol use during the past six months was reported by 41.5% of the participants in both groups. Complete attendance (attendance at six group sessions and at least six individual sessions) was achieved by 89.0% of the DBT-CM participants and 84.0% of the HP participants. Retention at six months was 87.7% for the HP group and 90.1% for the DBT-CM group.

Primary Analysis: Program Effectiveness for Drug Use Abstinence

At the six-month follow-up visit, 65.5% (38/58) of DBT-CM participants and 48.3% (28/58) of HP participants were abstinent for drug use, based on urinalysis confirmation of self-report (Table 2). Drug abstinence increased at six-month follow-up in both groups compared to the baseline. However, the magnitude of the increase in drug use abstinence was greater in the DBT-CM group compared to the HP group (i.e., the interaction term was significant; OR = 2.60; 95% CI [1.04, 6.53]; p = .04).

Secondary Outcomes

Similarly, participants in the DBT-CM group were more likely to become or remain alcohol-abstinent during the study period (OR = 3.12; 95% CI [1.24, 7.85]; p = .02); the HP group did not change. The differences in increased odds of substance abstinence (abstinent for both drugs and alcohol) was not significant (i.e., the interaction term was nonsignificant; OR = 2.39; 95% CI [0.92, 6.23]; p = .07).

Sensitivity Analysis and Imputation for Missing Data

Figure 1 shows the results of the complete case analysis (primary analysis) and sensitivity analysis. In per-protocol analysis of only participants who completed all program sessions (n = 53 for HP and n = 51 for DBT-CM group), the DBT-CM treatment showed a greater effect on abstinence for drug use (p < .05), alcohol use (p < .05), and substance use (p < .05) than the HP program. When missing outcome data at six months were imputed by carrying the baseline data forward, the DBT-CM informed program had greater effect on alcohol abstinence than the HP program (p = .02), while the differences between the two programs for substance abstinence (p < .11) did not reach statistical significance. In multiple imputation analysis, the difference effect between DBT-CM and HP groups did not reach statistically significance for any of the three outcomes (Figure 1). Including months since last exit from prison or jail (p = .10 between HP and DBT-CM groups) into the models to account for possible lack of balance between the program groups did not change our findings.

Baseline Predictors of Drug Use Abstinence

Using the $p < .10$ criterion in bivariate logistic regression models, DBT-CM program and Mental Health Index were associated with drug abstinence at six months. Factors associated with a reduced likelihood of six-month drug abstinence included: drug use at baseline; Black, Latina, and other race/ethnicity vs. White; impulse control difficulties; CES-D depression score; and depression/anxiety score. All variables associated with drug use abstinence with $p < .10$ in bivariate analysis were evaluated for inclusion in the multivariable logistic regression model.

Table 3 shows the final multivariable logistic regression model, including all variables associated with drug use abstinence at six months ($p < .05$). DBT-CM program remained an positive predictor of drug use abstinence at six months (*aOR* = 3.15; 95% CI [1.30, 7.69]; $p = .01$). Race/ethnicity was also significant, with lower odds of drug use abstinence found for Black (*aOR* = 0.05; 95% CI [0.01, 0.50]; $p = .01$), Latino (*aOR* = 0.08; 95% CI [0.01, 0.74]; $p = .03$), and other race/ethnicity (*aOR* = 0.05; 95% CI = [0.00, 0.64]; $p = .02$) vs. White. In addition, higher CES-D score was independently associated with lower odds of drug use abstinence (*aOR* = 0.91 for 1 unit increase in CES-D score; 95% CI [0.84, 0.98]; $p = .01$). Race/ethnicity was found to be a confounder for the association between the intervention and drug use abstinence, as adjusting for this factor led to an increase in the effect estimate for the intervention (*OR* = 2.04 in bivariate model to *aOR* = 3.15 after adjustment; Table 3). (The confounding occurred because a higher proportion of Black subjects were assigned to the DBT intervention [44.6% vs. 36.9%] for HP group. Since Black subjects were less likely to be abstinent at six months, the unadjusted model resulted in an artificially attenuated odds ratio for the effect DBT on abstinence [unadjusted *OR* = 2.04]. The multivariable model accounts for the imbalance in racial composition between the DBT and HP groups by statistically controlling for race/ethnicity [*aOR* = 3.15]. Similar effect of race and ethnicity on drug use outcomes has been documented in other studies and is addressed in the discussion.)

Discussion

Guided by the CHSCP, the purpose of this RCT was to determine the effect of DBT-CM versus a HP program on abstinence from drug and alcohol use among homeless female parolees/probationers. To our knowledge, this is the first study to demonstrate that a DBT-CM intervention compared to an HP program delivered by CHWs and registered nurses has been successful in achieving higher rates of drug and alcohol abstinence at six-month follow-up. The CHSCP provided a framework to understand how the DBT-CM influenced drug use abstinence.

For many women who are offenders, substance use, a maladaptive coping mechanism during reentry is an ongoing challenge, leading to further arrest and re-incarceration (Cobbina, 2010; Freudenberg, Daniels, Crum, Perkins, & Richie, 2005). Our previous, qualitative research (Nyamathi et al., 2016; Salem, Nyamathi, Idemundia, et al., 2013) and extensive community-based work have informed the development of the DBT-CM intervention and engaged collaboration between CHWs and nurses during reentry to help homeless female offenders more successfully transition into the community.

Informed by the CHSCP, one of the main goals of the DBT-CM team was to replace maladaptive coping methods (i.e., substance use) with more positive coping methods (i.e., burning bridges to substance use, positive social support, etc.). Given that reentry is a critical time, health and social services should be aimed at providing programs that will address drug use, as it will likely reduce recidivism and decrease the likelihood of future criminal justice involvement. During our program, the DBT-CM team also provided targeted referrals that included employment, education, housing and health.

Given that a DBT-CM informed group appears to be an effective strategy for homeless female offenders during reentry, integration of this intervention at RDT sites should be further tested in a larger scale trial. Race/ethnicity was an independent predictor of continued substance use, with those who self-reported as Black, Latina, or members of other groups more likely to continue to use than White women. This finding is consistent with the CHSCP, which posits that situational factors that cause psychosocial stress may lead to maladaptive coping behaviors, including substance use. Black and Latino homeless women may have higher levels of psychosocial stress due to perceived and experienced racial and ethnic discrimination, leading to increased substance use (Carliner, Delker, Fink, Keyes, & Hasin, 2016). Similar findings were reported in a previous intervention study among homeless persons that found that Black participants were more likely to continue to use drugs at follow-up compared to White participants (Padgett, Stanhope, Henwood, & Stefancic, 2011). Gaining a greater understanding of differences between racial and ethnic groups may inform modified approaches to improve outcomes for Black and Latina homeless women.

Further, our findings demonstrated that depressive symptomology was associated with drug use at six months. This finding is consistent with previous studies among homeless women in Los Angeles County (Galaif, Nyamathi, & Stein, 1999; Tucker et al., 2005). Under the CHCSP framework, substance use could be considered a maladaptive coping method to relieve the negative impact of depression. These findings demonstrate the importance of addressing depressive symptomology among this population.

Limitations

Our findings relate to adult women offenders across a wide age span who resided in Southern California. Our findings may not be generalizable across other parts of the U.S. Likewise, our sample includes women on two different types of conditional release (probation and parole). While our sensitivity analysis showed a general pattern that DBT-CM was more effective than HP in achieving the drug and alcohol use outcomes, the effect size varied under different assumptions and did not reach statistical significance in some cases. A larger randomized-controlled trial is needed to validate our findings and generate more robust estimates of the effect of DBT-CM on drug and alcohol use.

Conclusions

Our intervention focuses on an understudied and often hidden group that is navigating between prison/jail and community reentry. Building upon these findings will necessitate integrating a culturally sensitive lens to identify differences among drug abstinence for

African-Americans, Latinas, and Whites. Another important consideration is to conduct further assessment on intake related to depression and linkage into care during release. Future studies necessitate a larger sample size and inclusion of a qualitative follow up study to gain a greater understanding of areas of improvement and need. Moreover, including a cost effectiveness analysis of this program as compared with the cost of prison and other health issues may provide helpful information for the design of future programs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This study was funded by the National Institute on Drug Abuse (NIDA), 5R34DA035409), NIAID K01 AI118559. This project was supported by the National Center for Advancing Translational Sciences (NCATS), National Institutes of Health (NIH), through grant UL1 TR0001241.

References

Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). American Journal of Preventive Medicine. 1994; 10(2):77–84. [PubMed: 8037935]

Bellg AJ, Borrelli B, Resnick B, Hecht J, Minicucci DS, Ory M. … Treatment Fidelity Workgroup of the NIH Behavior Change Consortium. Enhancing treatment fidelity in health behavior change studies: Best practices and recommendations from the NIH Behavior Change Consortium. Health Psychology. 2004; 23:443–451. DOI: 10.1037/0278-6133.23.5.443 [PubMed: 15367063]

Berzins LG, Trestman RL. The development and implementation of dialectical behavior therapy in forensic settings. International Journal of Forensic Mental Health. 2004; 3:93–103. DOI: 10.1080/14999013.2004.10471199

Binswanger IA, Nowels C, Corsi KF, Long J, Booth RE, Kutner J, Steiner JF. "From the prison door right to the sidewalk, everything went downhill," a qualitative study of the health experiences of recently released inmates. International Journal of Law & Psychiatry. 2011; 34:249–255. DOI: 10.1016/j.ijlp.2011.07.002 [PubMed: 21802731]

California Department of Corrections and Rehabilitation. 2013 Outcome Evaluation Report. Sacramento, CA: 2014. Retrieved from http://www.cdcr.ca.gov/Adult_Research_Branch/Research_documents/Outcome_evaluation_Report_2013.pdf

Carliner H, Delker E, Fink DS, Keyes KM, Hasin DS. Racial discrimination, socioeconomic position, and illicit drug use among US Blacks. Social Psychiatry & Psychiatric Epidemiology. 2016; 51:551–560. DOI: 10.1007/s00127-016-1174-y [PubMed: 26810670]

Cobbina JE. Reintegration success and failure: Factors impacting reintegration among incarcerated and formerly incarcerated women. Journal of Offender Rehabilitation. 2010; 49:210–232. DOI: 10.1080/10509671003666602

Fearn NE, Vaughn MG, Nelson EJ, Salas-Wright CP, DeLisi M, Qian Z. Trends and correlates of substance use disorders among probationers and parolees in the United States 2002–2014. Drug & Alcohol Dependence. 2016; 167:128–139. DOI: 10.1016/j.drugalcdep.2016.08.003 [PubMed: 27515722]

Freudenberg N, Daniels J, Crum M, Perkins T, Richie BE. Coming home from jail: The social and health consequences of community reentry for women, male adolescents, and their families and communities. American Journal of Public Health. 2005; 95:1725–1736. DOI: 10.2105/ajph.2004.056325 [PubMed: 16186451]

Galaif ER, Nyamathi AM, Stein JA. Psychosocial predictors of current drug use, drug problems, and physical drug dependence in homeless women. Addictive Behaviors. 1999; 24:801–814. [PubMed: 10628514]

Gratz KL, Roemer L. Multidimensional assessment of emotional regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. Journal of Psychopathology & Behavioral Assessment. 2004; 26:41–54.

Gratz KL, Roemer L. Multidimensional assessment of emotional regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale [Erratum]. Journal of Psychopathology & Behavioral Assessment. 2008; 30:315.doi: 10.1023/B:JOBA.0000007455.08539.94

Greenland S. Modeling and variable selection in epidemiologic analysis. American Journal of Public Health. 1989; 79:340–349. [PubMed: 2916724]

Institute of Behavioral Research. TCU Drug Screen II. Fort Worth, TX: Texas Christian University; 2007. Retrieved from https://ibr.tcu.edu/forms/tcu-drug-screen/

Joe GW, Broome KM, Rowan-Szal GA, Simpson DD. Measuring patient attributes and engagement in treatment. Journal of Substance Abuse Treatment. 2002; 22:183–196. [PubMed: 12072163]

Jolani S, Frank LE, van Buuren S. Dual imputation model for incomplete longitudinal data. British Journal of Mathematical & Statistical Psychology. 2014; 67:197–212. DOI: 10.1111/bmsp.12021 [PubMed: 23909566]

Lazarus, R., Folkman, S. Stress, appraisal and coping. New York, NY: Springer; 1984.

Leukefeld C, Oser CB, Havens J, Staton Tindall M, Mooney J, Duvall JB, Knudsen H. Drug abuse treatment beyond prison walls. Addiction Science & Clinical Practice. 2009; 5:24–30. [PubMed: 19369916]

Linehan, MM. Cognitive-behavioral treatment of borderline personality disorder. New York, NY: Guilford Press; 1993.

Linehan MM, Comtois KA, Murray AM, Brown MZ, Gallop RJ, Heard HL, … Lindenboim N. Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and borderline personality disorder. Archives of General Psychiatry. 2006; 63:757–766. DOI: 10.1001/archpsyc.63.7.757 [PubMed: 16818865]

McNeil R, Guirguis-Younger M. Illicit drug use as a challenge to the delivery of end-of-life care services to homeless persons: Perceptions of health and social services professionals. Palliative Medicine. 2012; 26:350–359. DOI: 10.1177/0269216311402713 [PubMed: 21464120]

Nee C, Farman S. Female prisoners with borderline personality disorder: Some promising treatment developments. Criminal Behavior and Mental Health. 2005; 15:2–16. DOI: 10.1002/cbm.33

Nyamathi A. Comprehensive health seeking and coping paradigm. Journal of Advanced Nursing. 1989; 14:281–290. [PubMed: 2661620]

Nyamathi A, Leake B, Albarran C, Zhang S, Hall E, Farabee D, … Faucette M. Correlates of depressive symptoms among homeless men on parole. Issues in Mental Health Nursing. 2011; 32:501–511. DOI: 10.3109/01612840.2011.569111 [PubMed: 21767252]

Nyamathi A, Leake B, Longshore D, Gelberg L. Reliability of homeless women's reports: Concordance between hair assay and self report of cocaine use. Nursing Research. 2001; 50:165–171. [PubMed: 11393638]

Nyamathi AM, Srivastava N, Salem BE, Wall S, Kwon J, Ekstrand M, … Faucette M. Female ex-offender perspectives on drug initiation, relapse, and desire to remain drug free. Journal of Forensic Nursing. 2016; 12:81–90. DOI: 10.1097/jfn.0000000000000110 [PubMed: 27195929]

Padgett DK, Stanhope V, Henwood BF, Stefancic A. Substance use outcomes among homeless clients with serious mental illness: Comparing housing first with treatment first programs. Community Mental Health Journal. 2011; 47:227–232. [PubMed: 20063061]

Rubin, DB. Multiple imputation for nonresponse in surveys. New York, NY: Wiley; 1987.

Salem BE, Nyamathi A, Idemundia F, Slaughter R, Ames M. At a crossroads: Reentry challenges and healthcare needs among homeless female ex-offenders. Journal of Forensic Nursing. 2013; 9:14–22. [PubMed: 24078800]

Salem BE, Nyamathi A, Keenan C, Zhang S, Marlow E, Khalilifard F, … Marfisee M. Correlates of risky alcohol and methamphetamine use among currently homeless male parolees. Journal of Addictive Diseases. 2013; 32:365–376. DOI: 10.1080/10550887.2013.849973 [PubMed: 24325770]

Schlotfeldt RM. Nursing in the future. Nursing Outlook. 1981; 29:295–301. [PubMed: 6908691]

Shelton D, Kesten K, Zhang W, Trestman R. Impact of a dialectic behavior therapy-corrections modified (DBT-CM) upon behaviorally challenged incarcerated male adolescents. Journal of Child and Adolescent Psychiatric Nursing. 2011; 24:105–113. DOI: 10.1111/j.1744-6171.2011.00275.x [PubMed: 21501287]

Sherbourne CD, Stewart AL. The MOS social support survey. Social Science & Medicine. 1991; 32:705–714. [PubMed: 2035047]

Stewart AL, Hays RD, Ware JE Jr. The MOS short-form general health survey. Reliability and validity in a patient population. Medical Care. 1988; 26:724–735. [PubMed: 3393032]

Stout RL, Wirtz PW, Carbonari JP, Del Boca FK. Ensuring balanced distribution of prognostic factors in treatment outcome research. Journal of Studies on Alcohol. 1994; (Suppl, 12):70–75. [PubMed: 7723001]

Tsai J, Kasprow WJ, Rosenheck RA. Alcohol and drug use disorders among homeless veterans: Prevalence and association with supported housing outcomes. Addictive Behaviors. 2013; 39:455–460. DOI: 10.1016/j.addbeh.2013.02.002 [PubMed: 23490136]

Tucker JS, D'Amico EJ, Wenzel SL, Golinelli D, Elliott MN, Williamson S. A prospective study of risk and protective factors for substance use among impoverished women living in temporary shelter settings in Los Angeles County. Drug and Alcohol Dependence. 2005; 80:35–43. DOI: 10.1016/j.drugalcdep.2005.03.008 [PubMed: 16157229]

Walters GD, White TW, Denney D. The Lifestyle Criminality Screening Form. Preliminary data. Criminal Justice & Behavior. 1991; 18:406–418. DOI: 10.1177/0093854891018004003

Wright, EM., Van Voorhis, P., Bauman, A., Salisbury, EJ. Gender-responsive risk/needs assessment: Final report prepared for the Minnesota Department of Corrections. Cincinnati, OH: University of Cincinnati; 2008.

Zeger SL, Liang KY. Longitudinal data analysis for discrete and continuous outcomes. Biometrics. 1986; 42:121–130. [PubMed: 3719049]

Zerger, S. A review of the literature. Nashville, TN: National Health Care for the Homeless Council; 2002. Substance abuse treatment: What works for homeless people?.

Zhang W, O'Brien N, Forrest JI, Salters KA, Patterson TL, Montaner JSG, … Lima VD. Validating a shortened depression scale (10 item CES-D) among HIV-positive people in British Columbia, Canada. PLOS ONE. 2012; 7(7):e40793.doi: 10.1371/journal.pone.0040793 [PubMed: 22829885]

Biographies

Adeline M. Nyamathi, ANP, Ph.D., FAAN, is Founding Dean and Distinguished Professor, Sue & Bill Gross School of Nursing, University of California, Irvine. At the time this work was completed, she was Distinguished Professor, School of Nursing, University of California at Los Angeles.

Sanghyuk S. Shin, PhD, is Assistant Professor, Sue & Bill Gross School of Nursing, University of California, Irvine. At the time the work was completed, he was Assistant Professor-In-Residence, School of Public Health, University of California, Los Angeles.

Jolene Smeltzer, MSN, RN, is student, Mervyn M. Dymally School of Nursing, Los Angeles, CA.

Benissa E. Salem, PhD, MSN, RN, is Assistant Adjunct Professor and Project Director, School of Nursing, University of California, Los Angeles.

Kartik Yadav, MSCR, is Project Director, Sue & Bill Gross School of Nursing, University of California, Irvine. At the time this research was completed, he was Project Director, School of Nursing, University of California, Los Angeles.

Maria L. Ekstrand, PhD, is Professor, School of Medicine, University of California, San Francisco.

Susan F. Turner, PhD, is Professor, Department of Criminology, Law and Society, University of California, Irvine.

Mark Faucette, BS, is Vice President, Amistad de Los Angeles, Los Angeles, CA.

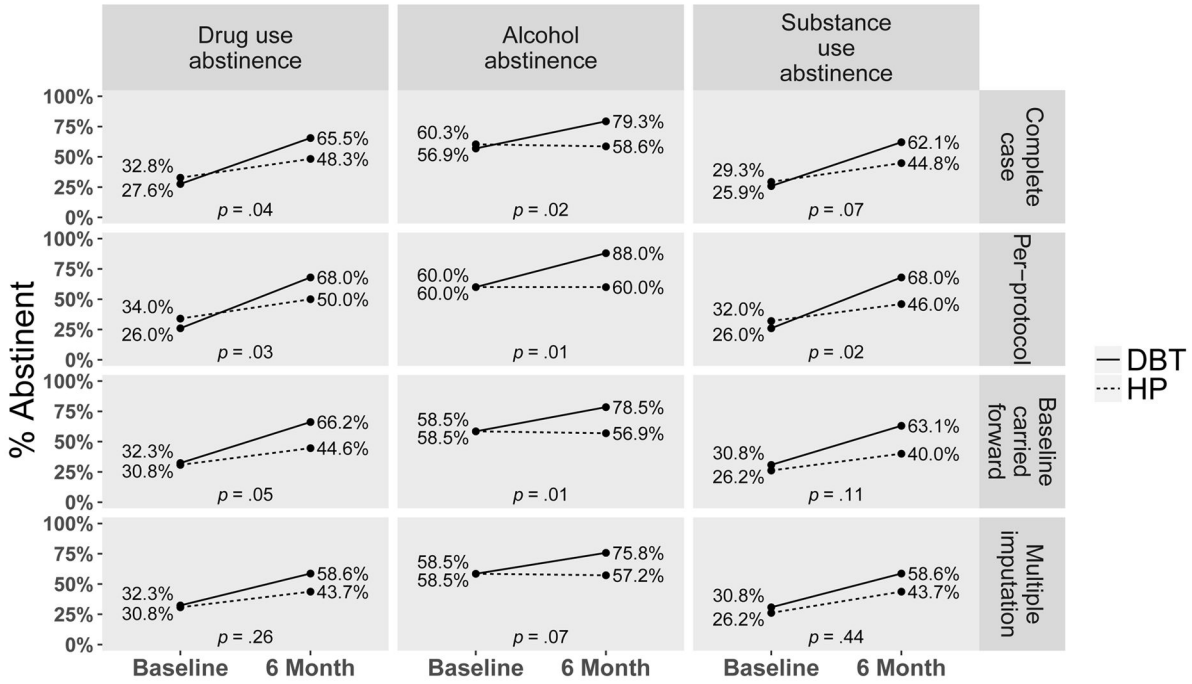

FIGURE 1.

Changes in outcomes for Health Promotion vs. DBT-CM groups, showing the primary analysis using complete case data and sensitivity analyses. The *p*-values for the coefficient of the intervention x time point interaction term estimated using logistic regression models with generalized estimating equation (GEE) are shown.

TABLE 1

Participant Characteristics

	HP (*n* = 65)		DBT-CM (*n* = 65)	
Type/characteristic	***n***	***(%)***	***n***	***(%)***
Demographic and situational				
Education				
< 12 years	18	(27.7)	21	(32.3)
12 years or GED	26	(40)	27	(41.5)
Some college or vocation	15	(23.1)	13	(20)
College graduate	6	(9.2)	4	(6.2)
Race/ethnicity				
White	11	(16.9)	7	(10.8)
Black	24	(36.9)	29	(44.6)
Latino	26	(40)	26	(40)
Other	4	(6.2)	3	(4.6)
Site				
RDT Los Angeles	13	(20)	14	(21.5)
Shelter/service	14	(21.5)	7	(10.8)
RDT Pomona	38	(58.5)	44	(67.7)
Employment (employed)	51	(78.5)	57	(87.7)
Parole (currently; yes)	7	(10.8)	7	(10.8)
Probation (currently; yes)	46	(70.8)	45	(69.2)
Prison (frequency)				
Never	30	(46.2)	29	(44.6)
Once	16	(24.6)	12	(18.5)
2–4 times	13	(20)	11	(16.9)
≥ 5 times	6	(9.2)	13	(20)
Depression (CES-D ≥ 10)	29	(44.6)	29	(44.6)
Program attendance (complete)	55	(84.0)	58	(89.0)
Program retention (yes)	57	(87.7)	59	(90.1)
	M	**(*SD*)**	***M***	**(*SD*)**
Age (years)	38.6	(11.3)	39.1	(11.5)
Psychosocial (scores)				
Social Support	3.5	(1.1)	3.4	(1.0)
Impulse Control Difficulties	14	(5.7)	13.5	(5.4)
Lack of Emotional Awareness	13.6	(5.3)	14.1	(5.5)
Limited Emotion Regulation	17.3	(7)	17.1	(6.5)
CES-D	9.6	(6.1)	9.6	(6.7)
Mental Health Index	68.0	(22.6)	67.6	(23.1)
PTSD Score	1.8	(1.6)	1.5	(1.6)
Anger/Hostility	1.5	(1.2)	1.4	(1.1)

	HP (*n* = 65)		DBT-CM (*n* = 65)	
Type/characteristic	***n***	***(%)***	***n***	***(%)***
Relationship	5.1	(3.4)	4.8	(3)
Depression/Anxiety	2.2	(2)	2.4	(2.1)
Treatment Readiness	40.4	(7.9)	40.1	(9.5)

Note. $N = 130$. All p-values were nonsignificant ($p > .05$). CES-D = Center for Epidemiologic Studies-Depression; DBT-CM = Dialectical Behavioral Therapy Case Management; GED = general educational development; HP = Health Promotion; PTSD = Posttraumatic stress disorder; RDT = residential drug treatment; *SD* = standard deviation.

TABLE 2

GEE Logistic Regressions: Abstinence by Treatment Group at Baseline and 6-Month Follow-up With Differences in Change Over Time[a]

		Health Promotion (*n* = 58)		DBT-CM (*n* = 58)		Treatment × Time interaction		
Substance(s)	**Occasion**	***n***	**(%)**	***n***	**(%)**	***OR***	**95% CI**	***P***
Drug[b]	Baseline	19	(32.8)	16	(27.6)	2.60	[1.04, 6.53]	.04
	6-Month	28	(48.3)	38	(65.5)			
Alcohol	Baseline	35	(60.3)	33	(56.9)	3.12	[1.24, 7.85]	.02
	6-Month	34	(58.6)	46	(79.3)			
Substance[c]	Baseline	17	(29.3)	15	(25.9)	2.39	[0.92, 6.23]	.07
	6-Month	26	(44.8)	36	(62.1)			

Note. CI = confidence interval; DBT-CM = Dialectical Behavioral Therapy-Case Management; OR = odds ratio.

[a]Estimated by treatment x time interaction in logistic regression models with generalized estimating equation (GEE).

[b]Scored 0 for “not abstinent” if the participant tested positive for drug use in urinalysis regardless of self-reported response.

[c]Use of illicit drugs or alcohol.

TABLE 3

Baseline Predictors of Drug Use Abstinence at 6 Months

	Bivariate			Multivariate		
Predictor	***OR***	**95% CI**	***p***	***aOR***	**95% CI**	***p***
Program						
Health Promotion	1.00			1.00		
Dialectical Behavior Therapy	2.04	[0.96, 4.30]	.06	3.15	[1.30, 7.69]	.01
Drug use (any = yes, baseline)	0.28	[0.11, 0.68]	.005	0.19	[0.07, 0.56]	.002
Race/ethnicity						
White	1.00			1.00		
Black	0.07	[0.01, 0.59]	.01	0.05	[0.01, 0.50]	.01
Latino	0.12	[0.01, 0.97]	.05	0.08	[0.01, 0.74]	.03
Other	0.11	[0.01, 1.40]	.09	0.05	[0.00, 0.64]	.02
Impulse Control Difficulties	0.94	[0.88, 1.00]	.06			
Mental Health Index	1.02	[1.00, 1.04]	.02			
Depression/Anxiety (score)	0.76	[0.63, 0.93]	.006			
CES-D (score)	0.93	[0.87, 0.99]	.02	0.91	[0.84, 0.98]	.01

Note. $N = 116$. *aOR* = adjusted odds ratio; CES-D = Center for Epidemiologic Studies-Depression; CI = confidence interval; *OR* = odds ratio.