COVER PAGE

Title: A trauma-Informed Adaptation of Mindfulness-Based Relapse Prevention for Women in Substance Use Treatment

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PROCEDURES AND STATISTICAL ANALYTIC PLAN

This goal of this study was to develop and implement an integrated intervention protocol for a feasibility and initial efficacy trial of TI-MBRP. During the treatment development phase, information was gathered from focus groups with counselors and patients. The trial determined feasibility, acceptability and initial efficacy, explored mediators and moderators of change, and informed the design for a larger randomized-control trial.

The study was executed in two phases. The first phase consisted of intervention development and refinement. Intervention development was accomplished by conducting three focus groups with counselors and patients of a chemical dependency treatment center for women in which standard MBRP is a required part of programming. The purpose of these focus groups was to gather themes associated with trauma and substance use (e.g., avoidance of PTSD symptoms and function of substance use as it relates to PTSD, craving, guilt/shame, self-esteem). Information gathered after each Phase I focus groups was integrated into the standard MBRP protocol, along with aspects of CPT. Each protocol modification was presented to participants at subsequent Phase I focus group meetings for feedback and further refinement of the protocol until a final pilot adaptation was created. The pilot protocol underwent three revisions with participants' feedback. Phase II of the study consisted of a feasibility and initial efficacy trial using the refined intervention, and collection and assessment of feasibility and preliminary outcome data.

Phase I: Intervention Development and Refinement

Counselors and residents from the Volunteers of America Women's Residential Center (WRC) were recruited for a series of focus groups to assist with the development and refinement of TI-MBRP. Attending separate groups to ensure confidentiality, counselors and residents with previous experience in MBRP groups discussed how trauma-related symptoms and issues have

manifested during MBRP sessions, and offered suggestions, reflections, and concerns regarding the appropriateness and acceptability of integration of trauma education and treatment approaches into MBRP. Information collected during these focus groups informed the initial adaptation of the intervention.

Following these focus groups, protocol revisions were made by the Principal Investigator, and presented to counselors, residents, project mentors, and consultants for further input; a finalized protocol was developed, resulting in the TI-MBRP protocol and treatment manual used in the feasibility and initial efficacy trial.

Trauma Informed- Mindfulness-Based Relapse Prevention. TI-MBRP is an eight-session intervention that integrates trauma education and treatment approaches of CPT (Resick & Schnicke, 1993) into the standard MBRP protocol (Bowen, Chawla, & Marlatt, 2010). TI-MBRP honors the foundations of mindfulness meditation practice and cognitive-behavioral techniques of MBRP while introducing PTSD education and trauma processing surrounding five primary themes from CPT: Trust, Safety, Power and Control, Esteem, and Intimacy. Each TI-MBRP session included mindfulness practices that bring awareness to cognitive and behavioral processes underlying substance use, and how substance use functions as a mechanism to cope with PTSD symptoms. Sessions build upon content and practices in previous sessions, as participants become more aware of factors underlying their substance use and develop skills for responding to triggers or high-risk situations more effectively. The goal of TI-MBRP is to educate women in chemical dependency treatment settings about the interrelationship between substance use and trauma, support trauma processing with present-centered awareness via mindfulness-based exposure/response prevention practices, and prepare participants to skillfully respond to high-risk situations that increase risk of relapse.

Phase II: Feasibility, Acceptability, and Initial Efficacy

Trial Selection of participants and sampling. Participants were recruited from Hazelden Betty Ford Foundation (HBFF) and Lifeworks NW in the Portland metro area, which offer inpatient and intensive outpatient (IOP) treatment for SUD. Facilities under HBFF included one residential and one IOP clinic, and facilities under Lifeworks NW included two residential and one IOP clinic, totaling five clinics. Criteria for admittance into all facilities include a dual-diagnosis for substance use disorder (SUD) and another mental health disorder. Approximately 95% of women within these treatment facilities have a lifetime history of trauma, and approximately 88% are dually diagnosed with SUD and PTSD. As part of the standard care at the residential sites at HBFF and Lifeworks NW, patients undergo a detoxification treatment phase upon admission, followed by a "core learning" phase in which patients participate in group and individual therapy. They then move into a "transition phase" during which they prepare an aftercare plan, and secure both sober housing accommodations and partial employment and/or enrollment in an educational institute or trade school. Patients enrolled in HBFF and Lifeworks NW IOP have already undergone detoxification and are required to participate in groups, individual therapy and case management; treatment completion is between eight and 12 months.

Patients in the core learning phase of residential treatment, and patients in IOP were recruited for the study. Patients in residential programs were physically stable after the detoxification phase, and able to participate in groups. The core learning phase of treatment within residential facilities typically begins two to three weeks after detoxification and lasts for approximately three months. Counselors and administrators of both residential and IOP clinics assisted with recruitment via word of mouth, flyers, and announcements at weekly group meetings. Data was monitored during the recruitment process and additional effort was made to

recruit ethnic and racial minority groups when necessary. To be included in the study, individuals 1) were in the "core" phase of treatment or in IOP at LWNW or HBFF; 2) scored at least a four or higher on Breslau's Short Screening Scale (Kimberling et al., 2006) for PTSD; 3) were between 18 and 70 years of age; 4) were fluent in speaking and reading English; and 5) had clearance from appropriate clinical staff. Individuals were excluded from study participation if they 1) endorsed active suicidality, hallucinations, or intense emotional lability; 2) had already participated in an MBRP group in current or past treatment; and 3) did not provide informed consent. Inclusion and exclusion criteria were assessed by the Inclusion/Exclusion Screening Tool.

Sample size estimation. For a fully-powered, cluster-randomized design, a power analysis conducted via G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) using $\alpha = .05$, medium effect size across primary outcomes, mediators and moderators, a variance inflation factor of 2.55, and power level of .8 suggests a sample size of 437 participants (Donner, 1998). As a feasibility and initial efficacy trial, it is justified to recruit 10% of what is required of a fully powered clinical trial (Cocks & Torgerson, 2013; Treece & Treece, 1977); thus, we aimed to recruit 44 participants. Due to high attrition rates (56%) at a 15-week follow-up from previous research at the Phase I clinical sites (Witkiewitz, 2014), we aimed to recruit 100 participants to secure a sufficient sample size at one-month follow-up powered to analyze primary outcome data at the end of intervention implementation. We aimed for an attrition rate of 40% or less due to the short duration of the study and greater ease in contacting participants at follow-up due to most participants' residential and active IOP status. Mediators and moderators were not included in the power analysis due to the current study being a feasibility and initial efficacy trial, and the

exploratory intention of examining mechanisms and moderators for a future, fully-powered study.

Personnel involved in the study. The study PI and three advanced graduate-level Research Assistants (RAs) were responsible for pre- and post-intervention focus groups. TI-MBRP manual adaptation was informed by input from CPT literatures, primary mentors, WRC staff and patients, and consultants. The PI and RAs delivered either TI-MBRP or Standard MBRP. In addition to three RAs who served as study interventionists, three additional graduate-level RAs assisted with data collection at each assessment time, totaling six RAs throughout the study. Before implementation of the study, RAs responsible for implementing interventions completed an advanced teacher training in MBRP. Those who facilitated TI-MBRP attended the MBRP teacher training and an additional training in the TI-MBRP protocol. RAs responsible for implementing standard MBRP did not receive training in TI-MBRP to account for possible contamination effects by Standard MBRP interventionists. All RAs attended a training in implementing study protocol and procedures, which included training on recruitment and screening; assessment collection, entry, and storage; protocols for adverse events; and contacting participants throughout the study. Counselors from study sites were involved in the screening and recruitment of participants for the study. All study personnel completed a protection of human subjects course and HIPAA course prior to contact with any participants and involvement in the study.

Procedures. Interested patients in IOP or in the core phase of residential treatment were screened for eligibility based on the Inclusion/Exclusion Screening Tool, BSSS (Kimberling et al., 2006), and had clearance from appropriate clinical staff. Individuals who signed up for the study were asked to complete the Inclusion/Exclusion Screening Tool and BSSS. If they

endorsed a four or higher on the BSSS and met inclusion criteria, they were offered participation in the study. Interested patients also had clearance from their primary counselors to confirm they did not meet exclusion criteria. Eligible individuals were provided with a written and oral informed consent. The PI or RA reviewed the informed consent and answer any questions or concerns that individuals had about study procedures, confidentiality, data analysis, and dissemination of results. Once written informed consent was obtained, participants were notified of the group start date within one week of signing the consent form. Participants were asked to complete a battery of paper-and-pencil assessments within one week prior to the start of the first session. After assessments were completed, cohorts of participants were randomized to receive either Standard MBRP or TI-MBRP. A non-interventionist RA used computer randomization software to assign to cohorts to either Standard MBRP or TI-MBRP. Ten TI-MBRP and Standard MBRP groups were implemented simultaneously at five sites for maximization of participants within the given timeframe over a 12-month period.

After the first Standard MBRP and TI-MBRP session, participants were provided with a CD player and CD with audio-recordings of guided meditation practices used in the intervention (i.e., body scan, breath awareness) to use daily as a part of their homework requirements. Cohorts randomized to the TI-MBRP group were given an additional CD with mindfulness practices administered only in the TI-MBRP course.

Participants completed a post-course assessment battery within one week of the completion of the eight-session course, taking place over four weeks. They had access to doctoral level psychology graduate students and to their primary counselor to discuss any distressing feelings related to the study.

One week after post-course assessments, participants were invited to participate in a focus group to discuss what was helpful about the intervention and what could be changed. Focus groups were audio-recorded, transcribed, and analyzed in NVivo Pro V12. Frequently discussed topics within focus groups were used to inform changes to the pilot protocol which will optimize interventions within TI-MBRP targeting craving, substance use and PTSD symptoms.

One month after the completion of post-course assessments, participants were asked to complete a follow-up assessment battery. If participants were unable to be physically present to complete the follow-up assessment, they were offered a phone interview during which an RA administered self-report assessment measures orally.

Participants were given a $20 gift card (not redeemable for alcohol, cigarettes, or lottery tickets) at completion of each of the first two assessments (i.e., baseline assessment, post-course assessment) and post-course focus group. A $40 gift card was provided at completion of the one-month follow-up assessment. Total possible compensation for participation in the study was $100.

Design and analyses. This study is an initial step in exploring the safety, feasibility, and acceptability of a novel adaptation to an evidence-based intervention. We employed a cluster-randomized, mixed methods, repeated measures design to determine feasibility, acceptability, initial efficacy, and mediators and moderators for TI-MBRP for women with co-occurring SUD and PTSD. Data from this study will inform the ecological validity and any further modifications that need to occur to the adapted protocol before conducting a larger cluster-randomized trial (Leon, Davis, & Kraemer, 2011; Moore, Carter, Nietert, & Stewart, 2011). Furthermore, determining initial efficacy and mediators and moderators will inform whether integrating

evidence-based trauma education and interventions into MBRP will reduce PTSD symptom severity and substance use indices in dually diagnosed women with PTSD-SUD more efficiently than SUD treatment alone, and inform which measures to test as mechanisms and moderators in a larger trial (Leon, Davis, & Kraemer, 2011).

Paper-and-pencil, self-report measures used at baseline, post course, and follow-up assessment points, as well as records of attendance, were double-entered into SPSS 26.0 by RAs. Prior to conduction planned quantitative analyses, data was checked for normality (skew +/- 2, kurtosis +/-2), homogenetity ($p<.05$), and accuracy using the exploratory function in SPSS (Fields, 1999). Outliers were assessed by identifying studentized residuals greater than ± 3 standard deviations. Although missing data is expected in this population, Restricted Maximum Likelihood Estimations (RMLE) allow for all participants to be included in analyses even if they present with missing data.

Feasibility and acceptability was assessed using multiple metrics. Based on completion rates of an RCT conducted at the Phase I clinical site (Witkiewitz et al., 2014), we assessed recruitment and retention rates, with a target rate retention of 60% or better. Participant overall course satisfaction was measured by the OCSS. Treatment dropout was monitored by tracking attendance at each session and information will be gathered from clinical sites to determine whether the participant dropped out of treatment altogether or the study. This will allow assessment of any systematic bias or characteristics of TI-MBRP drop-outs vs. course completers.

To assess initial efficacy, Repeated Measures Analysis of Variance (RM ANOVA) was used to examine differences between TI-MBRP and Standard MBRP in substance use, craving, and PTSD symptoms over time. When an interaction effect was detected, an ANCOVA was used

to determine the timepoint in which two conditions differed, controlling for baseline scores (Fields, 1999). Mediators and moderators were examined using PROCESS in SPSS 26.0 to help identify factors that explain or support change in the relationships between PTSD symptom severity and craving, and PTSD symptom severity and substance use.

For Phase II qualitative data collection and analyses, ten one-hour long focus groups were audio recorded once participants completed either TI-MBRP or Standard MBRP. Women were asked eight questions to assist with the refinement of the pilot protocol (See Appendix . Questions were as follows:

1. What was your overall experience like in this group?
2. How did this class help with understanding the relationship between substance use and trauma?
3. How did this class help with processing the impact of traumatic events on aspects of your life now?
4. How was this group different or similar from other substance use and trauma groups you have completed in the past?
5. Is there anything that you felt was missing from this program that would have enhanced your experience while taking this course?
6. What aspects of the treatment did you find helpful and/or important in your recovery process?
7. What aspects did you dislike and feel could be changed or taken out?
8. Would you recommend this group to other women who have not taken it yet?
9. How would you describe the group to other women who have not taken this group yet?
10. Are there certain people you would not recommend this group to or think that this group would be inappropriate for?

All audio recordings were transcribed by a third party company, TranscribeMe. Transcribed focus-group data were uploaded into NVivo 12 Pro and coded by the PI and two RAs.. A constant comparison analysis (Fram, 2013; Leech & Onwuegbuzie, 2011) was implemented to code relevant information pertinent to refining the pilot protocol of TI-MBRP, which is recommended for pilot qualitative research (Leech & Onwuegbuzie, 2007). Three coders went through several iterations of extracting themes from transcribed audio recordings on what

women thought the most and least helpful aspects of the program were.