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Mindfulness-Based Stress Reduction in Veterans With PTSD

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In modern society, post-traumatic stress disorder (PTSD) is surprisingly prevalent, with the National Institute of Mental Health estimating that 6.8% of Americans will experience PTSD during their lifetime (NIMH, 2018). War veterans are at an even higher risk of suffering from PTSD than the general population (Norris, 2013) and also face more barriers to treatment (Tanielian, 2008). Past studies have demonstrated a wide range of adverse mental and physical health outcomes from PTSD (Spitzer, 2009) and high rates of suicide among veterans with PTSD are well documented (U.S. Department of Veterans Affairs). In addition to individual burden, relationship distress is a likely outcome of PTSD in couples (Campbell & Renshaw, 2018) along with a loss of family functioning (Evans, 2003) and national economic hardship (Congressional Budget Office). Exploring effective treatment options for PTSD encompasses the practical and ethical obligation of health care providers. Pharmacological interventions such as antipsychotics, antiadrenergic drugs, and anxiolytics have shown efficacy in treating PTSD symptoms (Alderman, 2009; Ravindran, 2009) while benzodiazepines are falling out of favor given their non-effectiveness and potential for addiction and harmful side effects (VA/DoD Clinical Practice Guideline for PTSD). The use of psychological interventions, however, has been argued to benefit patients, both alone and in combination with medication (Ursano, 2004; Forbes, 2007).

Due to the high rates of dropout and high self-reported residual PTSD symptoms with trauma-focused interventions, which includes prolonged exposure, cognitive processing therapy, and eye movement desensitization therapy, and non-trauma focused interventions, made up of cognitive behavioral therapy (Bradley, 2005), a different approach is warranted and requested from both the patient and provider end (Bomyea, 2012).Mindfulness-based techniques has been shown to reduce symptoms of depression and psychological stress while increasing the quality of life of patients from different cultural backgrounds (Vujanovic, 2009). Mindfulness is the act of experiencing the present moment non-judgmentally and openly, which may reduce PTSD symptoms of intrusion, cognitive avoidance, negative alterations in cognitions and mood, and alterations in arousal by allowing health care practitioners to approach rather than avoid upsetting thoughts and feelings (Gallegos, 2015).

A review of the current literature through CINAHL, Cochrane Reviews, and PubMed found that mindfulness-based stress reduction (MBSR) as a therapy option for veterans with PTSD is a new and emerging field, despite MBSR’s proven benefit for the general public. After an assessment, review process, and understanding of the current research,

there is sufficient evidence to suggest that different forms of MBSR,including mantram repetition practice, yoga, mindfulness-based cognitive therapy, breathing exercises, sitting meditation, breathing meditation, and body awareness training is effective in improving quality of life outcomes for veterans with PTSD, without the high dropout rates nor residual PTSD symptoms found in other interventional therapies.Given that MBSR interventions are low cost, cost effective, minimally time intensive, and easily implemented in a practice setting, MBSR may be a viable adjunctive therapy for veterans who may not feel supported in coming forward with their disorder as well as for veterans who want another approach in treating their PTSD.

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Abstract Summary:

A review of the current literature suggests that different forms of mindfulness-based stress reduction (MBSR) is effective in improving quality of life outcomes for veterans with PTSD.

Content Outline:

INTRODUCTION

Post-traumatic stress disorder (PTSD) is reorganized by the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*, 2013) under 'Trauma- and Stressor-Related Disorders' as a mental health disorder due to witnessing or experiencing a traumatic event of threatened death, serious injury or sexual violence. The symptoms of PTSD are classified within four symptom clusters of intrusion, persistent avoidance, negative alterations in cognitions and mood, and alterations in arousal. In modern society, trauma is surprisingly prevalent. Roughly 80% of clients seen in community mental health clinics have experienced at least one incident of trauma during their lifetime (Breslau & Kessler, 2001). In the United States, there was an 82.7% reported exposure to a traumatic event, with the most common factor being accidents and injuries, and the least being collective violence (Benjet, 2016). With the recent rise in school shootings, the continued war in the Middle East, and an increase in climate-change related natural disasters, the prevalence of trauma can be expected to grow. While not all patients experiencing trauma will go on to develop PTSD, the NIMH estimates that 6.8% of Americans will experience PTSD during their lifetime (NIMH, 2018).

War veterans are at higher risk of suffering from PTSD than those in the general population (Norris, 2013). They also face more barriers to treatment, including the requirement that they have an honorable or general discharge to access Department of Veterans Affairs (VA) medical benefits, long waitlists at VA medical centers, and the stigma of both admitting to and seeking treatment for mental illness within military communities (Tanielian, 2008). Past studies have demonstrated a wide range of adverse mental and physical health outcomes from PTSD (Spitzer, 2009) and high rates of suicide among veterans with PTSD are well documented (U.S. Department of Veterans Affairs). In addition to individual burden, relationship distress is a likely outcome of PTSD in couples (Campbell & Renshaw, 2018) along with a loss of family functioning (Evans, 2003) and national economic hardship (Congressional Budget Office).

Exploring effective treatment options for PTSD encompasses the practical and ethical obligation of health care providers. Pharmacological interventions such as antipsychotics, antiadrenergic drugs and anxiolytics have shown efficacy in treating PTSD symptoms (Alderman, 2009; Ravindran, 2009) while benzodiazepines are falling out of favor given their non-effectiveness and potential for addiction and harmful side effects (VA/DoD Clinical Practice Guideline for PTSD). The use of psychological interventions, however, has been argued to benefit patients, both alone and in combination with medication (Ursano, 2004; Forbes, 2007).

Trauma-focused interventions, which includes prolonged exposure, cognitive processing therapy, and eye movement desensitization therapy, and non-trauma focused interventions, made up of cognitive behavioral therapy, both have high dropout rates and high self-reported residual PTSD symptoms (Bradley, 2005). These poor

completion rates suggest that a new interventional approach is necessary, and both patients and providers have requested more PTSD treatment options (Bomyea, 2012). Mindfulness-based techniques has been shown to reduce symptoms of depression and psychological stress while increasing the quality of life of patients from different cultural backgrounds (Vujanovic, 2009). Mindfulness is the act of experiencing the present moment non-judgmentally and openly, which may reduce PTSD symptoms of intrusion, cognitive avoidance, negative alterations in cognitions and mood, and alterations in arousal by allowing health care practitioners to approach rather than avoid upsetting thoughts and feelings (Gallegos, 2015).

With that in mind, a research question worth exploring is: how does mindfulness-based stress reduction (MBSR), in addition to standard care, affect patient reported quality of life outcomes in veterans with post-traumatic stress disorder compared to those treated with standard of care alone? This can become a complex question to answer due to the impossible nature of grouping individuals' progress and treatments, which are highly unique and differ across individuals. Another complication lies in society's definition of both PTSD and quality of life, which are dependent on subjective self-reports about emotions and feelings, and again is hard to quantify.

A review the current literature on CINAHL, Cochrane Reviews, and PubMed was undertaken in order to assess for the feasibility of implementing these research-based protocols into real practice and provide recommendations to guide future research studies and health care implementation as it relates to improving quality of life in veterans with PTSD.

BODY I

Borrman et. al examined the effects of mindful attention increases on multiple dimensions of psychological outcomes in veterans with PTSD. In order to increase mindful attention, they utilized a strategy known as Mantram Repetition Practice (MRP). MRP consists of the repetition a spiritual word, phrase, or brief prayer known as a mantram in order to calm the body, quiet the mind, and improve concentration. This randomized controlled trial included 146 veterans with PTSD as a result of military trauma. Initial eligibility was confirmed via the Clinician Administered PTSD Scale (CAPS), which is widely regarded to be the gold standard in PTSD assessment (Department of Veteran Affairs, 2018). Participants were randomized to treatment as usual (TAU), vs TAU + MRP. Participants in the TAU + MRP group were given MRP instruction via group classes for 90 minutes weekly over 6 weeks. Their number of daily mantram repetition sets were then measured over 28 days via wrist-worn counters and a daily log. The study theorized that mindful attention as measured via the Mindful Attention Awareness Scale (MAAS) would increase after mindfulness-based interventions via a dose-response effect and that this increase would mediate psychological outcomes.

These outcomes were measured via multiple scales including CAPS, The PTSD Checklist, the Brief Symptom Inventory-18, and the norm-based Mental Health Component Summary from the Health Survey Short Form 12 version 2 (SF 12v2). Treatment effects were analyzed using hierarchical linear modeling (HLM), which demonstrated an increase in MAAS scores in the MRP+TAU group as compared to the TAU group. This increase in mindful attention correlated with a significantly greater reduction in PTSD symptomology and improvement in mental health related quality of

life in the MRP+TAU group as measured by the scales above. The treatment was well tolerated, with only 4% of patients (3 from each group) dropping out prior to the completion of treatment for unspecified reasons. The study itself has several strengths, including its RCT format, its control of TAU between the groups, its sample size, and its use of multiple measures with high validity and reliability. Its weaknesses included a low number of female participants (n=4) and the potential confounding effect of peer support resulting from the group class meetings in the MRP+TAU group. However, the study is overall quite effective and suggests that MRP is a convenient, portable, low-risk, effective, and easily implemented addition to usual PTSD treatment. Implementation could be achieved with minimal clinician training and time and could be anticipated to be well-received by patients.

BODY II

A Kearney et. al. study titled “Effects of Participation in a Mindfulness Program for Veterans with Posttraumatic Stress Disorder: A Randomized Controlled Pilot Study” sought to assess the feasibility of MBSR as an intervention for PTSD, since it may affect hypervigilance, avoidance, and reactivity associated with this disorder. The study divided two groups between Treatment as Usual (TAU) and TAU with an addition of MBSR. There was a very low risk for harm, and participants in the control (TAU) group were offered MBSR training after the conclusion of the study. Over the course of 11 months, there were 47 trial participants in total, with 37 males and 10 females. Of those, 32 were Caucasian. The study consisted of an 8-week trial whereby participants met once per week for 8 weeks and one 8 hour session on a weekend. Any psychiatric comorbidities disqualified the subjects, including current substance abuse, schizoaffective disorders, or current suicidal or homicidal ideation. Six questionnaires were used to ascertain the participants’ symptoms before, after, and at a 4 week follow up to the study: the PTSD checklist (civilian version) was used to detect PTSD symptoms, the The Life Events checklist was used to ascertain Trauma events, the PHQ-9 Health Related Quality of Life, short form 8 was employed as the Depression screen. The Five Facet Mindfulness Questionnaire was used to rate mindfulness, and the Behavioral Activation for Depression Scale was also used. For various reasons, including time constraints and familial obligations, 2 patients dropped out of the MBSR treatment arm, and one dropped out of the TAU arm. This study had several limitations, principal among them that there was a small cohort of only 47 people. There were few women, and the study also didn’t take into account the type of TAU being employed, chiefly among them the use of benzodiazepines which can alter the study results in unknown myriad ways.

At the conclusion of the study, analysis revealed no statistically significant change between the control group and the MBSR group. However, the study was a pilot and they determined that in order for there to be any statistical significance, 196 people would be needed to participate. Those that participated in the MBSR portion of the study found it helpful, and the group concludes that more studies into this modality are needed. The study also suggests that further training for clinicians in MBSR would be useful.

BODY III

Drs. Azad Marzabadi and Hashemi Zadeh completed a randomized, controlled trial with 28 participants in a study titled “The Effectiveness of Mindfulness Training in Improving

the Quality of Life of the War Victims with Post Traumatic Stress Disorder (PTSD).” All the participants were male, were between the age range of 35-60, and had at least a secondary education. The intervention consisted of eight 90-minute mindfulness training sessions held twice a week for one month, in addition to regular standard of care. During the first session, a pre-test 26-item World Health Organization (WHO) quality of life questionnaire was administered and relaxation was introduced; during the second session, participants were trained to relax 14 muscle groups; for the third session, participants were given relaxation training for another 6 muscle groups; for the fourth session, participants were taught mindfulness-based breathing and required to practice this breathing 20 minutes before bed; in the fifth session, participants were trained to pay attention to their body movements while breathing; in the sixth session, they were taught to scan their minds for positive and negative thoughts and to let them into and out of their minds without judgment; in the seventh session, sessions four, five and six were repeated; in the eighth session, the WHO post-test on quality of life was administered. The experimental group also took the post-test 2 months after the end of treatment. The control group received their regular standard of care without any mindfulness training and they also completed the WHO quality of life questionnaires. Data across the groups was analyzed using the Repeated Measure ANOVA function of SPSS version 17, which found the treatment to be effective with an effect size of 0.689; there was a decrease in the post-test and delayed post-test scores for the experimental group in comparison to the control group. This study therefore met the study investigator’s goal of finding mindfulness to be a mediator in improving psychological performance and reducing stress. Limitations to this study includes the small number of participants, the exclusion of females, the short interval between the post-test and the delayed post-test, and the lack of follow-up results. Strengths of the study includes the use of validated tools in diagnosing PTSD and tracking quality of life, the randomization process, and the use of a control group. Given the minimal mindfulness training required by the psychiatrist to run the session, the minimal time commitment on the end of the participants, and the overall positive outcomes, it would be worthwhile to offer a mindfulness-based training for interested veterans. It would be useful to track outcomes longer than Drs. Azad Marzabadi and Hashemi Zadeh had to assess for any prolonged impact of the mindfulness intervention.

BODY IV

Kyle Stephenson and his colleagues authored a 2017 article titled “Changes in Mindfulness and Posttraumatic Stress Disorder Symptoms Among Veterans Enrolled in Mindfulness-Based Stress Reduction” in the *Journal of Clinical Psychology*. His study completed secondary analyses of pooled data from 2 published and 2 unpublished studies of mindfulness-based stress reduction for veterans from the years 2008-2012 to assess for which aspects of mindfulness are associated with severity of PTSD symptoms and whether only certain clusters of PTSD symptoms were affected by levels of mindfulness. All four trials had similar exclusion criteria, which excluded history of psychotic disorder, mania, borderline personality disorder, suicidal or homicidal ideation with intent, and active substance use disorder. The final combined sample consisted of 113 participants with an average age of 52.44, 80% male, and 78% Caucasian. The intervention consisted of one facilitator leading a group of 20-25 veterans weekly for 2.5 hours for 8 weeks, in addition to a 7-hour retreat on a Saturday between weeks 6 and 7.

Sessions consisted of training on body scan meditation, breathing meditation, mindful movement, and loving-kindness meditation, and veterans were asked to practice mindfulness meditation for 30-45 minutes a day, 6 days a week using audio CDs and informal mindfulness practices were assigned weekly. A book about mindfulness practices and a workbook were given to each veteran as supplemental reading material. The PTSD Checklist-Civilian version, PTSD Symptom Scale-Interview, Patient Health Questionnaire-9, and Five Facet Mindfulness Questionnaire were completed by the participants at pre- and post- intervention. Overall, the researchers found that participants who reported increased mindfulness over the course of the treatment also reported reduced PTSD symptoms, which was consistent with earlier research findings. Stephenson's secondary analyses suggests that mindfulness focusing on Non-Reactivity and Acting with Awareness were most strongly and consistently correlated with changes in PTSD. Likewise, increases in Observing were associated with worsening PTSD symptoms while changes in Non-Judging and Describe facets of mindfulness were not significantly associated with changes in PTSD. In terms of PTSD symptom clusters, changes in Hyperarousal exhibited the strongest association with changes in aspects of mindfulness, followed by Emotional Numbing, Re-Experiencing, and finally Avoidance. A benefit of this study is that it expands on knowledge regarding mechanisms and effectiveness of mindfulness-based treatments, which may help further the development of targeted future treatments. Limitations in this study include the lack of a control group, lack of in-depth interviews, participant pool not matching the general veteran pool, and exclusion of participants who dropped out of treatment prematurely. Given that Stephenson's study found that mindfulness based in Observing exacerbated PTSD symptoms, this can help guide mindfulness practices away from using this feature. Otherwise, it would be useful to specifically implement Non-Reactivity and Acting with Awareness forms of mindfulness practice into the veteran population due to its highly validated ability to effect positive change.

BODY V

A meta-analysis of randomized controlled trials examining meditation and yoga to treat symptoms of posttraumatic stress disorder was completed by Autumn Gallegos and her colleagues and published in the *Clinical Psychology Review* journal. Using searches through MEDLINE, PsychINFO, and Clinicaltrials.gov, 19 randomized controlled trials with data on 1,173 participants was included and examined. Type of mindfulness approach (meditation, mindfulness training, yoga movement, and mantra meditation), primary outcome measure (self-report or clinician administered), veteran status, sample size, and use of a control group were examined for effectiveness. The meta-analysis found that mind and body health approaches to the treatment to PTSD has sizeable effects with no appreciable differences between the intervention types. Hedge's *g*was used as the index of effect adjusted for any pre-intervention differences between intervention and control groups in the meta-analysis. Studies were then grouped according to the use of the Clinician Administered PTSD Scale (CAPS) or the use of the Posttraumatic Stress Disorder Checklist (PCL), where CAPS were considered the primary measure, followed by PCL, followed by 2 studies which used differing measures of PTSD. *Q*-test was used to determine heterogeneity across subgroups. The analysis also found that clinician-administered studies compared to self-reported questionnaires had no difference to outcomes, and that these results are comparable across veterans

compared to non-veteran groups. Gallegos' results confirmed previously published meta-analyses on similar intervention types and outcomes. Limitations to this analysis includes the inclusion of a small size of viable studies, the inclusion of small trials, and the inclusion of studies with high or unclear risk of bias. Notwithstanding these limitations, this meta-analysis helps provide support for personalizing treatment options as well as studies that pursue not only completion rates but also includes remission rates among PTSD interventions. Given the positive effects of meditation and yoga, these interventions should be offered for individuals experiencing posttraumatic stress disorder, both in the veteran population and general population based on Gallegos' results. Considering that most meditation and yoga practices take place outside of a healthcare setting yet have such strong health benefits, time and energy spent by health care teams to teach, implement, and support mindfulness approaches are well worth the effort.

BODY VI

Bremner et. al (2017) looked at mindfulness practices of meditation and the effects of yoga exercises. The participants in this study were veterans returning from combat deployment in Iraq or Afghanistan. The sample was small and included a large age range of participants between 18 and 65 years old. The team analyzed participants with brain imaging (PET CT) scans completed during exposure to different stimulators. The use of PET CT gives a more objective result on a condition that is very much one of subjectivity. Since MBSR "has been associated with changing the brain regions: the medial prefrontal cortex, amygdala, hippocampus, parietal cortex, and insula, which play an important role memory, learning, fear, and responses to threats in the involvement of PTSD (Bremner et. al, 2017)," these are the areas of the participant's brain that were analyzed throughout the course of the study. Over an 8-week course of MSRB therapy, clinician-administered questionnaires, and serial brain imaging of neutral (i.e. Birds chirping and people talking) and combat-related scenarios, it was found that there was a significant reduction in PTSD symptoms.

According to the study, MBSR changes brain function, shown by a decrease in the activation of fear and stress responses in the brain. As far as a use of such a study in future practice, it is not likely that there will be a time to perform PET CT scans while stimulating patients with "real-life war scenarios including images and sounds." It sounds of an ethical dilemma and one that would not be in the best interest of the patient nor along the ethical lines of "do no harm." The results of the study, however, can be used to encourage persons suffering from PTSD to participate in questionnaires to track progress and to work on mindfulness practices including yoga exercises.

Conclusion

The research articles summarized and evaluated above help answer the central part of the PICO question: mindfulness-based stress reduction (MBSR) is effective in improving the reported quality of life of veterans with post-traumatic stress disorder (PTSD), a common and disruptive mental health condition, when used alongside standard of care compared to standard of care alone. The studies looked at different forms of MBSR, including mantram repetition practice, yoga, mindfulness-based cognitive therapy, breathing exercises, sitting meditation, breathing meditation, and body awareness training. With the exception of Bremner's PET CT scan, which would not be feasible nor ethical given our population, these interventions are low risk, cost effective due to the

minimal clinic space and clinician time requirement, minimally time intensive with an average of 4-8 weeks of participant training, and can be easily implemented in a practice setting. The low amount of available research studies specially looking at MBSR for veterans with PTSD conveys that this is a reasonable new area of research. A grounded theory approach, which was missing from the reviewed articles, would help give insight into the intricacies of the lives of veterans with PTSD from a qualitative perspective. Given the stigma associated with PTSD and the military's silence on the issue, MBSR is a viable adjunctive therapy for veterans who many not feel supported in coming forward with their disorder as well as for veterans who want another approaching in treating their PTSD. MBSR is therefore highly recommended as an adjunct treatment option in treating veterans with PTSD.

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