

Mindfulness-Based Stress Reduction for Posttraumatic Stress Disorder Symptoms, emotional exhaustion and coping styles of Emergency Nurses: A Randomized Clinical Trial

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Abstract

Background: Post-traumatic stress disorder (PTSD) is one of the most prevalent mental health issues among emergency nurses, particularly in the aftermath of the COVID-19 pandemic. However, there is a scarcity of empirical studies on improving PTSD and related symptoms. **Objective:** To investigate the effectiveness of the mindfulness-based stress reduction (MBSR) program in reducing PTSD symptoms, emotional exhaustion, and coping styles among emergency nurses. **Methods:** A randomized clinical trial was conducted with 74 emergency nurses experiencing symptoms of PTSD who were recruited from two hospitals. Participants were randomly assigned to either the intervention group (n=38) or the comparison group (n=36) using a random number calculation procedure. The intervention group received an 8-week MBSR program, while the comparison group had the option to receive the same training upon completion of the study. Self-reported data on mindfulness, PTSD symptoms, emotional exhaustion, and coping styles were evaluated at baseline, after treatment, and 1-month of follow-up. **Results:** Participants in the MBSR group showed a significant improvement in PTSD symptoms ($M(I-J)=-7.789$, $P<0.001$, 95% $CI=3.642\sim11.937$), emotional exhaustion ($M(I-J)=4.763$, $P=0.004$, 95% $CI=1.274\sim8.253$) and mindfulness ($M(I-J)=-7.421$, $P<0.001$, 95% $CI=-12.349\sim2.493$) after treatment. These effects were sustained up to 1-month follow-up. No significant improvement in coping style was observed in any of the subjects. **Conclusion:** MBSR is feasible and effective in reducing symptoms of PTSD and emotional exhaustion among emergency nurses. However, it has a lesser effect on coping styles. MBSR has the potential to alleviate the psychological impact of occupational stress on nurses.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has imposed excessive workloads and psychological pressure on frontline healthcare personnel (Martínez-Caballero, García-Sanz, Cárdena-García, & Martínez-Piedra, 2021). Except for acute severe cases, patients with fever and suspected infection were also referred to emergency departments, further increasing the overwhelming workload on nurses. Emergency nurses have experienced intense insecurity due to insufficient information, fears of infection, isolation from their families, and exposure to traumatic events. These factors led to a series of negative physical and emotional changes, such as insomnia, fear, anxiety, burnout, and distress, which had a lasting impact on nurses' mental health even after the pandemic (An et al., 2020; Lai et al., 2020; Saragih, Tonapa, Saragih, Advani, & Batubara, 2021).

Post-traumatic stress disorder (PTSD) was found to be one of the most prevalent mental health issues and long-term consequences among emergency nurses during the COVID-19 pandemic (Saragih et al., 2021; Yunitri, Chu, Kang, Jen, & Pien, 2022). Studies have reported a prevalence rate of 9.1% to 30.9% (Bahadırli & EserSagaltici, 2021; Martínez-Caballero et al., 2021; Song et al., 2020). Emergency nurses experiencing symptoms of PTSD suffer from psychological and physiological distress, leading to reduced work efficiency, diminished quality of life, increased incidence of nursing errors, and a higher likelihood of intending to leave

their positions. These consequences could have a negative impact on the effectiveness of the healthcare system (Garrett, Salmon, Angela, & Morehead, 2019; Luo, Zhang, & Yuan, 2020). Given the critical role of emergency nurses in the healthcare system and the potential hazards of continuous, complicated trauma-related situations for them, it is crucial to identify potential strategies to improve PTSD symptoms in this population. Unfortunately, there is a lack of research focusing on this issue, despite the abundance of studies on the mental health of nurses during the pandemic (Ramachandran et al., 2022).

Mindfulness-Based Stress Reduction (MBSR) is a psychological intervention developed by Jon Kabat-Zinn in 1979. It is based on the fundamental concept of mindfulness. Mindfulness is defined as 'the intentional awareness of the present moment with a non-judgmental and accepting attitude'. It aims to encourage practitioners to harness their internal resources and energy to manage stress, pain, and even illness in healthier and adaptive ways (Kabat-Zinn, 2013). The formal MBSR program is a group-based intervention that consists of a 2.5-hour session once a week for eight weeks. It guides participants to practice mindful breathing, body scan, meditation, and yoga, and includes a daylong retreat between the sixth and seventh weeks. Participants are also encouraged to practice mindfulness at home for approximately 45 minutes per day.

MBSR has been widely applied to nurses in recent years. Empirical evidence shows many benefits of MBSR, including reduced anxiety, depression, professional fatigue, and work stress (Wexler & Schellinger, 2022; Yang, Tang, & Zhou, 2018). It also leads to improved job satisfaction and quality of life, even in abbreviated programs (Anderson, 2020; Ghawadra, Abdullah, Choo, Danaee, & Phang, 2020). A recently published study also demonstrated the effectiveness of an online MBSR program in improving the sleep quality of nurses working in COVID-19 care units (Nourian, Nikfarid, Khavari, Barati, & Allahgholipour, 2021).

Meanwhile, considering the limitations of traditional PTSD intervention therapies such as cognitive-behavioral therapy and eye movement desensitization and reprocessing in terms of patient compliance and prognosis, MBSR has garnered interest as an alternative or adjunct therapy for PTSD symptoms (Goetter et al., 2015). A growing body of evidence has suggested that MBSR has been effective in reducing PTSD symptoms in a variety of populations, from veterans to cancer patients. This is achieved by improving the ability to distinguish between past and present, encouraging people to accept distressing thoughts, feelings, and experiences without avoidance and hypervigilance, and identifying and stopping emotional and physical dysregulation at an early stage (Cole et al., 2015; Müller-Engelmann, Wunsch, Volk, & Steil, 2017; Polusny et al., 2015; Schellekens et al., 2017). A review of neurobiological evidence suggests that MBSR could alleviate PTSD by targeting the neurobiological pathways characteristic of PTSD (Boyd, Lanius, & McKinnon, 2018). Despite these promising findings, as far as we know, there has been a lack of empirical research evaluating the effectiveness of MBSR in improving PTSD symptoms in emergency nurses.

In the present study, our aim was to develop an in-person MBSR program for emergency nurses and examine its impact on PTSD symptoms among this group. Additionally, considering the prevalence of emotional exhaustion among emergency nurses during the pandemic and the impact of emotional exhaustion and coping styles on PTSD symptoms as reported in previous research (Chen, Sun, Chen, Jen, & Kang, 2021; Colville et al., 2017; Ding et al., 2015; Yuan, Wang, Shao, Xu, & Lu, 2022), we also aimed to investigate the program's effectiveness in reducing emotional exhaustion and enhancing coping styles.

METHODS

Participants

Nurses from the emergency departments of two hospitals were recruited. The inclusion criteria are as follows: (1) a minimum of one year of experience working in the emergency department; (2) Impact of Event Impact Scale-Revised (IES-R) scores ranging from 12 (indicating at least one PTSD symptom) to 66 points (indicating an extremely high level of PTSD symptoms, which may require further clinical diagnosis and treatment); (3) willingness to participate in the study. Exclusion criteria included: (1) previous participation in mindfulness training; (2) physical limitations preventing participation in longer mindfulness training; (3) clinical diagnosis of a severe mental disorder or current treatment with psychotropic drugs or interventions.

Procedure

This parallel-group randomized clinical study was conducted in Chongqing, China, from October 2021 to January 2022. Subjects were recruited through advertisements that included the study design, overall structure of the intervention program, themes and duration of each session, and potential benefits and risks. The applicants interested in participating were asked to complete the online eligibility assessment (using the Questionnaire Star platform). A total of 89 emergency nurses applied, and 74 of them were enrolled in the study. All participants provided informed written consent to participate in this study. Participants were randomly assigned to either the intervention group ($n=38$) or the comparison group of waiting lists ($n=36$) using the random number calculation procedure (www.random.org) by a researcher who was not associated with the current study. Figure 1 illustrates the flow of participants through the study.

The intervention group received MBSR training once a week for eight weeks, while the comparison group received no intervention. However, they were offered the same training upon completion of the study if they wished. The author evaluated the outcomes without knowledge of the treatment condition. They served as an independent evaluator at the beginning of the study, after the intervention (week 9), and at the 1-month follow-up (week 13).

Intervention

The intervention is based on the standard MBSR course. Adapting to the time constraints of nurses and with the approval of professors specialized in mindfulness therapy, the 1-day group retreat was modified to self-guided practice at home, making it easier to integrate into the nurses' schedules. The instructor completed a comprehensive MBSR course and an instructing practicum, and has 3 years of teaching experience. A psychologist experienced in MBSR supervised the intervention sessions to maintain the integrity of the treatment. Each session introduced a new theme and an unusual practice, such as body scanning, mindful movement (yoga and walking), observing emotions, and mindful eating, among others. Group discussions about participants' experiences with practices have also been conducted in every session. The practice audio was provided to the participants to facilitate at-home practice after class. To reduce absenteeism, the instructor conducted on-site training twice a week per session, with no more than 3 days between sessions and identical content. The participants were given the option to attend one of the two sessions. The program also encourages participants to develop present-moment awareness in their daily activities. A WeChat group (Tencent Inc., China) was created for the intervention group to provide reminders, encouragement, facilitate discussions, and offer additional instructions. The control group also had a WeChat group for communication.

Instrument

PTSD symptoms were assessed using the revised Impact of Event Scale-Revised (IES-R) (Weiss, 2007). The IES-R is a 22-item self-report measure consisting of three subscales: reexperiencing, avoidance, and hyperarousal. All items are rated on a five-point scale ranging from 0 (not at all) to 4 (extremely). A total score greater than 12 has been reported to predict clinical symptoms of PTSD, and higher total scores indicate more severe symptoms (Sheen, Spiby, & Slade, 2015). The full score in this sample demonstrates excellent internal consistency (Cronbach $\alpha = 0.912$).

Mindfulness was assessed using the Chinese version of the Mindfulness Attention Awareness Scale (MAAS) (Deng et al., 2012). The MAAS was widely used to assess individuals' awareness of the present moment and their level of attention. It consists of a 15-item scale with a range from 1 (almost always) to 6 (almost never); higher scores indicate higher state mindfulness. The Cronbach's alpha of MAAS was 0.903 in this study, indicating a high level of internal consistency.

Emotional exhaustion was assessed using the emotional exhaustion subscale of the Maslach Burnout Inventory (MBI) created by Maslach and Jackson (1981). The emotional exhaustion subscale consisted of 9 items, which were rated on a Likert scale ranging from 0 "never" to 6 "every day". Higher scores indicated higher frequencies of experienced emotional exhaustion. The scale showed excellent internal consistency (Cronbach's $\alpha = 0.972$) in this sample.

Coping styles were evaluated using the Simple Coping Style Questionnaire (SCSQ) (Yaning, 1988). The SCSQ was widely used to measure participants' coping styles in response to life events. This questionnaire consists of 12 items related to positive coping and 8 items related to negative coping, with a response range from 0 (never) to 3 (always). The higher the one-dimensional scores, the more individuals tended to adopt this kind of coping style. The Cronbach's alpha for the positive coping style and the negative coping style was 0.932 and 0.895, respectively, in this sample.

Data Analysis

All analyses were performed using IBM SPSS Statistics 22.0. Intention-to-treat analyses were conducted for the participants' results. The missing data from the failed follow-up participants were imputed using 'multiple imputation' (Jakobsen, Gluud, Wetterslev, & Winkel, 2017). Continuous variables are presented as mean and standard deviation (SD), while categorical variables are presented as absolute numbers and proportions. The data were assessed for distributional assumptions, and approximate normality and homogeneity of variance were confirmed. Baseline differences between groups were assessed using the independent *t*-test for continuous variables and the chi-square test for categorical variables. A repeated measures analysis of variance (ANOVA) was conducted to compare changes over time in outcomes between groups, with a 2 (condition) by 3 (time) design.

The Bonferroni method was employed to make multiple adjustments for post hoc pairwise comparisons and to correct for multiplicity in the reported *P* values. Changes between intervals and effect sizes were reported along with the corresponding 95% confidence intervals (CI). All tests were two-tailed, and $P < .05$ indicated statistical significance.

RESULTS

Adherence

Among the 38 participants in the intervention group, 2 withdrew after the first session due to a loss of interest. At the end of the study, there were 36 active participants, and the average number of sessions attended was 5.89 ± 2.15 (ranging from 4 to 8). Reasons for absence included illness, working overtime, and caring for family members. One month into the follow-up, three participants from the intervention group did not respond to the final questionnaire, while 33 participants from the comparison group completed all three assessments.

Characteristics of the participants and baseline differences between the groups

The sample consisted of 69 female nurses (93.2%) and 5 male nurses (6.8%), with a mean age of 31.7 years ($SD = 5.4$) and a mean duration of emergency practice of 10.1 years ($SD = 5.8$). Most of the nurses were married ($n = 53$, 71.6%), 64 (86.5%) had obtained a bachelor's degree, and 54 (72.9%) held junior titles. There were no differences between the groups in demographic and clinical characteristics, as well as baseline outcome scores (see Table 1).

Effects of the intervention: Disparities between groups

The outcome data were consistent with homogeneity of variance and a normal distribution. Table 2 presents descriptive statistics of the mean scores of outcomes at baseline, post-intervention, and 1-month follow-up. It also includes group comparisons based on time, the main effect of the group, and the interaction effect of the time group in the MBSR and comparison group. We observed significant time effects for PTSD symptoms ($F = 5.947$, $P = 0.003$, partial $\eta^2 = 0.076$), emotional exhaustion ($F = 4.584$, $P = 0.012$, partial $\eta^2 = 0.060$), and mindfulness ($F = 4.342$, $P = 0.019$, partial $\eta^2 = 0.057$). Additionally, we found significant time group interaction effects for PTSD symptoms ($F = 4.174$, $P = 0.017$, partial $\eta^2 = 0.055$) and emotional exhaustion ($F = 3.152$, $P = 0.046$, partial $\eta^2 = 0.042$). Regarding the difference between the groups, the results showed significant effects only on the post-intervention scores of PTSD symptoms ($F = 5.916$, $P = 0.017$, 95% $CI = 1.492 \sim 15.054$). The time effect, the main effect of the group, and the interaction effect of the time and group for two coping styles were not significant.

Effects of the intervention: Pre-post disparities

Simple main effects tests with Bonferroni correction revealed significant changes in the main outcomes over time for both groups (see Table 3). There was a significant decrease in symptoms of PTSD ($M(I-J) = -7.789, P < 0.001, 95\% CI = 3.642 \sim 11.937$) and emotional exhaustion ($M(I-J) = 4.763, P = 0.004, 95\% CI = 1.274 \sim 8.253$) and an increase in mindfulness ($M(I-J) = -7.421, P < 0.001, 95\% CI = -12.349 \sim -2.493$) from before to post-test in the MBSR group, while no significant changes were found in the comparison group. There were no significant differences in any outcomes between the post-test and the 1-month follow-up test in the MBSR group.

DISCUSSION

To our knowledge, this is the first study to conduct a MBSR program to reduce PTSD symptoms among emergency nurses. The current findings indicate that participants who underwent the MBSR program showed improvements in symptoms of PTSD compared to those in the comparison group, and these improvements remained stable one month after treatment. The program was also successful in enhancing mindfulness and reducing emotional exhaustion among emergency nurses. However, no significant changes have been observed in the coping styles of either group. The evidence contributes to the existing literature by showing the feasibility and potential effectiveness of MBSR for emergency nurses experiencing PTSD symptoms.

Attention monitoring and acceptance are the two fundamental components in mindfulness training (Bishop et al., 2010). According to the Monitoring and Acceptance Theory, attention monitoring can help practitioners enhance their awareness of their present experience, while acceptance encourages practitioners to approach experiences with a non-judgment, open, and equanimous manner. The combined effects of attention monitoring and acceptance synergistically contribute to the positive health outcomes associated with mindfulness training, as highlighted by Lindsay and Creswell (2017). The results of this study are consistent with the theoretical framework. Individuals who participated in the MBSR program showed lasting improvements in PTSD symptoms after the treatment and at the 1-month follow-up, while no similar improvements were observed in the control group. The current finding is consistent with previous studies that demonstrated moderate to strong effects of MBSR therapy on PTSD symptoms in other populations (Harding, Simpson, & Kearney, 2018; Polusny et al., 2015; Stephenson, Simpson, Martinez, & Kearney, 2017).

Findings from the present study suggest that a reduction in PTSD symptoms may be associated with changes in mindfulness during the treatment. Consistent with previous studies (Anderson, 2020; Ducar, Penberthy, Schorling, Leavell, & Calland, 2020; Wang et al., 2017), participants in the intervention group reported a significant improvement in mindfulness skills after treatment. This suggests that the current program facilitated self-acceptance and self-care among emergency nurses. No significant differences in mindfulness were found between the two groups in the post-intervention or follow-up. This lack of difference may be attributed to the noisy work environment, heavy workload, high occupational risk, and constantly changing situations in the emergency department. Nurses are compelled to maintain a state of hypervigilance and hyperirritability in order to cope with various stressful events. This finding highlights the need for supportive organizational measures to accompany the intervention, creating a low-pressure environment for nurses to manage their physical and mental health in practice. This intervention helped emergency nurses develop positive psychological functioning and counteract the avoidance and suppression of thoughts that frequently characterize PTSD symptoms (Lang, 2017). The implication is significant, as it demonstrates the practicality and effectiveness of the MBSR program for managing PTSD symptoms, even for nurses who are constantly exposed to traumatic stress.

In addition to reductions in PTSD symptoms, a significant finding in this study is the sustained improvement in emotional exhaustion among nurses in the intervention group observed at the 1-month follow-up, compared to the comparison group. This finding is consistent with prior research (Duarte & Pinto-Gouveia, 2016; Gauthier, Meyer, Grefe, & Gold, 2014). Emotional exhaustion is the central component of burnout, which is one of the most common chronic psychological symptoms experienced by clinical nurses (Maslach & Leiter, 1997). Yuan et al. (2022) previously found that emotional exhaustion is a factor that promotes

the development of PTSD symptoms among emergency nurses, and it also serves as a mediator between mindfulness and PTSD symptoms. The present study demonstrated that emotional exhaustion decreased as mindfulness improved, and these changes were in consistent with changes in symptoms of PTSD. The empirically confirmed findings indicate that MBSR practice can help increase the mental resources of emergency nurses, improve emotion regulation skills, and thus alleviate emotional exhaustion and related PTSD symptoms (Duarte & Pinto-Gouveia, 2016).

Few previous studies have assessed the effectiveness of MBSR in coping styles. In the present study, there was no significant improvement in either of the coping styles among all the subjects observed. This result challenges the findings of Fuente et al. (2018), who reported a significant decrease in the use of negative coping strategies and a significant increase in the use of positive coping strategies among university students after a mindfulness-based intervention. One possible reason is differences in population. Stable preferences or personality differences, which are relatively fixed, determine individual differences in coping styles (Carver, Scheier, & Weintraub, 1989). Although mindfulness practice could help emergency nurses reduce automatic reactions to stressful events by temporarily inhibiting coping responses (Hamilton, Kitzman, & Guyotte, 2006), it is challenging to change habitual and maladaptive coping styles in a short period. Therefore, a longer MBSR intervention or a combination of MBSR with coping training for emergencies may be necessary to enhance coping mechanisms for managing stress and work-related challenging.

There are several strengths in this study. First, this study addresses a significant gap in the field as there were only a few studies that evaluated the effectiveness of the MBSR program on PTSD symptoms, emotional exhaustion, and coping styles in emergency nurses. Secondly, we conducted an in-person MBSR program for emergency nurses. Given the scheduling challenges faced by emergency nurses, we have implemented several measures to offer more flexibility in scheduling. These measures include holding each session twice a week and providing a self-guided 1-day retreat. These strategies have resulted in a lower attrition rate compared to previous studies.

This study has limitations. First, the findings relied entirely on the use of self-report questionnaires and are subject to the limitations associated with this type of methodology, such as response bias. Combined assessment methods, such as interviews and behavioral measurements, could be an intriguing avenue for future studies. Secondly, the short follow-up period also limited our current findings. It is unknown whether the effects persist beyond one month. Future trials with longer-term follow-up are necessary to assess the long-term effectiveness of the treatment.

CONCLUSION

Taken together, these findings suggest that MBSR was feasible and effective in reducing PTSD symptoms and emotional exhaustion among emergency nurses, but it has a lesser effect on coping styles. Nursing leaders might consider introducing MBSR to emergency nurses as part of their continuing professional education. They should also develop supportive strategies for implementation to ensure that nurses maintain dedicated practice in the demanding clinical work. Additionally, targeted on-the-job mindfulness-based programs could be developed to help nurses integrate mindfulness into their daily routine and reap its benefits.

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Fig. 1 Flow chart of the trial

Table 1

Demographic, clinical characteristics, and study results at baseline

	MBSR (n=38) [M ± SD/n(%)]	comparison (n=36) [M ± SD/n(%)]	τ/χ^2	P-Value
Age	32.42±5.48	31.03±5.32	1.109	0.271
Years of emergency nursing	10.58±6.30	9.53±5.19	0.781	0.437
Gender			0.277	0.599

	MBSR (n=38) [M ± SD/n(%)]	comparison (n=36) [M ± SD/n(%)]	τ/χ^2	P-Value
Female	36(94.7%)	33(91.7%)		
Male	2(5.3%)	3(8.3%)		
Education background			2.110	0.146
College degree	3(7.9%)	7(19.4%)		
Bachelor	35(92.1%)	29(80.6%)		
Professional title			2.397	0.494
Nurse	12(31.6%)	12(33.3%)		
Senior nurse	14(36.8%)	16(44.4%)		
Supervisor nurse	12(31.6%)	7(19.4%)		
Co-chief superintendent nurse	0	1(2.8%)		
Marital status			0.163	0.686
Spinsterhood	10(26.3%)	11(30.6%)		
Married	28(73.7%)	25(69.4%)		
Mindfulness	51.66±10.83	53.61±11.47	-0.753	0.454
PTSD symptoms	31.21±12.16	32.22±13.36	-0.341	0.734
Emotional exhaustion	21.53±9.95	21.11±11.71	0.165	0.870
Positive coping	24.74±6.26	24.92±7.33	-0.114	0.910
Negative coping	10.61±3.09	10.28±4.39	0.373	0.710

Table 2

Means and standard deviations (SDs) of the results were recorded at the beginning of the study, after the intervention, and at 1-month follow-up. The analysis included the main effect of time, the main effect of the group, and the interaction effect of time and groups

Outcomes	Time	MBSR (n=38, M ± SD)	comparison (n=36, M ± SD)	Time			Group			Time*Group interaction	
				<i>F</i>	<i>P-value</i>	η^2	<i>F</i>	<i>P-value</i>	η^2	<i>F</i>	<i>P-value</i>
Mindfulness	T1	51.66±10.83	53.61±11.47	4.7342	0.019	0.057	0.913	0.343	0.013	0.936	0.063
	T2	59.08±13.07	64.67±12.32								
	T3	58.03±13.53	53.72±14.03								
PTSD symptoms	T1	31.21±12.16	32.22±13.36	3.6947	0.003	0.076	3.366	0.071	0.045	4.174	0.017
	T2	23.42±14.01	31.69±15.24								
	T3	25.11±13.81	31.33±13.58								
Emotional exhaustion	T1	21.53±9.95	21.11±11.71	1.584	0.012	0.060	1.462	0.231	0.020	3.152	0.046
	T2	16.76±8.93	20.44±10.50								
	T3	16.40±10.48	20.81±11.04								
Positive coping	T1	24.74±6.26	24.92±7.33	2.388	0.095	0.032	0.008	0.927	<0.001	0.008	0.992

Outcomes	Time	MBSR (n=38, M ± SD)	comparison (n=36, M ± SD)	Time	Time	Time	Group	Group	Group	Time*Group interaction	Time*Group interaction	Time*Group interaction
Negative coping	T2	26.58±6.12	26.78±8.36									
	T3	25.53±7.42	25.53±8.10									
	T1	10.61±3.09	10.28±4.30	0.253	0.777	0.004	0.838	0.956	0.332	0.013	0.140	0.000
	T2	9.26±4.51	10.92±4.77									
	T3	9.66±4.48	10.72±4.53									

T1, pre-intervention; T2, post-intervention; T3, 1 month follow-up

Table 3

The variation in outcomes at baseline, after treatment, and at 1-month follow-up between MBSR and controls

Outcomes	Time	Intervention (n=38, M ± SD)				Control (n=36, M ± SD)				<i>p-value</i>	<i>95%CI</i>
		M(I-J)	<i>p-value</i>	<i>95%CI</i>		M(I-J)	<i>p-value</i>	<i>95%CI</i>			
Mindfulness	T1	51.66±10.83				53.61±11.47					
	T2	59.08±13.07	-7.421	<0.001	-12.349 ~ -2.493	54.67±12.32	-1.056	>0.999	-6.105 ~ 4.093		
	T3	58.03±13.55	1.053	>0.999	-3.374 ~ 5.479	53.72±14.03	0.944	>0.999	-3.605 ~ 5.593		
PTSD symptoms	T1	31.21±12.16				32.22±13.36					
	T2	23.42±14.02	7.789	<0.001	3.642 ~ 11.937	31.69±15.24	0.528	>0.999	-3.705 ~ 4.761		
	T3	25.11±13.83	-1.684	>0.999	-6.027 ~ 2.658	31.33±13.58	0.361	>0.999	-4.105 ~ 4.827		
Emotional exhaustion	T1	21.53±9.95				21.11±11.71					
	T2	16.76±8.93	4.763	0.004	1.274 ~ 8.253	20.44±10.50	0.667	>0.999	-2.905 ~ 4.239		
	T3	16.40±10.48	0.368	1.217	>0.999	20.81±11.04	-0.361	>0.999	-3.405 ~ 2.673		
Positive coping	T1	24.74±6.26				24.92±7.33					
	T2	26.58±6.12	-1.842	0.341	-4.661 ~ 0.997	26.78±8.36	-1.861	0.359	-4.713 ~ 1.011		
	T3	25.53±7.45	1.053	>0.999	-1.699 ~ 3.805	25.53±8.10	1.250	0.846	-1.505 ~ 4.005		
Negative coping	T1	10.61±3.09				10.28±4.39					
	T2	9.26±4.51	1.342	0.250	-0.532 ~ 3.216	10.92±4.77	-0.639	>0.999	-2.505 ~ 1.227		
	T3	9.66±4.48	-0.395	>0.999	-1.995 ~ 1.206	10.72±4.53	0.194	>0.999	-1.405 ~ 1.793		

T1, pre-intervention; T2, post-intervention; T3, 1 month follow-up

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