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Original Article

Efficacy of Mindfulness-Based Interventions for Treating Anxiety in PTSD Patients

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ABSTRACT

Background: Post-traumatic stress disorder is frequently accompanied by persistent anxiety, hyperarousal, sleep disturbance, and impaired emotional regulation. Mindfulness-based interventions may support trauma-exposed patients by improving present-moment awareness, distress tolerance, and regulation of intrusive thoughts and bodily arousal. Objective: This study evaluated whether an eight-week structured mindfulness-based intervention added to routine psychological support produced greater reductions in anxiety and PTSD symptoms than routine psychological support alone among veterans and civilian trauma survivors in Islamabad, Pakistan. Methods: This two-arm controlled clinical trial included 120 adults aged 18 to 60 years with PTSD symptoms of at least three months' duration and moderate anxiety. Participants were allocated equally to mindfulness-based intervention plus routine psychological support or routine psychological support alone. The intervention included weekly 60–75-minute sessions over eight weeks, incorporating breathing exercises, body awareness, mindful sitting, grounding techniques, mindful movement, and home practice. Anxiety was assessed using the Generalized Anxiety Disorder-7 scale, and PTSD symptoms were assessed using the PTSD Checklist for DSM-5 at baseline, week 8, and week 12. Results: Follow-up completion was 93.3% in the mindfulness group and 90.0% in the control group. At week 12, GAD-7 scores decreased by 7.4 points in the mindfulness group compared with 2.8 points in the control group. PCL-5 scores decreased by 20.5 points versus 7.9 points, respectively. Week-12 between-group differences favoured mindfulness for both anxiety (-4.3 points) and PTSD symptoms (-11.9 points). Conclusion: Mindfulness-based intervention added to routine psychological support was associated with clinically meaningful short-term reductions in anxiety and PTSD symptoms among trauma-exposed adults in Islamabad. Keywords: Mindfulness-Based Intervention; PTSD; Anxiety; Trauma Survivors; Veterans; GAD-7; PCL-5; Pakistan; Clinical Trial.

INTRODUCTION

Post-traumatic stress disorder is a disabling trauma-related psychiatric condition that may develop after exposure to actual or threatened death, serious injury, sexual violence, combat, terrorism, displacement, interpersonal violence, accidents, natural disasters, or other life-threatening events. Its clinical presentation commonly includes intrusive recollections, nightmares, avoidance of trauma reminders, persistent negative alterations in cognition and mood, hyperarousal, sleep disturbance, irritability, impaired concentration, and functional limitation. Anxiety is one of the most frequent and clinically important symptom dimensions in PTSD, as many affected individuals remain persistently tense,

vigilant, fearful, and physiologically reactive even after the traumatic threat has ended. This continuing state of perceived danger contributes to social withdrawal, occupational impairment, disturbed family functioning, poor sleep, somatic tension, and reduced quality of life, making anxiety reduction a central therapeutic target in trauma-exposed populations (1–4).

The global burden of PTSD is substantial, although its occurrence varies according to trauma type, cumulative exposure, individual vulnerability, social support, and access to mental health care. Population-level evidence indicates that trauma exposure is common across diverse settings, but the risk of persistent PTSD is particularly high after severe, repeated, interpersonal, or life-threatening trauma. Veterans and survivors of violence represent two clinically important groups because their traumatic exposure may be intense, recurrent, and closely linked to perceived threat to life or bodily integrity. In such populations, PTSD is rarely confined to memory-based symptoms alone; it frequently presents with generalized anxiety, exaggerated startle responses, autonomic arousal, avoidance of emotionally triggering situations, and difficulty regulating distress in daily life (3,4). This overlap between PTSD and anxiety is clinically relevant because patients may initially seek care for nervousness, panic-like symptoms, poor sleep, body tension, or inability to relax rather than directly reporting trauma-related distress.

In Pakistan, trauma-related psychological morbidity has growing public health importance. The population has been exposed to multiple trauma sources, including terrorism, internal displacement, natural disasters, road traffic accidents, domestic and community violence, occupational trauma, and medical trauma. Local studies have documented post-traumatic stress, anxiety, depression, post-traumatic growth, moral injury, and psychological resilience issues among police officials exposed to war-related trauma, internally displaced children, healthcare workers, and women experiencing traumatic medical events (27–31). These findings indicate that PTSD and trauma-related anxiety are not restricted to military populations but occur across community, occupational, and healthcare contexts. Islamabad, as a major urban center receiving patients from diverse regions and backgrounds, provides a clinically relevant setting for studying interventions among veterans and civilian trauma survivors with persistent PTSD symptoms and comorbid anxiety.

Evidence-based treatments for PTSD include trauma-focused cognitive behavioural therapy, prolonged exposure therapy, cognitive processing therapy, and eye movement desensitization and reprocessing. These interventions can substantially reduce PTSD symptoms; however, they may not be acceptable or feasible for all patients. Some individuals avoid trauma-focused treatment because direct trauma narration can be emotionally overwhelming, while others discontinue therapy early or continue to experience anxiety, sleep disturbance, physiological arousal, and emotional dysregulation despite receiving psychological support (32–34). These clinical challenges highlight the need for adjunctive, acceptable, low-cost, and culturally adaptable interventions that can help patients regulate anxiety and distress, particularly in settings where access to specialist trauma-focused psychotherapy may be limited.

Mindfulness-based interventions offer one such therapeutic approach. Mindfulness involves purposeful, present-moment, non-judgmental awareness of thoughts, emotions, bodily sensations, and environmental experiences. In PTSD, attention is frequently pulled toward intrusive memories of past trauma or anticipatory fear of future threat. Mindfulness training aims to strengthen the capacity to observe distressing internal experiences without immediate avoidance, suppression, or reactive interpretation. Through breathing practice, body awareness, grounding, mindful sitting, mindful movement, and structured home practice, patients may learn to regulate autonomic arousal, tolerate distressing sensations, and reduce fear-driven responses to trauma-related thoughts and bodily cues (8–15). This mechanism is particularly relevant for PTSD patients with prominent anxiety, because anxiety often persists through heightened threat monitoring, catastrophic interpretation of bodily sensations, and difficulty disengaging from worry.

Previous clinical trials and reviews suggest that mindfulness-based approaches may reduce PTSD symptoms and related psychological distress, particularly among veterans and trauma-exposed adults. Randomized and pilot studies have reported benefits of mindfulness-based stress reduction, brief mindfulness training, mindfulness-based cognitive therapy, mindfulness-based exposure approaches, and mantram repetition for PTSD-related symptoms, emotional regulation, and distress tolerance (8–15). Systematic reviews, meta-analyses, and umbrella reviews further support the potential role of mindfulness-based interventions in trauma-related disorders, although effects vary across populations, intervention formats, comparators, follow-up periods, and methodological quality (16–23,26). Broader anxiety literature also indicates that mindfulness-based stress reduction can reduce anxiety symptoms and may offer clinically meaningful benefit in anxiety disorders, supporting its relevance for PTSD patients in whom anxiety is a major presenting complaint (24,25).

Despite growing international evidence, locally generated clinical data remain limited in Pakistani PTSD populations, particularly among mixed samples of veterans and civilian trauma survivors receiving routine psychological support. Much of the existing mindfulness evidence comes from Western veteran cohorts, and its applicability to Pakistani clinical settings requires careful evaluation because trauma experiences, help-seeking behaviour, cultural expectations, mental health resources, and therapy acceptability may differ. A structured mindfulness-based intervention that avoids complex spiritual framing, uses culturally comfortable language, and can be delivered in counselling or rehabilitation settings may provide a practical adjunct to routine psychological support. However, its clinical value must be assessed using validated symptom measures and clearly defined endpoints.

The present controlled clinical trial was therefore designed using a PICO-oriented framework in which the population comprised adults aged 18 to 60 years with PTSD symptoms of at least three months' duration and moderate anxiety; the intervention was an eight-week structured mindfulness-based intervention delivered in addition to routine psychological support; the comparator was routine psychological support alone; and the outcomes were changes in anxiety severity measured by the Generalized Anxiety Disorder-7 scale and PTSD symptom severity measured by the PTSD Checklist for DSM-5 at post-treatment and 12-week follow-up (5,7). The study aimed to determine whether structured mindfulness training produced greater reductions in anxiety and PTSD symptoms than routine psychological support alone among veterans and trauma survivors in Islamabad, Pakistan. It was hypothesized that participants receiving mindfulness-based intervention plus routine psychological support would show greater improvement in GAD-7 and PCL-5 scores at 12-week follow-up compared with participants receiving routine psychological support only.

MATERIALS AND METHODS

This study was conducted as a two-arm controlled clinical trial in Islamabad, Pakistan, to evaluate whether an eight-week structured mindfulness-based intervention, delivered in addition to routine psychological support, reduced anxiety and PTSD symptom severity more effectively than routine psychological support alone among veterans and civilian trauma survivors. The trial followed an interventional parallel-group design with baseline assessment, post-intervention assessment at eight weeks, and follow-up assessment at twelve weeks. The primary outcome was change in anxiety severity measured by the Generalized Anxiety Disorder-7 scale, and the secondary outcome was change in PTSD symptom severity measured by the PTSD Checklist for DSM-5. Psychological well-being was also assessed as an additional clinical outcome to describe broader changes in functioning and emotional status.

Participants were recruited from mental health clinics, rehabilitation centres, and counselling units in Islamabad. The source population included veterans exposed to war-related or duty-related traumatic events and civilian survivors of trauma, including violence, accidents, displacement, or other serious life-threatening experiences. Potential participants were screened by trained clinical personnel before

enrolment. Adults aged 18 to 60 years were eligible if they had PTSD symptoms persisting for at least three months and had moderate anxiety at screening. PTSD symptom severity was assessed using the PTSD Checklist for DSM-5, and anxiety severity was measured using the Generalized Anxiety Disorder-7 scale (5,7). Clinical confirmation of PTSD symptom presentation was supported, where applicable, by structured assessment aligned with DSM-5 criteria and the Clinician-Administered PTSD Scale for DSM-5 (6). Participants were excluded if they had severe psychosis, current substance dependence, serious neurological illness, or cognitive impairment that could prevent understanding of the intervention or completion of study assessments. Participants receiving psychiatric medication were not excluded, but medication use was recorded to allow interpretation of treatment effects in the context of usual clinical care. Individuals already participating in another active trauma-focused psychotherapy programme during the study period were excluded to reduce contamination of the intervention effect.

Eligible participants were provided information about the purpose of the study, intervention procedures, assessment schedule, potential benefits, voluntary participation, confidentiality, and the right to withdraw without loss of routine care. Written informed consent was obtained before enrolment. Participant confidentiality was maintained by assigning study codes and removing personal identifiers from data sheets used for analysis. Baseline demographic and clinical information was recorded, including age, sex, veteran or civilian trauma-survivor status, trauma duration, previous counselling history, and current psychiatric medication use.

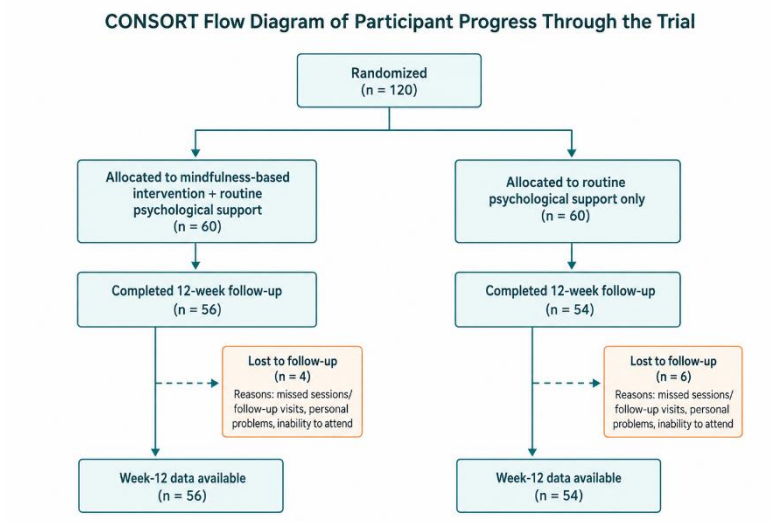

Figure 1 CONSORT Flowchart

After baseline assessment, participants were allocated into two equal groups of 60 participants each. Random allocation was performed using a computer-generated sequence, and allocation was concealed until baseline assessment was completed to reduce selection bias. The intervention group received structured mindfulness-based intervention in addition to routine psychological support, while the control group received routine psychological support only. Both groups continued to receive the usual supportive care available at the participating centres, allowing the study to estimate the additional effect of mindfulness training over routine psychological support.

The mindfulness-based intervention was delivered over eight weeks, with one session per week. Each session lasted approximately 60 to 75 minutes and was conducted in small groups by a psychologist experienced in trauma care and mindfulness practice. Sessions were delivered in simple Urdu and English according to participant comfort. The intervention was clinically framed and avoided complex spiritual or religious content, focusing instead on present-moment awareness, breathing regulation, body awareness, emotional observation, grounding, and self-practice. The first session introduced mindfulness and explained the relationship between trauma, anxiety, attention, and bodily arousal. The second and third sessions focused on breathing exercises and body awareness. The fourth session

addressed recognition of anxious thoughts and trauma-related cognitive reactivity. The fifth session focused on responding calmly to difficult emotions. The sixth session included mindful movement and grounding techniques. The seventh session addressed sleep, daily stress, and self-care. The eighth session reviewed all practices and supported development of an individualized home-practice plan. Participants were asked to practice mindfulness at home for 10 to 15 minutes daily using written instructions. Session attendance was recorded, and participants who missed a session were contacted once and encouraged to continue without coercion.

The control group received routine psychological support according to the usual practice of the participating centres. This included supportive counselling, psychoeducation, basic emotional support, and follow-up contact as routinely provided in the clinical setting. Control participants did not receive structured mindfulness sessions during the active trial period. After study completion, participants in the control group were offered basic mindfulness education for ethical balance.

Outcome assessments were completed at three time points: baseline before group allocation, week 8 immediately after completion of the intervention period, and week 12 follow-up. Anxiety severity was measured using the GAD-7, a seven-item self-report instrument commonly used to assess generalized anxiety symptoms (7). PTSD symptom severity was measured using the PCL-5, a DSM-5-based PTSD symptom checklist used to quantify trauma-related symptom burden (5). Where clinical confirmation was required, PTSD symptom assessment was supported by structured clinical evaluation aligned with DSM-5 criteria and CAPS-5 principles (6). Psychological well-being was assessed using a brief well-being measure to describe broader emotional and functional change. Assessments were performed using the same instruments at each time point to ensure comparability over time.

The main exposure variable was treatment group, categorized as mindfulness-based intervention plus routine psychological support or routine psychological support alone. The primary dependent variable was change in GAD-7 score from baseline to week 12. The secondary dependent variable was change in PCL-5 score from baseline to week 12. Additional variables included age, sex, trauma category, trauma duration greater than one year, previous counselling history, current psychiatric medication use, baseline anxiety severity, baseline PTSD symptom severity, intervention attendance, and follow-up completion. Trauma category was operationalized as veteran-related trauma or civilian trauma exposure. Treatment adherence in the intervention group was assessed through session attendance, with completion of at least six of eight sessions considered adequate exposure to the mindfulness programme for descriptive adherence interpretation.

Several procedures were used to reduce bias and improve internal validity. Random allocation was used to reduce selection bias, and allocation was concealed until baseline assessment had been completed. The same validated instruments were used across both groups and at all time points to reduce measurement variability. Baseline demographic and clinical characteristics were compared between groups to assess comparability before intervention. Medication use and previous counselling history were recorded because both could influence psychological outcomes. The control group continued routine psychological support to reflect usual care, while the mindfulness group received the same routine support plus the structured intervention, allowing assessment of the incremental benefit of mindfulness training. Attendance was recorded to support interpretation of intervention exposure, and data were checked twice after entry to reduce transcription errors.

Data were entered into an electronic database and verified for completeness, consistency, and entry errors before analysis. Continuous variables, including age, GAD-7 scores, PCL-5 scores, and well-being scores, were summarized using means and standard deviations. Categorical variables, including sex, trauma category, trauma duration greater than one year, counselling history, medication use, and follow-up completion, were summarized using frequencies and percentages. Baseline comparability between groups was assessed using independent-samples t tests for normally distributed continuous variables and chi-square or Fisher's exact tests for categorical variables, as appropriate. Within-group change from

baseline to week 8 and week 12 was assessed descriptively and inferentially, but the primary trial inference was based on between-group differences in change from baseline to week 12. Between-group treatment effects were planned to be reported as mean differences in change scores with 95% confidence intervals and p-values. Effect sizes were calculated to estimate the clinical magnitude of treatment benefit in addition to statistical significance.

For repeated outcome measurements across baseline, week 8, and week 12, changes over time were evaluated using repeated-measures analysis or an equivalent longitudinal approach suitable for three time-point continuous outcomes. Baseline score adjustment was used where appropriate to improve precision in estimating between-group differences. Potential confounding by medication use, trauma category, sex, and baseline severity was assessed through adjusted analyses when these variables showed imbalance or clinical relevance. Participants who completed baseline and at least one follow-up assessment were included in the longitudinal analysis. Missing outcome data were reviewed to determine the pattern and extent of missingness, and available follow-up data were retained in analyses that could accommodate incomplete repeated measures. A two-sided p-value of less than 0.05 was considered statistically significant. Statistical analysis was conducted using standard statistical software, and results were interpreted using both statistical significance and clinical relevance of score reduction.

The study was conducted according to basic ethical principles for human participant research, including voluntary participation, informed consent, confidentiality, privacy, and the right to withdraw without affecting routine care. Participants experiencing psychological distress during screening, intervention sessions, or follow-up assessments were managed within the clinical support pathway of the participating centres. The control condition did not withhold routine care, and mindfulness education was made available to control participants after completion of the study period. Data integrity was maintained through coded data collection forms, double-checking of entered data, consistent use of validated outcome tools, documentation of attendance, and preservation of the same assessment schedule for both groups.

RESULTS

A total of 120 participants were enrolled and randomized equally into the mindfulness-based intervention group and the control group, with 60 participants in each arm. Follow-up completion at 12 weeks was 56 of 60 participants in the mindfulness group and 54 of 60 participants in the control group, giving completion rates of 93.3% and 90.0%, respectively. Overall attrition was 8.3%, with 10 participants not completing the 12-week follow-up. Dropout was slightly higher in the control group than in the mindfulness group, although the absolute difference was small at 3.3 percentage points. The main reported reasons for dropout were missed intervention or follow-up sessions, personal difficulties, and inability to attend scheduled visits.

Table 1. Participant Flow and Follow-Up Completion

Study Stage	Mindfulness Group	Control Group	Total
Enrolled and allocated	60	60	120
Completed 12-week follow-up	56	54	110
Did not complete 12-week follow-up	4	6	10
Completion rate	93.3%	90.0%	91.7%
Attrition rate	6.7%	10.0%	8.3%

Baseline demographic and clinical characteristics were broadly comparable between groups, supporting adequate pre-intervention balance. The mean age was 36.8 ± 8.9 years in the mindfulness group and 37.4 ± 9.2 years in the control group, with no statistically significant between-group difference (mean difference, -0.6 years; p=0.717). Male participants represented 70.0% of the mindfulness group and 66.7% of the control group (p=0.695), reflecting the inclusion of veterans in both study arms. The proportion of veterans was nearly identical between groups, with 31 participants (51.7%) in the mindfulness group and 30 participants (50.0%) in the control group (p=0.855). Trauma duration greater than one year was

reported by 63.3% and 60.0% of participants, respectively (p=0.707). Previous counselling history and current psychiatric medication use were also balanced, indicating that both arms entered the trial with similar background exposure to routine mental health care.

Table 2. Baseline Characteristics of Participants

Variable	Mindfulness Group (n=60)	Control Group (n=60)	Between-Group Difference / Test	p-value
Age, years, mean ± SD	36.8 ± 8.9	37.4 ± 9.2	Mean difference: -0.6 years	0.717
Male sex	42 (70.0%)	40 (66.7%)	χ^2=0.154	0.695
Female sex	18 (30.0%)	20 (33.3%)	—	—
Veterans	31 (51.7%)	30 (50.0%)	χ^2=0.033	0.855
Civilian trauma survivors	29 (48.3%)	30 (50.0%)	—	—
Trauma duration >1 year	38 (63.3%)	36 (60.0%)	χ^2=0.141	0.707
Previous counselling history	22 (36.7%)	24 (40.0%)	χ^2=0.141	0.707
Current psychiatric medication use	19 (31.7%)	18 (30.0%)	χ^2=0.039	0.843

At baseline, anxiety severity was similar between groups. The mean GAD-7 score was 15.8 ± 3.2 in the mindfulness group and 15.5 ± 3.4 in the control group, with a small and statistically non-significant between-group difference of 0.3 points (95% CI, -0.9 to 1.5; p=0.620). By week 8, the mindfulness group showed a marked reduction in anxiety to 9.6 ± 3.5, whereas the control group decreased to 13.2 ± 3.7. This produced a between-group difference of -3.6 points favouring mindfulness (95% CI, -4.9 to -2.3; p<0.001). At week 12, the treatment separation widened further: the mindfulness group had a mean GAD-7 score of 8.4 ± 3.4 compared with 12.7 ± 3.8 in the control group, corresponding to a between-group difference of -4.3 points (95% CI, -5.7 to -2.9; p<0.001) and a large standardized effect size (Cohen's d=-1.19).

PTSD symptom severity followed a similar pattern. Baseline PCL-5 scores were comparable, with a mean of 52.4 ± 9.8 in the mindfulness group and 51.7 ± 10.1 in the control group (mean difference, 0.7 points; 95% CI, -2.9 to 4.3; p=0.701). At week 8, the mindfulness group improved to 34.8 ± 10.6, while the control group improved to 45.6 ± 10.8, yielding a between-group difference of -10.8 points favouring mindfulness (95% CI, -14.7 to -6.9; p<0.001). At week 12, the mindfulness group maintained greater improvement, with a mean PCL-5 score of 31.9 ± 10.2 compared with 43.8 ± 11.0 in the control group. The week-12 between-group difference was -11.9 points (95% CI, -15.9 to -7.9; p<0.001), with a large standardized effect size (Cohen's d=-1.12).

Table 3. Anxiety and PTSD Symptom Scores Across Baseline, Week 8, and Week 12

Outcome and Time Point	Mindfulness Group, Mean ± SD	Control Group, Mean ± SD	Between-Group Mean Difference	95% CI for Difference	Between-Group p-value	Effect Size, Cohen's d
GAD-7 baseline	15.8 ± 3.2	15.5 ± 3.4	0.3	-0.9 to 1.5	0.620	0.09
GAD-7 week 8	9.6 ± 3.5	13.2 ± 3.7	-3.6	-4.9 to -2.3	<0.001	-1.00
GAD-7 week 12	8.4 ± 3.4	12.7 ± 3.8	-4.3	-5.7 to -2.9	<0.001	-1.19
PCL-5 baseline	52.4 ± 9.8	51.7 ± 10.1	0.7	-2.9 to 4.3	0.701	0.07
PCL-5 week 8	34.8 ± 10.6	45.6 ± 10.8	-10.8	-14.7 to -6.9	<0.001	-1.01
PCL-5 week 12	31.9 ± 10.2	43.8 ± 11.0	-11.9	-15.9 to -7.9	<0.001	-1.12

Note: Negative mean differences favour the mindfulness-based intervention group. Between-group estimates were calculated from reported aggregate means, standard deviations, and available group sizes. Week-12 estimates used completed follow-up denominators of n=56 for the mindfulness group and n=54 for the control group.

Within-group change also supported clinically greater improvement in the mindfulness group. The mean GAD-7 score decreased from 15.8 at baseline to 8.4 at week 12 in the mindfulness group, representing an absolute reduction of 7.4 points. In contrast, the control group decreased from 15.5 to 12.7, an absolute reduction of 2.8 points. The absolute difference in mean change between groups was therefore 4.6 GAD-7 points in favour of mindfulness. For PTSD symptoms, the mindfulness group showed a 20.5-point reduction in PCL-5 score, from 52.4 at baseline to 31.9 at week 12, whereas the control group showed a 7.9-point reduction, from 51.7 to 43.8. The absolute difference in mean change was 12.6 PCL-5 points in favour of mindfulness. Both within-group reductions were statistically

significant in the original analysis, but the magnitude of change was substantially larger in the mindfulness group for both outcomes.

Table 4. Baseline-to-Week-12 Change in Anxiety and PTSD Scores

Outcome	Group	Baseline Mean ± SD	Week 12 Mean ± SD	Absolute Mean Change	Within-Group p-value	Difference in Mean Change Favouring Mindfulness
GAD-7 anxiety score	Mindfulness	15.8 ± 3.2	8.4 ± 3.4	-7.4	<0.001	4.6 points
GAD-7 anxiety score	Control	15.5 ± 3.4	12.7 ± 3.8	-2.8	0.018	—
PCL-5 PTSD score	Mindfulness	52.4 ± 9.8	31.9 ± 10.2	-20.5	<0.001	12.6 points
PCL-5 PTSD score	Control	51.7 ± 10.1	43.8 ± 11.0	-7.9	0.011	—

The clinical pattern across both outcomes indicates that the mindfulness-based intervention produced a stronger and sustained reduction in anxiety and PTSD symptoms compared with routine psychological support alone. Anxiety improved by 46.8% in the mindfulness group, calculated from a 7.4-point reduction relative to the baseline GAD-7 score of 15.8, compared with an 18.1% reduction in the control group. PTSD symptoms improved by 39.1% in the mindfulness group, based on a 20.5-point reduction from a baseline PCL-5 score of 52.4, compared with a 15.3% reduction in the control group. These differences suggest that the intervention had clinically meaningful benefit beyond usual supportive care, particularly because treatment separation was already evident at week 8 and remained present at week 12.

Participants receiving mindfulness-based intervention also reported subjective improvement in sleep, body tension, emotional control, and ability to manage distressing thoughts during daily activities. These observations were more frequently noted among participants who attended at least six of the eight mindfulness sessions. However, because these symptoms were not reported using separate validated numerical scales in the available dataset, they should be interpreted as supportive clinical observations rather than independent measured endpoints. The primary quantitative evidence therefore rests on the GAD-7 and PCL-5 outcomes, both of which showed larger improvement in the mindfulness group than in the control group.

Overall, the results indicate that an eight-week structured mindfulness-based intervention added to routine psychological support was associated with greater reductions in both anxiety and PTSD symptom severity among veterans and trauma survivors in Islamabad. The groups were comparable at baseline, follow-up completion was high in both arms, and statistically significant between-group differences emerged by week 8 and persisted at week 12. The strongest observed effects were at week 12, where the mindfulness group had 4.3-point lower GAD-7 scores and 11.9-point lower PCL-5 scores than the control group, with large standardized effect sizes for both outcomes.

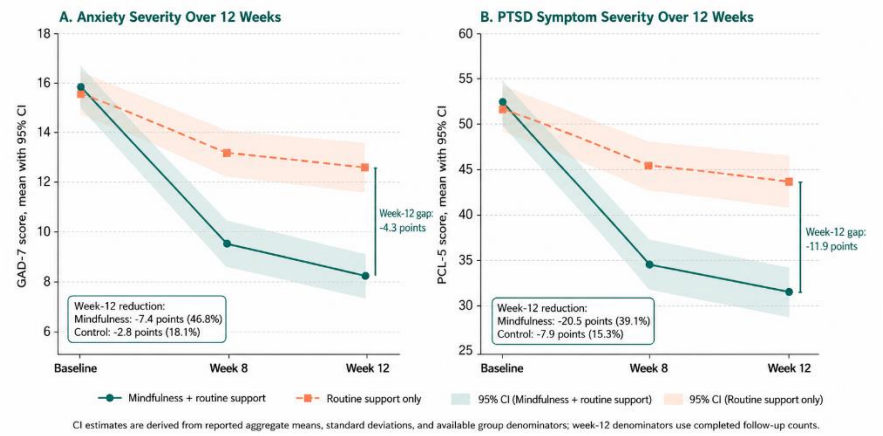

Figure 2 Clinically meaningful divergence in symptom trajectories comparison

The panelled figure demonstrates a clinically meaningful divergence in symptom trajectories between the mindfulness-based intervention group and the control group across 12 weeks. Anxiety severity declined from 15.8 to 8.4 on the GAD-7 in the mindfulness group, representing a 7.4-point reduction and 46.8% improvement, compared with a smaller decline from 15.5 to 12.7 in the control group, representing a 2.8-point reduction and 18.1% improvement. PTSD symptom severity showed a parallel treatment gradient, with PCL-5 scores decreasing from 52.4 to 31.9 in the mindfulness group, equivalent to a 20.5-point reduction and 39.1% improvement, compared with a reduction from 51.7 to 43.8 in the control group, equivalent to a 7.9-point reduction and 15.3% improvement. By week 12, the mindfulness group showed 4.3-point lower GAD-7 scores and 11.9-point lower PCL-5 scores than the control group, indicating sustained and clinically relevant separation across both anxiety and trauma-related symptom domains.

DISCUSSION

This controlled clinical trial showed that an eight-week structured mindfulness-based intervention, delivered in addition to routine psychological support, was associated with greater reductions in anxiety and PTSD symptom severity than routine psychological support alone among veterans and civilian trauma survivors in Islamabad. The two groups were comparable at baseline for demographic and clinical characteristics, including age, sex distribution, veteran or civilian trauma status, trauma duration, previous counselling, medication use, baseline GAD-7 score, and baseline PCL-5 score. By week 12, the mindfulness group demonstrated a 7.4-point reduction in GAD-7 score compared with a 2.8-point reduction in the control group, producing a 4.6-point greater mean improvement in anxiety symptoms. PTSD symptoms followed the same direction, with the mindfulness group showing a 20.5-point reduction in PCL-5 score compared with a 7.9-point reduction in the control group, corresponding to a 12.6-point greater mean improvement. These findings suggest that mindfulness training provided clinically meaningful benefit beyond routine psychological support, particularly because group separation was evident by week 8 and persisted at week 12.

The improvement in anxiety is clinically important because anxiety is not merely a comorbid symptom in PTSD but a core driver of distress, avoidance, hypervigilance, sleep disturbance, and impaired daily functioning. In the present trial, participants receiving mindfulness training moved from a baseline mean GAD-7 score in the moderate-to-severe range toward a substantially lower symptom range by follow-up, whereas the control group showed only modest improvement. This pattern supports the therapeutic rationale that mindfulness may help patients regulate anticipatory fear, bodily tension, intrusive worry, and reactivity to internal trauma cues. PTSD is frequently maintained by persistent threat monitoring and autonomic arousal, and mindfulness practice may reduce this cycle by teaching patients to observe thoughts, emotions, and body sensations without immediate avoidance or catastrophic interpretation (1–4,13,14).

The reduction in PTSD symptom severity also supports previous evidence that mindfulness-based interventions may be useful for trauma-related distress. The present findings are consistent with the randomized clinical trial by Polusny et al., in which mindfulness-based stress reduction improved PTSD symptoms among veterans, and with the trial by Possemato et al., which found benefit from brief mindfulness training among veterans with PTSD symptoms in primary care settings (8,9). Pilot and clinical studies by Kearney et al. and King et al. similarly indicated that structured mindfulness programmes, mindfulness-based cognitive therapy, and mindfulness-based exposure approaches may reduce trauma-related symptoms and improve emotional regulation in combat veterans (10–12). The present study extends this evidence to a Pakistani clinical context and to a mixed trauma-exposed sample that included both veterans and civilian survivors.

The magnitude of reduction in PCL-5 score is notable because PTSD symptom improvement exceeded the reduction observed in the control group despite both arms receiving routine psychological support.

Routine support may reduce distress through psychoeducation, therapeutic contact, emotional ventilation, and counselling; however, mindfulness may have added a specific self-regulation skill set that participants could apply outside the clinical setting. Breathing exercises, grounding, mindful sitting, body awareness, and non-reactive observation of thoughts may have helped participants interrupt the escalation of distress during trauma reminders and anxious states. Mechanistic research suggests that mindfulness may influence PTSD symptoms through improved interoceptive awareness, emotional regulation, attentional control, and reduced reactivity to trauma-related bodily sensations (13,14,26). The present results are compatible with these pathways because improvement was observed across both anxiety and PTSD domains.

The findings are also consistent with broader evidence on mindfulness for anxiety. Hoge et al. reported that mindfulness-based stress reduction was a meaningful treatment option for adults with anxiety disorders, while Zhou et al. found that mindfulness-based stress reduction reduced anxiety symptoms in young people in a systematic review and meta-analysis (24,25). Although the current study focused on patients with PTSD symptoms rather than primary anxiety disorders, the observed GAD-7 reduction suggests that mindfulness may target transdiagnostic anxiety processes, including repetitive worry, heightened arousal, fear of internal sensations, and difficulty disengaging from perceived threat. This is clinically relevant because many patients with PTSD seek treatment for anxiety, sleep disturbance, body tension, panic-like symptoms, and inability to relax before they are willing or able to engage in trauma-focused discussion.

The Pakistani context strengthens the practical relevance of the findings. Trauma-related psychological morbidity in Pakistan is associated with terrorism, displacement, violence, occupational exposure, medical trauma, and community-level adversity. Local studies have documented post-traumatic stress, post-traumatic growth, psychological distress, and resilience-related concerns in police officials, internally displaced children, healthcare professionals, and women exposed to traumatic medical events (27–31). These data indicate that trauma-related anxiety and PTSD symptoms are not restricted to military populations and require interventions that can be adapted across clinical and community settings. A structured mindfulness-based programme delivered in simple Urdu and English, without complex spiritual framing, may therefore be feasible as an adjunctive intervention in counselling clinics, rehabilitation centres, hospital-based mental health services, and community mental health programmes.

The inclusion of both veterans and civilian trauma survivors is important because PTSD symptoms may arise after different forms of trauma, yet many maintaining mechanisms are shared across trauma types. Veterans may experience duty-related threat, combat exposure, or repeated exposure to violence, while civilian survivors may experience accidents, displacement, interpersonal violence, or sudden life-threatening events. Despite these differences, both groups may present with hyperarousal, avoidance, intrusive thoughts, emotional numbing, poor sleep, fear, and anxiety. The baseline balance between veteran and civilian trauma status in this trial supports the interpretation that observed treatment differences were not explained by unequal distribution of trauma category. Nevertheless, future studies should examine whether treatment response differs by trauma type, trauma chronicity, sex, medication use, baseline severity, and intervention adherence.

The findings also have implications for stepped or adjunctive PTSD care. Trauma-focused psychotherapies remain evidence-based treatments for PTSD, but not all patients are immediately ready for direct trauma processing. Some patients avoid trauma narration because it is emotionally overwhelming, while others discontinue therapy early or retain residual anxiety and physiological arousal after standard care (32–34). Mindfulness-based intervention should not be presented as a replacement for established trauma-focused treatment; rather, it may serve as an adjunctive or preparatory approach for patients who need improved distress tolerance, grounding, present-moment awareness, and emotional regulation before or alongside trauma-focused therapy. This interpretation is

consistent with systematic reviews showing potential benefit of mindfulness-based approaches while also noting variability in effect sizes, intervention formats, comparators, and methodological quality (16–23).

Several limitations must be considered. First, the follow-up period was limited to 12 weeks, so the durability of treatment effects beyond short-term follow-up remains uncertain. Second, the study was conducted in one city, which may limit generalizability to rural areas, other provinces, or different mental health service structures in Pakistan. Third, some participants were using psychiatric medication, and although medication use was recorded and balanced at baseline, residual confounding cannot be excluded. Fourth, the control condition reflected routine psychological support and may have varied across providers or centres, which limits precision in estimating the comparative contribution of mindfulness. Fifth, blinding of participants was not feasible because of the behavioural nature of the intervention, and assessor blinding was not clearly documented, creating potential risk of detection bias. Sixth, although subjective improvements in sleep, body tension, and emotional control were reported, these outcomes were not supported by separate validated numerical scales in the available dataset and should be interpreted cautiously. Finally, change-score confidence intervals could not be fully estimated from the available aggregate data because raw individual-level data and correlations between repeated measures were not available.

Despite these limitations, the trial provides locally relevant evidence that mindfulness-based intervention may be a practical adjunct to routine psychological support for PTSD patients with clinically important anxiety. The use of validated symptom measures, comparable baseline groups, high follow-up completion, and consistent improvement across both GAD-7 and PCL-5 outcomes strengthen the interpretation of benefit. Future randomized trials should use preregistered protocols, larger multicentre samples, longer follow-up, standardized active control conditions, assessor blinding where feasible, intervention fidelity monitoring, adherence tracking, and prespecified subgroup analyses. Additional outcome measures for sleep, functioning, quality of life, physiological arousal, and clinically significant response or remission would further clarify the therapeutic role of mindfulness in trauma-related mental health care.

CONCLUSION

Mindfulness-based intervention delivered over eight weeks as an adjunct to routine psychological support was associated with greater reductions in anxiety and PTSD symptom severity than routine psychological support alone among veterans and civilian trauma survivors in Islamabad. The mindfulness group showed larger improvements in GAD-7 and PCL-5 scores by week 8, with sustained benefit at week 12, indicating clinically meaningful short-term reductions in both anxiety and trauma-related symptoms. These findings support mindfulness-based intervention as a feasible, low-cost, and culturally adaptable supportive approach for PTSD patients who experience persistent anxiety, particularly in settings where access to specialist trauma-focused psychotherapy is limited or where patients require preparatory emotional regulation skills before direct trauma-focused treatment. Larger preregistered multicentre trials with longer follow-up, standardized control conditions, blinded outcome assessment, fidelity monitoring, and broader functional outcomes are needed to confirm durability, generalizability, and comparative effectiveness.

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