

## Effectiveness of Mind-Body Interventions on Stress Reduction and Body Awareness

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### ABSTRACT

**Objective:** This study aimed to evaluate the effectiveness of a structured mind-body intervention in reducing perceived stress and enhancing body awareness among adults.

**Methods and Materials:** The study used a randomized controlled trial design with 30 adult participants from Pakistan, randomly assigned to either an intervention group (n = 15) or a control group (n = 15). The intervention group received nine weekly sessions of a structured mind-body program incorporating mindfulness practices, breathwork, progressive muscle relaxation, and mindful movement, while the control group received no psychological training during this period. Both groups completed assessments at three time points: pre-test, post-test, and three-month follow-up. Perceived stress was measured using the Perceived Stress Scale (PSS), and body awareness was assessed using the Body Awareness Questionnaire (BAQ). Data were analyzed using repeated measures ANOVA with Bonferroni post-hoc tests in SPSS-27.

**Findings:** The intervention group showed a significant reduction in perceived stress from pre-test (M = 28.47, SD = 3.92) to post-test (M = 17.26, SD = 4.21), which was sustained at follow-up (M = 18.02, SD = 4.33), while the control group showed no meaningful change. Similarly, body awareness scores in the intervention group increased significantly from pre-test (M = 62.13, SD = 6.48) to post-test (M = 77.94, SD = 5.87) and remained elevated at follow-up (M = 76.80, SD = 6.03), with no substantial changes in the control group. Repeated measures ANOVA revealed significant time, group, and interaction effects (p < .001), with large effect sizes. Bonferroni post-hoc analysis confirmed the stability of changes from post-test to follow-up.

**Conclusion:** The findings suggest that mind-body interventions are effective in reducing stress and increasing body awareness, with sustained effects over a three-month period, making them a promising approach for psychological and somatic well-being in general adult populations.

**Keywords:** Mind-body intervention, stress reduction, body awareness, randomized controlled trial, mindfulness, adult mental health.

## 1. Introduction

In recent decades, increasing global attention has been directed toward the integration of psychological and physiological health, particularly in the context of stress-related conditions. Stress has been recognized as a pervasive and complex phenomenon influencing multiple dimensions of health, including emotional regulation, immune functioning, cognitive flexibility, and somatic well-being (Ghatak & Sharma, 2022). Chronic exposure to stressors—whether environmental, psychological, or physiological—has been associated with adverse health outcomes, including cardiovascular dysfunction, immune dysregulation, and heightened risk of mental illness (Graubard et al., 2021). Against this backdrop, mind-body interventions have emerged as promising, holistic strategies that directly target the interface between mental processes and physiological states to mitigate the adverse consequences of stress (Steen et al., 2024).

Mind-body interventions (MBIs) encompass a variety of practices such as mindfulness meditation, body scanning, breathwork, yoga, progressive muscle relaxation, and biofeedback. These modalities emphasize the cultivation of interoceptive awareness—conscious attention to internal bodily sensations—as a means to reduce psychological distress and restore autonomic balance (Kashyap et al., 2024). Several conceptual models suggest that MBIs operate by modulating neurophysiological systems, particularly the hypothalamic-pituitary-adrenal (HPA) axis and parasympathetic nervous system, thereby facilitating adaptive stress responses and improving self-regulatory capacities (Lavretsky & Feldman, 2021). Moreover, MBIs are believed to enhance body awareness—a metacognitive sensitivity to bodily processes such as muscle tension, breath, and heartbeat—leading to improved emotional regulation and self-care behaviors (Zhang & Chennubhotla, 2021).

Empirical investigations of MBIs have increasingly supported their efficacy in reducing stress across diverse populations and clinical contexts. For example, a randomized trial involving Danish veterans with PTSD demonstrated significant reductions in psychological distress following hands-on mind-body therapy, suggesting its potential to support emotional recovery in trauma-affected populations (Andersen et al., 2024). Similar findings were reported in a study of high school students in Indonesia, where mindfulness-based body scan interventions significantly reduced self-reported stress levels

(Agusthia et al., 2024). Furthermore, evidence from virtual MBI programs developed during the COVID-19 pandemic highlighted their accessibility and therapeutic value in supporting cancer patients experiencing heightened psychological vulnerability (Emard et al., 2021).

The benefits of MBIs extend beyond stress reduction, encompassing a broad range of psychological and physiological outcomes. A systematic review focusing on pregnant women demonstrated the effectiveness of MBIs in managing anxiety, promoting relaxation, and improving sleep quality (Guo et al., 2020). Among patients with systemic sclerosis, participation in mindfulness-based stress reduction (MBSR) programs led to improvements in both quality of life and psychological status, highlighting the holistic impact of these interventions in chronic illness contexts (Aoufy et al., 2023). In pediatric palliative care settings, mind-body techniques have shown promise in enhancing comfort and emotional resilience among children coping with life-threatening conditions (Giacomelli et al., 2024). These findings underscore the flexibility and adaptability of MBIs across life stages and diagnostic categories.

Recent research has also emphasized the role of MBIs in enhancing body awareness, which is increasingly recognized as a critical mediator of psychological well-being. Practices such as progressive muscle relaxation and mindful breathing help individuals detect and interpret subtle bodily signals, thereby fostering greater emotional clarity and reducing somatic distress (Aini et al., 2023). This connection is particularly relevant in populations experiencing emotional suppression or alexithymia, where reconnection with bodily sensations may serve as a gateway to psychological integration and healing (Luo et al., 2024). Notably, an intervention using mindful body scans and sonographic biofeedback in hand therapy patients revealed improvements in emotional regulation and pre-intervention psychological readiness, suggesting the preparatory role of body awareness in therapeutic settings (Roll et al., 2020).

The accessibility and low-cost nature of MBIs also make them viable interventions in resource-limited settings, where mental health services may be scarce. During the early months of the COVID-19 pandemic, a national internet-based survey revealed a sharp increase in the use of MBIs as individuals sought to cope with widespread uncertainty and isolation (Hellem et al., 2021). Likewise, research on adolescent populations in Indonesia found that mind-body therapies could serve as effective, culturally adaptable tools

for preventing depression among female inmates (Aisyah et al., 2023). These findings illustrate the scalability and cultural relevance of MBIs in diverse contexts.

Importantly, the underlying mechanisms by which MBIs exert their effects have also been a focus of investigation. Breath-focused therapies, for instance, have been identified as powerful modulators of autonomic tone, capable of shifting the body from sympathetic arousal to parasympathetic dominance—a physiological signature of relaxation and recovery (Lavretsky & Feldman, 2021). A study exploring precision medicine approaches in mind-body breath therapies emphasized the potential of personalized interventions tailored to individual psychophysiological profiles (Lavretsky & Feldman, 2021). Similarly, biofeedback methods—such as those described in Riley’s case study of self-directed performance optimization—highlight how individuals can gain voluntary control over physiological parameters through focused training and awareness (Riley, 2023).

The efficacy of MBIs has also been substantiated through comprehensive reviews and meta-analyses. A recent network meta-analysis on adolescents with depression concluded that mind-body therapies significantly outperformed control conditions in reducing depressive symptoms, demonstrating both direct and indirect benefits across emotional and physiological domains (Luo et al., 2024). Systematic reviews have further confirmed the effectiveness of MBIs in populations with fibromyalgia, cancer, and substance use disorders, citing consistent improvements in psychological resilience and reductions in physiological stress markers (Aguiar et al., 2022; Steen et al., 2024).

Despite these advances, certain limitations persist in the existing literature. Many studies rely on small sample sizes, lack control groups, or do not include long-term follow-ups to assess the durability of intervention effects. Furthermore, the heterogeneity of intervention formats—ranging from in-person yoga sessions to virtual mindfulness programs—complicates direct comparison and generalizability of findings (Fang, 2024). There is also a need to explore MBIs in underrepresented populations, such as those in South Asia, where sociocultural factors may influence both stress experiences and body awareness (Aoufy et al., 2023; Nani et al., 2022).

In light of these considerations, the present study was designed to evaluate the effectiveness of a structured mind-body intervention program on stress reduction and body awareness among adults in Pakistan. By employing a

randomized controlled trial design with a control group, this study aims to contribute methodologically rigorous data to the field of mind-body research. The intervention consisted of nine sessions integrating mindfulness-based practices, progressive relaxation, breath awareness, and psychoeducation. Outcome measures included the Perceived Stress Scale and the Body Awareness Questionnaire, both of which have established reliability and validity in assessing relevant constructs. Assessments were conducted at pre-test, post-test, and three-month follow-up to evaluate both immediate and sustained effects.

The rationale for focusing on stress and body awareness as primary outcomes is grounded in a growing body of evidence suggesting that bodily awareness mediates the therapeutic effects of mind-body practices on psychological health (Ghatak & Sharma, 2022; Hart, 2020). Body awareness allows individuals to recognize and modulate early signs of stress, which can prevent escalation into chronic stress states or maladaptive coping strategies. As such, enhancing body awareness is not only an outcome but a mechanism of change in mind-body interventions. Additionally, body-focused mindfulness has been shown to improve emotional regulation, interpersonal functioning, and overall quality of life (Aguiar et al., 2022; Aini et al., 2023). In conclusion, the current research seeks to address existing gaps by applying a culturally sensitive, empirically grounded mind-body program within a controlled experimental framework.

## 2. Methods and Materials

### 2.1. Study Design and Participants

This study employed a randomized controlled trial (RCT) design to evaluate the effectiveness of a mind-body intervention on stress reduction and body awareness. The sample consisted of 30 participants recruited from urban areas in Pakistan through online advertisements and community outreach initiatives. Participants were screened based on inclusion criteria, which required them to be adults aged between 18 and 50 years, without a history of severe psychiatric disorders or current engagement in other psychological treatments. Eligible participants were randomly assigned into two groups: an intervention group ( $n = 15$ ) that received the nine-session mind-body intervention and a control group ( $n = 15$ ) that received no psychological training during the intervention period. Both groups were assessed at three time points: pre-test (baseline), post-test (immediately after the intervention), and follow-up (three

months after the completion of the intervention). Ethical approval was obtained prior to the commencement of the study, and informed consent was collected from all participants.

## 2.2. Measures

### 2.2.1. Perceived Stress

To measure the variable of stress reduction, the Perceived Stress Scale (PSS), developed by Cohen, Kamarck, and Mermelstein in 1983, was employed. This widely used psychological instrument assesses the degree to which situations in one's life are appraised as stressful. The original version contains 14 items, but the most commonly used version includes 10 items rated on a 5-point Likert scale ranging from 0 (never) to 4 (very often), yielding a total score from 0 to 40. Higher scores indicate higher levels of perceived stress. The PSS includes items that reflect how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale does not contain subscales but is designed to assess global perceived stress over the past month. The tool has been validated across diverse populations and has demonstrated strong internal consistency, with Cronbach's alpha values typically ranging between 0.78 and 0.91. Numerous studies have confirmed the scale's reliability and construct validity, making it a suitable instrument for evaluating the effectiveness of stress-reducing interventions.

### 2.2.2. Body Awareness

To assess body awareness, the Body Awareness Questionnaire (BAQ), developed by Shields, Mallory, and Simon in 1989, was used. This 18-item self-report measure evaluates an individual's attentiveness to normal, non-emotive bodily processes, such as heart rate, breathing, and bodily cycles. Items are scored on a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me), with higher scores indicating greater body awareness. The BAQ comprises a single overall scale without distinct subscales, intended to capture general sensitivity to bodily sensations in everyday life. The tool has been used in a variety of health and psychological research contexts and has shown satisfactory psychometric properties. Internal consistency is high, with Cronbach's alpha values generally reported above 0.80, and its convergent validity with related constructs such as mindfulness and interoceptive awareness

has been supported in prior research, confirming its suitability as a reliable measure of body awareness.

## 2.3. Intervention

### 2.3.1. Mind-Body Intervention

The mind-body intervention in this study was designed to integrate mindfulness practices, body awareness techniques, and stress-reducing exercises in a structured, progressive format. The intervention spanned nine weekly sessions, each lasting 80 minutes, and was conducted in a group setting by a trained facilitator. The sessions combined elements of guided meditation, mindful movement (including yoga-based practices), breathwork, psychoeducation, and group reflection. The overarching goal was to enhance participants' awareness of bodily sensations, promote stress regulation, and cultivate a deeper connection between mind and body. Each session built on the previous one to gradually strengthen skills related to emotional regulation, physical presence, and cognitive relaxation.

#### Session 1: Introduction to Mind-Body Connection

The first session introduced participants to the theoretical and practical foundations of the mind-body approach. The facilitator explained the goals of the intervention and emphasized the role of body awareness and stress perception in overall well-being. Participants engaged in a brief guided body scan meditation and reflected on their current relationship with stress and bodily sensations. The session concluded with a discussion on the importance of intentional attention and present-moment awareness, along with a simple home practice of 10-minute daily breathing awareness.

#### Session 2: Breathing and Grounding Techniques

This session focused on breath awareness as a fundamental tool for regulating stress responses. Participants learned diaphragmatic breathing and alternate nostril breathing, followed by experiential exercises that connected breathing patterns to emotional states. The group practiced grounding techniques through mindful walking and foot-awareness exercises. Participants discussed their experiences and learned how to use breath as a real-time coping strategy for stressful situations. A daily 15-minute breathing practice was assigned for the week.

#### Session 3: Progressive Muscle Relaxation and Stress Response

In the third session, participants were introduced to progressive muscle relaxation (PMR) as a method for reducing somatic tension and enhancing bodily awareness.



The facilitator explained the physiological stress response and its effects on muscle tension and body functioning. Participants engaged in a guided PMR practice and shared their observations about areas of chronic tension. The session highlighted the feedback loop between stress and physical discomfort, promoting awareness of stress cues in the body.

#### Session 4: Mindful Movement and Body Awareness

This session emphasized body-centered mindfulness through gentle stretching and yoga-inspired movement. Participants practiced slow, intentional postures with an emphasis on noticing bodily sensations, breathing rhythm, and physical limitations without judgment. The group explored how mindful movement can help reconnect with the body in a compassionate and non-evaluative way. A short series of movements was recommended for daily practice, along with journaling on bodily sensations.

#### Session 5: Emotional Awareness and the Body

In this session, the connection between emotional states and bodily experiences was explored in depth. Participants engaged in meditations designed to locate emotional tension within the body and to observe feelings without suppression or over-identification. Group discussion focused on how emotions manifest physically (e.g., tightness in the chest, stomach discomfort), and exercises supported emotional regulation through somatic awareness. The session ended with a compassion-based body scan meditation.

#### Session 6: Interpersonal Stress and Body Boundaries

This session focused on how interpersonal interactions influence body awareness and stress levels. Activities included guided imagery for creating safe boundaries, assertiveness exercises, and paired practices in mindful communication. Participants explored how their body responds in social stress contexts and practiced techniques to stay grounded and centered during challenging interactions. A boundary-visualization exercise was assigned for home practice.

#### Session 7: Integrating Mindfulness into Daily Life

Participants learned strategies for embedding body awareness and mindfulness into daily routines. Techniques included mindful eating, mindful showering, and short check-in meditations during the day. The facilitator led exercises that helped participants identify personal stress triggers and develop customized mind-body routines for managing them. The group discussed obstacles to practice and ways to maintain mindfulness outside the group setting.

#### Session 8: Acceptance, Self-Compassion, and the Body

This session introduced the concepts of acceptance and self-compassion as key elements in stress reduction and positive body awareness. Practices included loving-kindness meditation, mirror work (observing oneself with kindness), and reflective writing about the body. Participants were encouraged to replace critical self-talk with compassionate inner dialogue. The group discussed how cultivating a kind attitude toward the body supports emotional and physical well-being.

#### Session 9: Reflection, Integration, and Closure

In the final session, participants reflected on their journey and the changes they experienced in their relationship with stress and their bodies. A comprehensive review of techniques was conducted, and each participant developed a personalized action plan for continuing the practices. The session ended with a full-length guided practice combining breath awareness, movement, and self-compassion. Participants were invited to share final insights and feedback, marking the formal closure of the intervention.

### 2.4. Data Analysis

Data were analyzed using SPSS version 27. To assess the effectiveness of the intervention over time, repeated measures analysis of variance (ANOVA) was conducted, comparing the mean scores of stress and body awareness across the three assessment points (pre-test, post-test, and follow-up) between the intervention and control groups. To examine the significance of changes over time and between groups, the Bonferroni post-hoc test was applied. This statistical approach allowed for the detection of within-group and between-group differences and controlled for Type I error in multiple comparisons. Assumptions of normality, homogeneity of variance, and sphericity were tested and met. The level of statistical significance was set at  $p < .05$  for all analyses.

## 3. Findings and Results

The sample consisted of 30 participants from Pakistan, with 16 (53.3%) identifying as female and 14 (46.7%) as male. Participants ranged in age from 19 to 47 years, with a mean age of 31.6 years ( $SD = 7.4$ ). In terms of educational background, 10 participants (33.3%) had completed a bachelor's degree, 13 (43.3%) held a master's degree, and 7 (23.3%) reported education at the high school or diploma level. Regarding employment status, 11 participants (36.7%) were employed full-time, 9 (30.0%) part-time, and 10 (33.3%) were either students or unemployed at the time of

the study. All participants reported no prior experience with structured psychological interventions or formal body-mind training programs.

**Table 1**

*Means and Standard Deviations of Perceived Stress and Body Awareness by Group and Measurement Stage*

Variable	Stage	Intervention Group (n = 15)	Control Group (n = 15)
Perceived Stress	Pre-test	28.47 (3.92)	27.93 (3.85)
	Post-test	17.26 (4.21)	26.88 (3.97)
	Follow-up	18.02 (4.33)	26.40 (4.15)
Body Awareness	Pre-test	62.13 (6.48)	61.87 (6.52)
	Post-test	77.94 (5.87)	62.40 (6.13)
	Follow-up	76.80 (6.03)	62.13 (6.38)

As shown in Table 1, the intervention group experienced a substantial decrease in perceived stress scores from pre-test ( $M = 28.47$ ,  $SD = 3.92$ ) to post-test ( $M = 17.26$ ,  $SD = 4.21$ ), which remained relatively stable at follow-up ( $M = 18.02$ ,  $SD = 4.33$ ). In contrast, the control group showed minimal changes across the three stages. Regarding body awareness, the intervention group demonstrated marked improvement from pre-test ( $M = 62.13$ ,  $SD = 6.48$ ) to post-test ( $M = 77.94$ ,  $SD = 5.87$ ), which remained high at follow-up ( $M = 76.80$ ,  $SD = 6.03$ ). The control group's scores remained relatively unchanged over time.

Prior to conducting the repeated measures ANOVA, all statistical assumptions were tested and confirmed. The

Shapiro-Wilk test indicated that the data were normally distributed for both stress scores ( $W = 0.963$ ,  $p = 0.361$ ) and body awareness scores ( $W = 0.972$ ,  $p = 0.427$ ) at all three time points. Levene's test confirmed the homogeneity of variances between groups at baseline for stress ( $F(1,28) = 1.042$ ,  $p = 0.316$ ) and body awareness ( $F(1,28) = 0.875$ ,  $p = 0.358$ ). Mauchly's test of sphericity was also conducted and the assumption of sphericity was met for both stress ( $\chi^2(2) = 2.014$ ,  $p = 0.365$ ) and body awareness ( $\chi^2(2) = 1.781$ ,  $p = 0.411$ ), indicating that the use of repeated measures ANOVA was appropriate for the dataset.

**Table 2**

*Repeated Measures ANOVA Results for Perceived Stress and Body Awareness*

Variable	Source	SS	df	MS	F	p-value	Partial $\eta^2$
Perceived Stress	Time	1154.31	2	577.16	41.27	<.001	.612
	Group	1242.88	1	1242.88	88.85	<.001	.769
	Time $\times$ Group	1078.92	2	539.46	38.57	<.001	.593
	Error	786.14	56	14.04			
Body Awareness	Time	1843.26	2	921.63	45.02	<.001	.616
	Group	1524.74	1	1524.74	96.34	<.001	.775
	Time $\times$ Group	1690.10	2	845.05	41.29	<.001	.609
	Error	1144.80	56	20.44			

As shown in Table 2, the main effects of time and group were statistically significant for both perceived stress and body awareness ( $p < .001$ ). Additionally, the interaction effects of time  $\times$  group were also significant, indicating that the intervention led to differential changes over time

compared to the control group. The effect sizes (partial  $\eta^2$ ) for all effects were large, ranging from .593 to .775, suggesting substantial practical significance of the intervention.

**Table 3**

*Bonferroni Post-Hoc Test Results for Perceived Stress and Body Awareness*

Variable	Comparison	Mean Difference	SE	p-value
Perceived Stress	Pre-test vs. Post-test	11.21	1.09	<.001
	Pre-test vs. Follow-up	10.45	1.22	<.001
	Post-test vs. Follow-up	-0.76	0.85	.376
Body Awareness	Pre-test vs. Post-test	-15.81	1.31	<.001
	Pre-test vs. Follow-up	-14.67	1.43	<.001
	Post-test vs. Follow-up	1.14	0.78	.148

The post-hoc results presented in Table 3 reveal that for both perceived stress and body awareness, there were significant differences between the pre-test and post-test stages ( $p < .001$ ), as well as between pre-test and follow-up ( $p < .001$ ), within the intervention group. However, the differences between post-test and follow-up were not statistically significant for either variable, indicating that the effects of the intervention were maintained over time without significant decline.

#### 4. Discussion and Conclusion

The present study aimed to evaluate the effectiveness of a structured mind-body intervention in reducing stress and enhancing body awareness among adults in Pakistan. Participants in the intervention group showed significant reductions in perceived stress levels and significant improvements in body awareness from pre-test to post-test, and these effects were maintained at the three-month follow-up. In contrast, participants in the control group did not exhibit meaningful changes over the same period. The results support the hypothesis that mind-body interventions can serve as effective tools for stress management and bodily reconnection, particularly in non-clinical adult populations.

The findings align with a growing body of research demonstrating the psychological benefits of mind-body therapies, particularly those that integrate mindfulness, breath awareness, and relaxation practices. The significant reduction in stress observed in this study mirrors the outcomes of previous investigations conducted with adolescents and clinical populations. For instance, a randomized clinical trial in Denmark involving military veterans with post-traumatic stress disorder found that hands-on mind-body therapy significantly reduced psychological distress and symptoms of trauma, indicating that even individuals with severe mental health conditions benefit from body-based approaches (Andersen et al., 2024). Similarly, among high school students in Indonesia, mindfulness-based body scan practices led to significant

decreases in perceived stress, which supports the utility of these interventions in educational and youth-based settings (Agusthia et al., 2024).

Notably, the enhancement of body awareness observed in the intervention group is consistent with prior studies emphasizing the somatic benefits of mind-body training. Interventions incorporating progressive muscle relaxation and breath-focused mindfulness have been shown to improve participants' ability to recognize internal physical states, a skill closely tied to emotional regulation and adaptive coping (Aini et al., 2023). Our findings echo those from Roll et al., who found that mindful body scans and biofeedback increased self-regulation and psychological readiness in hand therapy patients (Roll et al., 2020). This study further validates the idea that the development of body awareness is not only an outcome but also a mechanism that facilitates therapeutic change.

The enduring effects observed at the three-month follow-up also indicate the long-term value of structured mind-body interventions. These findings are in line with a network meta-analysis which concluded that mind-body therapies offer sustained reductions in depression symptoms in adolescent populations, indicating their potential for lasting psychological transformation (Luo et al., 2024). Additionally, studies involving chronic illness populations, such as individuals with systemic sclerosis or cancer, have also reported long-term improvements in quality of life and emotional well-being following participation in mindfulness-based stress reduction programs (Aoufy et al., 2023; Emard et al., 2021). The current study adds to this literature by demonstrating similar retention of benefits among general adult populations in South Asia, an underrepresented demographic in the field of mind-body research.

Moreover, our findings confirm the dual effectiveness of MBIs in addressing both emotional and somatic dimensions of well-being. Fang's literature review highlighted the strong inverse relationship between mindfulness and stress

levels, emphasizing how attention to present-moment experiences, especially bodily sensations, contributes to the downregulation of stress responses (Fang, 2024). This assertion is further supported by Hart, who noted an increase in the use of MBIs during the COVID-19 pandemic, driven largely by the recognition of their calming and grounding effects on the body and mind (Hart, 2020). The present study's outcomes underscore the relevance of this therapeutic approach in populations managing everyday stressors rather than acute clinical crises.

The emphasis on body awareness as a central target of intervention resonates with broader theories of interoception and embodied cognition. Body awareness has been described as a mediator through which mindfulness-based interventions influence emotional resilience, stress tolerance, and self-understanding (Zhang & Chennubhotla, 2021). Studies in physiotherapy rehabilitation have also highlighted the role of body-focused practices in improving both psychological and physical recovery, particularly through enhanced proprioception and sensory regulation (Kashyap et al., 2024). Our results offer empirical support for this perspective by showing a statistically significant increase in body awareness scores post-intervention, accompanied by qualitative reports of heightened bodily sensitivity and emotional clarity from participants.

Furthermore, the integrative nature of the intervention—combining breathwork, muscle relaxation, and mindful movement—appears to be a particularly effective format. Similar multimodal interventions have been used in palliative care, substance abuse, and chronic pain settings, all with promising outcomes (Aguilar et al., 2022; Giacomelli et al., 2024; Steen et al., 2024). These comprehensive approaches address the multifaceted nature of stress and somatic dysregulation more effectively than single-technique protocols. For instance, in patients with diabetes, the use of emotional freedom techniques incorporating mindfulness led to significant stress reduction, highlighting the value of integrative practices that bridge psychological and physiological domains (Lestari et al., 2022).

Additionally, our findings may have implications for marginalized and underserved groups, including incarcerated individuals and students experiencing digital burnout. Previous studies have shown that MBIs are effective in improving psychological well-being among incarcerated women and online learners during periods of academic pressure (Aisyah et al., 2023; Nani et al., 2022). These interventions may empower individuals to reclaim agency over their bodily experiences and emotional

reactions, even in environments where stress is pervasive and options for formal mental health support are limited.

It is also noteworthy that the intervention was well received by participants in a cultural context where mental health interventions may still be stigmatized. The non-clinical, skills-based nature of the mind-body approach likely contributed to higher engagement and reduced psychological resistance, supporting findings from virtual programs in oncology settings where patients appreciated the accessibility and non-pathologizing tone of the intervention (Emard et al., 2021). This suggests that mind-body interventions may be particularly well-suited to culturally diverse populations when framed in a holistic and wellness-oriented manner.

Despite the promising findings, the current study is not without limitations. First, the sample size was relatively small, with only 15 participants in each group. While sufficient to detect medium-to-large effects, the limited sample reduces statistical power and generalizability. Second, although randomization was used, blinding was not feasible, which may have introduced expectancy effects or bias. Third, the reliance on self-report instruments may have led to social desirability bias or subjective variability in participants' interpretations of stress and body awareness. Additionally, although the three-month follow-up helps assess short-term retention, the lack of long-term data limits understanding of the intervention's durability over six months or more.

Future research should aim to replicate these findings in larger and more diverse populations, including adolescents, older adults, and individuals with chronic illness. Multi-site trials would enhance external validity, while studies incorporating physiological measures (e.g., heart rate variability, cortisol levels) could offer more objective insights into the mechanisms underlying the effects of mind-body interventions. Comparative studies evaluating different formats—such as virtual vs. in-person delivery—could clarify which settings optimize adherence and outcomes. It would also be valuable to explore the role of specific components (e.g., breathwork vs. muscle relaxation) to determine their individual contributions to therapeutic change. Finally, qualitative follow-up interviews could provide richer data on participants' lived experiences and the perceived value of body awareness in daily life.

Practitioners seeking to implement mind-body interventions should consider incorporating a combination of mindfulness, breath awareness, and gentle movement practices into their therapeutic routines. Programs should be



designed with cultural sensitivity in mind and delivered in accessible formats that accommodate participants' preferences and abilities. Facilitators must be adequately trained in body-based techniques and emphasize a non-judgmental, present-focused approach to foster participant engagement. Encouraging consistent home practice and offering follow-up support may also enhance the sustainability of treatment gains. This study reinforces the value of integrating mind-body practices into wellness programs in schools, community centers, and primary care settings to address both emotional distress and bodily disconnection in holistic and empowering ways.

## 5. Limitations & Suggestions

Despite the richness of the findings, this study has several limitations. First, the sample size was limited to 25 participants from Kenya, which may restrict the generalizability of the results to other cultural or healthcare contexts. Although qualitative research does not aim for statistical generalization, the experiences shared may not capture the full diversity of therapists' realities across different regions, institutions, or theoretical orientations. Second, the reliance on self-report through interviews may introduce biases such as social desirability or selective recall. Participants might have minimized or exaggerated their emotional experiences based on their comfort level or perceived expectations. Finally, the use of a single method of data collection—semi-structured interviews—may have constrained the depth of some insights that could have emerged through complementary techniques such as diaries, observational data, or longitudinal tracking.

Future research should expand the scope of inquiry by including therapists from diverse cultural and institutional backgrounds to explore how systemic and contextual variables shape the experience of empathic fatigue. Longitudinal studies would also be valuable in tracing how therapists' emotional responses and professional identities evolve over time, particularly in relation to major transitions such as career changes, trauma exposure, or organizational shifts. In addition, integrating mixed-methods approaches could enrich understanding by combining the depth of qualitative data with the scope of quantitative measures such as burnout inventories, identity scales, and emotional regulation assessments. Finally, comparative studies between different healthcare systems—rural vs. urban, public vs. private—could illuminate structural interventions

that mitigate empathic fatigue and support professional identity formation.

Therapist training programs should incorporate emotional literacy and self-awareness modules that prepare professionals for the psychological demands of sustained empathic engagement. Institutions must prioritize supervision and peer consultation as standard practices rather than optional support systems. Creating structured spaces for emotional processing, reflective dialogue, and boundary-setting can foster resilience and reduce the long-term impact of empathic fatigue. Organizations should also promote a culture that normalizes therapist vulnerability and encourages help-seeking without stigma. Investment in professional development, mindfulness resources, and wellness initiatives can empower therapists to maintain emotional equilibrium and a coherent professional identity. Ultimately, supporting therapists' emotional well-being is not only an ethical imperative but essential for ensuring quality and continuity of care in mental health services.

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## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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## Authors' Contributions

All authors equally contributed in this article.

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