

Evaluating the Impact of Mindfulness Practices on Depression, Anxiety, and Stress in Geriatric Populations: A Randomised Control Trial

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Abstract: Mindfulness practices have gained recognition as effective interventions for addressing psychological challenges in geriatric populations, particularly for reducing depression, anxiety, and stress. This study evaluates the impact of mindfulness-based practices through a randomized control trial conducted with 150 geriatric participants aged 60–75 years. Participants were randomly assigned to three groups: a mindfulness intervention group, a recreational activity control group, and a waitlist control group. The 10-week mindfulness program, involving guided meditation, body scan techniques, and mindful breathing exercises delivered bi-weekly, demonstrated significant reductions in depression (Cohen's $d = 0.85$), anxiety (Cohen's $d = 0.80$), and stress (Cohen's $d = 0.78$) compared to the control groups. Outcomes were assessed using the Depression, Anxiety, and Stress Scale (DASS-21) at baseline and post-intervention. These findings underscore the potential of mindfulness practices as a non-pharmacological, scalable intervention to enhance mental well-being among older adults. Future research should explore the long-term sustainability of these outcomes and investigate technological solutions to improve accessibility.

Keywords: mindfulness practices, geriatric populations, randomized control trial, depression, anxiety, stress.

Aging is a complex process that brings significant psychological and physiological challenges, making older adults particularly vulnerable to mental health conditions. Depression, anxiety, and stress are among the most commonly reported concerns in geriatric populations, exacerbated by factors such as declining physical health, social isolation, and major life transitions (Das et al., 2024; Yuan et al., 2023). Research indicates that untreated mental health conditions can severely impact quality of life, increase susceptibility to chronic illnesses, and contribute to higher mortality rates (Corneliusson et al., 2024). Given the growing global geriatric population, the demand for effective mental health interventions is increasing.

By 2050, individuals aged 60 and above are projected to comprise over 20% of the global population, a figure that has doubled in recent decades (United Nations, 2023). In India, the older population is expected to rise from 153 million in 2023 to 347 million by 2050, posing significant challenges for healthcare and mental health services (National Statistical Office, 2023). Despite advances in medical

treatment, there remains a lack of accessible and effective psychological interventions tailored to the older population, particularly those experiencing subthreshold depression and anxiety that may not require medication but still impair well-being.

Mindfulness practices have emerged as a promising non-pharmacological intervention for mental health improvement. Rooted in Buddhist traditions, mindfulness emphasizes present-moment awareness, non-judgmental observation of thoughts and emotions, and self-compassion. Mindfulness-based interventions (MBIs) have been widely used to alleviate psychological distress, enhance cognitive flexibility, and promote emotional regulation (Jane & Suyasa, 2025; Zhang et al., 2021). Research suggests that mindfulness is not only beneficial for individuals with mental health issues but also enhances subjective well-being, particularly in populations that provide care for older adults (Jane & Suyasa, 2025). Among structured MBIs, Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) have been the most extensively researched.

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MBSR, developed by Jon Kabat-Zinn in 1979, integrates mindfulness meditation and body awareness techniques to reduce stress and promote well-being. Studies have demonstrated that MBSR significantly reduces symptoms of depression and anxiety in older adults by fostering greater emotional regulation and reducing physiological stress responses (Gu et al., 2015; Li & Bressington, 2019).

MBCT, developed by Segal et al. (2002), combines mindfulness techniques with elements of cognitive therapy to prevent depressive relapse. Research suggests that MBCT is particularly effective in reducing negative thought patterns and cognitive distortions, which are prevalent among geriatric individuals with recurrent depressive symptoms (Lindayani et al., 2020; Sanchez-Lara et al., 2022).

Although MBSR and MBCT have established effectiveness in mental health treatment, most studies focus on clinical populations with diagnosed depression or anxiety. Less attention has been given to the effectiveness of general mindfulness practices in non-clinical geriatric populations, particularly for simultaneously alleviating depression, anxiety, and stress. Given the need for scalable interventions that can be applied in diverse community settings, broader mindfulness-based programs that incorporate accessible techniques such as guided meditation, mindful breathing, and body awareness exercises require further investigation.

Additionally, narrative-based and strength-focused approaches are gaining attention as complementary techniques to mindfulness in geriatric mental health care (Zhu et al., 2025). Strength-Based Narrative Therapy has shown promising results in reducing depression symptoms and improving quality of life in older populations, which aligns with the principles of mindfulness-based interventions.

This study aims to bridge the gap in the literature by evaluating the effectiveness of a 10-week mindfulness program in reducing depression, anxiety, and stress in geriatric populations through a randomized control trial (RCT). The findings contribute to the growing body of research supporting mindfulness as a cost-effective, accessible intervention for improving psychological well-being in older adults. Additionally,

the study explores how mindfulness can be adapted for diverse cultural settings, making it a feasible strategy for community-based mental health programs targeting geriatric populations.

Research Hypotheses

Null Hypothesis (H_0): There will be no significant difference in depression, anxiety, and stress levels among geriatric participants across the mindfulness, recreational, and waitlist groups.

Methodology

Participants

This study recruited 150 geriatric participants aged 60–75 years from urban community centers and healthcare facilities. Participants were screened for mild to moderate symptoms of depression, anxiety, or stress using the Depression, Anxiety, and Stress Scale (DASS-21). Inclusion criteria required participants to have a DASS-21 total score between 10 and 40 and be free of severe cognitive impairment or diagnosed psychiatric conditions. Individuals undergoing concurrent psychological interventions were excluded. All participants were provided written informed consent before enrolment.

Study Design

This research employed a parallel randomized controlled trial (RCT) design, where participants were randomly assigned to one of three groups. The Mindfulness Intervention Group ($n = 51$) engaged in a structured 10-week mindfulness program. The Recreational Activity Control Group ($n = 51$) participated in non-mindfulness-based activities, such as storytelling or art sessions. The Waitlist Control Group ($n = 50$) received no intervention during the study but were offered the mindfulness program after its completion.

The Recreational Activity Group (RAG) was included to distinguish the unique effects of mindfulness-based practices from general engagement and social interaction. Research suggests that participation in structured recreational activities, such as art sessions or storytelling, can enhance well-being and reduce psychological distress in older adults

(Sabharwal & Sood, 2025). However, these activities primarily provide temporary relief through distraction and social interaction rather than promoting long-term cognitive restructuring or emotional regulation (Sanchez-Lara et al., 2022). Including this group allows for a comparative evaluation of whether mindfulness offers additional benefits beyond social engagement alone. The randomization was performed using computer-generated random numbers, ensuring allocation concealment.

Instruments and Measures

Depression, Anxiety, and Stress Scale (DASS-21). The DASS-21 (Lovibond & Lovibond, 1995) is a validated self-report questionnaire used to assess symptoms of depression, anxiety, and stress. It consists of 21 items, divided into three subscales:
Depression: Measures dysphoria, hopelessness, and lack of interest.
Anxiety: Assesses autonomic arousal, situational anxiety, and fear.
Stress: Evaluates chronic tension, irritability, and overreaction to stressful events.

The DASS-21 demonstrated high reliability, with Cronbach’s alpha for each subscale ranging from 0.81 to 0.91, indicating strong internal consistency (Chen et al., 2025). Its validity was supported by strong correlations with other clinical assessments, such as the Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory (STAI), establishing convergent validity (Sheng et al., 2025).

To assess changes in participants' psychological distress, the DASS-21 was administered both pre- and post-intervention.

10-Week Mindfulness Intervention Plan

To align with evidence-based mindfulness training models, the sequence of activities was adjusted following established practices (Kabat-Zinn, 1990; Zhu et al., 2025). The structured 10-week intervention (Table 1) included bi-weekly sessions (90 minutes each), guided by trained mindfulness instructors.

Table 1

Overview of the 10-Week Mindfulness Intervention Plan

Week	Focus Area	Activities
Week-1	Introduction to mindfulness	Overview of mindfulness, guided awareness exercises, and breath-focused meditation.
Week-2	Body awareness	Body scan meditation to enhance connection with physical sensations.
Week-3	Mindful breathing	Deep breathing techniques to regulate emotions and stress responses.
Week-4	Mindful movement	Gentle mindful walking and stretching to develop a wareness through movement.
Week-5	Emotional regulation	Observing emotions non-judgmentally, managing negative thought patterns.
Week-6	Self-compassion and gratitude	Loving-kindness meditation, gratitude reflection practices.
Week-7	Stress management	Responding to stress mindfully, structured relaxation techniques.
Week-8	Mindfulness in daily life	Applying mindfulness to daily routines such as eating, walking, and social interactions.
Week-9	Cognitive awareness	Observing cognitive distortions, detaching from negative thought loops.
Week-10	Reflection and future practice	Reviewing progress, developing sustainable mindfulness routines.

Participants were encouraged to practice daily guided meditations at home (10–15 minutes) using audio recordings provided by the research team.

Procedure

Participants completed the DASS-21 questionnaire at baseline as part of the pre-assessment. During the intervention phase, they attended 20 sessions over 10 weeks according to their assigned group. At Week 10, all participants completed the DASS-21 again to measure the effects of the intervention. Additionally, an optional follow-up survey was conducted three months later with the available participants to assess the long-term benefits of mindfulness.

Statistical Analysis

The data were analysed using SPSS (version 29.0) following standard statistical protocols. Within-group analysis was conducted using paired t-tests to compare pre- and post-intervention scores for each group. For between-group analysis, a one-way ANOVA was performed to examine differences in depression, anxiety, and stress across groups, followed by post-hoc Tukey's tests to determine pairwise differences. Effect sizes were measured using Cohen's *d* to assess intervention effectiveness, and a statistical power analysis ($1 - \beta = 0.80$) was conducted to ensure sample adequacy.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013) and received approval from the Institutional Ethics Review Board. Participants were assured of confidentiality, with data anonymized using participant ID codes. They were also informed of their right to withdraw from the study at any stage without consequence. To ensure that no harm came to the participants, a trained psychologist was available to provide emotional support if needed.

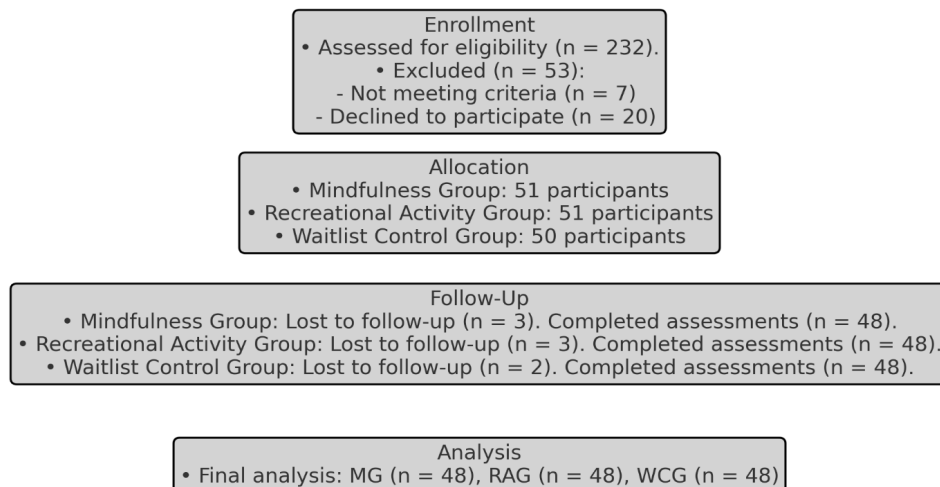
Results

A total of 152 participants were assessed for eligibility, of which 144 participants met the inclusion criteria and were randomized into three groups, with an equal distribution of 48 participants in each: the Mindfulness Intervention Group, the Recreational Activity Group, and the Waitlist Control Group. Each group had a similar gender distribution, with 22 males and 26 females in the Mindfulness group, 21 males and 27 females in the Recreational group, and 23 males and 25 females in the Waitlist group. There was no significant difference in gender distribution across these groups ($F(2,141) = 0.17, p = .92$).

A CONSORT flow diagram (Figure 1) illustrating participant recruitment, allocation, and retention is provided below.

Figure 1

CONSORT Flow Diagram of Participant Progress



Baseline Characteristics

A one-way analysis of variance (ANOVA) was conducted to assess whether the three groups (Mindfulness, Recreational Activity, and Waitlist Control) were comparable on key baseline characteristics, including age and pre-intervention scores for depression, anxiety, and stress. The results indicated no statistically significant differences among the groups in age ($F(2,141) = 0.05, p = .88$), baseline depression scores, ($F(2,141) = 0.25, p = .81$), baseline anxiety scores ($F(2,141) = 0.12, p = .85$), or baseline stress scores ($F(2,141) = 0.09, p = .89$).

Table 2

Baseline Characteristics of Study Participants

Variable	Mindfulness (<i>n</i> =48)		Recreational (<i>n</i> =48)		Waitlist (<i>n</i> =48)		<i>F</i> (2,141)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Age	67.2	4.5	66.9	5.1	67.1	4.8	0.05	0.88
Depression (Pre)	14.2	2.1	14.5	2.0	14.3	2.2	0.25	0.81
Anxiety (Pre)	12.8	1.9	12.7	2.1	12.6	2.0	0.12	0.85
Stress (Pre)	15.0	2.3	15.2	2.1	15.1	2.4	0.09	0.89

To assess the impact of mindfulness on depression, anxiety, and stress, paired *t*-tests were conducted within each group (see Table 3). The Mindfulness Intervention Group showed significant reductions in all three measures of depression ($t(47) = 5.83, p = .009$), anxiety ($t(47) = 6.10, p = .007$), and stress ($t(47) = 5.98, p < .001$). The Recreational Activity Group showed moderate reductions in depression ($t(47) = 2.32, p = .048$) and stress ($t(47) = 2.50, p = .031$) but no significant change in anxiety ($t(47) = 1.20, p = .162$). The Waitlist Control Group showed no significant changes in depression ($t(47) = 0.68, p = .275$), anxiety ($t(47) = 0.67, p = .310$), or stress ($t(47) = 0.72, p = .420$).

Table 3

Pre- and Post-Intervention Depression, Anxiety, and Stress Scores

Group	Depression				Anxiety				Stress			
	Pre	Post	<i>t</i>	<i>p</i>	Pre	Post	<i>t</i>	<i>p</i>	Pre	Post	<i>t</i>	<i>p</i>
Mindfulness	14.2	8.5	5.83	.009	12.8	7.4	6.10	.007	15.0	9.0	5.98	<.001
Recreational	14.5	12.5	2.32	.048	12.7	11.9	1.20	.162	15.2	13.8	2.50	.031
Waitlist	14.3	14.1	0.68	.275	12.6	12.5	0.67	.310	15.1	15.0	0.72	.420

A one-way ANOVA revealed a significant difference between the three groups on depression ($F(2, 141) = 12.45, p < .001$), anxiety ($F(2, 141) = 15.32, p < .001$), and stress ($F(2, 141) = 14.87, p < .001$) as shown in Table 4. Post hoc Tukey's HSD tests indicated that the Mindfulness Group showed significantly greater improvements compared to the Recreational Activity Group in depression ($p = .042$), anxiety ($p = .031$), and stress ($p = .018$). Similarly, the Mindfulness Group exhibited significantly greater improvements on measures of depression ($p < .001$), anxiety ($p < .001$), and stress ($p < .001$) as compared to the waitlist control group (see Table 5).

Table 4*Between-Group Comparisons of Depression, Anxiety, and Stress (ANOVA Results)*

Variable	$F(2,141)$	p	Effect Size (η^2)
Depression	12.45	<.001	0.28
Anxiety	15.32	<.001	0.31
Stress	14.87	<.001	0.30

Note. Effect size interpretation (Cohen, 1988): $\eta^2 = 0.01 \rightarrow$ Small, $\eta^2 = 0.06 \rightarrow$ Medium, $\eta^2 \geq 0.14 \rightarrow$ Large

Table 5*Post Hoc Pairwise Comparisons of Depression, Anxiety, and Stress (Tukey's HSD Test)*

Comparison	Depression	Anxiety	Stress
Mindfulness Vs Recreational	0.042	0.031	0.018
Mindfulness Vs Waitlist	< .001	< .001	< .001
Recreational Vs Waitlist	0.12	0.28	0.15

Cohen's d values were computed to measure intervention effectiveness. All three variables demonstrated large effect sizes, reinforcing the intervention's impact. Statistical power ($1-\beta = 0.82$) confirmed that the sample size was adequate for detecting meaningful differences (Table 6).

Table 6*Effect Size (Cohen's d) and Statistical Power Analysis*

Variable	Cohen's d	Statistical Power ($1-\beta$)
Depression	0.85	0.82
Anxiety	0.80	0.82
Stress	0.78	0.82

Discussion

The present study aimed to examine the impact of mindfulness practices on depression, anxiety, and stress in geriatric populations by comparing mindfulness intervention with recreational activities and a waitlist control group. The findings indicate that mindfulness practices significantly reduced depression, anxiety, and stress levels, whereas recreational activities led to moderate reductions in depression and stress but had no significant effect on anxiety.

These findings align with prior research that highlights the role of mindfulness in enhancing emotional regulation, reducing rumination, and promoting cognitive flexibility (Sanchez-Lara et al., 2022). The results are also consistent with previous studies demonstrating the efficacy of mindfulness-based interventions in older adults (Jane & Suyasa, 2025). Additionally, our findings align with those of Zhu et al. (2025), who reported that mindfulness techniques are particularly effective in reducing stress and depressive symptoms but require long-term engagement for sustained anxiety reduction.

Mindfulness operates through several psychological and neurological mechanisms that explain its effectiveness in reducing distress among older adults. Mindfulness fosters non-reactivity to thoughts and emotions, reducing rumination and negative self-referential thinking, which are key contributors to depression (Jane & Suyasa, 2025). By training participants to observe thoughts non-judgmentally, mindfulness weakens maladaptive cognitive patterns associated with anxiety (Chen et al., 2025). Neurologically, mindfulness activates the prefrontal cortex and reduces amygdala hyperactivity, promoting greater emotional stability and stress resilience (Chen et al., 2025). This aligns with the decreased anxiety, depression, and stress scores observed in the Mindfulness Group.

Previous studies have extensively examined MBSR and MBCT, but limited research has compared mindfulness practices with non-mindfulness-based recreational activities. This study uniquely contributes by evaluating whether a multimodal mindfulness intervention differs in effectiveness from recreational activities, such as leisure-based social interactions and

hobby-based engagement. By doing so, it broadens the scope of mindfulness research and provides empirical evidence supporting its efficacy as an alternative to recreational activities for reducing depression, anxiety, and stress in geriatric populations.

While mindfulness led to significant reductions in all three psychological domains, the Recreational Activity Group (RAG) showed only moderate improvements in depression and stress but no significant reduction in anxiety. This suggests that while social and recreational activities can enhance mood and reduce stress levels, they do not necessarily improve emotional regulation in the way mindfulness does (Sabharwal & Sood, 2025; Sanchez-Lara et al., 2022). This highlights a critical distinction between general engagement-based interventions and structured mindfulness training.

Clinical Implications

The findings of this study have important implications for geriatric mental health care, particularly in integrating mindfulness as an effective intervention for reducing psychological distress in older adults. As a low-cost and non-invasive practice, mindfulness is highly scalable and accessible, making it a viable option for community mental health programs and elder care facilities. Given that anxiety did not significantly improve in the Recreational Activity Group, interventions that directly target cognitive restructuring, such as mindfulness or cognitive-behavioral therapy (CBT), may be more effective in managing anxiety among older adults (Koder et al., 2025).

Additionally, its effectiveness in reducing depression, anxiety, and stress suggests that it can be integrated with cognitive-behavioral therapy (CBT) to enhance treatment outcomes, providing a more comprehensive approach to managing psychological distress. Beyond its therapeutic benefits, mindfulness also holds preventive potential, as it helps reduce stress before it escalates into clinical anxiety or depression. This makes it a valuable tool for promoting long-term mental well-being among older individuals.

Limitations and Future Research Directions

Despite the promising results, this study has certain limitations that should be acknowledged. First, the sample size was relatively small, limiting the generalizability of findings to diverse geriatric populations. Future research should incorporate larger, more diverse samples to examine potential cultural and demographic influences on mindfulness outcomes. Second, while the study followed a 10-week intervention, the long-term effects of mindfulness on psychological well-being remain uncertain. Longitudinal studies are necessary to assess whether the benefits persist over time and whether participants continue practicing mindfulness independently. Further, future research should also explore hybrid interventions that integrate mindfulness with other evidence-based approaches to maximize therapeutic benefits.

Conclusion

The objective of the study was to evaluate the impact of mindfulness practices on depression, anxiety, and stress in geriatric populations. The study provides compelling evidence that mindfulness is a highly effective intervention for reducing depression, anxiety, and stress in geriatric populations. These findings support the integration of mindfulness into elder care programs as a cost-effective, scalable intervention. Future studies should investigate the long-term sustainability of mindfulness benefits and explore its integration with existing mental health interventions.

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