

Depression, Anxiety and Stress in Meditation Practitioners versus Non Meditation Practitioners: A Cross-sectional Study

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ABSTRACT

Introduction: Recent rapid technological advancements and societal changes have dramatically transformed modern life, leading to a significant increase in mental health concerns. Meditation, an ancient practice, has gained considerable attention in recent years for its psychological and neurological benefits.

Aim: To compare levels of depression, anxiety and stress between Meditation Practitioners (MPs) and Non meditation Practitioners (NMPs) and to examine the relationship between different parameters of meditation practice and levels of depression, anxiety and stress.

Materials and Methods: A cross-sectional study was conducted in the Department of Humanities and Liberal Arts, DIT University, Dehradun, Uttarakhand, India, from March 2024 to November 2024. Each participant was assessed for depression, anxiety and stress using the Depression, Anxiety and Stress Scale-21 (DASS-21) scale. Various aspects of meditation practice were evaluated using a socio-demographic data sheet. Participants were higher education students residing in the northern region of

India. Individuals with a minimum of one year of experience in any established meditation practice and who practiced meditation at least twice a week were classified as MPs. After applying the criteria, a total of 400 participants were included, with 200 MPs (Meditation group) and 200 NMPs (Non meditation group). Pearson's correlation, independent t-tests and regression analyses were performed using Statistical Package for Social Sciences (SPSS) version 29.0.

Results: The mean age of MPs was 21.80±4.4 years, while that of NMPs was 22.30±3.6 years. MPs demonstrated significantly lower levels of depression (MP=9.50±7.8; NMP=12.82±9.4; p<0.001), anxiety (MP=10.67±7.0; NMP=13.66±9.2; p<0.001), stress (MP=12.76±7.4; NMP=15.14±8.2; p<0.01) and total DASS scores (MP=32.92±19.5; NMP=41.62±24.0; p<0.001). Meditation experience showed a negative correlation with depression scores (r=-0.151; p<0.05), while frequency of weekly meditation practice demonstrated negative correlations with anxiety (r=-0.224; p<0.01). The total DASS scores were (r=-0.151; p<0.05).

Conclusion: The findings suggest that meditation serves as an effective intervention strategy for improving mental health.

Keywords: Meditation practice, Mental health promotion, Mind-body practices, Psychological distress, University students

INTRODUCTION

The rapid progression of globalisation, technological advancements and urbanisation has significantly altered human lifestyles, creating both opportunities and challenges [1]. Competitive work environments, digital overload and social isolation associated with modern living have exacerbated mental health concerns, making them a major public health issue. In India, the burden of mental health disorders is particularly alarming, with approximately 56 million individuals experiencing depression and 38 million affected by anxiety disorders [2].

Depression, anxiety and stress are interrelated constructs that substantially influence psychological health and functioning. Research indicates that these conditions impair executive functioning and processing speed [3], increase aggression [4], intensify negative affect [5], contribute to mood disturbances [6], cause interpersonal difficulties [7], disrupt emotional functioning [8] and regulation [9], reduce happiness [10] and lower overall well-being and life satisfaction [11]. Understanding these relationships is crucial for developing effective mental health interventions.

Meditation, an ancient practice rooted in spiritual and philosophical traditions, has gained significant scientific attention in recent years for its psychological and neurological benefits [12]. Numerous studies indicate that mindfulness-based practices effectively reduce stress, anxiety and depressive symptoms [13-18].

Most existing research has been conducted in Western populations, although psychological outcomes are influenced by cultural context

[19]. The present study was conducted in India, where meditation has deep historical and spiritual significance [20]. Furthermore, while several studies compare meditators and non meditators [13], relatively few investigate how the duration and frequency of meditation practice influence mental health outcomes [15].

Accordingly, the objectives of the present study were:

- To compare levels of depression, anxiety and stress between MPs and NMPs; and
- To examine the relationship between meditation practice parameters and mental health outcomes.

It was hypothesised that MPs would exhibit lower levels of depression, anxiety and stress and that increased duration and frequency of meditation practice would be negatively correlated with these psychological symptoms.

MATERIALS AND METHODS

A cross-sectional study was conducted in the Department of Humanities and Liberal Arts, DIT University, Dehradun, Uttarakhand, India, from March to November 2024. Prior to participation, informed consent was obtained from all individuals. Ethical approval was granted by the Departmental Ethics Committee (DITU/HLA/2023/009).

Sample size calculation: The target sample size (n=196) was calculated based on a previous study [13], which reported significant

differences in anxiety levels between meditation practitioners (n=111; 10.07±7.7) and non practitioners (n=111; 14.38±8.8), with an effect size of 0.52 (medium), an alpha level of 0.05 and power of 0.95 using G*Power software [21].

Information regarding the study's purpose and procedures was disseminated through University notice boards to encourage voluntary participation. Participants were higher education students residing in northern India. A total of 400 participants were enrolled and equally divided into meditation (n=200) and non meditation (n=200) groups.

Inclusion and Exclusion criteria: Participants who had practiced meditation for at least one year and engaged in meditation at least twice per week were classified as MPs. All others were categorised as NMPs.

Participants were excluded, if they:

- (i) Submitted incomplete questionnaires,
- (ii) Had chronic medical conditions,
- (iii) Were taking regular medication, or
- (iv) Were experiencing ongoing psychological trauma.

Study Procedure

Depression, Anxiety and Stress Scale-21 (DASS-21): The Depression, Anxiety and Stress Scale-21 (DASS-21) is a widely used self-report instrument designed to assess the severity of core symptoms associated with depression, anxiety and stress experienced during the preceding week [22]. The scale comprises 21 items, divided into three subscales of seven items each, measuring depressive symptoms, anxiety and stress. Participants rate each item on a four-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"), with higher scores indicating greater symptom severity.

The DASS-21 demonstrates excellent reliability, with Cronbach's alpha coefficients of 0.900 for anxiety, 0.923 for stress and an overall alpha of 0.961, indicating strong internal consistency. The scale has been standardised and validated in the Indian context, confirming its reliability and validity for assessing psychological distress among Indian populations [23].

STATISTICAL ANALYSIS

The SPSS version 29.0 was used for all statistical analyses. Independent (unpaired) t-tests were performed to compare levels of:

- (i) Depression,
- (ii) Anxiety and
- (iii) Stress between MPs and NMPs.

Pearson's product-moment correlation and regression analyses were also conducted to examine the relationships and predictive effects of:

- (i) Duration of meditation practice (in months),
- (ii) Number of days of meditation practice per week and
- (iii) Daily meditation duration (in minutes) on psychological variables including depression, anxiety and stress.

RESULTS

Of the total participants, 200 were assigned to the meditation group (mean age=21.80±4.4 years) and 200 to the non meditation group (mean age=22.30±3.6 years) [Table/Fig-1]. The gender distribution was relatively balanced across groups, with a slightly higher proportion of females in both groups [Table/Fig-1].

The MPs exhibited significantly lower scores in depression (p<0.001), anxiety (p<0.001), stress (p<0.01) and total DASS scores (p<0.001) compared with NMPs [Table/Fig-2].

Duration of meditation practice (in months) showed a significant negative correlation with depression scores (p<0.05). Meanwhile, the number of days of meditation practice per week demonstrated

S. No.	Baseline characteristics	Meditation practitioners (MP) (n=200)	Non meditation practitioners (NMP) (n=200)	p-value
1	Age (in years)			0.29
	mean±SD	21.80±4.4	22.30±3.6	
2	Gender			
	M:F (n)	80:120	94:106	
	M:F (%)	40:60	47:53	
3	Education (in years)			0.001
	Mean±SD	13.22±1.9	13.86±2.1	
4	Meditation			
	Experience (in months) (mean±SD)	36.98±57.2	Not applicable	
	Number of days (per week) (mean±SD)	5.12±2.2	Not applicable	
	Daily practice (in minutes) (mean±SD)	67.75±48.4	Not applicable	
5	Meditation			
	Mantra meditation	119	Not applicable	
	Mindful breathing	28	Not applicable	
	Guided meditation	19	Not applicable	
	Other types of meditation	10	Not applicable	
	Not mentioned	24	Not applicable	

[Table/Fig-1]: Baseline characteristics of the participants.

S. No.	Variables	Meditation	Non meditation	SED	t-value	Cohen's d	p-value
		Mean±SD	Mean±SD				
Depression, anxiety and stress							
a	Depression	9.50±7.8	12.82±9.4	0.859	3.876	0.3862	<0.001
b	Anxiety	10.67±7.0	13.66±9.2	0.808	3.706	0.3693	<0.001
c	Stress	12.76±7.4	15.14±8.2	0.778	3.061	0.3050	0.002
d	DASS (Total)	32.92±19.5	41.62±24.0	2.173	4.005	0.3991	<0.001

[Table/Fig-2]: Comparison of the levels of depression, anxiety and stress between the meditation (MP) and non meditation practitioners (NMP). DAS Total: Total of Depression, Anxiety and Stress Score; independent t-test was applied; SD: Standard deviation; SED: Standard error of difference

significant negative correlations with anxiety (p<0.01) and total DASS scores (p<0.05) [Table/Fig-3].

S. No.	Variables	Experience (in months)		Number of days (per week)		Daily practice (in minutes)	
		r-value	p-value	r-value	p-value	r-value	p-value
1	Depression	-0.151*	0.030	-0.079	0.258	0.056	0.424
2	Anxiety	-0.109	0.118	-0.224**	0.001	-0.108	0.123
3	Stress	-0.096	0.172	-0.103	0.139	0.042	0.547
4	DASS (Total)	-0.136	0.052	-0.151*	0.030	0.000	0.998

[Table/Fig-3]: Correlation coefficient (r-value) of depression, anxiety and stress with different parameters of meditation. p=level of significance; *p<0.05; **p<0.01; r=Product moment (Pearson's) correlation

Regression

Regression analyses indicated that meditation variables predicted psychological outcomes as follows:

Depression: r=0.186, R²=0.034 (3.4% variance explained), F=2.393, p>0.05

Anxiety: r=0.263, R²=0.069 (6.9% variance explained), F=4.994, p<0.01

Stress: r=0.158, R²=0.025 (2.5% variance explained), F=1.714, p<0.05

Total DASS score: r=0.212, R²=0.045 (4.5% variance explained), F=3.158, p<0.05

DISCUSSION

The present study demonstrated significantly lower levels of psychological distress among MPs compared with NMPs, thus accepting the study hypothesis. Consistent with these results, a previous cross-sectional study comparing meditators and non meditators (N=111 per group) reported significantly lower anxiety and stress levels among meditation practitioners ($p < 0.001$ for both) [13].

Furthermore, visualisation meditation has been shown to be particularly effective in reducing stress and anxiety among students compared with non meditative control groups, especially in improving motivational and emotional outcomes [16].

A negative correlation was observed between the duration of meditation practice (in months) and depression scores, while the number of days of meditation practice per week showed negative associations with anxiety and the combined depression, anxiety and stress (DASS) scores. These results are consistent with previous findings, where 67 individuals practicing mindfulness meditation demonstrated significant reductions in anxiety and stress scores [13]. Similarly, Ranabhat CL et al., [14] reported that 453 women regularly engaged in yoga, meditation, or worship were less likely to report illness. Another web-based survey identified positive associations between mindfulness and self-compassion, along with significant negative correlations between mindfulness and anxiety, stress and depression scores [15].

These findings suggest a potential dose-response relationship, in which longer and more frequent engagement in meditation produces greater protective effects against psychological distress. Supporting this perspective, Alvarado-García PAA et al., (2025) conducted a longitudinal study in which 64 college students practicing mindfulness meditation for 12 weeks exhibited decreased levels of stress, anxiety and depression [17]. Likewise, Morais P et al., (2022) reported significant reductions in anxiety following participation in a mindfulness-based programme, further confirming the effectiveness of meditation in anxiety management [18].

These outcomes align with neuroplasticity models of meditation, which propose that sustained practice induces structural and functional changes in brain regions associated with emotion regulation [24]. Additionally, frequent meditation practice may help maintain a consistent state of mindful awareness, thereby preventing the accumulation of anxious thoughts and ruminative patterns [25].

The present findings can be understood through multiple physiological and theoretical frameworks. Meditation enhances prefrontal cortex regulation of limbic system activity, particularly amygdala responses to emotional stimuli, resulting in improved emotional control and stress resilience [26]. It also modulates the default mode network, reducing mind-wandering and excessive self-referential thinking commonly associated with depression and anxiety [27].

Physiologically, meditation's stress-reducing effects may be mediated through decreased Hypothalamic-Pituitary-Adrenal (HPA) axis activity and reduced cortisol secretion [28], alongside increased parasympathetic nervous system activity [29,30]. These biological changes may create a positive feedback mechanism whereby reduced stress enhances meditation effectiveness, further strengthening emotional regulation.

Neuroimaging studies support these observations. Rajyoga meditation practitioners have demonstrated increased Grey Matter Volume (GMV) in brain regions such as the prefrontal cortex and anterior cingulate cortex—areas involved in reward processing and emotional regulation [31]. Increased GMV in these regions has been associated with greater subjective happiness and lower psychological distress [31,32]. Furthermore, regular meditation practice appears to influence neurochemical balance, including elevated Gamma-Aminobutyric Acid (GABA) secretion, which may contribute to anxiety reduction and mood enhancement [33].

Collectively, these findings carry important implications for mental health interventions in India and similar cultural contexts, where meditation is culturally rooted and accessible.

Limitation(s)

The present study has several limitations. Specific meditation techniques were not differentiated and the cross-sectional design precluded causal inference regarding meditation effects. Reliance on self-report measures might introduce response bias. Medication history was not recorded and the sample was drawn from a localised population, limiting generalisability to broader national or global contexts.

CONCLUSION(S)

Meditation practitioners exhibited significantly lower levels of depression, anxiety and stress compared with non practitioners. These findings support meditation as both a preventive and therapeutic mental health strategy, emphasising the importance of consistent practice and long-term engagement.

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REFERENCES

- [1] Freeman M. The World Mental Health Report: Transforming mental health for all. *World Psychiatry*. 2022;21(3):391-92. Doi: 10.1002/wps.21018. PMID: 36073688; PMCID: PMC9453907.
- [2] Gururaj G, Varghese M, Benegal V, Rao GN, Pathak K, Singh LK, et al. National Mental Health Survey of India, 2015-16: Summary. Bengaluru: National Institute of Mental Health and Neurosciences; 2016 [cited 2025 Jul 4]. Available from: <https://indianmhs.nimhans.ac.in/phase1/Docs/Summary.pdf>.
- [3] Snyder HR. Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: A meta-analysis and review. *Psychol Bull*. 2013;139(1):81-132. Doi:10.1037/a0028727.
- [4] Fava M, Rosenbaum JF. Anger attacks in depression. *Depress Anxiety*. 1998;8 Suppl 1:59-63. PMID: 9809215.
- [5] Sultson H, Murd C, Havik M, Konstel K. Negative affect instability predicts elevated depressive and generalised anxiety disorder symptoms even when negative affect intensity is controlled for: An ecological momentary assessment study. *Front Psychol*. 2024;15:1371115. Doi: 10.3389/fpsyg.2024.1371115.
- [6] Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer Publishing Company; 1984.
- [7] Zheng M, Guo X, Chen Z, Deng J, Hu M. Association between interpersonal relations and anxiety, depression symptoms, and suicidal ideation among middle school students. *Front Public Health*. 2023;11:1053341. Doi:10.3389/fpubh.2023.1053341
- [8] Gruber J, Oveis C, Keltner D, Johnson SL. A discrete emotions approach to positive emotion disturbance in depression. *Cogn Emot*. 2011;25(1):40-52. Doi:10.1080/02699931003615984
- [9] Visted E, Vollestad J, Nielsen MB, Schanche E. Emotion regulation in current and remitted depression: A systematic review and meta-analysis. *Front Psychol*. 2018;9:756. Doi: 10.3389/fpsyg.2018.00756.
- [10] Milić J, Skitarelić N, Majstorović D, Zoranić S, Čivljak M, Ivanišević K, et al. Levels of depression, anxiety and subjective happiness among health sciences students in Croatia: A multi-centric cross-sectional study. *BMC Psychiatry*. 2024;24(1):50. Doi: 10.1186/s12888-024-05498-5.
- [11] Ooi PB, Khor KS, Tan CC, Ong DLT. Depression, anxiety, stress, and satisfaction with life: Moderating role of interpersonal needs among university students. *Front Public Health*. 2022;10:958884. Doi: 10.3389/fpubh.2022.958884. PMID: 36249213; PMCID: PMC9554619.
- [12] Telles S, Gupta RK, editors. Evidence-based perspectives on the psychophysiology of yoga and its applications. Pennsylvania (USA): IGI Global; 2020. Doi: 10.4018/978-1-7998-1757-4.
- [13] Duraimani SL. A cross-sectional and longitudinal study of the effects of a mindfulness meditation mobile application platform on reducing stress and anxiety. *Int J Yoga*. 2019;12(3):226-32. Doi: 10.4103/ijoy.IJOY_56_18.
- [14] Ranabhat CL, Kim C-B, Park M-B, Bajgai J, Kim C-B. Impact of spiritual behavior on self-reported illness: A cross-sectional study among women in the Kailali district of Nepal. *J Lifestyle Med*. 2018;8(1):23-32. Doi: 10.15280/jlm.2018.8.1.23.
- [15] Snaith N, Schultz T, Rasmussen P, Proeve M. Mindfulness, self-compassion, anxiety and depression measures in South Australian yoga participants: Implications for designing a yoga intervention. *Complement Ther Clin Pract*. 2018;32:92-99. Doi: 10.1016/j.ctcp.2018.05.009.
- [16] Aksu Ç, Ayar D. The effects of visualization meditation on the depression, anxiety, stress and achievement motivation levels of nursing students. *Nurse Educ Today*. 2023;120:105618. Doi: 10.1016/j.nedt.2022.105618.

- [17] Alvarado-García PAA, Soto-Vásquez MR, Infantes Gomez FM, Guzman Rodriguez NM, Castro-Paniagua WG. Effect of a mindfulness program on stress, anxiety, depression, sleep quality, social support, and life satisfaction: A quasi-experimental study in college students. *Front Psychol.* 2025;16:1508934. Doi: 10.3389/fpsyg.2025.1508934.
- [18] Morais P, Pinheiro AP, Fonseca MS, Quintão C. The mindfulness meditation effect on states of anxiety, depression, stress and life quality of life. In: *Proceedings of the 15th International Joint Conference on Biomedical Engineering Systems and Technologies [Internet]*. Setubal (Portugal): SciTePress; 2022. P. 479-86.
- [19] Goodmann DR, Daouk S, Sullivan M, Cabrera J, Liu NH, Barakat S, et al. Factor analysis of depression symptoms across five broad cultural groups. *J Affect Disord.* 2021;282:227-35. Doi: 10.1016/j.jad.2020.12.129.
- [20] Bronkhorst J. Can there be a cultural history of meditation? With special reference to India. In: Eifring H, editor. *Hindu, Buddhist and Daoist meditation: Cultural histories*. Oslo: Hermes Academic Publishing; 2014. p. 27-40.
- [21] Erdfelder E, Faul F, Buchner A. GPOWER: A general power analysis program. *Behav Res Methods Instrum Comput.* 1996;28:1-11. Doi: 10.3758/BF03203630.
- [22] Osman A, Wong JL, Bagge CL, Freedenthal S, Gutierrez PM, Lozano G. The Depression Anxiety Stress Scales-21 (DASS-21): Further examination of dimensions, scale reliability, and correlates. *J Clin Psychol.* 2012;68(12):1322-38. Doi: 10.1002/jclp.21908.
- [23] Sharma MK, Hallford DJ, Anand N. Confirmatory factor analysis of the Depression, Anxiety, and Stress Scale among Indian adults. *Indian J Psychiatry.* 2020;62(4):379-83. Doi: 10.4103/psychiatry.IndianJPsychiatry_313_19.
- [24] Davidson RJ, McEwen BS. Social influences on neuroplasticity: Stress and interventions to promote well-being. *Nat Neurosci.* 2012;15(5):689-95. Doi: 10.1038/nn.3093.
- [25] Lutz A, Slagter HA, Dunne JD, Davidson RJ. Attention regulation and monitoring in meditation. *Trends Cogn Sci.* 2008;12(4):163-69. Doi: 10.1016/j.tics.2008.01.005.
- [26] Tang YY, Hölzel BK, Posner MI. The neuroscience of mindfulness meditation. *Nat Rev Neurosci.* 2015;16(4):213-25. Doi: 10.1038/nrn3916.
- [27] Brewer JA, Worhunsky PD, Gray JR, Tang YY, Weber J, Kober H. Meditation experience is associated with differences in default mode network activity and connectivity. *Proc Natl Acad Sci U S A.* 2011;108(50):20254-59. Doi: 10.1073/pnas.1112029108.
- [28] Vargas-Uricoechea H, Castellanos-Pinedo A, Urrego-Noguera K, Vargas-Sierra HD, Pinzón-Fernández MV, Barceló-Martínez E, et al. Mindfulness-based interventions and the hypothalamic-pituitary-adrenal axis: A systematic review. *Neurol Int.* 2024;16(6):1552-84. Doi: 10.3390/neurolint16060115.
- [29] Ganguly A, Hulke SM, Bharshanakar R, Parashar R, Wakode S. Effect of meditation on autonomic function in healthy individuals: A longitudinal study. *J Family Med Prim Care.* 2020;9(8):3944-48. Doi: 10.4103/jfmpc.jfmpc_460_20.
- [30] Telles S, Singh N, Gupta RK, Balkrishna A. A selective review of dharana and dhyana in healthy subjects. *J Ayurveda Integr Med.* 2016;7:255-60. Doi: 10.1016/j.jaim.2016.09.004.
- [31] Babu MGR, Kadavigere R, Koteswara P, Sathian B, Rai KS. Rajyoga meditation induces grey matter volume changes in regions that process reward and happiness. *Sci Rep.* 2020;10(1):16177. Doi: 10.1038/s41598-020-73221-x.
- [32] Ancelin ML, Carrière I, Artero S, Maller J, Meslin C, Ritchie K, et al. Lifetime major depression and grey-matter volume. *J Psychiatry Neurosci.* 2019;44(1):45-53. Doi: 10.1503/jpn.180026.
- [33] Guglietti CL, Daskalakis ZJ, Radhu N, Fitzgerald PB, Ritvo P. Meditation-related increases in GABA_B modulated cortical inhibition. *Brain Stimul.* 2013;6(3):397-402. Doi: 10.1016/j.brs.2012.08.005.

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