

# Effectiveness of Mindfulness Meditation on Depression, Anxiety, and Stress among Undergraduate Nursing Students: A Quasi-experimental Study

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## ABSTRACT

**Introduction:** High levels of stress and anxiety are usually experienced by students as a result of peer pressure and concerns about college. Students who struggle to control their stress and anxiety may experience mood swings, behavioural changes, and even depression.

**Aim:** To assess the effectiveness of mindfulness meditation on depression, anxiety, and stress among undergraduate nursing students.

**Materials and Methods:** This quasi-experimental study was conducted at Yenepoya Nursing College, Yenepoya (Deemed to be University), and Zulekha Nursing College, Mangaluru, Karnataka, India for a duration of five weeks from April 2022 to May 2022. A total of 84 study participants were enrolled and divided into two groups: the intervention group (n=42) and the control group (n=42). The intervention group received mindfulness meditation for 15 minutes, twice a day in the morning and evening for four weeks. The Depression Anxiety and Stress Scale (DASS-42) was used to assess depression, anxiety, and stress in both groups.

Data were analysed using Statistical Package for the Social Sciences (SPSS) Version 23.0. Baseline data were presented using frequency and percentage. Two-factor repeated measures Analysis of Variance (ANOVA) and Bonferroni post-hoc tests were adopted to assess the difference between pre and post-test scores for stress, anxiety, and depression in repeated intervals. The level of significance was set at p-value <0.05.

**Results:** A comparison within the intervention group at different time points showed a significant difference in the reduction of stress, anxiety, and depression from the pretest after the administration of mindfulness meditation (p-value <0.05). The reduction of stress, anxiety, and depression in the intervention group was significantly different from the control group (p-value <0.05).

**Conclusion:** Mindfulness meditation significantly reduces stress, anxiety, and depression among students. Hence, it can be incorporated into daily life to help individuals deal with a variety of stressful events.

**Keywords:** Behavioural changes, Depression anxiety stress scale, Stressful events

## INTRODUCTION

Stress is a normal part of life. It can be experienced from the environment, body, and thoughts. It is the body's reaction to any change that requires an adjustment or response [1]. The body reacts to these changes with physical, mental, and emotional responses. The human body is designed to experience stress and react to it. Stress can be positive, keeping us alert, motivated, and ready to avoid danger. It becomes negative when a person faces continuous challenges without relief or relaxation. Prolonged activation of the stress response causes wear and tear on the body, both physically and emotionally [2]. According to a study conducted in Uganda, stress is prevalent among undergraduate students at a rate of 57.4%, where the most often mentioned stressors were emotional and academic [3].

Stress may lead to anxiety and depression. Anxiety and depression are very common negative emotional experiences prevalent among contemporary college students. Prolonged exposure to anxiety and depression may cause physical and mental disturbances, lowering the level of academic performance, quality of life, and other issues among students [4]. Anxiety is a feeling of fear or apprehension about what is to come, and it is our body's natural response to stress. In a study at Husson University in the United States, the majority of the subjects had higher levels of state anxiety than usual, and more than half had higher levels of trait anxiety [5].

Globally, more than 280 million people of all ages suffer from depression [6]. It is a common mild mental disorder characterised

by feelings of sadness, loss, or anger that interfere with a person's everyday activities [7]. A study conducted in Bhubaneswar, India, showed that more than half of the students were affected by depression, anxiety, and stress, with morbidity found to be higher in 5<sup>th</sup>-semester students than in 2<sup>nd</sup>-semester students, and male students reported lower scores compared to female participants [8].

Meditation teaches the brain to maintain attention even in the face of negative thoughts, emotions, and bodily sensations, which frequently occur when one is worried or anxious. Additionally, it aids in preparing the brain for demanding circumstances. The primary advantages are a decrease in stress and anxiety, promotion of emotional stability, reduction in pain, and improvement in sleep [9]. Mindfulness is regarded not as something to get or acquire, but as an internal resource that already exists, patiently waiting to be reawakened [10]. Being mindful means being able to focus on the present moment with curiosity and without judgment. A type of clear-mind meditation is mindfulness meditation. It seeks to promote mental clarity and non judgment, which can assist people in acknowledging and accepting things as they are in all ways. Mindfulness meditation originated from Vipassana meditation in Buddhism, where the concept of self is temporary and considered harmful by thoughts of selfishness, attachment, and pain. Therefore, mindfulness meditation is a means of sensory detachment and reducing one's misperceptions about the world [11]. A meta-analysis study revealed that mindfulness meditation helps reduce stress, anxiety, and depression among people [12]. A study done at Cambridge University in Spain also found that doing personal

relaxation exercises and practicing mindfulness could help reduce stress, anxiety, and depression [13]. Another study done at the University of California concluded that techniques of mindfulness meditation may represent a powerful cognitive-behavioural coping strategy for transforming the ways in which one respond to life events [14].

In day-to-day life, there are numerous experiences and events that cause stress and anxiety, which may tie in with aspects of lowered well-being. One of the most effective ways to cope with depression, anxiety, and stress is mindfulness meditation, which will help slow down racing thoughts and promote mental well-being. If mindfulness meditation is practiced by healthcare professional students, it enables them to manage their personal and academic-related stress and anxiety. They can guide patients to practice it when they visit hospitals, and to a certain extent, it improves the quality of life for patients. Therefore, the purpose of the current research was to evaluate the effectiveness of mindfulness meditation on depression, anxiety, and stress among undergraduate nursing students.

## MATERIALS AND MEHODS

A quasi-experimental study was conducted at Yenepoya Nursing College and Zulekha Nursing College, Mangaluru, Karnataka, India, for a duration of five weeks from April 1, 2022, to May 7, 2022. The study was approved by the Institutional Ethics Committee of Yenepoya Deemed to be University with approval number YEC2/871. Informed consent was obtained from all the participants.

**Inclusion criteria:** Undergraduate students studying in the 3<sup>rd</sup> year and 4<sup>th</sup> year of B.Sc. Nursing Colleges, aged between 20-22 years, and staying in the hostel were included in the study.

**Exclusion criteria:** Undergraduate students diagnosed with psychiatric problems such as neurotic or psychotic disorders, currently on treatment, and those with chronic low back pain were excluded from the study. Students who had practiced any form of mindfulness meditation were also excluded from the study.

**Sample size:** Sample size estimation was done using G\*power software. With a significance level of 5% and power of 95%, assuming an effect size of 0.8 [15], the total sample size obtained was 84 students. Non probability purposive sampling technique was used.

After self-introduction by the researcher, the purpose of the study was explained to the students. Using non probability purposive sampling technique, the study participants were divided into two groups: the intervention group and the control group, with 42 students in each group.

Demographic proforma and DASS-42 [16] were used to collect information from both the intervention and control group participants.

For the intervention group, prior to the start of the mindfulness meditation program, the researchers assessed the participants' levels of stress, anxiety, and depression on the first day of data collection. Mindfulness meditation training was given for 15 minutes, twice a day in the morning and evening, for four weeks. The training was provided in the Zulekha ladies hostel for the girls and in the auditorium for boys by a certified and trained researcher in performing mindfulness meditation. The undergraduate students were supervised during the entire training period. They were taught to focus on their breath by sitting straight in one place, and this was done for 15 minutes, morning and evening, regularly for four weeks. After the completion of the mindfulness meditation sessions, the first post-assessment of depression, anxiety, and stress was conducted after four weeks of training, and the second post-test assessment was conducted one week later to check for any changes in the levels of depression, anxiety, and stress among students, using the DASS-42 [16].

In the control group, levels of depression, anxiety, and stress were assessed among undergraduate students on the first day of data collection. No intervention (mindfulness meditation) was given to the participants in the control group.

## STATISTICAL ANALYSIS

The data obtained were analysed using descriptive and inferential statistics with SPSS version 23.0. Demographic data were represented in terms of percentage and frequency. The mean, median, and standard deviation for depression, anxiety, and stress were computed. Two-factor repeated measures ANOVA and post-hoc analysis were used to assess the effectiveness of mindfulness meditation within the intervention and control groups. An independent t-test was used to compare the depression scores between the intervention and control groups. A Chi-square test was computed to find the association between depression, anxiety, and stress with selected demographic variables. The level of significance, denoted by 'p', was set at 0.05%.

## RESULTS

On average, 21 students (50%) in both the intervention and control groups belonged to the age group of 20-21. Half of the participants in both groups, 21 students (50%), were studying in the third and fourth year of B.Sc. Nursing. The majority of students, 32 (76.2%) in the intervention group and all participants in the control group (42, 100%), were females. Approximately 18 students (42.9%) in both the intervention and control groups had a monthly family income of Rs. 50,001-75,000. In the intervention group, 29 students (69%) and in the control group, 33 students (78.6%) belonged to nuclear families. All the students in both groups were staying in hostels. The majority of students in the intervention group, 35 (83.3%), and all participants in the control group (42, 100%) were not practicing any other mode of relaxation techniques routinely.

In the intervention group, a total of 24 students (57.1%) had moderate depression in the pretest, which decreased to mild in post-test-1, and most students became normal in post-test-2. Only a few students, 5 (11.9%), were in the normal category in the pretest. Above-average percentage of students in the control group had a moderate level of depression in the pretest, and nearly average students had mild depression in post-test-1 and post-test-2. Only 4 students (9.5%) had no depression in the pretest and post-tests. In the control group, 15 students (35.7%) had moderate depression in pretest-1, and 17 (40.5%) had moderate depression in post-test-2. A statistically significant difference ( $p=0.001$ ) was observed in the levels of depression in the intervention group over the repeated intervals [Table/Fig-1,2]. The independent t-test showed a significant difference ( $p\text{-value}<0.05$ ) in the levels of depression between the groups at post-test-1 and post-test-2 [Table/Fig-3].

Parameter	Group	Test	Mean±SD	F value	p-value
Depression	Intervention (n=42)	Pretest	14.24±4.10	57.98	0.001*
		Post-test-1	10.21±1.83		
		Post-test-2	8.74±1.53		
	Control (n=42)	Pretest	13.90±2.85	2.87	0.063
		Post-test-1	12.83±3.67		
		Post-test-2	13.57±3.43		

**[Table/Fig-1]:** Effectiveness of mindfulness meditation on depression among undergraduate students.

F: Two factor repeated measures ANOVA; \*Significant  $p<0.05$  level; SD: Standard deviation

Parameter	Group	Test	MD	SE	p-value
Depression	Intervention (n=42)	Pretest-Post-test-1	4.02	0.60	0.001*
		Pretest-Post-test-2	5.50	0.60	0.001*
		Post-test-1 - Post-test-2	1.48	0.60	0.045*
	Control (n=42)	Pretest-Post-test-1	1.07	0.73	0.430
		Pretest-Post-test-2	0.33	0.73	1.000
		Post-test-1 - Post-test-2	0.74	0.73	0.937

**[Table/Fig-2]:** Comparison of depression scores within intervention and control groups.

Test used: ANOVA test with Bonferroni post-hoc test; MD: Mean difference; SE: Standard error; \*Significant at  $p<0.05$

Parameters	Test	Group	Mean±SD	MD	t value	p-value
Depression	Post-test-1	Intervention n=42	10.21±1.83	2.62	4.141	0.001*
		Control n=42	12.83±3.67			
	Post-test-2	Intervention n=42	8.74±1.53	4.83	8.340	0.001*
		Control n=42	13.57±3.43			

**[Table/Fig-3]:** Comparison of depression scores between the groups. SD: Standard deviation; MD: Mean difference; t: Independent t-test; \*Significant at p (<0.05)

A total of 22 students (52.4%) in the intervention group had moderate anxiety in the pretest, which decreased to mild in post-test-1 and post-test-2. More than average students had normal anxiety in the post-test-1 and post-test-2. The majority, 26 students (61.9%), in the control group had a moderate level of anxiety in the pretest, 6 students (14.3%) had mild anxiety, and 10 students (23.8%) had no anxiety. In post-test-1, 17 students (40.5%) had moderate anxiety, 14 students (33.3%) had mild anxiety, and 11 students (26.2%) had no anxiety. In post-test-2, half of the students, 21 (50%), had moderate anxiety, 7 students (16.7%) had mild anxiety, and 14 students (33.3%) were in the normal category. There was a significant reduction in the level of anxiety in the intervention group compared to the control group (p-value=0.001) [Table/Fig-4,5]. The independent t-test showed a significant reduction (p-value=<0.05) in anxiety scores between the groups at post-test-1 and post-test-2 [Table/Fig-6].

Parameter	Group	Test	Mean±SD	F	p-value
Anxiety	Intervention n=42	Pretest	10.57±2.84	40.57	0.001*
		Post-test-1	7.76±1.19		
		Post-test-2	7.40±1.17		
	Control n=42	Pretest	10.02±2.55	0.60	0.55
		Post-test-1	9.69±2.75		
		Post-test-2	10.14±1.75		

**[Table/Fig-4]:** Effectiveness of mindfulness meditation on anxiety among undergraduate students. F: Repeated measures ANOVA; SD: Standard deviation; \*Significant at (p<0.05) level

Parameter	Group	Test	MD	SE	p-value
Anxiety	Intervention n=42	Pretest-Post-test-1	2.81	0.41	0.001*
		Pretest-Post-test-2	3.17	0.41	0.001*
		Post-test-1 - Post-test-2	0.36	0.41	0.048*
	Control n=42	Pretest-Post-test-1	0.33	0.59	1.000
		Pretest-Post-test-2	0.12	0.59	1.000
		Post-test-1 - Post-test-2	0.45	0.59	1.000

**[Table/Fig-5]:** Comparison of anxiety scores within intervention and control group. Test used: ANOVA test with Bonferroni post-hoc test; MD: Mean difference; SE: Standard error \*Significant (p<0.05)

Parameter	Test	Group	Mean±SD	MD	t value	p-value
Anxiety	Post-test-1	Intervention n=42	7.76±1.19	1.93	4.18	0.001*
		Control n=42	9.69±2.75			
	Post-test-2	Intervention n=42	7.40±1.17	2.74	5.92	0.001*
		Control n=42	10.14±1.75			

**[Table/Fig-6]:** Comparison of anxiety scores between the groups. t: Independent t-test; SD: Standard deviation; MD: Mean difference; \*Significant at p<0.05

A total of 25 students (59.5%) in the intervention group had mild stress in the pretest, and the majority of students were in the normal category in pretest-1 and pretest-2. Only a few students, 15 (35.7%), were in the normal category, while 9 students (21.4%)

had mild stress in post-test-1, and 10 students (23.8%) had mild stress in post-test-2. In the control group, 9 students (21.4%) had moderate stress, 20 students (47.6%) had mild stress, and 13 students (31%) were in the normal category in the pretest. In post-test-1, 21 students (50%) had mild stress, 8 students (19%) had moderate stress, and 13 students (31%) had no stress. In post-test-2, 19 students (45.2%) had mild stress, 17 students (40.5%) had no stress, and 6 students (14.3%) had a moderate level of stress. A significant difference was observed in the levels of stress between the pretest and post-test-1 (p-value=0.001), pretest and post-test-2 (p-value=0.001), and post-test-1 and post-test-2 (p-value=0.012) in the intervention group [Table/Fig-7,8]. Additionally, there was a significant reduction (p-value=<0.05) in the levels of stress between the groups at post-test-1 and post-test-2 [Table/Fig-9].

Parameter	Group	Test	Mean±SD	F	p-value
Stress	Intervention n=42	Pretest	15.93±3.03	36.32	0.001*
		Post-test-1	12.93±1.61		
		Post-test-2	11.79±2.19		
	Control n=42	Pretest	16.05±3.79	2.98	0.056
		Post-test-1	16.52±3.66		
		Post-test-2	15.07±3.18		

**[Table/Fig-7]:** Effectiveness of mindfulness meditation on stress among undergraduate students.

Test used: Repeated measures of ANOVA; SD: Standard deviation; \*Significant at (p<0.05) level

Parameter	Group	Test	MD	SE	p-value
Stress	Intervention n=42	Pretest-Post-test-1	3.00	0.51	0.001*
		Pretest-Post-test-2	4.14	0.51	0.001*
		Post-test-1 - Post-test-2	1.14	0.51	0.012*
	Control n=42	Pretest-Post-test-1	0.48	0.78	1.000
		Pretest-Post-test-2	0.98	0.78	0.631
		Post-test-1 - Post-test-2	1.45	0.78	0.190

**[Table/Fig-8]:** Comparison of stress scores within intervention and control group. n=42+42; Test used: ANOVA test with Bonferroni post-hoc test; MD: Mean difference; SE: Standard error \*Significant (p<0.05)

Parameter	Time	Group	Mean±SD	MD	t value	p-value
Stress	Post-test-1	Intervention n=42	12.93±1.61	3.60	5.81	0.001*
		Control n=42	16.52±3.66			
	Post-test-2	Intervention n=42	11.79±2.19	3.29	5.51	0.001*
		Control n=42	15.07±3.18			

**[Table/Fig-9]:** Comparison of stress scores between the groups.

Test used: Independent t-test; SD: Standard deviation; MD: Mean difference; \*Significant at p<0.05

The present study showed a significant reduction in the levels of stress (p-value=0.001), anxiety (p-value=0.001), and depression (p-value=<0.001). However, there was no significant association between depression and anxiety scores with selected demographic variables. There was a significant association between stress and selected demographic variables such as age (p-value=0.028) and year of study (p-value=0.028).

## DISCUSSION

The present study revealed that mindfulness meditation was effective in reducing the levels of stress, anxiety, and depression among students. In the present study, 50% of participants in both the intervention and control groups were in the 20-21 years age group. The majority of students, 32 (76.2%) in the intervention group and all participants in the control group (42, 100%), were females. Most of the students in the intervention group, 29 (69%), and the control group, 33 (78.6%), belonged to nuclear families. These findings were supported by another study conducted by Kang YS et al.,

which showed that 45% of participants in the intervention group and 56.2% in the control group belonged to the 20-21 years age group. The majority of students in both groups were female, and 80.2% of students in both groups belonged to nuclear families [17].

More than half, 24 students (57.1%), in the intervention group had moderate depression in the pretest, which decreased to mild in post-test-1, and most students became normal in post-test-2. These findings were consistent with a meta-analysis conducted in Shandong, China [18]. The majority of students, 22 (52.4%), in the intervention group had moderate anxiety in the pretest, which decreased to mild in post-test-1 and post-test-2. More than average students had normal anxiety in the post-test-1 and post-test-2. These findings were consistent with another study conducted by Paul R et al., in Thailand, which showed that mindfulness meditation reduced levels of anxiety and stress [19].

In the present study, 25 students (59.5%) in the intervention group had mild stress in the pretest, and the majority of students were in the normal category in post-test-1 and 2. These findings were supported by another study where the prevalence of stress, anxiety, and depression was high (41%, 63%, and 43%, respectively), which reduced to 30%, 47%, and 30%, respectively, to some extent after interventions ( $p$ -value=0.028) [20]. The present research findings were also consistent with another study conducted by Manju J in Bhopal, which showed that almost 90% of students were stressed due to their new course, but after implementing mindfulness meditation, students were able to handle their stress [21]. [Table/Fig-10] shows comparison of different studies [13,19,21].

S. No.	Authors name and publication year	Place of study	Sample size	Intervention given	Parameters compared	Conclusion
1.	Gallego J et al., 2014 [13]	Spain	125	Mindfulness program	Stress, anxiety and depression	Effect of reducing the identified variables such as stress, anxiety and depression were higher for the mindfulness group than for physical education group and control group.
2	Paul R et al., 2015 [19]	Thailand	86	Mindfulness meditation and biofeedback	Anxiety and stress	Mindfulness meditation is effective to reduce anxiety and stress.
3	Manju J 2016 [21]	Bhopal	30	Mindfulness meditation	Stress	After mindfulness meditation, the students were able to handle their stress.
4.	Present study 2023	Mangaluru, Karnataka	84	Mindfulness meditation	Stress, depression and anxiety	Mindfulness meditation was very effective in reducing stress, anxiety and depression.

[Table/Fig-10]: Supporting literature for the present study [13,19,21].

The present study showed a significant reduction in the levels of stress ( $p$ -value=0.001), anxiety ( $p$ -value=0.001), and depression ( $p$ -value=<0.001) among students who underwent mindfulness

meditation. These findings were supported by a study conducted by Schreiner I and Malcolm JP, who also found a significant reduction in the levels of depression ( $F=18.30$ ,  $p$ -value <0.001), anxiety ( $F=18.49$ ,  $p$ -value <0.001), and stress ( $F=19.76$ ,  $p$ -value <0.001) after implementing mindfulness meditation in study subjects [22]. The present study findings are further supported by an integrated literature review, which found that mindfulness meditation had a positive impact on nurses and nursing students' stress, anxiety, depression, burnout, sense of well-being, and empathy [23].

In the present study, there was no significant association between depression and anxiety scores with selected demographic variables ( $p$ -value >0.05). However, there was a significant association between stress and selected demographic variables such as age ( $\chi^2=4.805$ ,  $p$ -value=0.028) and year of study ( $\chi^2=4.805$ ,  $p$ -value=0.028). These findings were in contrast to a study conducted by Dube A et al., who found a significant association between stress, anxiety, and depression and selected demographic variables such as gender and year of study ( $p$ -value <0.05) [24].

### Limitation(s)

The present study had several limitations. First, a purposive sampling technique was used to select participants, which may limit the generalisability of the findings to a larger population. Second, the study was conducted in specific settings, which may restrict the applicability of the results to other contexts.

### CONCLUSION(S)

Mindfulness meditation has been shown to be effective in reducing levels of depression, anxiety, and stress among undergraduate students. Therefore, it is recommended that mindfulness meditation be included in the curriculum of various educational institutions, including healthcare professional institutions. This can help students in overcoming various stressful situations during their study period.

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**PLAGIARISM CHECKING METHODS:** [Jain H et al.]

- Plagiarism X-checker: Feb 16, 2023
- Manual Googling: Aug 29, 2023
- iThenticate Software: Sep 01, 2023 (19%)

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- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

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