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Reducing anxiety among teacher candidates: The efficacy of mindfulness-based stress reduction in higher education

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Abstract: The high anxiety rate among students, especially prospective teachers, is a significant concern in higher education. Unmanaged anxiety can negatively affect quality of life, academic performance, and professional competence. This study aims to evaluate the effectiveness of Mindfulness-Based Stress Reduction (MBSR) in reducing state and trait anxiety among undergraduate students in education programs. The research employed a quasi-experimental design with a pretest-posttest approach involving 24 participants divided into two groups: an intervention group and a waitlist control group. The intervention group participated in eight sessions of a modified MBSR program tailored for teacher training students, while the waitlist group studied the MBSR material independently. Measurements were taken before and after the intervention using the State-Trait Anxiety Inventory (STAI), and data were analyzed using a 2x2 Repeated Measures ANOVA. Results indicated a significant decrease in both state and trait anxiety in the intervention group following the MBSR program. The average state anxiety score decreased from 55.33 to 49.83, a reduction of 5.5 points, while trait anxiety decreased from 55.33 to 50.25, a reduction of 5.08 points. Conversely, the waitlist group experienced only a slight decrease in state anxiety and a minor increase in trait anxiety. Statistical analysis revealed significant effects of time and group interactions ($p < 0.05$), with large effect sizes ($\eta^2 = 0.558$ for state anxiety and $\eta^2 = 0.312$ for trait anxiety), indicating that MBSR has a substantial impact on reducing anxiety, particularly in state anxiety.

Keywords: *College students, Mental health, Mindfulness-based stress reduction, State anxiety, Trait anxiety.*

1. Introduction

Mental health is a concern for students in higher education globally. This is because mental health has a significant impact on the quality of life of students Cleofas [1]. Freitas, et al. [2] said that the quality of student life is highly correlated with the existence of symptoms of depression, anxiety, and stress. In line with that, Jenkins, et al. [3] also reported that depression and anxiety have a significant impact on students' quality of life.

In fact, anxiety in college students is at an alarming level [4]. According to Gallea, et al. [5] most students experience depression, anxiety, and stress. Recent studies show a high prevalence of anxiety and depression problems among college students in various countries [6, 7]. In Brazil, rates of depression and anxiety range from 25% to 28.51% [8]. Meanwhile, in Pakistan, anxiety is the most common mental health problem among college students in the Sialkot region, affecting 88.4% of the sample [9]. A study in Southeast Asia found that the rate of college students' depression ranged from 18.4% to 29.4%, while the anxiety rate ranged from 23.6% to 42.4% [10]. The health student population in Malaysia, most cases of stress and depression are at normal to mild levels, while most students show moderate to very severe anxiety [11, 12].

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Studies in Indonesia show similar results. Early detection of mental health problems and obtained a mapping of the prevalence and distribution of students' mental status at a university in Indonesia, found that 26.9% of students experienced mild depression, 18.5% experienced moderate depression, 9.3% experienced severe or extreme depression, and 86.8% experienced high levels of anxiety [13]. Studies on health students show similar things, where most Indonesian medical students report symptoms of depression (22.2%) and anxiety (48.1%), including 3.0% and 8.1% with very severe symptoms [14]. In line with that, as many as 58% of nursing students experience severe anxiety and 30% experience very severe anxiety in preparing for their thesis [15].

In another focus, anxiety has a detrimental impact on student life. Data show that anxiety, stress and depression among U.S. undergraduate students have an impact on including eating disorders, compulsive disorders, PTSD, and sleep disorders [16]. More than that, [17] said that the combined prevalence of depression and anxiety among undergraduate students reached 25% with 14% of the combined prevalence of having suicide risk factors. In Indonesia, high levels of anxiety can negatively impact learning outcomes [18] and students' critical thinking skills [19].

Various factors contribute to student anxiety. Each individual has different causes and impacts of anxiety [20]. The heavy academic workload and competitive nature of the student's academic environment are one of the causes of mental health disorders, including anxiety [21, 22]. In line with that, the demands of final projects and exams are also a factor of anxiety in health students in Indonesia [15, 23].

In other findings, psychological, biological, lifestyle, social, and financial impulses were also reported to affect anxiety in addition to academic demands [24]. Bullying is also often associated with the cause of student depression which is correlated with anxiety [25]. In addition, poor sleep quality, fatigue, headaches were identified as risk factors for anxiety and depression [11]. However, parental factors, family history of psychiatric disorders, self-esteem, and academic performance were found to be significant risk factors [26].

The high anxiety among students causes the need for appropriate interventions so that they do not have worse consequences [27]. Mindfulness-based Intervention (MBI) is one of the recommended interventions to manage anxiety. MBI shows efficacy in reducing anxiety symptoms in various populations [28-30]. In the youth population, Zhou, et al. [31] have concluded that MBI is effective in reducing state and trait anxiety. Among professionals, MBI is also known to be effective in reducing experiences of anxiety, depression, and work-related stress, such as in healthcare workers [32, 33] and athletes [34]. Meanwhile, in patients with clinical diseases, the effectiveness of MBI in reducing anxiety is unquestionable [35-38].

In more specific populations, MBI significantly improves student mental health [39]. The following systematic review is also proof of MBI's effectiveness in managing anxiety in the student population. As Jun, et al. [40] concluded that MBI has a positive effect on anxiety remission among Chinese students. In addition, MBI seems to have the potential to be useful in relieving students' functional emotional disorders, one of which is caused by anxiety [41].

This study aims to determine the effectiveness of Mindfulness-Based Stress Reduction (MBSR) to reduce anxiety (state and trait anxiety) of undergraduate teaching students at the University of Borneo Tarakan. As a student, it is known that several causes of anxiety include psychological impulses, lifestyle and social demands [42]. As prospective teachers, one of the anxiety arises due to concerns about professional competence and management abilities [43].

In addition to reducing current anxiety, MBI is needed to prepare prospective teachers to face difficult situations when working in the future [44]. As revealed by Agyapong, et al. [45] the prevalence of moderate to severe anxiety among teachers ranges from 38% to 41.2% due to dense performance demands. In addition, high levels of anxiety and stress are also experienced by teachers due to the demands of using technology in the classroom [46]. Mindfulness-based Intervention (MBI) during teacher training is essential because it will reduce stress and improve the quality of teaching for early-career teachers [47].

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Several studies propose the importance of mindfulness programs for teacher training students. A study proposes a comprehensive teacher welfare program to improve mental health and reduce burnout among teachers in Thailand [44]. It is in line with Ressler, et al. [48] that the mental health of prospective teachers is important for their development and that teacher preparation programs should provide an environment that normalizes mental health care and supports self-care. Mindfulness practices support the creation of a psychologically safe space for aspiring teachers to prepare for their teaching placements before graduation [49].

Mindfulness-based programs for teachers are essential for improving social-emotional competence, well-being, and behaviour in the classroom, as well as student engagement and social competence [50]. Mindfulness training programs for high school teachers significantly improve their occupational health, well-being, and interactions with students in the most stressful classrooms [51]. This is corroborated by Valosek, et al. [52] where meditation-based health programs that are part of the mindfulness program are effective in reducing teacher fatigue and increasing resilience, psychological stress, and fatigue. The same thing was also conveyed by Juul, et al. [53] in the attention program significantly improved the mental health of teacher training students with several positive effects such as reducing disturbing thoughts.

We hope that mindfulness-based stress reduction (MBSR) can reduce anxiety (state and trait anxiety), as well as significantly improve the mental well-being of undergraduate teaching students. Not only that, the anxiety management skills produced in this intervention are expected to improve the social-emotional competence of teacher training students so that in the future they will be able to increase interaction with students in the classroom without significant stress disturbances.

2. Method

2.1. Participants

Participants are recruited through brochures that are widely distributed online. The eligibility criteria for this study include inclusion criteria, namely students of the Faculty of Teacher Training, University of Borneo Tarakan with a minimum of 6 semesters of undergraduate programs and volunteers to participate in all programs. Meanwhile, the exclusion criterion is to feel anxiety reported through an online survey. The online questionnaire was preceded by an introductory page for the study, contact information for the researcher, and confirmation of voluntary participation to participate in the intervention during 8 meetings. Other characteristics such as gender, age and background were ignored in this study

A total of 24 students of the Faculty of Teacher Training, University of Borneo Tarakan undergraduate program are registered in this program. They were divided into 2 groups, namely the intervention group and the waitlist group with 12 participants each. The intervention group is the first group that will follow the program and the waitlist group will be the control group that will follow the program after the first group completes the program.

2.2. Intervention

This program is named *'Mindfulness for Teacher Education Students'* (MTES), designed specifically for undergraduate teaching students who experience stress due to academic and social pressure during their teacher education. This program is adapted from Mindfulness-Based Stress Reduction (MBSR) by Kabat-Zinn [54] with modifications to meet the unique needs of teacher training students. The group-based program includes eight sessions designed to build mindfulness skills gradually. Each session lasts 60 minutes except for the first 90-minute session as additional time to introduce the entire series of programs. In one week, 2 sessions were carried out so that this program was completed in 1 month. Each session includes reflections and open discussions to help participants understand the concept of mindfulness deeply and integrate it into their daily lives. During the break in the session, participants can discuss achievements and obstacles in practicing mindfulness tasks at home. The program is designed not to interfere with the student's academic routine. Therefore, there is no strict optimization

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procedure. Participants who do not do the full mindfulness task during the break of the session can still take part in the entire series of programs.

For the waitlist group, they did not receive any intervention unless they were asked to learn MBSR independently through reading materials and videos that had been shared by the trainer. Waitlist groups are also strongly advised to look for other references that can improve their mindfulness skills. The goal is for the waitlist group to have more optimal readiness during face-to-face interventions in the future.

2.3. Measures

To measure anxiety symptoms in undergraduate teaching students, researchers used the State-Trait Anxiety Inventory (STAI) by Spielberger [55]. This scale consists of 40 items consisting of 20 items on the state anxiety inventory subscale and 20 items on the trait anxiety inventory subscale. Each item is rated on a 4-point Likert scale, namely never, sometimes, often, always. All participants in this program participated in a pre-intervention assessment before the program and a post-intervention assessment after the program with a State-Trait Anxiety Inventory (STAI) through a google form at their respective homes to improve the privacy and accuracy of measurements.

2.4. Statistical Analyses

Statistical data analysis using the Statistical Package for the Social Sciences (SPSS) for windows version 26 application. Before carrying out the main analysis, several prerequisite tests are performed to ensure that the data meets the necessary assumptions. First, a normality test was performed to ensure that the distribution of data in each group (before and after the intervention) followed the normal distribution, using the Kolmogorov-Smirnov or Shapiro-Wilk test. Second, a variance homogeneity test was carried out using Levene's Test to ensure that the variance between groups did not differ significantly. Third, the sphericity test is carried out with Mauchly's Test to check the assumption of uniformity of variance differences between measurements.

To test the effect of Mindfulness-Based Stress Reduction (MBSR) on anxiety, both State Anxiety and Trait Anxiety were used the ANOVA 2x2 Repeated Measures Test to test the influence of time and group on anxiety. The first factor is Time, which consists of two time conditions, namely before and after the MBSR intervention, while the second factor is the Group, which consists of the intervention group and the waitlist group. The test includes several analyses. Tests of Within-Subjects Effects were used to measure changes in anxiety in the same group at two different times (before and after the MBSR intervention). Tests of Between-Subjects Effects measure differences in anxiety between the intervention group and the waitlist group after the intervention. In addition, the "Time × Group" Interaction was tested to find out if there was a significant effect of the interaction between time and group on anxiety, which showed whether the effect of MBSR on anxiety differed depending on time.

As a final step, effect measures are used to measure the strength of MBSR's influence on anxiety. Partial Eta Squared (η^2) is used to indicate the magnitude of the influence of these factors, where if η^2 = 0.01-0.06 indicates a small influence, if η^2 = 0.06-0.14 indicates a moderate influence, and if $\eta^2 > 0.14$ indicates a large influence. With these measures, statistical analysis provides comprehensive information about the influence of MBSR on State Anxiety and Trait Anxiety, both in groups, between groups, and interactions between time and groups.

3. Results

3.1. Implementation of the MBSR Program

Of the 12 participants in the intervention group, the participation rate was 6.8 (standard deviation=0.69 and median=7) from 8 sessions. From the satisfaction figures, it is known that 5 participants stated that they were very satisfied, 6 participants stated satisfaction, and only 1 participant stated that they were neutral towards the entire training series. Participants' activeness during face-to-

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face sessions and session breaks were not considered in this study.

Meanwhile, in the waitlist group, 5 people stated that MBSR was very helpful in managing anxiety and couldn't wait to participate in the face-to-face program, 6 people stated that they did not understand MBSR very well and wanted to learn more about it in the face-to-face program and 1 person stated that they were not interested in MBSR and did not want to participate in the face-to-face program. It was concluded that the interest of waitlist group participants to learn MBSR was quite high. This can be a good capital for the wailist group if it gets intervention in the future.

3.2. Prerequisite Test of ANOVA 2x2 Repeated Measures

In the prerequisite test, the results of the Shapiro-Wilk test showed that the pretest and posttest scores for State Anxiety and Trait Anxiety were normally distributed (significance value > 0.05), so that the assumption of normality was met. The Levene test showed that the variance between the intervention group and the waitlist in State Anxiety and Trait Anxiety was homogeneous ($p > 0.05$), meaning that the homogeneity assumption was met. In addition, the sphericity test (Mauchly's Test) shows that the variance difference between pretest and posttest conditions is the same, which satisfies the sphericity assumption. However, the data from the prerequisite test results is not shown in this article and can be downloaded in the supplementary.

3.3. Efficacy of the MBSR

3.3.1. State Anxiety

The results of the ANOVA 2x2 Repeated Measures for State Anxiety test showed several significant findings. In the test of the influence of the main factor of time and group-time interaction, the results of the Tests of Within-Subjects Effects both showed a p value of < 0.05, which means that there was a significant change in the State Anxiety score from pretest to posttest and there was a significant interaction between time (pretest and posttest) and the group. This indicates that there is an overall reduction in anxiety after treatment with significant changes from before to after the intervention.

The group factor for State Anxiety through the results of the Tests of Between-Subjects Effects showed a p value of $p < 0.05$, which indicates a significant difference between the intervention group and the waitlist group in the State Anxiety score. The intervention group showed a larger change as the average pretest-postest decreased from 55,333 to 49,833 which was 5.5 compared to the waitlist group of only 1.0837. This showed that MBSR was more effective in reducing State Anxiety in the intervention group compared to the waitlist group which was also strengthened by a decrease in minimum and maximum values.

This suggests that the effect of MBSR is more pronounced in lowering State Anxiety in the intervention group compared to the waitlist group, reinforcing the evidence that MBSR has a positive effect on reducing anxiety. Effect Size (Partial Eta Squared, η^2) indicates a value of $\eta^2 = 0.558$, which indicates a large effect size. This suggests that MBSR treatment has a strong impact on the reduction of State Anxiety, giving an indication that the changes that occur are not just coincidental, but are significant influences.

Table 1.
Anxiety descriptive analysis.

	State Anxiety			
	Intervention		**Waitinglist**	
	Pretest	**Postest**	**Pretest**	**Postest**
Mean	55,333	49,833	55,4167	54,333
Std. Dev.	2,93	4,01	1,67	2,53
Minimum	49	44	53	49
Maximum	61	56	58	57

Multivariate Tests also confirmed that MBSR treatment had a significant effect on reducing State

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Anxiety, with significant differences between pretest and posttest, as well as between the intervention group and the waiting list. The Time and Group interactions were also significant, with a large effect size ($\eta^2 = 0.558$), suggesting that the MBSR intervention was effective in lowering State Anxiety compared to the waitlist group.

3.4. Trait Anxiety

Not too far from state anxiety, the results of the ANOVA 2x2 Repeated Measures for Trait Anxiety test also showed some significant findings. In the Tests of Within-Subjects Effects of time and time-group interaction both showed a p value of < 0.05, which means that there was a significant change in the Trait Anxiety score from pretest to posttest. This indicates an overall decrease in anxiety after treatment, with significant changes from before to after the intervention.

The group factor in the results of the Tests of Between-Subjects Effects showed a p value of < 0.05, indicating a significant difference between the Intervention group and the waitlist group in the Trait Anxiety score. The Intervention group showed a change in the number of anxiety scores, which confirmed that the MBSR intervention was more effective in reducing Trait Anxiety compared to the waitlist group that only learned independently. In the intervention group, there was a decrease in the value of trait anxiety, namely from 55,333 to 50.25 or 5,083 while for the waitlist group, there was an increase in anxiety, namely from the initial 48.5833 to 50.33 or 1.7467.

Table 2.
Trait anxiety descriptive analysis.

	Trait anxiety			
	Intervention		Waiting list	
	Pretest	Postest	Pretest	Postest
Mean	55,333	50,25	48,5833	50,33
Std. Dev.	2,994	3,04	2,274	3,33
Minimum	51	45	45	47
Maximum	59	55	52	53

The results of the "Time and Group" interaction showed a p value of < 0.05, which means that there was a significant interaction between the time (pretest and posttest) and the group. This shows that the effect of MBSR is more pronounced in lowering Trait Anxiety in the Intervention group compared to the waitlist group, confirming that MBSR has a positive influence in reducing long-term anxiety.

Table 3.
Result ANOVA 2x2 repeated measures anxiety.

Anxiety	Group (Inter-Wait)		Time (Pre-Post)		Group x Time		
	F	Sig. (p-value)	F	Sig. (p-value)	F	Sig. (p-value)	Partial η^2
State	5,117	0,034	27,783	0	12,505	0,002	0,558
Trait	13,278	0,001	9,966	0,005	41,882	0	0,312

Effect Size (Partial Eta Squared, η^2) shows a value of $\eta^2 = 0.312$, which indicates a large effect size. This signifies that MBSR treatment has a strong impact on the decrease of Trait Anxiety, with significant and substantial changes in the individual's anxiety levels. Multivariate Tests (Exact statistic) also confirmed that MBSR treatment had a significant effect on reducing Trait Anxiety. There are significant differences between pretest and posttest, as well as between the intervention group and the waitlist. The Time-to-group interaction was also significant, with a large effect size ($\eta^2 = 0.312$), suggesting that MBSR was effective in lowering Trait Anxiety in the intervention group compared to the waitlist group.

Finally, it is concluded based on the value of η^2 in state anxiety = 0.558 and Trait Anxiety = 0.312 even though they are both strong in providing effects/influences, it can be concluded that MBSR has a

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greater effect/effect of reducing state anxiety. This is also strengthened by the result of a decrease in the average anxiety value in the intervention group in state anxiety of 5.5 much greater than the decrease in the anxiety trait of 5,083.

4. Discussion

The results showed that there was a significant decrease in the level of state anxiety in both the MBSR intervention group and the waitlist group after treatment. This decline occurred in both groups, although with more significant changes in the group that received direct intervention.

The reduction in state anxiety in both groups (intervention and waitlist) suggests that anxiety can be affected by mindfulness exercises [56]. The eight-session MBSR process, which involves meditation, mindfulness, and relaxation exercises, can help individuals to better recognize and manage their emotional reactions to stress, which is a major factor in anxiety. This is in line with the findings [57] that MBSR programs are able to improve well-being and mental health by reducing stress and anxiety and improving emotional regulation.

One of the important findings of the study is that a decrease in anxiety states occurred not only in the intervention group, but also in the waitlist group. This shows that state anxiety can be reduced simply by learning the principles of mindfulness independently and not receiving direct MBSR intervention. Several studies have shown similar that even without formal MBSR, a person can experience a reduction in anxiety through self-taught mindfulness practices [58]. However, although the decrease in state anxiety occurred in the waitlist group, these findings reinforce the argument that MBSR has a greater effect in helping students cope with state anxiety in a more structured and systematic way. This was confirmed by Simonsson, et al. [59] who showed that participants in the MBSR program experienced a greater improvement in overcoming state anxiety compared to waiting lists or less structured interventions. A significant reduction in state anxiety in teachers who received Mindfulness-Based Stress Reduction (MBSR) interventions has shown early evidence that this approach is effective in reducing short-term anxiety.

In addition to the impact on state anxiety, the study also explored the effectiveness of MBSR on trait anxiety which measures more profound and more permanent levels of anxiety in individuals. The results of the study showed that MBSR was not only effective in reducing state anxiety but also had a significant influence on reducing trait anxiety in the intervention group. This is in line with the research of Norouzi, et al. [34] which concluded that MBSR effectively reduced state and trait anxiety in the intervention group compared to the control group. Related to this, MBSR is considered to have an effect on changes in brain activity related to emotion regulation which can contribute to a reduction in long-term anxiety symptoms as well as show an effect on the nature of anxiety [60].

But what is interesting is that, although there is a decrease in state anxiety in the waitlist group, there is a tendency to increase trait anxiety although it is not significant. The researchers assume that this increase is due to a lack of effective stress management strategies or errors in understanding trait anxiety due to learning MBSR independently. The weak data obtained on the waitlist group makes researchers unable to confirm why this can happen. Several studies may be able to answer this assumption, such as research by Priebe and Kurtz-Costes [61] which states that the effectiveness of independent mindfulness practice can vary, which means that there is a possibility that independent MBSR practice can actually increase anxiety traits. This is corroborated by Salajegheh, et al. [62] who stated that without structured guidance, individuals may not fully utilize the benefits of mindfulness, potentially leading to increased anxiety due to unresolved worries or ineffective self-regulation strategies. On the other hand, the findings of Hirshberg, et al. [63] are in contrast to the two researchers above, where the increase in trait anxiety in the waitlist group is certainly not due to the influence of MBSR, either obtained through training or independent study, which means that the increase in trait anxiety may be due to other factors that are not taken into account by the researcher. This is one of the things that needs to be researched in the future.

The relationship between traits and state anxiety is very complex. Trait anxiety can amplify the

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effects of state anxiety, especially when individuals face stress or challenges during independent studies. These interactions can lead to further degradation in inhibition control, resulting in increased levels of anxiety [64]. Individuals with trait anxiety often show deficits in attention control, which leads to increased distractions and irrelevant stimulus inhibition disorders. Research suggests that these individuals may struggle with delayed target selection and reduced inhibitory inhibition, which can exacerbate feelings of anxiety when engaging in self-directed studies [65].

Although in general MBSR shows a strong effect in influencing anxiety reduction, it can be concluded that MBSR has a greater effect of decreasing anxiety compared to trait anxiety. This shows that MBSR is more effective in reducing temporary or situational anxiety. This conclusion is particularly accurate given the dynamic nature of the anxiety of the state that fluctuates with direct stressors so that it is more receptive to the acute stress-reducing effects of MBSR [66]. Simply put, through mindfulness and breathing meditation, MBSR leads to a significant reduction in state anxiety [67].

Conversely, although there was a decrease in trait anxiety, the effect was not as large as that of state anxiety. Xie, et al. [68] in their study explained that the mechanism of MBSR reduces trait anxiety by altering the underlying cognitive and emotional processes even though it does not directly reduce trait anxiety. Xie also added that the long-term nature of the anxiety trait may require more sustained interventions or additional therapeutic components beyond MBSR to achieve significant reduction. But. Overall, these findings show that MBSR is an effective intervention in reducing anxiety in teacher training students with a greater effect on state anxiety than trait anxiety.

5. Limitations and Future Research Directions

The study has several limitations that need to be noted when interpreting the findings. One of the main limitations is the intervention design that is limited to the intervention group which on average only follows 6.8 sessions of the MBSR program face-to-face without strict optimization procedures. Although in general these sessions were sufficient to show a significant reduction in anxiety, longer duration and intensity of the intervention may result in stronger and more long-lasting effects. Therefore, future research may explore variations in the duration and frequency of MBSR sessions to understand the long-term impact and effectiveness of these interventions.

The waitlist group in this study only learned independently through documents and videos without any face-to-face sessions. This can limit true and even biased understanding of the effectiveness of MBSR in a more tangible context. Richer interventions with instructor or group support can enrich the participant's experience and provide more significant outcomes. For the record, the waitlist group that only received independent learning materials also showed an increase although not significantly in state anxiety, which added to the strength of the argument that MBSR with direct interaction is more effective in reducing anxiety.

Additionally, in this study, factors such as gender, cultural background, religion, and other demographic factors were ignored. In fact, these factors can affect an individual's response to MBSR interventions. For example, cultural and spiritual traditions can affect a person's stress and anxiety levels, as well as how they respond to mindfulness techniques. Therefore, further research needs to expand the variables considered, including factors such as social, cultural, and religious background, to identify their influence on responses to MBSR. More detailed research can provide insight into whether there are specific groups that benefit more from these programs and whether personalization of intervention programs can increase their effectiveness.

Another direction that can be explored is the combination of MBSR with a client culture-based approach to enhance the effect of interventions. Combining these approaches will likely result in greater changes in anxiety and provide further guidance on the most effective methods of reducing anxiety in students. This research can also further explore related psychological or physiological aspects that have the potential to be explained more deeply with multidimensional analysis.

Taking these factors into account, future research is expected to provide a deeper understanding of

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the effectiveness of MBSR in reducing anxiety in teacher training students as well as identify key factors influencing responses to these interventions.

6. Conclusion

This study showed that the Mindfulness-Based Stress Reduction (MBSR) program showed a significant reduction in both types of anxiety after the MBSR intervention, with a greater effect on state anxiety than on trait anxiety. Another interesting finding was that in the waitlist group that did not receive direct intervention, they experienced a mild increase in trait anxiety although not significantly. The limitations of this study were that the average participation rate was 6.8 from 8 face-to-face sessions and without strict optimization procedures and the program did not consider the demographic factors of the participants. Suggest the need for further research with a more varied design such as considering aspects of the client's tradition, religion and background to explore the long-term influences and factors that may affect the effectiveness of MBSR.

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Institutional Review Board Statement:

The study involving human participants was reviewed and approved by the Institute for Research and Community Service, University of Borneo Tarakan. Participants in this study provided written informed consent to participate in this study.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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References

[1] J. V. Cleofas, "Student involvement, mental health and quality of life of college students in a selected university in Manila, Philippines," *International Journal of Adolescence and Youth*, vol. 25, no. 1, pp. 435-447, 2020.

[2] P. H. B. d. Freitas, A. L. Meireles, I. K. d. S. Ribeiro, M. N. S. Abreu, W. d. Paula, and C. S. Cardoso, "Symptoms of depression, anxiety and stress in health students and impact on quality of life," *Revista Latino-Americana de Enfermagem*, vol. 31, p. e3884, 2023. https://doi.org/10.1590/1518-8345.6315.3885

[3] P. E. Jenkins, I. Ducker, R. Gooding, M. James, and E. Rutter-Eley, "Anxiety and depression in a sample of UK college students: a study of prevalence, comorbidity, and quality of life," *Journal of American College Health*, vol. 69, no. 8, pp. 813-819, 2021. https://doi.org/10.1080/07448481.2019.1709474

[4] I. G. Franzoi, M. D. Sauta, and A. Granieri, "State and trait anxiety among university students: A moderated mediation model of negative affectivity, alexithymia, and housing conditions," *Frontiers in Psychology*, vol. 11, p. 1255, 2020. https://doi.org/10.3389/fpsyg.2020.01255

[5] J. I. Gallea, L. A. Medrano, and L. P. Morera, "Work-related mental health issues in graduate student population," *Frontiers in Neuroscience*, vol. 15, p. 593562, 2021. https://doi.org/10.3389/fnins.2021.593562

[6] A. Duffy *et al.*, "Predictors of mental health and academic outcomes in first-year university students: Identifying prevention and early-intervention targets," *BJPsych Open*, vol. 6, no. 3, p. e46, 2020. https://doi.org/10.1192/bjo.2020.24

[7] D. Hernández-Torrano *et al.*, "Mental health and well-being of university students: A bibliometric mapping of the literature," *Frontiers in Psychology*, vol. 11, p. 1226, 2020. https://doi.org/10.3389/fpsyg.2020.01226

[8] L. M. Demenech, A. T. Oliveira, L. Neiva-Silva, and S. C. Dumith, "Prevalence of anxiety, depression and suicidal behaviors among Brazilian undergraduate students: A systematic review and meta-analysis," *Journal of Affective Disorders*, vol. 282, pp. 147-159, 2021.

[9] S. Asif, A. Mudassar, T. Z. Shahzad, M. Raouf, and T. Pervaiz, "Frequency of depression, anxiety and stress among university students," *Pakistan Journal of Medical Sciences*, vol. 36, no. 5, pp. 971–976, 2020.

[10] E. Ramón-Arbués, V. Gea-Caballero, J. M. Granada-López, R. Juárez-Vela, B. Pellicer-García, and I. Antón-Solanas, "The prevalence of depression, anxiety and stress and their associated factors in college students," *International journal of environmental research and public health*, vol. 17, no. 19, p. 7001, 2020. https://doi.org/10.3390/ijerph17197001

[11] M. F. Fauzi *et al.*, "Stress, anxiety and depression among a cohort of health sciences undergraduate students: the prevalence and risk factors," *International Journal of Environmental Research and Public Health*, vol. 18, no. 6, p. 3269, 2021. https://doi.org/10.3390/ijerph18063269

[12] N. E. Mohamad, S. M. Sidik, M. Akhtari-Zavare, and N. A. Gani, "The prevalence risk of anxiety and its associated factors among university students in Malaysia: A national cross-sectional study," *BMC Public Health*, vol. 21, pp. 1-12, 2021. https://doi.org/10.1186/s12889-021-10440-5

[13] A. T. Setyanto, "Early detection of prevalence of mental health disorders in students at universities," *Wacana*, vol. 15, no. 1, pp. 66-78, 2023. https://doi.org/10.20961/wacana.v15i1.69548

[14] A. S. Ramadianto, I. Kusumadewi, F. Agiananda, and N. W. Raharjanti, "Symptoms of depression and anxiety in Indonesian medical students: association with coping strategy and resilience," *BMC Psychiatry*, vol. 22, no. 1, p. 92, 2022. https://doi.org/10.1186/s12888-022-03745-1

[15] N. S. Wardani, "Nursing students' anxiety and self-directed learning readiness (SDLR) in thesis writing," *Journal of Nursing and Midwifery Sciences*, vol. 3, no. 1, 2024. https://doi.org/10.54771/yv92n654

[16] H. K. Kang, C. Rhodes, E. Rivers, C. P. Thornton, and T. Rodney, "Prevalence of mental health disorders among undergraduate university students in the United States: A review," *Journal of psychosocial nursing and mental health services*, vol. 59, no. 2, pp. 17-24, 2021.

[17] E. Sheldon *et al.*, "Prevalence and risk factors for mental health problems in university undergraduate students: A systematic review with meta-analysis," *Journal of Affective Disorders*, vol. 287, pp. 282-292, 2021. https://doi.org/10.1016/j.jad.2021.03.054

[18] N. Wardani, "The influence of mathematics anxiety on the learning outcomes of grade X high school students," *NUCLEUS*, vol. 3, no. 2, pp. 155–161, 2022.

[19] J. R. W. Rowldotul, P. T. S., L. Kartikasari, and S. Fiangga, "Critical thinking in open-ended problem solving in terms of mathematics anxiety," *Transformasi: Jurnal Pendidikan Matematika Dan Matematika*, vol. 4, no. 1, pp. 237-249, 2020.

[20] K. Cheung, K. Y. Tam, M. H. Tsang, L. W. Zhang, and S. W. Lit, "Depression, anxiety and stress in different subgroups of first-year university students from 4-year cohort data," *Journal of Affective Disorders*, vol. 274, no. 1, pp. 305-314, 2020.

[21] M. Asghar, A. Minichiello, and S. Ahmed, "Mental health and wellbeing of undergraduate students in engineering: A systematic literature review," *Journal of Engineering Education*, vol. 113, no. 4, pp. 1046-1075, 2024.

[22] P. Limone and G. A. Toto, "Factors that predispose undergraduates to mental issues: A cumulative literature review for future research perspectives," *Frontiers in Public Health*, vol. 10, p. 831349, 2022. https://doi.org/10.3389/fpubh.2022.831349

[23] D. S. A. Ningrum and E. Andriani, "The relationship between social support and student anxiety in facing exams," *Quanta: Jurnal Kajian Bimbingan dan Konseling dalam Pendidikan*, vol. 4, no. 2, pp. 87-92, 2020.

[24] M. Mofatteh, "Risk factors associated with stress, anxiety, and depression among university undergraduate students," *AIMS Public Health*, vol. 8, no. 1, pp. 36–65, 2020. https://doi.org/10.3934/publichealth.2021004

[25] R. Setiadi, Arsyawina, U. Kalsum, N. A. Syukur, and I. M. Ramdan, "Bullying as a risk factor of depression on undergraduate health students," *Global Pediatric Health*, vol. 8, p. 2333794X211023711, 2021. https://doi.org/10.1177/2333794X211023711

[26] S. Paudel, H. Gautam, C. Adhikari, and D. K. Yadav, "Depression, anxiety and stress among the undergraduate students of Pokhara Metropolitan, Nepal," *Journal of Nepal Health Research Council*, vol. 18, no. 1, pp. 27–34, 2020.

[27] S. Santre, "Mental health promotion in adolescents," *Journal of Indian Association for Child and Adolescent Mental Health*, vol. 18, no. 2, pp. 122-127, 2022. https://doi.org/10.1177/09731342221120709

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 7: 493-504, 2025
DOI: 10.55214/25768484.v9i7.8640

[28] H. Haller, P. Breilmann, M. Schröter, G. Dobos, and H. Cramer, "A systematic review and meta-analysis of acceptance-and mindfulness-based interventions for DSM-5 anxiety disorders," *Scientific Reports*, vol. 11, no. 1, p. 20385, 2021.
[29] X. Liu *et al.*, "Mindfulness-based interventions for social anxiety disorder: A systematic review and meta-analysis," *Psychiatry Research*, vol. 300, p. 113935, 2021. https://doi.org/10.1016/j.psychres.2021.113935
[30] H. Taylor, C. Strauss, and K. Cavanagh, "Can a little bit of mindfulness do you good? A systematic review and meta-analyses of unguided mindfulness-based self-help interventions," *Clinical Psychology Review*, vol. 89, p. 102078, 2021. https://doi.org/10.1016/j.cpr.2021.102078
[31] X. Zhou *et al.*, "Effects of mindfulness-based stress reduction on anxiety symptoms in young people: A systematic review and meta-analysis," *Psychiatry research*, vol. 289, p. 113002, 2020. https://doi.org/10.1016/j.psychres.2020.113002
[32] C. Hathaisaard, K. Wannarit, and K. Pattanaseri, "Mindfulness-based interventions reducing and preventing stress and burnout in medical students: A systematic review and meta-analysis," *Asian Journal of Psychiatry*, vol. 69, p. 102997, 2022. https://doi.org/10.1016/j.ajp.2021.102997
[33] S. A. Kriakous, K. A. Elliott, C. Lamers, and R. Owen, "The effectiveness of mindfulness-based stress reduction on the psychological functioning of healthcare professionals: A systematic review," *Mindfulness*, vol. 12, pp. 1-28, 2021.
[34] E. Norouzi, M. Gerber, F. F. Masrour, M. Vaezmosavi, U. Pühse, and S. Brand, "Implementation of a mindfulness-based stress reduction (MBSR) program to reduce stress, anxiety, and depression and to improve psychological well-being among retired Iranian football players," *Psychology of Sport and Exercise*, vol. 47, p. 101636, 2020. https://doi.org/10.1016/j.psychsport.2019.101636
[35] T.-L. Chen, S.-C. Chang, H.-F. Hsieh, C.-Y. Huang, J.-H. Chuang, and H.-H. Wang, "Effects of mindfulness-based stress reduction on sleep quality and mental health for insomnia patients: A meta-analysis," *Journal of Psychosomatic Research*, vol. 135, p. 110144, 2020. https://doi.org/10.1016/j.jpsychores.2020.110144
[36] W. Hui, L. Fenfen, and Z. Fenghao, "The efficacy of mindfulness-based stress reduction vs. standard or usual care in patients with breast cancer: A systematic review and meta-analysis of randomized controlled trials," *Translational Cancer Research*, vol. 11, no. 11, p. 4148, 2022.
[37] Y. Junye, M. Han, F. Miao, and D. Hua, "Using mindfulness-based stress reduction to relieve loneliness, anxiety, and depression in cancer patients: A systematic review and meta-analysis," *Medicine*, vol. 102, no. 37, p. e34917, 2023.
[38] Z. Yan *et al.*, "Effect of MBSR, DBT and CBT on the hypertension patients with depression/anxiety: Protocol of a systematic review and Bayesian network meta-analysis," *Plos One*, vol. 18, no. 2, p. e0281469, 2023. https://doi.org/10.1371/journal.pone.0282509
[39] G.-A. M. Martín, A. Aibar-Almazán, Y. Rivas-Campo, Y. Castellote-Caballero, and M. d. C. Carcelén-Fraile, "Mindfulness to improve the mental health of university students. A systematic review and meta-analysis," *Frontiers in Public Health*, vol. 11, p. 1284632, 2023. https://doi.org/10.3389/fpubh.2023.1284632
[40] L. Jun, C. Xu, K. Wan, Y. Liu, and L. Liu, "Mindfulness-based interventions to reduce anxiety among Chinese college students: A systematic review and meta-analysis," *Frontiers in Psychology*, vol. 13, p. 1031398, 2023. https://doi.org/10.3389/fpsyg.2022.1031398
[41] Y. Pan *et al.*, "Effectiveness of mindfulness-based stress reduction on mental health and psychological quality of life among university students: A GRADE-assessed systematic review," *Evidence-Based Complementary and Alternative Medicine*, vol. 2024, no. 1, p. 8872685, 2024.
[42] I. B. Mboya, B. John, E. S. Kibopile, L. Mhando, J. George, and J. S. Ngocho, "Factors associated with mental distress among undergraduate students in northern Tanzania," *BMC Psychiatry*, vol. 20, pp. 1-7, 2020. https://doi.org/10.1186/s12888-020-2448-1
[43] A. Narentuya, M. Zhang, and G. Tian, "Examining pre-service teachers' teaching anxiety during student teaching: A Chinese perspective," *European Journal of Education*, vol. 59, no. 4, p. e12734, 2024.
[44] P. Ratanasiripong, N. T. Ratanasiripong, W. Nungdanjark, Y. Thongthammarat, and S. Toyama, "Mental health and burnout among teachers in Thailand," *Journal of Health Research*, vol. 36, no. 3, pp. 404-416, 2022. https://doi.org/10.1108/JHR-05-2020-0181
[45] B. Agyapong, G. Obuobi-Donkor, L. Burback, and Y. Wei, "Stress, burnout, anxiety and depression among teachers: A scoping review," *International Journal of Environmental Research and Public Health*, vol. 19, no. 17, p. 10706, 2022. https://doi.org/10.3390/ijerph191710706
[46] J.-M. Fernández-Batanero, P. Román-Graván, M.-M. Reyes-Rebollo, and M. Montenegro-Rueda, "Impact of educational technology on teacher stress and anxiety: A literature review," *International Journal of Environmental Research and Public Health*, vol. 18, no. 2, p. 548, 2021. https://doi.org/10.3390/ijerph18020548
[47] P. Beuchel, J. G. Ophoff, C. Cramer, and M. Hautzinger, "Promoting occupational health and teaching quality: The impact of a mindfulness intervention in teacher training," *Teaching and Teacher Education*, vol. 114, p. 103703, 2022. https://doi.org/10.1016/j.tate.2022.103703
[48] M. B. Ressler, C. Apantenco, L. Wexler, and K. King, "Preservice teachers' mental health: Using student voice to inform pedagogical, programmatic, and curricular change," *Action in Teacher Education*, vol. 44, no. 3, pp. 252-268, 2022.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 7: 493-504, 2025
DOI: 10.55214/25768484.v9i7.8640

[49] N. Lemon, "Wellbeing in initial teacher education: using poetic representation to examine pre-service teachers' understanding of their self-care needs," *Cultural Studies of Science Education*, vol. 16, no. 3, pp. 931-950, 2021.
[50] J. S. De Carvalho, S. Oliveira, M. S. Roberto, C. Gonçalves, J. Barbara, and A. F. De Castro, "Effects of a mindfulness-based intervention for teachers: A study on teacher and student outcomes," *Mindfulness*, vol. 12, pp. 1719–1732, 2021. https://api.semanticscholar.org/CorpusID:233381035
[51] R. W. Roeser *et al.*, "Mindfulness training improves middle school teachers' occupational health, well-being, and interactions with students in their most stressful classrooms," *Journal of Educational Psychology*, vol. 114, no. 2, pp. 408–425, 2022.
[52] L. Valosek *et al.*, "Meditation effective in reducing teacher burnout and improving resilience: A randomized controlled study," presented at the Frontiers in Education, 2021.
[53] L. Juul, E. Brorsen, K. Gøtzsche, B. L. Nielsen, and L. O. Fjorback, "The effects of a mindfulness program on mental health in students at an undergraduate program for teacher education: a randomized controlled trial in real-life," *Frontiers in Psychology*, vol. 12, p. 722771, 2021. https://doi.org/10.3389/fpsyg.2021.722771
[54] J. Kabat-Zinn, *Mindfulness-based stress reduction (MBSR) authorized curriculum guide (S. F. Santorelli, F. Meleo-Meyer, & L. Koerbel, Eds.)*. United States: Center for Mindfulness in Medicine, Health Care, and Society, University of Massachusetts Medical School, 2017.
[55] C. D. Spielberger, "State-Trait anxiety inventory," Retrieved: https://api.semanticscholar.org/CorpusID:142658178. [Accessed 2010.
[56] P. Roca, C. Vazquez, G. Diez, G. Brito-Pons, and R. J. McNally, "Not all types of meditation are the same: Mediators of change in mindfulness and compassion meditation interventions," *Journal of Affective Disorders*, vol. 283, pp. 354-362, 2021. https://doi.org/10.1016/j.jad.2021.01.070
[57] M. Sanilevici, O. Reuveni, S. Lev-Ari, Y. Golland, and N. Levit-Binnun, "Mindfulness-based stress reduction increases mental wellbeing and emotion regulation during the first wave of the COVID-19 pandemic: A synchronous online intervention study," *Frontiers in Psychology*, vol. 12, p. 720965, 2021. https://doi.org/10.3389/fpsyg.2021.720965
[58] C. Reangsing, K. Moonpanane, K. Pitchalard, S. Kodyee, N. Seethikaew, and S. Oerther, "Effects of mindfulness-based interventions on psychological outcomes in college and university students during COVID-19 pandemics: A systematic review and meta-analysis," *Journal of Clinical Psychology*, vol. 79, no. 9, pp. 2023-2039, 2023.
[59] O. Simonsson, O. Bazin, S. D. Fisher, and S. B. Goldberg, "Effects of an eight-week, online mindfulness program on anxiety and depression in university students during COVID-19: A randomized controlled trial," *Psychiatry Research*, vol. 305, p. 114222, 2021. https://doi.org/10.1016/j.psychres.2021.114222
[60] P. R. Goldin *et al.*, "Evaluation of cognitive behavioral therapy vs mindfulness meditation in brain changes during reappraisal and acceptance among patients with social anxiety disorder: A randomized clinical trial," *JAMA Psychiatry*, vol. 78, no. 10, pp. 1134-1142, 2021. https://doi.org/10.1001/JAMAPSYCHIATRY.2021.1862
[61] N. P. Priebe and B. E. Kurtz-Costes, "The effect of mindfulness programs on collegiate test anxiety," *Mindfulness*, vol. 13, no. 11, pp. 2868-2878, 2022. https://doi.org/10.1007/s12671-022-02002-6
[62] Z. Salajegheh *et al.*, "Mindfulness-based stress reduction (MBSR) effects on the worries of women with poly cystic ovary syndrome," *BMC Psychiatry*, vol. 23, no. 1, p. 185, 2023. https://doi.org/10.1186/s12888-023-04671-6
[63] M. J. Hirshberg, S. B. Goldberg, M. Rosenkranz, and R. J. Davidson, "Prevalence of harm in mindfulness-based stress reduction," *Psychological Medicine*, vol. 52, no. 6, pp. 1080-1088, 2022.
[64] O. Myles, B. Grafton, and C. MacLeod, "Anxiety & inhibition: dissociating the involvement of state and trait anxiety in inhibitory control deficits observed on the anti-saccade task," *Cognition and Emotion*, vol. 34, no. 8, pp. 1746-1752, 2020.
[65] L. Hu, H. Tang, and Y. Huang, "General deficits of attentional inhibition in high trait anxiety: ERP evidence," *Cerebral Cortex*, vol. 33, no. 11, pp. 7288-7296, 2023.
[66] S.-L. Keng, E. M. Tong, E. T. L. Yan, R. P. Ebstein, and P.-S. Lai, "Effects of mindfulness-based stress reduction on affect dynamics: a randomized controlled trial," *Mindfulness*, vol. 12, pp. 1490-1501, 2021.
[67] M. Y. Balban *et al.*, "Brief structured respiration practices enhance mood and reduce physiological arousal," *Cell Reports Medicine*, vol. 4, no. 1, p. 100895, 2023. https://doi.org/10.1016/j.xcrm.2022.100895
[68] Q. Xie, Y. Guan, S. G. Hofmann, T. Jiang, and X. Liu, "The potential mediating role of anxiety sensitivity in the impact of mindfulness training on anxiety and depression severity and impairment: A randomized controlled trial," *Scandinavian Journal of Psychology*, vol. 64, no. 1, pp. 21-29, 2023. https://doi.org/10.1111/sjop.12860

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