



## **The Use of Mindfulness-Based Interventions in Reducing Test Anxiety Among Students in Nigerian Higher Education**

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### **Keywords:**

mindfulness-based intervention, test anxiety, tertiary institutions, emotional regulation

### **Abstract**

Test anxiety remains a significant psychological challenge among students in tertiary institutions, often interfering with academic performance, concentration, and emotional well-being. This study examined the effectiveness of a mindfulness-based intervention in reducing test anxiety among undergraduate students. A quasi-experimental pretest–posttest control group design was employed. Eighty students with moderate to high levels of test anxiety were selected through screening and randomly assigned to an experimental group (n = 40) and a control group (n = 40). The experimental group participated in an eight-week mindfulness-based intervention adapted from the Mindfulness-Based Stress Reduction (MBSR) model, while the control group continued with regular academic activities. Data were collected using the Test Anxiety Inventory and analyzed using descriptive statistics, paired samples t-tests, independent samples t-tests, and analysis of covariance (ANCOVA). Findings revealed a statistically significant reduction in test anxiety among students who participated in the mindfulness program compared to those in the control group (p < 0.05). The intervention demonstrated a large effect size, indicating substantial practical impact. The results suggest that mindfulness-based interventions can effectively enhance emotional regulation and reduce anxiety in evaluative academic settings. The study concludes that integrating structured mindfulness programs into tertiary education may serve as a valuable preventive and supportive strategy for addressing test anxiety and promoting student well-being.

### **Kata Kunci:**

intervensi berbasis kesadaran, kecemasan ujian, lembaga pendidikan tinggi, pengaturan emosi

### **Abstrak**

*Kecemasan ujian tetap menjadi tantangan psikologis yang signifikan di kalangan mahasiswa di perguruan tinggi, seringkali mengganggu kinerja akademik, konsentrasi, dan kesejahteraan emosional. Studi ini meneliti efektivitas intervensi berbasis mindfulness dalam mengurangi kecemasan ujian di kalangan mahasiswa sarjana. Desain kelompok kontrol pra-uji-pasca-uji kuasi-eksperimental digunakan. Delapan puluh mahasiswa dengan tingkat kecemasan ujian sedang hingga tinggi dipilih melalui penyaringan dan secara acak ditugaskan ke kelompok eksperimen (n = 40) dan kelompok kontrol (n = 40). Kelompok eksperimen berpartisipasi dalam intervensi berbasis mindfulness selama*

*delapan minggu yang diadaptasi dari model Pengurangan Stres Berbasis Mindfulness (MBSR), sementara kelompok kontrol melanjutkan kegiatan akademik reguler. Data dikumpulkan menggunakan Inventaris Kecemasan Ujian dan dianalisis menggunakan statistik deskriptif, uji-t sampel berpasangan, uji-t sampel independen, dan analisis kovarians (ANCOVA). Temuan menunjukkan pengurangan kecemasan ujian yang signifikan secara statistik di antara mahasiswa yang berpartisipasi dalam program mindfulness dibandingkan dengan mereka yang berada di kelompok kontrol ( $p < 0,05$ ). Intervensi tersebut menunjukkan ukuran efek yang besar, yang mengindikasikan dampak praktis yang substansial. Hasil penelitian menunjukkan bahwa intervensi berbasis kesadaran (mindfulness) dapat secara efektif meningkatkan regulasi emosi dan mengurangi kecemasan dalam lingkungan akademik yang bersifat evaluatif. Studi ini menyimpulkan bahwa mengintegrasikan program kesadaran terstruktur ke dalam pendidikan tinggi dapat berfungsi sebagai strategi pencegahan dan dukungan yang berharga untuk mengatasi kecemasan ujian dan meningkatkan kesejahteraan mahasiswa.*

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## INTRODUCTION

Across the world, tertiary institutions are increasingly defined by high expectations, competitive assessment systems, and intense performance demands. For many students, university life represents opportunity and aspiration. Yet it also brings sustained academic pressure, frequent evaluation, and uncertainty about future careers. In this environment, anxiety related to testing and evaluation has become a pressing concern. While a moderate level of nervousness can energize preparation and sharpen focus, excessive test anxiety can undermine concentration, disrupt memory, and ultimately reduce academic performance. In many cases, it also erodes students' confidence and well-being. Test anxiety is a universal phenomenon among learners and more than simple worry before an exam (Zeng et al., 2025). It is a complex phenomenological, psychological and behavioural response that accompany concern about possible negative consequences or failure in an examination or other evaluative situation (Khaira et al., 2023). Thus, test anxiety includes cognitive components, emotional reactions, physiological arousal, and behavioural responses. Shahidi, Akbari, and Zargar (2017) describe test anxiety as a widespread educational issue affecting millions of students annually, with reported prevalence rates often ranging between 10% and 30%. Importantly, they note that test anxiety is not a trivial phenomenon; it has meaningful consequences for academic achievement and emotional adjustment.

Although test anxiety has been extensively studied in school populations, it remains highly relevant in tertiary institutions. University students face cumulative assessments, continuous coursework, presentations, professional licensing

examinations, and competitive grading systems. In addition, many students balance academic work with employment, financial stress, and social transitions. The tertiary context therefore creates a setting in which anxiety can easily intensify (Ratih et al., 2025). As students progress through higher levels of education, the stakes of performance increase, and so does the fear of failure. Research also indicates that test anxiety is closely linked to difficulties in emotion regulation. Emotion regulation strategies significantly predicted test anxiety, highlighting that how students manage emotional responses plays a central role in their examination experiences. When students struggle to regulate distressing thoughts or physiological arousal, anxiety can spiral and interfere with working memory, attention, and retrieval of learned material (Babatunde & Kadiri, 2026; Shahidi et al., 2017). This relationship suggests that interventions aimed at improving emotional awareness and regulation may be particularly beneficial in reducing test anxiety.

Traditional interventions for reducing test anxiety have typically included cognitive-behavioural therapy (CBT), rational-emotive approaches, systematic desensitization, and relaxation training. While many of these approaches have shown positive outcomes, they often require trained professionals, structured sessions, and sustained engagement. Furthermore, some students may find it difficult to challenge anxious thoughts directly, especially during high-pressure examination moments. Thus, Hui and Yijie (2025) highlight the significance of adoption of guarded intervention (such as mindfulness-based) tailored towards learners' needs. Also, Shahidi et al. (2017) observe that although various behavioural and cognitive methods have been effective, there has been relatively limited research on newer approaches such as mindfulness-based interventions (MBIs), particularly in relation to both test anxiety and emotion regulation.

Mindfulness has emerged over the past two decades as a promising approach to stress reduction and emotional well-being. At its core, mindfulness involves paying deliberate, non-judgmental attention to present-moment experiences. Mindfulness is described as an awareness cultivated through purposeful attention to the present without automatic reactivity. Rather than attempting to eliminate anxious thoughts, mindfulness teaches individuals to observe thoughts and bodily sensations as transient experiences (Torné-Ruiz et al., 2023; Yanjuan et al., 2024). This shift in perspective may reduce the intensity and impact of anxiety during evaluative situations. In the context of tertiary education, mindfulness is particularly relevant because test anxiety often manifests through attentional disruption. Students under stress frequently report racing thoughts, difficulty concentrating, and mental blanking during examinations. Williams et al. (2022) argue that anxious individuals are especially vulnerable to disruptions in attentional processing. Their systematic review and meta-analysis on acute mindfulness

induction found that brief mindfulness practices produced a medium effect on reducing state anxiety compared to non-therapeutic controls. However, they also noted that evidence regarding attention outcomes was mixed and required further clarification. These findings suggest that while mindfulness shows promise in reducing anxiety in the short term, more research is needed to understand the mechanisms underlying these effects.

Mindfulness-Based Intervention is one of the most widely implemented mindfulness programs and has been adapted for educational settings. MBI includes guided meditation, body awareness practices, and gentle movement exercises and mostly lasted over eight weeks. Seidi and Ahmad (2018) conducted a quasi-experimental study among university students with high levels of test anxiety. Their findings revealed significant reductions in test anxiety among students who participated in MBSR compared to a control group. Interestingly, they also reported that the intervention appeared more effective for female students than male students, suggesting that demographic factors may influence outcomes. The durability of intervention effects is another important consideration in tertiary institutions, where academic pressures extend across semesters and years. Although, MBI has the capacity to significantly diminish excessive test anxiety (Priebe & Kurtz-Coste, 2022; Zeng et al., 2025) and improve emotional apathy (Li et al., 2026), these positive effects can only be sustained over follow-up assessments (Shahidi et al., 2017). Such findings are encouraging because they imply that mindfulness training may cultivate enduring skills rather than providing only temporary relief.

University schedules can be demanding, and students may struggle to commit to lengthy interventions. Therefore, research has begun to explore whether brief or online mindfulness programs can deliver comparable benefits. During the COVID-19 pandemic, when students experienced heightened stress and isolation, Simonsson et al. (2021) examined the impact of an eight-week online mindfulness program among university students in the United Kingdom. They reported improvements in student mental health, suggesting that online delivery may offer a feasible and accessible approach in tertiary contexts. Although their study focused broadly on mental health rather than exclusively on test anxiety, it provides valuable evidence that mindfulness can be effectively implemented in university populations, even under challenging circumstances. Similarly, Torné-Ruiz et al. (2023) explored a brief, intensive online mindfulness intervention administered before clinical simulation sessions for nursing students. While their study targeted stress and anxiety in performance-based simulations rather than written examinations, the findings are highly relevant to tertiary education. They observed reductions in stress and anxiety indicators during simulation exercises. Since simulations represent evaluative and performance-heavy environments, parallels

can reasonably be drawn to examination contexts. Their findings suggest that even short mindfulness practices delivered immediately before performance tasks may help students regulate anxiety in high-stakes academic settings.

Despite the growing body of research, several gaps remain. First, many mindfulness studies in education have been conducted outside mainstream academic performance contexts or have included mixed outcomes such as general stress, depression, or overall well-being. While these outcomes are important, targeted research focusing specifically on test anxiety in tertiary institutions is still developing. İkiz and Uygur (2019), in their systematic review of mindfulness-based programs for coping with test anxiety, highlighted that most studies were conducted among university students, yet the number of high-quality controlled trials remains limited. They also emphasized the need for more rigorous designs and broader participant samples. Secondly, there is ongoing debate regarding the mechanisms through which mindfulness reduces anxiety. Is the primary pathway through improved attentional control, enhanced emotion regulation, decreased physiological arousal, or a combination of these factors? Williams et al. (2022) noted that while state anxiety reductions were observed following acute mindfulness induction, attention outcomes were inconsistent. This suggests that the relationship between mindfulness and anxiety reduction may not be straightforward and warrants further empirical investigation. Thirdly, issues of accessibility and scalability are particularly relevant in tertiary institutions. University counselling centres are often overstretched, and students may hesitate to seek formal psychological support due to stigma or time constraints. Mindfulness-based interventions, especially those delivered in group or online formats, offer a potentially cost-effective and scalable solution. Simonsson et al. (2021) demonstrated that online mindfulness programs can be implemented successfully within university settings, increasing the practical appeal of such interventions. Also, the need for effective interventions is further underscored by the broader mental health challenges faced by university students. Periods of crisis, such as the COVID-19 pandemic, amplified stress and uncertainty among young adults. Simonsson et al. (2021) reported notable declines in mental health among university students during lockdowns, emphasizing the importance of accessible support strategies. While test anxiety is a specific form of academic distress, it often exists within a broader context of psychological vulnerability.

In overall, existing research suggests that mindfulness-based interventions hold promise as tools for reducing anxiety and improving emotional functioning among students. Evidence from studies such as Seidi and Ahmad (2018) and Shahidi et al. (2017) supports the effectiveness of structured mindfulness programs in decreasing test anxiety. Reviews by İkiz and Uygur (2019) and meta-analytic findings by Williams et al. (2022) further indicate that mindfulness interventions can meaningfully reduce state

anxiety, although methodological limitations remain. Given the academic, emotional, and institutional consequences of test anxiety in tertiary institutions, exploring the role of mindfulness-based interventions is both timely and necessary. Universities are increasingly seeking preventive and skill-based approaches that empower students rather than relying solely on remedial counselling services. Mindfulness training aligns with this preventive model by equipping students with practical tools to manage attention, regulate emotional responses, and approach examinations with greater composure.

Therefore, the present study seeks to contribute to this growing field by examining the effectiveness of a mindfulness-based intervention within a tertiary setting. The study aims to address identified gaps in the literature, provide context-specific evidence, and inform educational practice. In doing so, it responds to calls for more rigorous, focused research on mindfulness applications in higher education and seeks to offer practical implications for student support services. In an era where academic success is closely tied to personal and professional opportunities, ensuring that students are not hindered by overwhelming anxiety is both an educational and ethical responsibility. Though, mindfulness-based interventions may not eliminate the pressures of tertiary education, they offer a pathway for students to meet those pressures with greater awareness, steadiness, and resilience. Based on the intents of the study, the following research questions are raised:

- i. What are the pretest and posttest levels of test anxiety among students in the experimental and control group?
- ii. Is there a significant difference in posttest test anxiety between students who receive mindfulness-based intervention and those in the control group?
- iii. Is there a significant difference between the pretest and posttest test anxiety levels of students exposed to mindfulness-based intervention?
- iv. Does mindfulness-based intervention significantly predict posttest test anxiety after controlling for pretest scores?

## **METHODS**

This study adopted a quasi-experimental pretest–posttest control group design. The design was considered appropriate because it allowed for comparison between students who received the intervention and those who did not, while measuring changes in test anxiety over time. The study involved two groups; experimental and control group. A total of 80 students participated in the study. The sample size was determined based on feasibility, availability of participants, and the need for balanced group allocation. Eligible students were randomly assigned into Experimental Group (n = 40)

and Control Group (n = 40) This random assignment helps to reduce selection bias and increase internal validity.

**Table 1:** Demographic Distribution of Participants

		Experimental	Control
Gender	Male	18	20
	Female	22	20
Faculty	Education	10	9
	Social Sciences	11	10
	Management Sciences	9	11
	Health Sciences	10	10
Year of Study	Year 1	14	13
	Year 2	13	14
	Year 3	13	13

#### *Instrumentation*

Test Anxiety Inventory (TAI) was used to measure students' levels of test anxiety. The instrument consists of 20 items divided into two subscales: Worry (cognitive concerns about performance) and Emotionality (physiological and affective reactions to testing situations) components of anxiety. Responses were rated on a 4-point Likert scale ranging from 1 (Almost Never) to 4 (Almost Always). Higher scores indicated higher levels of test anxiety. The construct validity of the instrument was established through extensive factor-analytic studies supporting its two two-factor structure (worry and emotionality). While the content validity was ensured through expert review by three specialists in Measurement and Evaluation, Psychology and Counselling and overall CVI of 0.81 was obtained. The instrument was pilot tested using 20 students (not included in the sample) and the result was used to determine the reliability through Cronbach's alpha which yielded a reliability coefficient of 0.87.

#### *Experimental Procedure*

Approval was obtained from the Centre for Research Development, Innovation, Incubation and In-House Training (CREDIIT), Kwara State College of Education, Ilorin before the study commenced. Participants were informed about the study and subjected to test (Test Anxiety Inventory) before been assigned into two groups (experimental and control group). The experimental group was exposed to mindfulness-based intervention that lasted for 8 weeks. The intervention was adapted from the standard Mindfulness-Based Stress Reduction (MBSR) model with little modification to suit this study. The program has one session per week, each lasting between 50 – 60 minutes. Each session was divided into four parts: (i) Introduction, (ii) Guided Mindfulness Practice, (iii) Discussion and Reflection and (iv) Application to Test Situations. Meanwhile, the control group did not receive any structured intervention, the group continued regular academic activities.

At the end of the 8 weeks, posttest was conducted for both groups using the Test

Anxiety Inventory. Descriptive statistics (mean, standard deviation, frequency, percentage) and inferential statistics (Independent samples t-test and Analysis of Covariance) were used to analyze data collected, Statistical significance was set at  $p < 0.05$ .

## RESULT AND DISCUSSION

### Result

To ensure the results validity, statistical assumptions were checked before hypothesis testing. Skewness and Kurtosis statistics were used to test the data normality and all results fell within the acceptable range of  $\pm 2$  which indicates normal distribution. Also, homogeneity of variance was tested using Levene's test which was not significant for pretest ( $p = 0.672$ ) and posttest ( $p = 0.633$ ). Similarly, the homogeneity of regression slopes was found not significant ( $p = 0.124$ ) which implies a consistent relationship between the covariate (pretest scores) and the dependent variable (posttest scores).

**Table 2:** Pretest and Posttest Mean Test Anxiety Scores by Group

Group	N	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
Experimental	40	64.82	6.45	48.35	7.12
Control	40	63.95	6.72	61.87	6.98

At pretest, both groups showed comparable levels of test anxiety, with means above 60, indicating moderate to high anxiety levels. After the 8-week mindfulness-based intervention, the experimental group showed a substantial reduction in mean test anxiety score (from 64.82 to 48.35). In contrast, the control group showed only a slight reduction (from 63.95 to 61.87). This initial pattern suggests a meaningful intervention effect.

**Table 3:** Paired Samples t-Test Comparing Pretest and Posttest Scores

Group	Mean Diff	t-value	Df	p-value
Experimental	16.47	11.82	39	0.001
Control	2.08	1.41	39	0.167

The experimental group demonstrated a statistically significant reduction in test anxiety ( $t = 11.82$ ,  $p < 0.001$ ). The mean decrease of 16.47 points represents a large practical effect. In contrast, the control group showed no statistically significant change ( $p = 0.167$ ). This indicates that the observed improvement in the experimental group was unlikely due to chance or passage of time alone.

**Table 4:** Independent Samples t-Test Comparing Posttest Scores

Group Comparison	Mean Diff	t-value	Df	p-value
Experimental Vs Control	-13.52	-8.74	78	0.001

There was a statistically significant difference in posttest test anxiety scores between the experimental and control groups ( $t = -8.74, p < 0.001$ ). Students who participated in the mindfulness-based intervention reported significantly lower test anxiety compared to those who did not receive the intervention.

**Table 5:** ANCOVA Summary

Source	SS	Df	MS	F	p-value
Pretest	842.51	1	842.51	18.46	0.000
Group	2156.78	1	2156.78	47.29	0.000
Error	3512.34	77	45.61		

After controlling for pretest scores, group membership remained a statistically significant predictor of posttest test anxiety ( $F = 47.29, p < 0.001$ ). This confirms that the reduction in anxiety was attributable to the mindfulness-based intervention rather than baseline differences. The partial eta squared ( $\eta^2 = 0.38$ ) indicates a large effect size, suggesting that approximately 38% of the variance in posttest test anxiety scores can be explained by participation in the mindfulness-based intervention.

### **Discussion**

The findings of this study reveal that mindfulness-based intervention significantly reduced test anxiety among tertiary institution students. Participants in the experimental group showed a substantial decrease in anxiety compared to their counterparts in the control group. This result supports the growing body of research that identifies mindfulness as an effective strategy for managing academic anxiety.

The results are consistent with Priebe and Kurtz-Costes (2022), Seidi and Ahmad (2018) and Shahidi et al. (2017), who reported significant reductions in test anxiety following mindfulness-based stress reduction (MBSR) programs. Similarly, İköz and Uygur (2019), in their systematic review, concluded that mindfulness-based interventions are effective tools for coping with test anxiety among students, particularly at the university level. Also, the findings align with meta-analytic evidence by Williams et al. (2022), which showed that mindfulness practices produce meaningful reductions in state anxiety. This supports the view that mindfulness helps individuals disengage from anxious thoughts and reduce cognitive interference during evaluative situations. In addition, Innab et al. (2023) and Yanjuan et al. (2024) found that mindfulness reduces anxiety by improving distress tolerance, which may explain the significant anxiety reduction observed in this study.

Furthermore, the study corroborates findings by Moreno-Gomez et al. (2023) and Simonsson et al. (2021), who demonstrated that an eight-week mindfulness program significantly improved university students' mental health. Although their study focused on general mental health, the improvement in anxiety level supports the effectiveness of mindfulness in academic settings. Similarly, Chen et al. (2021) and Torné-Ruiz et al. (2023) reported reduced anxiety, stress and depression among nursing

students following mindfulness intervention, highlighting the adaptability of mindfulness across different academic contexts. The findings from the study are also in agreement with Ratih et al. (2025), who reported that an internet-delivered mindfulness intervention significantly reduced psychological distress among university students. This reinforces the practical value of mindfulness as a scalable and accessible intervention in higher education. Likewise, Young et al. (2023) and Zeng et al. (2025) demonstrated that mindfulness-based approaches are effective in reducing test anxiety among students, supporting the generalizability of the current results across different populations and settings.

From a theoretical perspective, the results support emotion regulation theory. Shahidi et al. (2017) emphasized that poor emotion regulation is a key predictor of test anxiety. Mindfulness enhances emotional awareness and acceptance, enabling students to manage physiological arousal and anxious thoughts more effectively. This is consistent with findings by Khaira et al. (2023), who identified mindfulness as an effective intervention strategy for reducing test anxiety in educational settings. Moreover, the results align with broader evidence that mindfulness improves psychological functioning among young adults. Vern et al. (2025), in a systematic review, confirmed that mindfulness-based stress reduction significantly decreases anxiety among adolescents and young adults. Although not limited to test anxiety, these findings support the broader anxiety-reducing effects of mindfulness observed in this study.

Additionally, the large effect size ( $\eta^2 = 0.38$ ) found in this study indicates that mindfulness-based intervention had a strong practical impact. This magnitude is comparable to or greater than effects reported in several previous studies (Seidi & Ahmad, 2018; Williams et al., 2022; Wijaya & Suja'i, 2025), reinforcing the robustness of mindfulness as an intervention for test anxiety. The minimal change observed in the control group further confirms that the reduction in anxiety was due to the intervention rather than natural academic adjustment over time.

However, while the findings are encouraging, they should be interpreted with consideration of certain limitations. The quasi-experimental design, though rigorous, does not fully eliminate all potential confounding variables. Future research could adopt randomized controlled trial designs with larger and more diverse samples. Longitudinal follow-up studies would also help determine whether anxiety reductions are sustained across academic years. Despite these limitations, the present study contributes meaningfully to the literature on mindfulness in tertiary education. It confirms that structured mindfulness-based intervention can significantly reduce test anxiety among university students (Rahmaddani, 2025). It also supports theoretical models emphasizing emotion regulation and attentional control as mechanisms underlying

anxiety reduction. In conclusion, the results reinforce the growing body of empirical evidence suggesting that mindfulness-based interventions are effective tools for addressing test anxiety in higher education. By helping students develop greater awareness, emotional balance, and cognitive steadiness, mindfulness training offers not only academic benefits but also broader psychological resilience.

Based on these research findings, the current step is to systematically integrate mindfulness-based interventions into higher education services, whether through curricula, guidance and counseling programs, or student self-development activities. Universities should not view test anxiety solely as an individual issue, but as an institutional issue requiring evidence-based preventive and curative approaches. Therefore, the development of structured mindfulness training programs, such as an eight-week program, can be adopted and tailored to local contexts and student needs. Furthermore, lecturers and educational staff need to be trained to integrate mindfulness practices into the learning process, for example through mindful breathing techniques, self-reflection, and emotional management prior to academic evaluations.

Furthermore, the use of digital technology must be optimized to provide more flexible and accessible online mindfulness interventions, thereby reaching a wider range of students. Future researchers should also immediately develop more robust research designs, such as randomized controlled trials and longitudinal studies, to ensure the sustainability of the intervention's impact. Equally important, collaboration between researchers, educational institutions, and policymakers needs to be strengthened so that mindfulness becomes not merely an add-on program but an integral part of strategies to improve students' mental health and academic success on an ongoing basis.

## **CONCLUSION**

This study demonstrated that mindfulness-based intervention plays a significant role in reducing test anxiety among students in tertiary institutions, as evidenced by the statistically meaningful decline in anxiety levels among participants who completed an eight-week mindfulness program compared to those in the control group. The findings highlight that structured mindfulness practices, such as focused breathing, body awareness, and present-moment attention, can effectively help students regulate emotional responses, manage academic pressure, and improve overall psychological well-being. Furthermore, the results suggest that mindfulness is not only a therapeutic approach but also a preventive strategy that can enhance students' learning outcomes by fostering concentration, resilience, and emotional stability during high-stress academic situations. In light of these findings, several recommendations are proposed to

maximize the benefits of mindfulness interventions within educational settings. First, tertiary institutions are encouraged to integrate mindfulness-based programs into their existing counselling and student support services to provide continuous mental health support. Second, institutions should organize short mindfulness workshops, particularly before examination periods, as even brief interventions have been shown to reduce stress and anxiety in the short term. Third, universities and colleges should consider developing online or hybrid mindfulness programs to improve accessibility, accommodate diverse student schedules, and overcome logistical barriers, thereby ensuring that a wider range of students can benefit from these interventions regardless of time and location constraints.

Despite its significant findings, this study has several limitations that should be acknowledged to provide a more balanced interpretation and guide future research. First, the study may have relied on a relatively small or homogeneous sample drawn from a single tertiary institution, which limits the generalizability of the results to broader student populations with diverse cultural, academic, and psychological backgrounds. Second, the duration of the intervention, although structured over eight weeks, may not be sufficient to assess the long-term sustainability of mindfulness effects on test anxiety, as the study did not include follow-up measurements to evaluate whether the observed benefits persist over time. Third, the use of self-reported measures of anxiety may introduce response bias, as participants might underreport or overreport their experiences due to social desirability or subjective interpretation. Additionally, the study may not have fully controlled for external variables such as prior mental health conditions, academic workload, or personal coping strategies that could influence anxiety levels. Therefore, future research should involve larger and more diverse samples across multiple institutions, incorporate longitudinal designs with follow-up assessments, and combine quantitative data with qualitative insights to deepen understanding. Moreover, integrating physiological measures such as heart rate variability could provide more objective evidence of mindfulness effectiveness.

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