# Dispositional Mindfulness as the Key for Enhancing Mental Health in Saudi Medical Students

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## ABSTRACT

**Medical students are widely recognized to experience high levels of stress and anxiety, which can negatively impact their mental health. Although mindfulness has been explored as an effective strategy to enhance psychological resilience and reduce stress, research on its application among Saudi medical students remains limited. This study aimed to explore the relationship between dispositional mindfulness, anxiety, and psychological well-being within the context of medical education. A cross-sectional study was conducted among medical students at King Abdulaziz University using stratified sampling techniques. To assess the targeted psychological constructs, we utilized several validated instruments, including the Arabic version of the Generalized Anxiety Disorder 7-item scale (GAD-7), the WHO-5 Well-Being Index, and the Short Form of the Freiburg Mindfulness Inventory (FMI-9). Data were analyzed using Stata version 15. Descriptive statistics for continuous variables were presented as means and standard deviations following normality testing, while categorical variables were summarized using frequencies and percentages. Correlation and regression analyses were performed to investigate the relationships among the study variables. The findings revealed a statistically significant inverse relationship ($p < 0.001$) between anxiety levels and mindfulness scores. Additionally, mindfulness was strongly associated with enhanced psychological well-being. Given the increasing stress associated with medical education, incorporating mindfulness-based interventions may serve as a promising strategy to support students' mental health. Future studies should consider longitudinal approaches to assess the sustained impact of mindfulness training on academic outcomes and psychological well-being among Saudi medical students.**

***Keywords: Dispositional Mindfulness, Psychological Well-being, Anxiety, Medical Students, Mindfulness-Based Interventions***

## INTRODUCTION

Mindfulness, defined as a quality of conscious awareness, has been widely recognized for its positive impact on emotional and mental well-being[1]. Conceptually, mindfulness has been explored as both a state—a temporary mental condition—and as a trait, known as *dispositional mindfulness* (DM), which reflects a stable personality characteristic[2]. The latter form, DM, has shown particular relevance for psychological health[3]. Interventions such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) have demonstrated efficacy in cultivating mindfulness. Their success has prompted increased scholarly interest in mindfulness as a fundamental human attribute rather than solely a practice-dependent outcome. Dispositional mindfulness refers to an individual's inherent tendency to pay attention to the present moment in a non-judgmental and accepting manner[2,4], and it has been identified as a potential psychological resource for managing stress and mental health symptoms[2].

Understanding the relationship between DM and psychological well-being is vital, especially since it can significantly influence one's capacity to manage both mental and physical health. Psychological well-being is a complex construct that includes both hedonic aspects (pleasure and enjoyment) and eudaimonic components (purpose and self-realization)[5]. Enhancing well-being contributes to improved quality of life, increased longevity, and positive socioeconomic outcomes[6]. Numerous studies have highlighted the positive effects of mindfulness on well-being in clinical and non-clinical settings[1,7-12]. At a global level, mental health challenges are becoming increasingly prevalent, with mental illnesses affecting approximately 13.0% of the population, including 4.1% for anxiety disorders alone[13]. In Saudi Arabia, a national mental health survey found that 20.2% of individuals met the criteria for a DSM-IV/CIDI disorder within a year, with anxiety disorders being the most common at 12.3%[14]. Other studies report similar rates of Major Depressive Disorder (12.7%) and Generalized Anxiety Disorder (12.4%)[15-17].

In response to rising mental health concerns, research on mindfulness interventions has grown, with evidence indicating that MBIs can alleviate symptoms of anxiety and depression across diverse populations[10,18-20]. These benefits are partly attributed to reduced rumination and anxiety—two cognitive processes closely linked to psychological distress[21].

Medical education is recognized as one of the most demanding academic paths[22], placing students at high risk for psychological strain. Literature suggests that medical students face higher rates of anxiety and depression than their non-medical peers[23,24], with global anxiety prevalence among medical students reaching 33.8%, and even higher rates reported in the Middle East and Asia[25,26]. At King Abdulaziz University in Jeddah, 34.9% of female medical students were found to suffer from severe anxiety[22].

Given these challenges, mindfulness has gained traction as a potential support strategy for medical trainees[27-29]. Studies have shown that online mindfulness programs and peer-led interventions can significantly enhance self-compassion, emotional awareness, and coping skills while reducing perceived stress[28-30]. Additionally, MBSR courses have shown

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promise in promoting personal satisfaction and mental well-being[31]. Although mindfulness research is expanding globally, investigations within Saudi Arabia are still in their early stages. Local researchers have called for culturally tailored studies to examine mindfulness within the unique sociocultural context of Saudi medical education[32,33].

This study aims to examine the associations between dispositional mindfulness, anxiety, and psychological well-being among medical students in Saudi Arabia. Using validated Arabic-translated instruments[34,35], this research addresses a critical gap in the regional literature and provides insights that may inform the development of well-being-focused strategies and curricula within medical education.

## METHODOLOGY

A cross-sectional study was conducted at the Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia, targeting Arabic-speaking medical students across all academic years, including both pre-clinical and clinical phases. Students diagnosed with psychiatric conditions such as schizophrenia, bipolar disorder, obsessive-compulsive disorder, or post-traumatic stress disorder were excluded to minimize confounding mental health factors.

To ensure representativeness, stratified sampling was employed based on gender, academic year, and level of clinical exposure. Data collection was carried out over a six-month period, from March to August 2024. Online questionnaires were distributed and collected with the assistance of trained student representatives from various academic years.

According to data provided by the Academic Affairs Department, the total student population was 2,390. The required sample size was calculated using the single proportion formula via the Raosoft software. Assuming a 95% confidence level, a 5% margin of error, and a response distribution of 50%, the minimum required sample size was determined to be 332 participants.

For data collection, we utilized validated Arabic-translated instruments selected for their reliability and relevance in assessing dispositional mindfulness, psychological well-being, and anxiety. Permissions from the original scale developers were obtained prior to use, in accordance with ethical and academic guidelines[34,35]. The survey comprised two parts: baseline demographic data (age, gender, and academic year), and standardized scales including the Arabic Version of the Short Form of the Freiburg Mindfulness Inventory (FMI-14): A 14-item instrument measuring mindfulness, focusing on two key dimensions—presence and acceptance. The Arabic Version of the WHO-5 Well-Being Index: A 5-item scale assessing subjective psychological well-being. The Arabic Version of the Generalized Anxiety Disorder 7-item Scale (GAD-7): A validated tool to measure the severity of generalized anxiety symptoms.

Ethical approval was secured from the Institutional Review Board (IRB) of King Abdulaziz University. Informed consent was obtained from all participants, and the purpose of the study was clearly communicated to them. Data privacy was maintained through anonymized responses, and all collected information was kept confidential and used strictly for research purposes.

**Statistical Analysis:** Statistical analysis was performed using Stata software version 15. Descriptive statistics were used to summarize the data: continuous variables were presented as means with standard deviations after checking for normal distribution, while categorical variables were summarized as frequencies and percentages.

Mindfulness, treated as a continuous outcome variable, was analyzed using two Analysis of Variance (ANOVA) tests—one to assess its association with anxiety (GAD-7 scores), and the other with well-being (WHO-5 scores). Post hoc analyses followed any significant findings to explore pairwise differences. Additionally, two multivariable linear regression models were conducted: the first to evaluate the relationship between anxiety and mindfulness, and the second between well-being and mindfulness. Each model adjusted for potential confounders, including age, gender, and academic level. Diagnostic tests were carried out post-estimation to verify model assumptions and ensure a good fit.

## RESULTS

### Sociodemographic Characteristics of the Study Sample

A total of 352 medical students participated in the study. The mean age of the respondents was $21.90 \pm 1.76$ years. The majority of participants were female (74.40%). When categorized by academic year, 25% of students were in their second year, while 14.80% were in their sixth year. Grouped according to academic stage, 44.60% of students were enrolled in the pre-clinical phase, whereas 55.40% were in the clinical phase, as shown in Table 1.

### Descriptive Summary of Key Psychological Measures

Table 2 presents the summary statistics for the three main psychological constructs assessed in the study: mindfulness, psychological well-being, and generalized anxiety disorder (GAD). The mean mindfulness score among participants was 37.36 (±6.67). The vast majority of respondents (93.2%) reported optimal levels of well-being, while only

**Table 1.** Sociodemographic and academic characteristics of study participants

| Characteristics | N (%) 352 (100.00) |
|---|---|
| **Age (μ, σ)** | 21.90 (1.76) |
| **Sex** | |
| Male | 90 (25.60) |
| Female | 262 (74.40) |
| **Academic year** | |
| Second | 88 (25.00) |
| Third | 69 (19.60) |
| Fourth | 73 (20.70) |
| Fifth | 70 (19.90) |
| Sixth | 52 (14.80) |
| **Academic level** | |
| Pre-clinical | 157 (44.60) |
| Clinical | 195 (55.40) |

**Table 2.** Mindfulness, wellbeing and generalized anxiety disorder scores of the study participants

| Scores | N (%) 352 (100.00) |
|---|---|
| **Mindfulness (μ, σ)** | 37.36 (6.67) |
| **Wellbeing** | |
| Poor | 6 (1.70) |
| Moderate | 18 (5.10) |
| Optimal | 328 (93.20) |
| **Generalized anxiety disorder** | |
| Minimal | 97 (27.60) |
| Mild | 130 (36.90) |
| Moderate | 74 (21.00) |
| Severe | 51 (14.50) |

**Table 3.** ANOVA tests examining the association between mindfulness and generalized anxiety disorder and wellbeing

| Predictor | Mindfulness (μ, σ) | P-value |
|---|---|---|
| **Generalized anxiety disorder[¥]** | | < 0.001 |
| Minimal | 40.37 (6.33) | |
| Mild | 38.16 (6.04) | |
| Moderate | 35.58 (6.09) | |
| Severe | 32.19 (5.98) | |
| **Wellbeing[*]** | | < 0.001 |
| Poor | 33.50 (5.54) | |
| Moderate | 30.44 (5.83) | |
| Optimal | 37.81 (6.51) | |

a small fraction (1.7%) exhibited poor well-being. In terms of anxiety levels, mild GAD was the most commonly reported category, affecting 36.9% of the sample. In contrast, 14.5% of participants reported symptoms consistent with severe anxiety.

**Association Between Mindfulness, Anxiety, and Well-Being**

As shown in Table 3, there is a statistically significant relationship between mindfulness and both generalized anxiety disorder (GAD) and psychological well-being (p < 0.001). Specifically, mindfulness scores tend to decline as the severity of anxiety increases, indicating a negative association. Conversely, mindfulness scores generally rise with higher levels of well-being, with the exception of the poor well-being category. These patterns are visually represented in Figures 1a
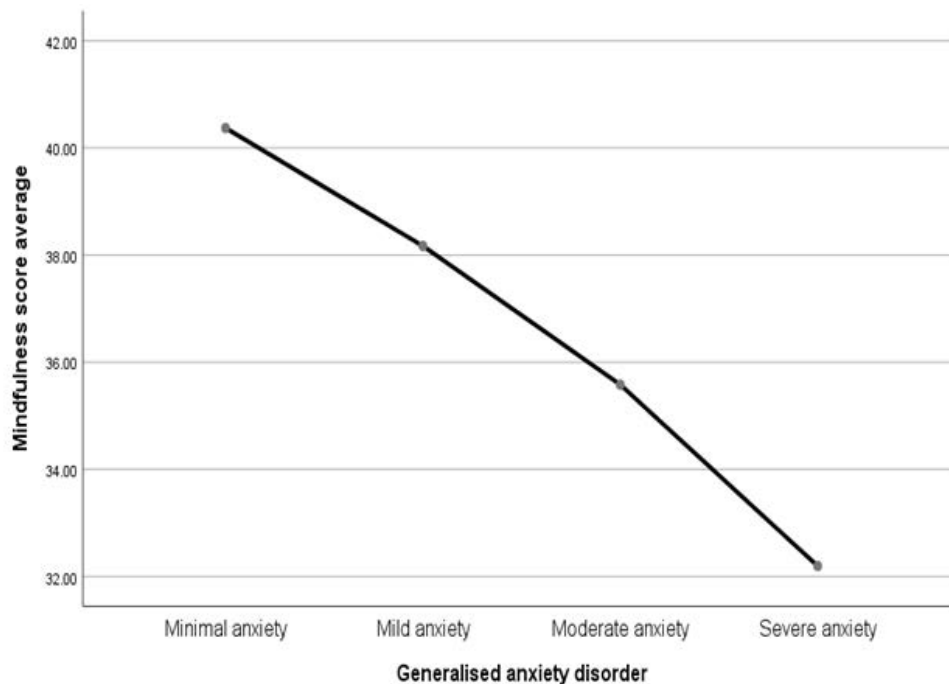
**Figure 1a and 1b: Mean plots of the mindfulness score**



**Figure 1a.** Shows the mean plot of the mindfulness score against the generalized anxiety disorder score.
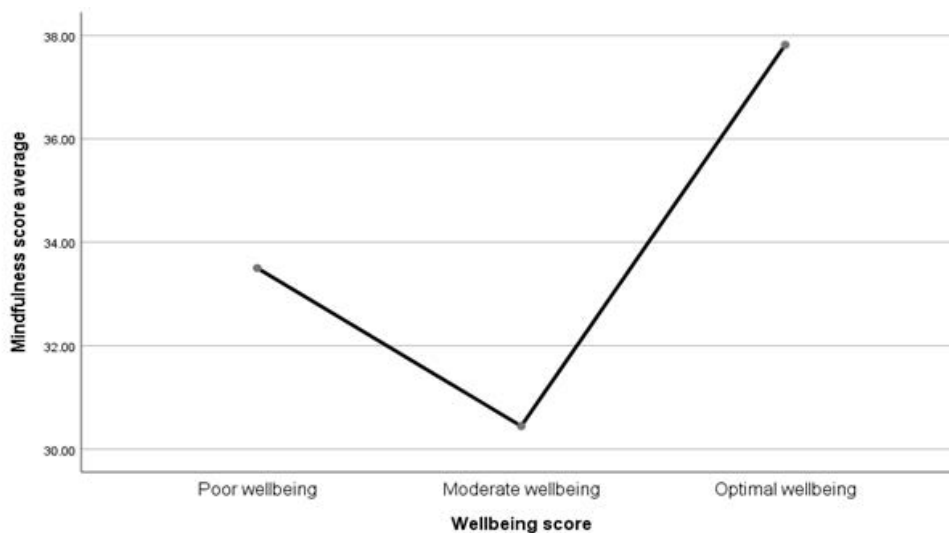


**Figure 1b.** Shows the mean plot of the mindfulness score against the wellbeing score.

and 1b, which further illustrate the trends in mindfulness across varying levels of anxiety and well-being.

¥Post hoc analysis found that the mean differences across all possible categories were significant at the 0.05 level

*Post hoc analysis found that the mean difference between moderate and optimal wellbeing was statistically significant at the 0.05 level

## Multivariable Regression Analysis: Mindfulness and Anxiety

Table 4 presents the multivariable linear regression model examining mindfulness with generalized anxiety disorder (GAD) as the primary predictor. The analysis revealed that variables such as age, gender, and academic level did not have a significant association with mindfulness, in either the unadjusted or adjusted models. In contrast, GAD remained a significant predictor in both models. Participants with moderate anxiety exhibited significantly lower mindfulness scores compared to those with mild anxiety, with this effect persisting after adjustment (Unadjusted β = -2.58, 95% CI: -4.34 to -0.83; Adjusted β = -2.51, 95% CI: -4.28 to -0.74). An even greater reduction in mindfulness levels was observed among participants with severe anxiety.

## Multivariable Regression Analysis: Mindfulness and Wellbeing

Table 5 displays the multivariable linear regression model assessing mindfulness with wellbeing as the primary predictor. In the unadjusted analysis, age, sex, and academic level did not show a significant association with mindfulness. However, after adjusting for these variables, sex emerged as a significant factor: male students demonstrated significantly higher mindfulness scores than females (adjusted β = 1.63, 95% CI: 0.06 to 3.21). Wellbeing was a strong predictor of mindfulness in both unadjusted and adjusted models. Specifically, participants reporting moderate wellbeing had significantly lower mindfulness scores compared to those with optimal wellbeing (Unadjusted β = -7.37, 95% CI: -10.45 to -4.29; Adjusted β = -7.31, 95% CI: -10.39 to -4.23).

## DISCUSSION

Dispositional Mindfulness (DM), often called trait mindfulness, refers to an individual's natural tendency toward present-moment awareness and attentiveness. This quality serves as a reliable resource in managing stress and symptoms effectively, thereby promoting better health and well-being[2]. Medical education is recognized as a high-stress environment, placing significant demands on students that may jeopardize their mental health[36]. A systematic review conducted in the United States and Canada highlighted that medical students experience considerably higher levels of stress and depression compared to the general population[37]. This trend is concerning, as the mental health of future healthcare providers directly impacts the overall well-being of the communities they will serve[38].

The present study focused on exploring the relationships among dispositional mindfulness, anxiety, and psychological well-being specifically within the context of medical education. Our findings indicated that the average mindfulness score was 37.36 ± 6.67, situated near the midpoint of the FMI-9 scale[14-59]. This outcome is consistent with a prior investigation involving Saudi medical students, which also

**Table 4.** Unadjusted and adjusted multivariable linear regression models in association with generalized anxiety disorders

| Factors | Unadjusted | | | Adjusted | | |
|---|---|---|---|---|---|---|
| | β | P-value | 95% CI | Coefficient | P-value | 95% CI |
| **Age** | -0.20 | 0.31 | -0.60 – 0.19 | -0.16 | 0.54 | -0.71 – 0.38 |
| **Sex** | | | | | | |
| Male | 1.47 | 0.07 | -0.11 – 3.07 | 1.19 | 0.11 | -0.29 – 2.69 |
| Female | Ref | | | | | |
| **Academic level** | | | | | | |
| Pre-clinical | 0.84 | 0.24 | -0.56 – 2.25 | 0.27 | 0.78 | -1.67 – 2.22 |
| Clinical | Ref | | | | | |
| **Generalized anxiety disorder** | | | | | | |
| Minimal | 2.20 | 0.008 | 0.58 – 3.81 | 2.10 | 0.01 | 0.48 – 3.72 |
| Mild | Ref | | | | | |
| Moderate | -2.58 | 0.004 | -4.34 - -0.83 | -2.51 | 0.005 | -4.28 - -0.74 |
| Severe | -5.97 | < 0.001 | -7.96 - -3.98 | -5.93 | < 0.001 | -7.94 - -3.93 |

**Table 5.** Unadjusted and adjusted multivariable linear regression models in association with generalized anxiety disorders

| Factors | Unadjusted | | | Adjusted | | |
|---|---|---|---|---|---|---|
| | Coefficient | P-value | 95% CI | Coefficient | P-value | 95% CI |
| **Age** | -0.20 | 0.31 | -0.60 – 0.19 | 0.02 | 0.93 | -0.55 – 0.60 |
| **Sex** | | | | | | |
| Male | 1.47 | 0.07 | -0.11 – 3.07 | 1.63 | 0.04 | 0.06 – 3.21 |
| Female | Ref | | | | | |
| **Academic level** | | | | | | |
| Pre-clinical | 0.84 | 0.24 | -0.56 – 2.25 | 0.89 | 0.38 | -1.14 – 2.93 |
| Clinical | Ref | | | | | |
| **Wellbeing** | | | | | | |
| Poor | -4.31 | 0.11 | -.955 – 0.92 | -3.93 | 0.14 | -9.18 – 1.31 |
| Moderate | -7.37 | < 0.001 | -10.45 - -4.29 | -7.31 | < 0.001 | -10.39 - -4.23 |
| Optimal | Ref | | | | | |

reported a moderate level of mindfulness[33]. Hence, medical training itself does not seem to confer increased resilience to psychological distress via mindfulness or provide a significant protective effect.

Moreover, we observed no significant correlation between academic year and mindfulness level among participants. This aligns with earlier studies suggesting that factors external to academic progression—such as personal traits and daily habits—play a more substantial role in determining mindfulness[39]. Although some academic disciplines may emphasize mindfulness-related skills, advancement through medical school alone does not necessarily enhance dispositional mindfulness.

Regarding anxiety, only 14.50% of participants reported severe anxiety, with 36.90% falling into mild to moderate categories. This distribution contrasts with a 2013 study at the same institution, which found that 34.9% of students experienced severe anxiety while 31.8% reported minimal to mild symptoms[22]. The observed reduction in severe anxiety may be attributed to the establishment of the Medical Students Support Unit (MSSU) at King Abdulaziz University in 2019, which offers improved access to mental health services, counselling, and stress management resources. Such interventions likely contributed to decreased anxiety by providing professional support and fostering a more open environment regarding mental health. Increased awareness and reduced stigma around psychological well-being may also have enhanced students' resilience over time. Differences in anxiety prevalence between studies may also stem from methodological variations, including different anxiety assessment tools or the timing of data collection (e.g., mid-semester versus exam periods).

Our analysis revealed that male students demonstrated significantly higher mindfulness levels than females, which contradicts findings from the FMI-9 validation study that reported no gender differences[34]. This discrepancy might be explained by gender-related variations in cognitive and emotional regulation. Males tend to exhibit less ruminative thinking and greater emotional detachment, traits that support the maintenance of non-judgmental, present-focused awareness—a key component of mindfulness. Conversely, females often show heightened emotional reactivity and stress sensitivity, potentially impairing their capacity for mindfulness[40]. Stress and coping mechanisms may further influence this gender gap; females reportedly experience higher stress and anxiety, both negatively correlated with mindfulness[41]. Therefore, despite active engagement in mindfulness practices, elevated stress responses may reduce dispositional mindfulness scores among females. Additional research is warranted to clarify how mindfulness manifests differently by gender within medical education.

Additionally, our results demonstrated an inverse relationship between mindfulness and anxiety severity, consistent with previous studies indicating that mindfulness acts as a protective factor against mental health challenges such as anxiety and depression[42]. For example, research from Ankara, Turkey, found that difficulties in emotion regulation fully mediate the relationship between mindfulness and psychological distress[43]. Individuals with lower mindfulness tend to struggle with adaptive emotion regulation strategies, leading to heightened emotional reactivity and increased anxiety. This mediating effect is supported by other findings linking emotional regulation to the impact of mindfulness on anxiety severity[44].

Importantly, we also identified a significant positive correlation between mindfulness and psychological well-being, where higher mindfulness scores corresponded with greater well-being. This aligns with research from the United Arab Emirates, which reported that mindfulness strongly predicts well-being[45]. Other studies confirm that individuals with higher dispositional mindfulness tend to experience increased life satisfaction and positive affect, reinforcing the notion that mindfulness enhances subjective well-being[46].

Our findings corroborate the beneficial role of mindfulness in psychological health. For instance, Aldbyani (2025) reported that Egyptian university students exhibited higher psychological well-being and reduced anxiety and stress following mindfulness meditation training[47]. Similarly, a study in Riyadh, Saudi Arabia, revealed a significant negative correlation between mindfulness and psychological distress among medical students[48]. Comparable results have been documented internationally, including in Asia, Australia, Italy, and India[49-52].

A distinct strength of this study is the use of validated Arabic-language instruments to assess dispositional mindfulness, anxiety, and well-being among Saudi medical students. There is a paucity of research employing culturally and linguistically appropriate tools for Arabic-speaking populations in medical education settings. Our use of such measures enhances the cultural relevance and validity of findings, providing a more accurate representation of mindfulness and psychological well-being in this context.

While the cross-sectional design limits causal inferences, longitudinal and experimental studies reviewed systematically support mindfulness as a means to reduce anxiety and improve emotional well-being. Students practicing mindfulness consistently report lower anxiety and enhanced emotional health[53,54]. Reinforcing the need for integrating mindfulness in medical curricula, a 2024 systematic review by Bennett-Weston et al. found that mindfulness interventions effectively decrease anxiety and boost well-being in medical students[55]. Another 2024 review by Koo et al. demonstrated that mindfulness-based programs significantly reduce anxiety and stress symptoms, underscoring their role in fostering emotional resilience[56]. Furthermore, Sperling et al.'s 2023 meta-analysis showed that even short-term mindfulness training produces modest to moderate reductions in stress levels among medical students compared to controls[57].

In summary, our results highlight an urgent need to incorporate structured mindfulness training into Saudi medical education. Given the demonstrated benefits of mindfulness-based approaches in lowering anxiety, enhancing resilience, and improving psychological well-being, implementing evidence-based mindfulness programs should be a priority. Future longitudinal research is essential to evaluate the long-term effects of such interventions on psychological health and academic performance, thereby informing curriculum development and optimizing the impact of mindfulness training as a core component of medical education.

While this study provides valuable insights, several limitations should be acknowledged when interpreting the findings. First, a portion of the data collection occurred during a break period, which might have influenced the reported levels of anxiety and well-being among students. Stressors faced by medical students fluctuate throughout the academic calendar, and students surveyed during breaks may not have experienced the same pressures as those undergoing clinical rotations or exam periods.

Nevertheless, research by Phang et al. (2015) demonstrated that mindfulness-based interventions effectively reduced stress and anxiety in medical students even during academic holidays, suggesting that stress and anxiety levels remain relatively stable across different academic phases[58]. This implies that psychological coping strategies play a more significant role in well-being fluctuations. Therefore, although the timing of data collection warrants consideration, it

is unlikely to have introduced significant bias in the anxiety and mindfulness scores reported in this study.

Secondly, the reliance on self-reported data introduces the potential for subjective bias, as participants' assessments of their emotional states may be influenced by transient mood, personal perceptions, or external factors at the time of survey completion. While self-report measures are common in psychological research, they inherently limit the objectivity of the findings.

Additionally, the sample was predominantly female, which may affect the generalizability of the results to male medical students. Previous studies indicate that female students are more likely to seek and engage with mindfulness-based interventions, potentially impacting participation rates and outcomes in such research[59]. Future investigations should strive for a more balanced gender representation to better understand potential gender-specific differences in the relationship between mindfulness, anxiety, and psychological well-being.

Despite these limitations, this study contributes valuable evidence supporting the role of mindfulness in enhancing medical students' mental health. Addressing these challenges in future research will be instrumental in advancing our understanding of how mindfulness-based approaches can be effectively integrated into medical education to support student well-being.

## CONCLUSION

This study adds to the growing body of evidence supporting the mental health benefits of mindfulness within academic environments, demonstrating a significant association between dispositional mindfulness, reduced anxiety, and enhanced well-being among medical students. In light of the increasing levels of stress and anxiety faced by medical students, our findings highlight the importance of integrating mindfulness-based interventions into medical curricula to promote students' psychological resilience and overall well-being. Although this study offers valuable insights, its conclusions should be interpreted cautiously due to limitations such as data collection during academic breaks, reliance on self-reported measures, and a predominantly female participant pool. Addressing these factors in future research will improve the applicability and generalizability of the findings. Future research should focus on longitudinal designs to evaluate the sustained impact of mindfulness training on psychological health, stress regulation, and academic success across a more diverse group of medical students.

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**Competing Interest:** None

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