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Navigating a Dual Crisis: Examining Burnout, Depression and Correlated Factors among Thai Medical Students during the COVID-19 Pandemic

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ABSTRACT

The COVID-19 pandemic has significantly impacted the psychological well-being of medical students due to several challenges including intense online learning, social distancing and demanding workloads. This study aimed to investigate the prevalence of burnout and depression among Thai medical students during the COVID-19 era, and explored factors associated with these conditions. Additionally, it aimed to elucidate the potential association between burnout and depression. This cross-sectional study was conducted among first- to sixth-year medical students at Thammasat University, Thailand. The online survey, which included a demographic and health behaviour questionnaire, the Maslach Burnout Inventory-Student Survey (MBI-SS), and the Patient Health Questionnaire-9 (PHQ-9), was distributed through the students' social network platform. There were 386 medical students in this study; the burnout prevalence was 9.3%, with lack of sleep as a significant factor (p = 0.042). Depression prevalence was 23.8% for moderate and 10.9% for major depression. Interpersonal problems, lack of academic guidance, failing exams and thoughts of resignation were associated with depression (p = 0.02, 0.016, 0.022, and < 0.001, respectively). Notably, 64.8% and 52.6% of participants reported worsened burnout and depression compared to pre-pandemic levels. All three burnout dimensions (emotional exhaustion, depersonalisation, personal efficacy) significantly correlated with depression (p < 0.001). This study underscores the concerning prevalence of burnout and depression among Thai medical students, particularly in light of the COVID-19 pandemic. A strong correlation between these conditions highlights the need for targeted interventions.

Keywords: *Burnout, Depression, COVID-19, Medical students*

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INTRODUCTION

Burnout, a psychological syndrome characterised by three dimensions: emotional exhaustion, depersonalisation and reduced personal accomplishment, results from chronic workplace stress that has not been successfully managed. It is prevalent among healthcare providers, including medical students (1). Medical students face demanding workloads, long working hours, tight deadlines, high competitiveness and challenges in maintaining work-life balance, all of which contribute to burnout (2). Findings from a recent systematic review study reveal the global prevalence of burnout among medical students range from 5.6% to 88% (3). Notably, a pre-pandemic study among Thai medical students reported an overall prevalence of burnout at 31% (4).

Depression is a widespread mental health disorder affecting nearly 28% of the global population (5), with adolescents and young adults being the most vulnerable (6). In Thailand, an estimated 1.5 million people suffer from depression (7). A 2021 study involving undergraduate students in Thailand found a concerning prevalence of 23%, highlighting the vulnerability of this population group (8). Medical students, burdened by academic stressors such as heavy workloads, frequent assessments and clinical pressures, experience a significantly higher depression prevalence compared to the general population (9–11).

The COVID-19 pandemic negatively affected medical students' mental health. Social distancing and the shift to online learning disrupted traditional education methods and social interaction, potentially increasing vulnerability to burnout and depression (12–17). Studies in Europe attribute academic burnout specifically to limitations of online learning, such as reduced opportunities for patient interaction and difficulty replicating essential clinical skills. This poses a particular challenge for final-year medical students who lack of crucial practical experience (14). Regarding depression, research suggests a global worsening of depression among medical students during the COVID-19 pandemic. A United States (US) study found a threefold increase in depressive symptoms compared to pre-pandemic levels. Additionally, another US study reported a 70% prevalence of depression among medical students during the COVID-19 era (15, 16). Social isolation due to enforced social distancing measures might be a contributing factor to this rise in depression (17).

The exploration of burnout among medical students in Thailand during the COVID-19 pandemic is limited. Surprisingly, a single study focusing on Thai clinical medical students residing in provincial hospitals found that severe burnout was not prevalent among them during the pandemic (18). However, research on burnout among other healthcare professionals in Thailand during COVID-19 paints a different picture. Studies examining Thai resident physicians, nurses and general healthcare workers have demonstrated a higher prevalence of burnout compared to pre-pandemic levels (19–21). In terms of depression, research in Thailand shows a trend similar to the global trend, suggesting a worsening of depression among medical students during the COVID-19 pandemic. Pre-pandemic studies documented a range of 9.3%–30.5% depression prevalence among Thai medical students (22–25). In contrast, post-pandemic studies have documented an increase in depression rates among medical students, ranging from 30.6% to 35.7% (26–28). Notably, studies specifically focused on medical students residing in urban medical schools revealed a significant increase in depression prevalence from 19.6% pre-pandemic to 35.7% during the COVID-19 era (27). This finding underscores the pandemic's potential to worsen mental

health within this specific population group.

In summary, the COVID-19 pandemic significantly impacted medical students' mental health, with increased rates of depression both in Thailand and internationally. While limited data exists on burnout among Thai medical students, research on other Thai healthcare workers indicates a higher prevalence during COVID-19. Limited data and inconsistencies in previous research regarding burnout among Thai medical students during the COVID-19 era necessitate further investigation. Furthermore, the relationship between burnout and depression in this specific context remains understudied. This study aims to address this gap by investigating the concurrent prevalence of burnout and depression among Thai medical students during the peak of the COVID-19 Omicron variant. It also explores associated factors such as demographics, health behaviours, academic stressors and social support, and examines the correlation between the two conditions.

METHODS

Study Design

The study employed a cross-sectional design, administering an online survey to medical students at Thammasat University, Thailand, between January and July 2022.

Participants

This study recruited 386 medical students from the 1st to 6th year at Thammasat University. To be eligible, participants had to be enrolled as medical students at Thammasat University during the 2022 academic year, be at least 18 years old, and proficient in the Thai language. An anonymous online survey questionnaire was administered using Google Forms. The survey was disseminated through various online platforms, including LINE, university forums and an exclusive Facebook group for Thammasat medical students. The survey instrument included completion checks to ensure all questions were answered before submission. Participation was voluntary, and no compensation or incentives were offered. Confidentiality and privacy of participant data were maintained throughout the research process.

Measurements

The online survey used in this study comprised three parts: a demographic questionnaire, the Thai version of the Maslach Burnout Inventory-Student Survey (MBI-SS) (29), and the Thai version of the Patient Health Questionnaire (PHQ-9) (30).

Demographic questionnaire: The first section collected general participant information, including gender, age, academic year, presence of underlying medical conditions, exercise frequency, sleep problems, interpersonal issues with colleagues, number of available academic advisors, thoughts of resignation from studies and experience of failing exams.

Maslach Burnout Inventory-Student Survey (MBI-SS): This validated tool measures burnout in student populations (31). The Thai version (29) used in this study comprises 15 items

categorised into three dimensions: emotional exhaustion (5 items), cynicism (4 items) and professional efficacy (6 items). Participants respond using a Likert scale ranging from 0 (never) to 6 (every day). Scores are then categorised for each dimension: emotional exhaustion (low = 0–9, moderate = 10–14, high = > 14); cynicism (low = 0–1, moderate = 2–6, high = > 6); and professional efficacy (low = > 27, moderate = 23–27, high = 0–23) (29). In this study, burnout is defined as exhibiting high levels of both emotional exhaustion and cynicism, alongside low professional efficacy.

Patient Health Questionnaire (PHQ-9): This self-administered tool assesses depressive symptoms over the past two weeks (32, 33). The Thai version consists of nine items with response options ranging from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 27, with higher scores indicating greater depressive symptom severity. Following established guidelines, depression severity was categorised as mild = 9–14, moderate = 15–19, or major depressive disorder = 20 or above (30). In this study, moderate to severe depression was considered clinically significant.

We also asked participants about their perceptions of burnout and depression levels before and after the pandemic. These comparisons were based on subjective self-reports. The question posed was: "Has your experience of burnout/depression after the COVID-19 pandemic differed from that of the pre-pandemic period?" The response options are as follows: (a) Yes, I feel worse than I did prior to COVID-19; (b) Yes, I feel better than I did prior to COVID-19; (c) No, there has been no change. The results reflect participants' subjective perceptions of change, not objective longitudinal data.

Statistical Analysis

The sample size was determined using the infinite population proportion formula, where the proportion was set at 0.31 (4), the margin of error (d) was 0.05, the alpha level (α) was 0.05, and Z was 1.96. This calculation yielded a minimum sample size of 329 students. Participant characteristics were summarised using descriptive statistics. Multivariable logistic regression analysis was conducted to assess the factors associated with burnout and depression. The correlation between burnout and depression scores was analysed using the Pearson's correlation coefficient. All statistical analyses were performed using STATA version 14.0, with a significant level set at $p < 0.05$.

RESULTS

Demographic Data

This study included 386 Thai undergraduate medical students from Thammasat University. The demographic characteristics of the participants are summarised in Table 1. The majority of participants were female (221, 57.3%), with a mean age of 20.6 years. Year of study distribution revealed a relatively even spread across the medical school programme, with the highest proportion in their third year (29.3%). Regarding health and lifestyle factors, 18.4% of the students reported having at least one underlying medical condition. Sleep habits indicated insufficient sleep for over half of the participants (56.0%), while only 15.0% reported engaging in regular exercise. Additionally, 15.0% of students acknowledged experiencing interpersonal problems, and 21.8% felt they lacked sufficient academic advisors for support. Notably, nearly half of the students (49.7%) had failed at least one

exam, and over half (53.1%) reported having thoughts of resigning from medical school.

Table 1: Demographic data

Variables (n = 386)	N (%)
Gender: female	221 (57.3)
Age: mean [SD]	20.6 [2.0]
Education year	
1	102 (26.4)
2	54 (14.0)
3	113 (29.3)
4	64 (16.5)
5	33 (8.6)
6	20 (5.2)
Underlying disease	71 (18.4)
Insufficient sleep	216 (56.0)
Exercise	
No	88 (22.8)
Sometimes	240 (62.2)
Regular	58 (15.0)
Interpersonal problems	58 (15.0)
Inadequate advisors	84 (21.8)
History of failing exams	192 (49.7)
Thoughts of resignation	205 (53.1)

Prevalence of Burnout in Medical Students during COVID-19 Pandemic

Burnout scores for all medical students are presented in Table 2. The mean scores for emotional exhaustion, depersonalisation, and low personal efficacy were 19.1, 9.8, and 22.5, respectively. A significant proportion of participants exhibited high levels of emotional exhaustion (79.3%) and depersonalisation (70.0%). Additionally, nearly half (49.0%) reported low levels of personal efficacy. However, the overall prevalence of burnout, as defined by established criteria, was 36 out of 386 participants (9.3%).

Table 2: Burnout scores in medical students during COVID-19 pandemic

	Mean [SD]	Low N (%)	Moderate N (%)	High N (%)
Emotion exhaustion	19.1 [36.2]	24 (6.2)	56 (14.5)	306 (79.3)
Depersonalization	9.8 [5.5]	31 (8.0)	85 (22.0)	270 (70.0)
Personal efficacy	22.5 [6.1]	88 (22.8)	109 (28.2)	189 (49.0)
Overall severe burnout*				36 (9.3)

Note: *Severe burnout - High emotional exhaustion + depersonalisation, low personal efficacy

Associated Factors of Burnout in Medical Students

Table 3 details the factors investigated for their association with burnout in medical students. Inadequate sleep emerged as the only statistically significant factor associated with burnout (OR = 2.21, $p = 0.042$).

Table 3: Associated factors of burnout in medical students

Variable	Odds ratio (95% CI)	*p*-value*
Gender: female	1.37 (0.65–2.88)	0.403
Age	1.00 (0.79–1.26)	0.998
Education year	0.93 (0.67–1.28)	0.654
Underlying disease	0.77 (0.28–2.11)	0.612
Exercise		
No	ref	ref
Sometimes	1.07 (0.42–2.72)	0.881
Regular	2.10 (0.67–6.6)	0.203
Insufficient sleep	2.21 (1.02–4.75)	0.042
Interpersonal problems	0.97 (0.31–3.06)	0.963
Inadequate advisors	0.42 (0.14–1.26)	0.122
History of failing exams	0.74 (0.35–1.56)	0.432
Thoughts of resignation	0.56 (0.26–1.21)	0.306

Notes: *Logistic regression analysis; event = severe burnout; ref = The authors use “no exercise” as a reference for comparison with “sometimes” and “regular” exercises.

Prevalence of Depression in Medical Students during COVID-19 Pandemic

Figure 1 illustrates the prevalence of depression amongst participants of different severity: mild, moderate and the most severe form which is major depressive disorder (MDD). MDD was identified in 42 participants (10.9%), followed by moderate depression in 92 participants (23.8%), mild depression in 135 participants (35.0%), and no depression in 117 participants (30.3%).

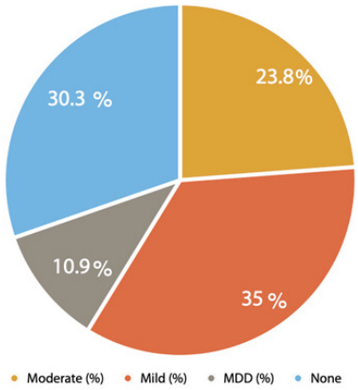

Figure 1: Prevalence of depression in medical students during COVID-19 pandemic.

Associated Factors of Depression in Medical Students

Table 4 presents the results of the analysis investigating factors associated with moderate and major depressive disorders in medical students. The analysis identified several significant associations: medical students experiencing interpersonal problems were more likely to be diagnosed with depression (OR = 2.28, $p = 0.02$). Students who felt they lacked sufficient advisors for support were also at an increased risk of depression (OR = 1.92, $p = 0.016$). Prior exam failure emerged as another significant factor associated with depression (OR = 1.73, $p = 0.022$). Notably, medical students with thoughts of resignation from medical school had the strongest association with depression (OR = 2.18, $p < 0.001$).

Table 4: Associated factors of depression in medical students

Variable	Odds ratio (95% CI)	*p*-value*
Gender: female	1.27 (0.8–2.0)	0.315
Age	1.08 (0.92–1.27)	
Education year	0.94 (0.76–1.16)	0.556
Underlying disease	1.44 (0.82–2.54)	0.207
Exercise		
No	ref	ref
Sometimes	1.22 (0.69–2.15)	0.485
Regular	1.3 (0.6–2.86)	0.504
Insufficient sleep	1.34 (0.84–2.15)	0.221
Interpersonal problems	2.08 (1.12–3.86)	0.02
Inadequate advisors	1.92 (1.13–3.26)	0.016
History of failing exams	1.73 (1.08–2.75)	0.022
Thoughts of resignation	2.18 (1.35–3.51)	< 0.001

Notes: *Logistic regression analysis; event = moderate + major depression; ref = The authors use "no exercise" as a reference for comparison with "sometimes" and "regular" exercises.

Comparison of Burnout and Depression before and during COVID-19

Figure 2 illustrates the self-reported changes in burnout and depression levels among medical students since the COVID-19 pandemic. A significant portion (64.8%) reported worsening burnout levels. Only 7.5% of students reported an improvement in burnout, while 27.7% described no change. Similarly, over half (52.6%) of the students reported worsening depression since the pandemic. While 41.2% described no change in depression levels, only 6.2% indicated improvement.

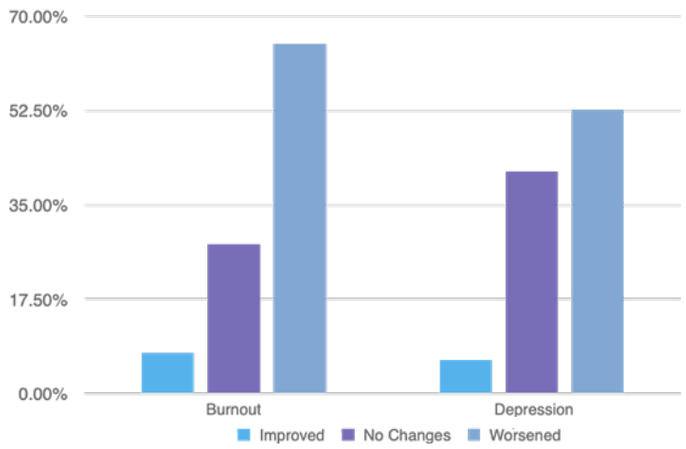

Figure 2: Comparison of burnout and depression before and during COVID-19.

Correlation between Burnout and Depression Scores

Table 5 presents the correlation coefficients between depression and the three dimensions of burnout: emotional exhaustion, depersonalisation and personal efficacy. Depression demonstrated a significant positive correlation ($p < 0.001$) with both emotional exhaustion ($r = 0.55$) and depersonalisation ($r = 0.46$). Conversely, a significant negative correlation ($p < 0.001$) was observed between depression and personal efficacy ($r = –0.45$).

Table 5: Correlation between burnout and depression scores

Components of burnout	Total PHQ-9 score: Coefficient (*p*-value)*
Emotion exhaustion	0.55 (< 0.001)
Depersonalisation	0.46 (< 0.001)
Personal efficacy	–0.45 (< 0.001)

Note: *The Pearson's correlation coefficient

DISCUSSION

To the best of our knowledge, this is the first study to investigate the relationship between burnout and depression among Thai medical students across all years of study during the COVID-19 pandemic. Our findings reveal a concerning prevalence of burnout and depression among this population, potentially exacerbated by the pandemic's impact. Additionally, we observed a statistically significant correlation between these two mental health conditions.

Burnout in Medical Students during COVID-19 Pandemic

This study investigated the prevalence of burnout among Thai medical students during the COVID-19 pandemic. The overall prevalence identified was 9.3%, which falls within the range reported in previous international studies (5.6%–67.1%) (34–38), but is notably lower than the 31% reported in a recent study of Thai medical students at a university in northeastern Thailand (4).

Several factors may account for the lower burnout prevalence observed in this study. Notably, 69.7% of our participants were preclinical students, who generally face less responsibility and patient exposure than their clinical counterparts (39–42). Additionally, the data were collected during the pandemic, when preclinical students' focus on foundational knowledge might have shielded them from the increased workloads seen in healthcare settings. Unlike clinical students in other environments who faced direct contact with COVID-19 patients, those in our study were likely not exposed to such pressures (43). In contrast, over half of the medical students (64.8%) reported worsened self-reported burnout symptoms compared to pre-pandemic levels. Considering the unchanged patient care workload, it is possible that online learning might be a contributing factor (13, 14). The pandemic's shift towards online learning introduces the potential for Zoom fatigue, a condition resulting from prolonged exposure to video conferencing platforms (44). Zoom fatigue arising from prolonged online interactions might have exacerbated the feelings of burnout among medical students, as evidenced by previous studies (45, 46).

Inadequate sleep emerged as the sole statistically significant factor associated with burnout in this study. This finding aligns with research conducted on medical residents at Thammasat University (19) and medical students in the US (47). Burnout is linked to insufficient sleep through its impact on the hypothalamic-pituitary-adrenal (HPA) axis and cortisol release, which negatively affects natural sleep-wake cycle (circadian rhythm) (48, 49). On the other hand, poor sleep quality can impair a person's ability to manage stress and cope with challenges, worsening symptoms of burnout (50). The singular significance of sleep in this study, despite the lower overall burnout prevalence, suggests it might be a strong predictor of burnout among medical students. Improving sleep quality among medical students is essential for enhancing their overall well-being and academic performance (51). Implementing strategies such as establishing a consistent sleep schedule, creating a conducive sleep environment, and prioritising sleep hygiene can significantly benefit students. Encouraging the use of relaxation techniques, such as mindfulness or deep breathing exercises, can help alleviate stress and promote better sleep (52, 53).

Depression in Medical Students during COVID-19 Pandemic

This study found a depression prevalence of 34.7% among medical students, with 23.8% experiencing moderate depression and 10.9% classified as having major depressive disorder. These rates exceed the global prevalence of 28% reported during non-pandemic times (54) and are higher than pre-pandemic rates in Thailand, which ranged from 9.3%–30.5% (22–24, 25). Post-pandemic studies from various Thai universities reported similar prevalence rates, ranging from 30.6%–35.7% (26, 27). Furthermore, studies in the US showed that over half of participants reported worsening depressive symptoms since the pandemic, mirroring a 70% increase in depression among US medical students (16). The high prevalence of depression in these studies underscores the need for increased awareness and screening for depression among medical students during COVID-19.

Factors associated with depression included interpersonal problems, inadequate advisor

support, previous exam failures and thoughts of resignation. These findings align with previous research indicating that interpersonal stressors can disrupt personal functioning and contribute to depression (10, 24, 39, 25, 55, 56). The relationship between academic stressors, particularly exam failures and feelings of hopelessness further corroborates findings from studies in Australia, Uganda and Nepal (57–59). Academic stressors may contribute to persistent stress, feelings of hopelessness, and ultimately depression (60). Inadequate advisor support also emerged as a significant factor, corroborating other studies (55, 61–64). Adequate support systems act as protective factors against stress and promote positive emotional well-being (65). Furthermore, the link between thoughts of resignation and depression has been reported elsewhere (66–68). These findings, along with ours, suggest that harbouring thoughts of leaving medical school might indicate negative career sentiment and potentially contribute to depression.

Although burnout and depression rates tend to increase among medical students during the COVID-19 pandemic, factors such as lack of sleep, interpersonal issues and academic stressors remain consistently correlated with these conditions. By reflecting on these consistent findings, we demonstrate that while the pandemic may have exacerbated certain conditions, the underlying challenges medical students face remain similar. These challenges, such as maintaining a work-life balance, coping with high academic demands, and managing interpersonal relationships, are not unique to the pandemic but are persistent stressors that medical students have contended with in various contexts.

Association between Burnout and Depression in Medical Students during COVID-19

Our study revealed an intriguing finding: depression prevalence (34.7%) among medical students was significantly higher than burnout prevalence (9.3%) during the COVID-19 pandemic. A growing body of research suggests a disparate impact of the COVID-19 pandemic on medical students' mental health. While burnout prevalence may not have universally increased (5), depression rates have consistently shown a significant rise across various studies (16, 17, 26–28).

These findings suggest that social distancing measures and other pandemic-related psychosocial factors may have had a stronger influence on depression in this population. While burnout prevalence remains inconsistent during COVID-19, it is important to acknowledge the potential for variation depending on several factors. Future research should explore the influence of academic stage (preclinical vs. clinical), practice setting (medical school vs. internship), and the intensity of online learning on burnout prevalence among medical students during pandemics. Investigating these factors in greater detail could inform targeted interventions to mitigate burnout and depression risk in this vulnerable population.

Our study findings reveal a significant positive association between all three dimensions of burnout (emotional exhaustion, depersonalisation and reduced sense of accomplishment) and depression. This pattern is consistent with prior research. For instance, a systematic review and meta-analysis established a strong link between burnout and depression (69). Similarly, research on Irish medical students demonstrated that those with high burnout scores exhibited a higher prevalence of depression compared to students with lower burnout scores (70).

This association is likely due to the overlapping nature of burnout and depression symptoms. Emotional exhaustion, a core component of burnout, is directly correlated with

depression as it encompasses feelings of fatigue, loss of energy and depressed mood (71). Depersonalisation, characterised by cynicism and detachment from work, can also be a consequence of mental health conditions like depression (72). Additionally, reduced sense of accomplishment, another dimension of burnout, may contribute to depression through a discrepancy between aspirations and perceived self-efficacy, as outlined by social cognitive theory (73).

Limitations

This study has several limitations. First, the cross-sectional design precludes establishing causal relationships between the variables and mental health problems. Second, the results relied on self-reported retrospective assessments; therefore, the potential for recall bias may be present. Third, selection bias is a concern, as students experiencing burnout or depression might be less likely to participate, leading to an underestimation of the true prevalence. Additionally, the majority of participants (69.7%) were preclinical students, which may limit generalisability to clinical year students. Furthermore, the study's generalisability to the wider medical student population may be restricted, as results might not be applicable to medical students at institutions with different curricula or learning environments, such as private universities or public universities in rural areas. In Thailand, medical students in public medical schools generally have larger class sizes than those in private institutions. Differences in private universities also include factors such as family background, socioeconomic status and wealth. Additionally, urban medical students tend to focus more on academic subjects, while rural students emphasise hands-on clinical skills. These variations may affect the levels of burnout and depression experienced in these different settings.

CONCLUSION

This study underscores the concerning prevalence of burnout and depression among medical students, highlighting the need for continuous assessment, monitoring and effective management strategies throughout their educational journey. The COVID-19 pandemic further exacerbated these mental health challenges, emphasising the importance of preparedness for future outbreaks. Notably, our findings revealed a potentially greater impact of depression compared to burnout on medical students during the pandemic. Additionally, burnout and depression are significantly linked, underscoring the crucial role of comprehensive mental health screenings that evaluate both conditions simultaneously.

The findings suggest the potential benefits of interventions that promote healthy sleep habits, foster strong social support networks, and provide targeted support for students experiencing interpersonal difficulties, academic setbacks, or thoughts of resignation. Future research should prioritise the development and implementation of evidence-based interventions to mitigate the burden of burnout and depression, ultimately fostering a more supportive and well-rounded learning environment for medical students, particularly during public health crises.

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ETHICAL APPROVAL

The study was approved by the Human Research Ethics Committee of the Faculty of Medicine, Thammasat University (028/2565), ensuring adherence to ethical principles outlined in the Declaration of Helsinki.

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