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Research Article

Clinical insights: Anxiety levels and sleep quality among Hang Tuah Faculty of Medicine's class of 2017-2022 pre-clinical and clinical Students

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ABSTRACT

Anxiety is a global psychiatric phenomenon, while poor sleep quality remains a pressing public health issue. The arduous medical education journey exposes students to prolonged stress, potentially exacerbating anxiety and sleep disturbances. This study investigates the correlation between anxiety and sleep quality in Hang Tuah Faculty of Medicine students, bridging the pre-clinical and clinical phases. Employing an analytical observational approach with a cross-sectional design, this study enrolled students from pre-clinical (batches 2020, 2021, 2022) and clinical years (batches DM45, DM46, DM47). Among the 409 approached participants, 296 met the inclusion criteria after excluding 113 samples. Data collection utilized online questionnaires with acquired informed consent. Sleep quality was evaluated via the Pittsburgh Sleep Quality Index, generating scores from 0 to 21. This study showed significantly robust evidence of an association between anxiety and sleep quality (p-value: 0.0001; r: 0.342) across both pre-clinical and clinical students. This study underscores a direct relationship: elevated anxiety levels correspond to diminished sleep quality. Such findings resonate with the prevailing challenges in medical education and their impact on students' mental and physical well-being. Implementing targeted interventions is crucial to address these concerns. In conclusion, this study underscores the undeniable link between anxiety and sleep quality among Hang Tuah Faculty of Medicine students, encompassing the years 2017 to 2022. The implications are far-reaching, emphasizing the necessity of interventions that enhance both psychological well-being and sleep quality. By recognizing and addressing these challenges, medical institutions can foster healthier academic environments and better equip students for their medical careers.

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INTRODUCTION

Anxiety, a widely prevalent psychiatric condition, often intertwines with depression, creating diagnostic complexities, particularly for non-specialists. This intricate connection contributes to underdiagnosis and inadequate management within primary care settings (Thibaut, 2017). Globally, anxiety disorders affect up to 33.7% of individuals during their lifetime, yet these disorders often remain unrecognized and undertreated (Bandelow and Michaelis, 2015). Despite stability in prevalence rates over time, anxiety disorders are marked by chronicity and significant comorbidity with other mental health conditions (Bandelow and Michaelis, 2015; Almokhtar A., J.M. and Azab, 2019).

Medical students, in particular, face amplified stressors due to their education's demanding and prolonged nature (Y et al., 2019; Shao et al., 2020). Amidst the relentless pursuit of competence, they grapple with academic burdens, intense competition, and exposure to emotional distress linked to patient suffering (Pokhrel, Khadayat and Tulachan, 2020). The burden is evident, with global studies revealing that medical students encounter higher anxiety rates than the general population (Quek et al., 2019; Fauziyah and Aretha, 2021).

The alarming rise in poor sleep quality poses a significant public health challenge, affecting both developed and developing nations (Shad, Thawani and Goel, 2015). Sleep deprivation exacts severe consequences, contributing to increased disease susceptibility, compromised immune function, and associations with metabolic disorders (Aldabal and Bahammam, 2011). Good sleep quality is pivotal for optimal neurocognitive performance and mental health (Aryadi et al., 2018).

The intricate interplay between anxiety and sleep quality is well-documented, and this reciprocal relationship extends both ways (Merrill, 2022). However, a knowledge gap persists regarding how these factors intersect within the unique context of medical education. The extended duration and multifaceted stressors of medical school might exacerbate anxiety and sleep disturbances, impacting student well-being and academic performance. Although existing literature underscores these concerns, there is still room for in-depth exploration of these interrelationships within specific educational settings.

This study fills a crucial knowledge gap by investigating the interplay of anxiety with sleep quality among Hang Tuah Faculty of Medicine students. Recognizing the implications for mental health and academic success, our research aims to contribute to developing targeted interventions and support mechanisms to enhance the well-being of medical students.

METHODS

To comprehend the intricate dynamics between anxiety and sleep quality among medical students, we conducted an analytic observational study with a cross-sectional design. Our study focused on Hang Tuah University Medical students, encompassing pre-clinical and clinical students. This approach ensured a diverse student body representation, which is essential for robust insights.

The pre-clinical group comprised students from batches 2022, 2021, and 2020, while the clinical group included batches DM47 (2018), DM46 (2018), and DM45 (2020). A careful sampling process led to 409 participants, out of which 296 met our specific criteria, while 113 were excluded based on predetermined factors. Data collection was carried out from August 2021 to July 2023.

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The exclusions included 76 participants who reported consuming coffee in the afternoon or evening 14 participants using medications containing substances like steroids, antidepressants, stimulants, beta-agonists, or theophylline. An additional 2 participants had a past medical history involving conditions such as hyperthyroidism, sleep apnea, chronic pain, or disability. Moreover, 21 participants facing recent distress due to events like bereavement or family issues within the past six months were also excluded.

To enhance the reliability of our findings, we utilized a proportionate stratified random sampling method, ensuring fair representation from each batch. Using the convenience of digital tools, we employed an online questionnaire to gather data. Upholding ethical norms, we secured informed consent from all participants, safeguarding their privacy and autonomy.

We employed the Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality, yielding a score range of 0 to 21. A higher PSQI score indicated poorer sleep quality, with data on a ratio scale(Almojali et al., 2017; AM et al., 2019). Anxiety levels were evaluated using the Zung Self-Rating Anxiety Scale, categorizing participants into non-anxious (20-44), mildly anxious (45-59), moderately anxious (60-74), and severely anxious (75-80) groups. This information was presented on an ordinal scale—data analysis using SPSS (Statistical Processing Software for Social Studies) software.

The ethical integrity of our study was upheld by obtaining clearance from the Research Ethical Committee of Hang Tuah University Faculty of Medicine, as confirmed by the ethical clearance letter numbered I/055/ UHT.KEPK.03/VIII/2023. This endorsement underscores our commitment to conducting ethical research throughout the study's course.

RESULTS

Table 1. Distribution of pre-clinical and clinical respondents based on batch

	Batch	Frequency	Percent (%)
Clinical	2017 (DM45)	50	33.3
	2018 (DM46)	49	32.7
	2019 (DM47)	51	34.0
	Total	150	100.0
Pre-clinical	2020	45	30.8
	2021	43	29.5
	2022	58	39.7
	Total	146	100.0

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Table 2. Characteristics of respondent

Variable	Frequency	Percent (%)
Age		
16	1	0.3
17	3	1.0
18	11	3.7
19	44	14.9
20	50	16.9
21	41	13.9
22	49	16.6
23	60	20.3
24	28	9.5
25	7	2.4
26	1	0.3
28	1	0.3
Gender		
Male	69	76.7
Female	227	23.3

Table 3. Sleep quality of clinical and pre-clinical students

	Sleep quality	Frequency	Percent (%)
Clinical	Good	49	32.7
	Poor	101	67.3
	Total	150	100.0
Pre-clinical	Good	42	28.8
	Poor	104	71.2
	Total	146	100.0

Table 4. Anxiety level of clinical and pre-clinical students

	Anxiety level	Frequency	Percent (%)
Clinical	Not Anxious	133	88.7
	Mild anxiety	16	10.7
	Moderate anxiety	1	0.7
	Total	150	100.0
Pre-clinical	Not Anxious	133	91.1
	Mild anxiety	12	8.2
	Moderate anxiety	1	0.7
	Total	146	100.0

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This research employs a proportionate stratified random sampling method to ensure a balanced representation of each batch. The application of the Slovin formula has determined the required number of respondents for each batch, as illustrated in the table provided.

The participants in this study fall within the age range of 16 to 28 years old and are predominantly female, with a male-to-female ratio of 1:3.

A Global PSQI score of ≤ 5 indicates good sleep quality, while a score > 5 suggests poor sleep quality. This highlights that a significant portion of both clinical and pre-clinical students are grappling with inadequate sleep quality.

The majority of clinical and pre-clinical students do not experience anxiety; however, among clinical students, a more significant number exhibit mild anxiety compared to their pre-clinical peers. The outcomes of the normality test signify that the sleep quality data does not follow a normal distribution. Hence the appropriate statistical tests used are non-parametric. Specifically, for the comparison between pre-clinical and clinical students' sleep quality, the Mann-Whitney U test is employed.

Similarly, for the comparison between pre-clinical and clinical students' anxiety levels, the Mann-Whitney U test is utilized.

Furthermore, the Spearman's rank correlation coefficient is applied to investigate the correlation between anxiety scores and study levels. This ensures robust and unbiased analysis, given the non-normal distribution of the data.

This table presents the Mean Rank analysis of sleep quality and anxiety scores in Clinical (N=150) and Pre-clinical (N=146) students. Pre-clinical students exhibit slightly higher sleep quality (Mean Rank: 151.58) and somewhat higher anxiety (Mean Rank: 150.26) compared to Pre-clinical students (Mean Rank: 146.69) compared to Clinical students (Mean Rank: 145.50).

There is a tendency for sleep quality to be poorer in pre-clinical students compared to clinical students; however, this difference is not statistically significant (p-value 0.538).

Anxiety level is worse in clinical students compared to pre-clinical students but shows no significant difference (p-value 0.493).

Table 5. Mean Rank sleep quality and anxiety score

	Study level	N	Mean Rank	Sum of Ranks
PSQI SCORE	Clinical	150	145.50	21825.00
	Pre-clinical	146	151.58	22131.00
	Total	296		
Anxiety Level	Clinical	150	150.26	22539.00
	Pre-clinical	146	146.69	21417.00
	Total	296		

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Table 6. Mann-Whitney U correlation between sleep quality and study level

	PSQI Score
Mann-Whitney U	10500.000
Wilcoxon W	21825.000
Z	-0.615
Asymp. Sig. (2-tailed)	0.538

Table 7. Mann-Whitney U correlation between anxiety score and study level

	Anxiety Level
Mann-Whitney U	10686.000
Wilcoxon W	21417.000
Z	-0.686
Asymp. Sig. (2-tailed)	0.493

Table 8. Sleep quality and anxiety level spearman correlation

			PSQI SCORE	Anxiety level
Spearman's rho	PSQI Score	Correlation Coefficient	1.000	0.342
		Sig (2-tailed)	.	0.0001
		N	296	296
	Anxiety level	Correlation Coefficient	0.342	1.000
		Sig (2-tailed)	0.0001	.
		N	296	296

This table highlights the significant statistical correlation between sleep quality (PSQI Score) and anxiety level. Spearman's rho indicates a correlation coefficient of 0.342 ($p = 0.0001$). Both variables exhibit strong correlation, reflected in their matching correlation coefficients. The sample size (N) is consistent at 296 for each variable. It can be concluded that the more anxiety an individual faces, the worse the sleep quality experience.

DISCUSSION

Our study brings a fresh perspective by investigating the relationship between anxiety levels and sleep quality among Hang Tuah Faculty of Medicine's Class of 2017-2022 pre-clinical and clinical students. This research sheds new light on the well-being of medical students who face unique challenges during their academic and professional journey. In this discussion, we delve into the outcomes of

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our investigation on sleep quality and anxiety levels among clinical and pre-clinical medical students. These findings provide crucial insights into the well-being of medical students, a cohort that faces distinct challenges due to the demanding nature of their academic and professional journey.

Sleep quality is an essential determinant of overall health and well-being. Our study revealed that a substantial proportion of both clinical and pre-clinical medical students experience poor sleep quality. Specifically, 67.3% of clinical students and 71.2% of pre-clinical students reported poor sleep quality. These results are consistent with the findings of Rao et al. (2020), whose comprehensive meta-analysis of observational studies involving medical students reported a pooled prevalence of poor sleep quality at 52.7%. This underscores the widespread nature of this issue. Furthermore, Mohamed Mohamed Bayoumy *et al.*, 2023 identified a concerning prevalence of poor sleep quality among college students, with 69.6% exhibiting scores indicative of poor sleep quality. This unity across studies underscores the urgency of interventions to address sleep quality among medical students.

Our study indicated that pre-clinical students exhibited slightly worse sleep quality than their clinical counterparts. This observation corresponds with the findings of CC *et al.* (2017), Alshehri *et. al.* (2023) and Shao *et al.* (2020), who documented that a majority of first-year medical students demonstrated Global Pittsburgh Sleep Quality Index (PSQI) scores exceeding 5, signifying poor sleep quality. Their study suggested that poor sleep hygiene habits, such as excessive internet use at night, irregular daily routines, and unhealthy eating patterns, were contributing factors. These findings reflect the considerable academic workload and irregular schedules that medical students often navigate, creating a challenging environment for sustaining healthy sleep patterns.

Moreover, anxiety prevalence among medical students is a notable concern. Our study uncovered that most clinical (88.7%) and pre-clinical (91.1%) students do not experience anxiety. However, a noteworthy percentage of clinical students (10.7%) reported mild anxiety, compared to pre-clinical students (8.2%) with similar levels. These results align with the research of Mohamed Mohamed Bayoumy et al. (2023), where the majority of students exhibited normal anxiety levels, while a minority reported mild to moderate levels of anxiety. Notably, none of the students in their study reported extreme anxiety levels.

Similarly, further insights from the study by Alshehri et al. (2023) offer contrasting findings. This cross-sectional study conducted during the COVID-19 pandemic examined depressive and anxiety symptoms among first-year and fifth-year medical students. Surprisingly, their results indicated a notable increase in anxiety symptoms among first-year students (58.1%) as compared to fifth-year students (48.9%). These findings challenge the notion that clinical students might experience more anxiety, as suggested by our study's observation of higher mild anxiety prevalence among clinical students.

Another intriguing perspective is presented by the cross-sectional survey conducted by AM Al-Khani, MI, MS, M, & N, (2019) in Saudi Arabia, which explored sleep quality, mental health, and academic performance among medical students. Their research found a substantial correlation between poor sleep quality and higher anxiety levels among medical students. While our study primarily focused on anxiety levels and sleep quality, it's worth noting that the intricate interplay between sleep quality, anxiety, and academic performance is a multidimensional aspect that

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deserves further investigation. The findings from AM et al.'s study could potentially shed light on additional factors influencing anxiety levels among medical students.

The varying results across these studies underscore the complexity of the relationship between anxiety, sleep quality, and academic progression in medical education. While our study emphasizes the higher prevalence of anxiety among pre-clinical students, the research by Alshehri *et al.* (2023) suggests that external factors, such as the circumstances of the COVID-19 pandemic, might play a role in shifting anxiety levels among different cohorts. Similarly, AM et al.'s (2019) study highlights the potential bidirectional influence between sleep quality and anxiety, emphasizing the need for a holistic approach when addressing anxiety-related concerns among medical students.

A similar pattern emerges when comparing our results with the work of Quek et al. (2019) and Almojali et al. (2017). Quek et al. explored anxiety prevalence among medical students in pre-clinical and clinical years and reported slightly higher anxiety rates in clinical years (26.4%) compared to pre-clinical years (26.2%). While the difference was not statistically significant, it highlights medical students' challenges as they progress through their studies.

The observed correlation between anxiety and sleep quality is paramount, which our study found to be statistically significant (p-value 0.0001, r 0.342). This suggests that heightened anxiety levels correspond to poorer sleep quality. This observation aligns with the findings of Ghawa, Lidia and Buntoro (2021) and Alwhaibi & Aloola (2023), who discovered a robust correlation (80.1%) between anxiety symptoms and poor sleep quality in their sample. Similar conclusions were reached by Adhaini Gusasi *et al.* (2023), who established a significant relationship ($p < 0.05$) between anxiety levels and sleep quality. These outcomes underscore the necessity for a holistic approach to student well-being, addressing anxiety management and sleep enhancement.

It is imperative to consider the physiological underpinnings of the intricate relationship between sleep and anxiety. Sleep deprivation can trigger physical and mental health issues, intensifying the impact of stress. Stress and sleep disturbances engage in a complex bidirectional interplay, with each factor influencing the other. Stress can lead to insomnia, contributing to the observed positive correlation between stress and insomnia. Additionally, certain sleep disorders, such as sleep apnea, can exacerbate stress by disrupting restful sleep, resulting in elevated cortisol release. Stress can also foster unhealthy habits like smoking, alcohol consumption, and poor dietary choices, which further contribute to sleep disturbances. This cyclic interplay ultimately compromises physical and psychological well-being, as Merrill (2022) expounded.

Although our study at Hang Tuah School of Medicine provides essential information about anxiety and sleep quality among medical students, several limitations need to be acknowledged. This study's focus on a single center may limit its generalizability to other institutions. Self-reported data may not fully reflect anxiety and sleep quality. A cross-sectional design, although suitable for associations, lacks the power to establish cause-and-effect relationships or track changes over time. Further research that integrates objective measures and explores multifaceted factors is needed. Additionally, expanding the sample size could improve statistical power and expand understanding of medical students' health. Despite these limitations, our study contributes

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significantly to understanding medical student health and highlights the need for targeted interventions to support mental health and sleep quality. It represents a fundamental step toward addressing these important issues in medical education.

In summary, our study furnishes valuable insights into medical students' sleep quality and anxiety levels. The notable prevalence of poor sleep quality and anxiety among both clinical and pre-clinical students underscores the urgency for intervention by educational institutions. Addressing these challenges is pivotal to promoting the well-being of medical students and ensuring their preparedness to deliver high-quality patient care in the future.

CONCLUSION

The study on anxiety and sleep quality among medical students and young doctors at Hang Tuah Medical Faculty (class 2017-2022) revealed significant findings. Predominantly female respondents (female-to-male ratio 3:1) were observed. Poor sleep quality was prevalent among clinical and pre-clinical students, notably worse in pre-clinical students. Clinical and pre-clinical students mainly did not experience anxiety, though mild anxiety was more common in clinical students. A noteworthy correlation between anxiety and poor sleep quality was established. Suggestions for improvement include peer communication about anxiety and sleep hygiene programs. Future research should delve deeper into causative factors for a comprehensive understanding.

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