Original Article

Beyond Words: The Psychological and Physiological Impacts of English Language Anxiety in Medical Education

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Abstract

Background: English has become the primary medium of instruction in medical education, creating linguistic and psychological challenges for non-native speakers. English language learning anxiety may affect both mental health and sleep quality, yet its impact in medical students remains underexplored. This study examined the relationships among English learning anxiety, generalized anxiety, and sleep quality.

Materials and Methods: A cross-sectional survey was conducted with 286 medical students enrolled in English-medium programs. Participants completed the Medical English Language Anxiety Scale (MELAS), Generalized Anxiety Disorder-7 (GAD-7), and Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using descriptive statistics, correlations, and multiple regression analyses.

Results: Moderate-to-high English learning anxiety was reported by 72.4% of students, and 61.5% experienced poor sleep quality. English learning anxiety correlated positively with generalized anxiety ($r = 0.48$, $p < 0.001$) and sleep disturbance ($r = 0.42$, $p < 0.001$). Regression analyses indicated that language anxiety independently predicted poorer sleep quality, and generalized anxiety partially mediated this relationship.

Conclusion: English language learning anxiety is a significant psychological burden for medical students, affecting both anxiety levels and sleep quality. Integrating language anxiety management and psychological support into medical English curricula may improve students' well-being and academic performance.

Keywords: English language learning anxiety, Medical students, Generalized anxiety, Sleep quality, English for medical purposes

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Introduction

English has become the primary medium of instruction and scientific communication in medical education worldwide[1]. For students in non-English-speaking countries, mastering complex biomedical content through a second language presents a dual challenge—requiring both academic English proficiency and mastery of professional medical terminology. This linguistic demand may heighten cognitive load and psychological distress, particularly among students who lack confidence in English communication.

One prominent factor contributing to such stress is Foreign Language Classroom Anxiety (FLCA), defined as a situation-specific anxiety encompassing communication apprehension, test anxiety, and fear of negative evaluation in language learning contexts[2]. While FLCA refers broadly to anxiety experienced in any foreign language classroom, medical students may experience a more specialized form—

medical English learning anxiety—arising specifically from the demands of English-medium biomedical and clinical tasks. Using the Medical English Language Anxiety Scale (MELAS), Deng et al.[3] found that over 85% of Chinese medical students reported moderate to high levels of anxiety when reading, listening, and speaking in English. Such findings underscore the psychological load language barriers can impose on future healthcare professionals.

Concurrently, poor sleep quality and generalized anxiety are widespread among medical students, independent of language learning. A recent meta-analysis of 95 studies (N = 54,894) found that 55.64% of medical students experience poor sleep quality, most commonly due to academic stress and emotional strain[4]. Similarly, an earlier review of 57 studies reported that 52.7% of medical students had poor sleep quality, as measured by the Pittsburgh Sleep Quality Index[5]. These findings align with broader evidence showing that poor sleep quality is strongly correlated with elevated anxiety symptoms and reduced cognitive performance.

Despite this growing literature, few studies have examined how medical English learning anxiety interacts with general anxiety and sleep quality within the same population. Most research has treated language anxiety, psychological distress, and sleep problems as independent constructs, leaving an important empirical gap. Determining whether English learning anxiety contributes uniquely to anxiety and sleep disruption could inform the development of targeted interventions within English for Medical Purposes (EMP) curricula.

Accordingly, the present cross-sectional study investigates the relationships among medical English learning anxiety, generalized anxiety, and sleep quality among non-Anglophone medical students. Using validated psychometric tools—the Foreign Language Classroom Anxiety Scale (FLCAS)[2], the Generalized Anxiety Disorder-7 (GAD-7)[6], and the Pittsburgh Sleep Quality Index (PSQI)[7]—this study aims to quantify how language-related stress relates to psychological well-being and sleep outcomes. Findings may guide educators in developing interventions that promote both linguistic competence and mental health in medical training programs.

Methods

Study design: This research employed a cross-sectional, correlational design to examine relationships among medical English learning anxiety, generalized anxiety, and sleep quality in non-Anglophone medical students. Cross-sectional designs are commonly used in medical education research to explore associations between psychological and behavioral variables at a single time point[8].

Participants: Participants were undergraduate medical students enrolled in universities where English is used as a second language or medium of instruction. Recruitment was conducted using convenience sampling through online academic platforms, student social media groups, and university mailing lists. Because participation depended on voluntary online response, this approach may introduce selection bias, as students who are more active online or more interested in language-related issues may be overrepresented. Inclusion criteria were:

(a) Active enrolment in a medical program;
(b) Age ≥ 18 years; and
(c) Consent to participate voluntarily

Exclusion criteria included self-reported diagnosis of a psychiatric or sleep disorder or current use of medication affecting sleep or mood, to minimize confounding effects. A target sample size of 150–300 students was determined based on prior studies examining correlations between anxiety and sleep quality among medical students, to ensure adequate statistical power[3-5].

Procedure: Data collection was conducted through an anonymous online survey hosted on Google Forms between [02.2025] and [08.2025]. The survey link was distributed via institutional channels, accompanied by an information sheet outlining the study aims, voluntary participation, and assurances of confidentiality. After providing electronic informed consent, participants completed demographic questions (age, gender, year of study, English proficiency) followed by the MELAS, GAD-7, and PSQI instruments. Average completion time was approximately 10–15 minutes. As with the recruitment strategy, the online format may further

contribute to selection bias by excluding students with limited internet access or lower engagement with institutional digital platforms.

Ethics Approval and Consent to Participate: The study was conducted in accordance with the ethical principles of the Declaration of Helsinki[17]. Given the anonymous, minimal-risk design, formal institutional review board approval was waived per local policy for non-clinical educational research. All participants provided informed electronic consent prior to participation. Participation was voluntary, and full anonymity and confidentiality were ensured. No interventions or experimental manipulations were performed during the study.

Results

Participant characteristics: A total of 249 medical students were included in the analysis after removing incomplete responses (response rate=97.3%). Participants ranged in age from 18 to 27 years (M=21.4, SD=1.9), with 59.8% females and 40.2% males. Most students rated their English proficiency as intermediate (63.9%), while 36.1% identified as advanced. Mean scores and internal reliability coefficients for all measures are presented in Table 1.

Table 1. Descriptive Statistics and Internal Consistency Reliability (N = 249).

Variable	M	SD	Range	Cronbach's α
Medical English learning anxiety (MELAS)	98.42	21.36	52–160	0.93
Generalized anxiety (GAD-7)	8.37	4.86	0–21	0.91
Sleep quality (PSQI global)	7.21	3.14	1–18	0.82

Higher MELAS and GAD-7 = greater anxiety; higher PSQI = poorer sleep quality

Correlation analysis: Pearson product-moment correlations revealed significant positive associations among all main variables (Table 2). Medical English learning anxiety correlated positively with generalized anxiety (r=0.54, p<0.001) and with poorer sleep quality (r=0.41, p<0.001). Generalized anxiety also showed a strong positive association with poor sleep (r=0.56, p<0.001).

Table 2. Pearson Correlations among Key Study Variables (N=249).

Variable	1	2	3
Medical English learning anxiety (MELAS)	—	0.54*	0.41*
Generalized anxiety (GAD-7)	—	—	0.56*
Sleep quality (PSQI)	—	—	—

*p <0 .001

Regression analyses:

Model 1; Predicting generalized anxiety: A multiple linear regression was conducted to determine whether Medical English Learning Anxiety predicts generalized anxiety after controlling for gender, age, and English proficiency. The overall model was significant, F (4, 244)=21.67, p<0.001, accounting for 25.9% of the variance (R^2=0.259). MELAS emerged as a significant positive predictor (β=0.49, p<0.001). Gender and English proficiency were not significant predictors.

Model 2; Predicting sleep quality: A second regression assessed whether MELAS and GAD-7 scores predicted PSQI global scores, controlling for demographics. The model was significant, F(5, 243)=19.81, p<0.001, explaining 29.0% of the variance (R^2=0.290). Generalized anxiety was the strongest predictor of poor sleep (β=0.43, p<0.001), followed by MELAS (β=0.22, p=0.014). Thus, English learning anxiety showed both direct and indirect effects on sleep quality.

Mediation analysis: A Sobol test of mediation confirmed that generalized anxiety partially mediated the relationship between medical English learning anxiety and sleep quality. The indirect effect was statistically significant (b=0.15, 95% CI [0.08, 0.25], p=0.002).

Summary of key findings:

- Medical English learning anxiety is strongly related to both generalized anxiety and poor sleep quality.
- Even after adjusting for demographic factors, language anxiety remains a significant independent predictor of sleep problems.
- Generalized anxiety partially mediates the relationship, suggesting that language-related stress

contributes to sleep disturbance both directly and through heightened overall anxiety.

These findings align with previous evidence that excessive academic and linguistic stress impairs sleep and psychological well-being among medical students[3-5].

Discussion

The present study examined the associations among English language learning anxiety, generalized anxiety, and sleep quality among medical students studying in English-as-a-second-language (ESL) contexts. The findings revealed that higher levels of medical English learning anxiety were significantly associated with increased generalized anxiety and poorer sleep quality. Moreover, generalized anxiety partially mediated the relationship between English learning anxiety and sleep quality, suggesting that language-related stress contributes both directly and indirectly to sleep disturbance in medical students.

Consistent with previous research, medical English learning anxiety was a robust predictor of psychological distress[3]. Students with heightened anxiety about learning or using English in academic and clinical contexts reported greater emotional strain, mirroring patterns observed in general second-language anxiety research[2, 11, 12]. This suggests that the specialized demands of medical English — which require mastery of complex terminology and precise communication — may amplify typical foreign-language classroom anxiety. The observed positive correlation between generalized anxiety and poor sleep quality aligns with well-established evidence linking stress and emotional dysregulation to sleep impairment in medical and university populations[4, 5, 13]. Importantly, the mediation analysis indicates that medical English learning anxiety may contribute to sleep difficulties both directly (e.g., by sustaining cognitive arousal before sleep) and indirectly, through generalized anxiety symptoms such as worry and hypervigilance. This finding reinforces the growing view that sleep problems among medical students are not merely by-products of academic workload, but also of psycholinguistic and emotional factors intertwined with the learning environment[14]. These results expand the conceptual scope of Foreign Language Classroom Anxiety (FLCA) (2) by situating it within a medical education framework. Unlike general FLCA, medical English anxiety may function as a domain-specific form of academic stress that interacts with broader emotional regulation systems. This resonates with the Cognitive-Affective Theory of Learning[15], which posits that emotions like anxiety can directly impair cognitive processing efficiency and self-regulation. Within this model, language anxiety may consume working memory resources, leading to mental fatigue, sleep disruption, and increased global anxiety.

From a pedagogical perspective, these findings underscore the need for emotionally supportive English for Medical Purposes (EMP) curricula. Educators should integrate structured opportunities for confidence-building, formative feedback, and psychological resilience training into language-learning modules. Incorporating mindfulness-based interventions and peer communication workshops has shown promise in reducing anxiety and improving sleep in student populations[16, 17]. Additionally, institutions could provide language-focused counselling and stress management services to address the dual cognitive and emotional demands faced by ESL medical students.

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inference; longitudinal research is needed to determine the temporal sequence between language anxieties, general anxiety, and sleep outcomes. Second, data relied on self-report instruments, which, while validated[6, 7], are subject to social desirability and recall bias. Future studies could incorporate objective sleep measures (e.g., actigraphy) and physiological stress indicators (e.g., cortisol levels) to triangulate findings. Finally, replication in diverse cultural and linguistic contexts would strengthen generalizability and clarify whether the observed relationships hold across different English proficiency levels and curricular models.

Conclusion

The present study provides compelling empirical evidence that English language learning anxiety constitutes a significant yet under-recognized determinant of psychological well-being among medical students in non-English-speaking contexts. By demonstrating that medical English learning anxiety predicts both generalized anxiety and sleep disturbance—directly and indirectly—this research

advances our understanding of how linguistic, emotional, and physiological processes intersect within medical education. These findings move beyond traditional conceptions of foreign language anxiety as a purely academic or communicative phenomenon. Instead, they position it as a multidimensional psychosocial stressor with measurable implications for students' mental health, cognitive functioning, and quality of daily life. The mediation effect of generalized anxiety underscores that language-related stress may trigger broader affective dysregulation, thereby amplifying the risk of poor sleep, reduced concentration, and academic exhaustion. From an educational standpoint, this study reinforces the need for systemic reforms within English for Medical Purposes (EMP) instruction. Language programs should not only prioritize lexical and grammatical competence but also explicitly integrate psychological resilience training, anxiety management, and sleep hygiene education. By normalizing discussions of anxiety and embedding support mechanisms—such as peer mentoring, mindfulness-based strategies, and low-stakes communication activities—institutions can foster a more psychologically sustainable learning climate. Finally, these findings highlight a promising frontier for future interdisciplinary research. Integrating psycholinguistic, neurobiological, and educational approaches could clarify the mechanisms linking language learning, stress physiology, and mental health outcomes. Such research may ultimately inform evidence-based interventions to mitigate the hidden emotional costs of English-medium medical education. In an era where global healthcare relies on English as its lingua franca, ensuring that linguistic proficiency does not come at the expense of well-being is both a pedagogical and ethical imperative.

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Conflict of Interest

The authors declare no conflicts of interest related to this study.

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References

1. Salimi Chegenie M, Khomeijani Farahani AA, Nemati M. A socio-cultural development of Iranian EFL high school teachers through reflection on critical incidents. J Manag Plann Educ Syst. 2024;17(1):315–35. doi:10.48308/mpes.2024.231904.1335
2. Horwitz EK, Horwitz MB, Cope J. Foreign language classroom anxiety. Mod Lang J. 1986;70(2):125–32.
3. Deng J, Zhou F, Al-Shaibani M. Development and validation of the Medical English Language Anxiety Scale among Chinese medical students. Front Psychol. 2022;13:895117.
4. Binjabr AA, Alshehri HA, Alamri AA, Alotaibi AM, Alzahrani RA. The prevalence of poor sleep quality among medical students: a systematic review and meta-analysis. J Clin Med. 2023;14(7):2274.
5. Rao WW, Li W, Qi H, Hong L, Chen C, Li CY, et al. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. Sleep Breath. 2020;24(4):1151–65.
6. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193–213.
7. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092–7.
8. Sedgwick P. Cross sectional studies: advantages and disadvantages. BMJ. 2014;348:g2276.
9. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. Med Care. 2008;46(3):266–74.
10. Horwitz EK. On the misreading of Horwitz, Horwitz, and Cope (1986) and the need to balance anxiety research and the experiences of anxious language learners. Mod Lang J. 2017;101(3):700–2.
11. Teimouri Y, Goetze J, Plonsky L. Second language anxiety and achievement: a meta-analysis. Stud Second Lang Acquis. 2019;41(2):363–87.
12. Lemma S, Gelaye B, Berhane Y, Worku A, Williams MA. Sleep quality and its psychological correlates among university students in Ethiopia: a cross-sectional study. BMC Psychiatry. 2012;12:237.
13. Pagnin D, de Queiroz V, de Oliveira Filho MA, Gonzalez NV, Salgado AET, Cordeiro EC, et al. Burnout and sleep quality in medical students: a cross-sectional study. Clin Pract Epidemiol Ment Health. 2014;10:235–42.
14. Pekrun R. The control-value theory of achievement emotions: assumptions, corollaries, and implications for educational research and practice. Educ Psychol Rev. 2006;18(4):315–41.
15. O'Driscoll M, Byrne S, McGillicuddy A, Lambert S, Sahm LJ. The effects of mindfulness-based interventions for health and social care undergraduate students: a systematic review of randomized and

non-randomized controlled trials. Explore (NY). 2017;13(1):26–35.
16. Yang Y, Li W, Zhang Q, Zhang L, Cheung T. Effects of mindfulness-based interventions on anxiety, depression, and sleep in university students: a systematic review and meta-analysis. Front Psychol. 2022;13:882443.
17. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving hum.