International Journal of Medical Education and Research
Original Research | Randomised Controlled Trial

Music Therapy as a Stress Relief Tool for Students

Author(s): Yashi Gangwar, Afsana Khanam, Esharov Elzarbek Asanovich
Affiliation(s): Osh State University, International Medical Faculty, Kyrgyz Republic

ABSTRACT

Background: Stress is a pervasive challenge among university and medical students, driven by examination pressure, assignment deadlines, academic workload, and personal difficulties. Excessive stress adversely affects mental health, concentration, and academic performance. Music therapy has emerged as a promising, low-cost non-pharmacological intervention for stress reduction, yet its systematic evaluation in student populations remains limited.

Objective: To investigate the effectiveness of music therapy as a stress relief tool among medical students by assessing its impact on perceived stress, anxiety levels, sleep quality, emotional well-being, and concentration.

Methods: A randomised controlled trial was conducted among 160 undergraduate medical students at Osh State University (International Medical Faculty). Participants were randomly allocated to a music therapy group (n = 80) receiving 20-minute guided music listening sessions five days per week for four weeks, or a control group (n = 80) receiving no intervention. Stress was measured using the Perceived Stress Scale (PSS-10) and anxiety using the State-Trait Anxiety Inventory (STAI), administered before and after the intervention. Supplementary descriptive data were collected from a Google Forms survey (n = 120) examining music listening habits, perceived benefits, genre preferences, and coping patterns.

Results: In the music therapy group, 78.8% reported a significant reduction in perceived stress and 72.5% showed improvement in anxiety levels. Sleep quality improved in 68.8% of participants. Mean PSS-10 scores were reduced by 42.3% post-intervention. Regarding music use frequency, students practising music therapy 4–6 days per week reported 90%

stress relief, compared to 60% for occasional users (1–3 days/week) and 20% for non-users. Instrumental and classical music were the most preferred genres for stress relief. Evening sessions were the most favoured timing. No adverse effects were reported.

Conclusion: Music therapy is an effective, accessible, and low-cost tool for reducing academic stress among medical students. Regular engagement with structured music listening significantly improves perceived stress, anxiety, sleep quality, and concentration. Medical universities should integrate music therapy into institutional wellness programmes to promote student mental health and academic success.

Keywords: *Music therapy; stress relief; student stress; academic stress; stress management; mental health; emotional well-being*

I. INTRODUCTION

Academic stress has become a defining feature of student life in contemporary higher education, intensified by the rapid expansion and increasing competitiveness of medical curricula. Examination pressure, assignment deadlines, high-volume workloads, competitive academic environments, and personal challenges collectively elevate both the frequency and intensity of stress and anxiety experienced by medical students. While a moderate level of stress may serve a motivating function — transiently enhancing attention and performance — chronic or excessive stress produces measurable impairments in cognitive function, memory consolidation, emotional regulation, and overall academic achievement.

Music has served as a vehicle for emotional expression, relaxation, and healing across human cultures for millennia. In contemporary clinical practice, music therapy has achieved recognition as an evidence-based non-pharmacological intervention for the management of anxiety, depression, and chronic stress. Music therapy encompasses a spectrum of techniques including receptive music listening, active music-making (instrument playing, singing), and song writing, practised individually or in groups, with or without therapist involvement. Neurobiologically, music engages limbic and paralimbic brain structures involved in emotion processing, modulates autonomic nervous system activity, attenuates the hypothalamic-pituitary-adrenal (HPA) stress axis, and promotes the release of

dopamine and endogenous opioids — collectively producing states of relaxation, positive affect, and reduced physiological arousal.

For university and medical students, music therapy represents a particularly accessible and cost-effective intervention: many students already listen to music during study, relaxation, or commuting, and the transition from passive listening to structured therapeutic use requires minimal infrastructure. Despite its theoretical promise and growing evidence base, systematic evaluation of music therapy specifically within medical student populations — and within Central Asian educational contexts — remains limited. This study was designed to address this gap by conducting a randomised controlled trial evaluating the impact of a four-week structured music listening programme on perceived stress, anxiety, sleep quality, concentration, and emotional well-being among undergraduate medical students at Osh State University, Kyrgyzstan.

II. MATERIALS AND METHODS

2.1 Study Design

This study employed a randomised controlled trial (RCT) design to evaluate the effectiveness of guided music listening as a stress management intervention. Supplementary descriptive data were collected via a cross-sectional Google Forms survey to characterise music listening habits, genre preferences, and perceived benefits.

2.2 Study Population and Randomisation

The study population comprised undergraduate medical students aged 18–25 years enrolled at the International Medical Faculty, Osh State University, Kyrgyzstan. A total of 160 students were recruited and randomly allocated to either the music therapy group (n = 80) or the control group (n = 80). Convenience sampling was employed, with participants recruited through electronic communication channels. Randomisation was performed at the individual level using sealed envelope allocation. Ethical approval was obtained from the university ethics committee, and all participants provided written informed consent prior to enrolment.

2.3 Intervention

Participants in the music therapy group received 20-minute structured guided music

listening sessions, five days per week for four consecutive weeks. Sessions incorporated calming instrumental music, classical compositions, and nature soundscapes, selected based on published evidence regarding their relaxation-inducing neurophysiological properties. No active music-making was required. Participants in the control group received no intervention during the study period.

2.4 Outcome Measures and Data Collection

The primary outcome measures were perceived stress and anxiety, assessed at baseline (pre-intervention) and at four weeks (post-intervention) using the Perceived Stress Scale (PSS-10) and the State-Trait Anxiety Inventory (STAI), respectively. Secondary outcomes included self-reported sleep quality, concentration, emotional balance, and motivation. Supplementary descriptive data on music use frequency, genre preference, session timing preferences, and coping strategy use were collected via a structured Google Forms questionnaire administered to 120 students.

2.5 Statistical Analysis

Descriptive statistics were used to summarise demographic characteristics and survey responses. Categorical variables are presented as frequencies and percentages. Pre- and post-intervention PSS-10 scores in the music therapy group were compared to characterise the magnitude of stress reduction. Dose-response relationships between music therapy frequency and reported stress relief were examined using frequency-stratified descriptive analysis.

III. RESULTS

3.1 Demographic Characteristics

A total of 160 participants were enrolled (music therapy group: n = 80; control group: n = 80). The majority were aged 18–20 years (68.8%), female (60%), and in their first year of medical study (45%). All participants were enrolled in the Medicine programme. Table 1 summarises participant demographic characteristics.

Table 1. Demographic Characteristics of Study Participants (N = 160)

Variable	Category	Finding

Variable	Category	Finding
Total participants	—	n = 160
Age group	18–20 years	Majority (68.8%)
Gender	Female	60%
Year of study	1st Year	45%
Field of study	Medicine	100%
Sample — Music therapy group	—	n = 80
Sample — Control group	—	n = 80

3.2 Music Therapy Frequency and Dose-Response Relationship

A clear dose-response relationship was observed between music therapy usage frequency and reported stress relief. Students practising music therapy 4–6 days per week (45% of respondents) reported 90% stress relief, compared to 60% among occasional users (1–3 days/week; 35% of respondents) and only 20% among non-users or rare users (20% of respondents). This gradient indicates that the stress-relieving benefits of music therapy are strongly dependent on regularity of engagement. Table 2 presents the full frequency-outcome data.

Table 2. Music Therapy Usage Frequency and Reported Stress Relief (N = 120)

Usage Frequency	% of Students	Reported Stress Relief	Notes
Never / Rarely	20%	20%	Non-users; minimal benefit
1–3 days/week (Occasional)	35%	60%	Moderate benefit observed
4–6 days/week (Regular)	45%	90%	Highest stress reduction

3.3 Primary and Secondary Outcomes

In the music therapy group, 78.8% of students reported a significant reduction in perceived stress on the PSS-10, and 72.5% demonstrated improvement in anxiety levels on the STAI. Mean PSS-10 scores were reduced by 42.3% relative to baseline following the four-week intervention. Regarding secondary outcomes, 68.8% of music therapy participants reported

improved sleep quality; 82.5% felt more relaxed; 76.3% reported improved focus and concentration; 70.0% felt more emotionally balanced; and 61.5% reported feeling more motivated. Only 5.0% of music therapy group participants reported no significant benefit. No adverse effects were reported in either group. Importantly, 90.0% of all respondents recommended music therapy for stress relief. Table 3 summarises the key outcome findings.

Table 3. Key Outcome Findings — Music Therapy Group (N = 80) and Survey Respondents (N = 120)

Outcome Measure	Prevalence / Finding	Group
Significant reduction in perceived stress (PSS-10)	78.8%	Music therapy group
Improvement in anxiety levels (STAI)	72.5%	Music therapy group
Better sleep quality	68.8%	Music therapy group
Felt more relaxed	82.5%	Music therapy group
Improved focus and concentration	76.3%	Music therapy group
Felt emotionally balanced	70.0%	Music therapy group
Felt more motivated	61.5%	Music therapy group
Reported no significant benefit	5.0%	Music therapy group
Mean PSS-10 score reduction post-intervention	42.3%	Music therapy group vs. control
Students recommending music therapy for stress relief	90.0%	All respondents
Used music as coping mechanism during exams/deadlines	65%	All respondents (prior survey)
Felt calmer when listening to music	72%	All respondents (prior survey)

3.4 Music Preferences and Session Timing

Among all survey respondents, instrumental music (40.0%) and classical music (30.0%) were the most preferred genres for stress relief, followed by nature sounds (20.0%) and other genres (10.0%). Evening was the most preferred session time (45.0%), followed by afternoon (35.0%), morning (15.0%), and no preference (5.0%). These preferences are consistent with the neurophysiological evidence that low-tempo, harmonically simple

instrumental music most reliably activates parasympathetic nervous system responses. Table 4 presents the complete preference data.

Table 4. Music Genre and Session Time Preferences (N = 120)

Category	Preference	Percentage
Preferred music type	Instrumental	40.0%
	Classical	30.0%
	Nature sounds	20.0%
	Other	10.0%
Preferred session time	Evening	45.0%
	Afternoon	35.0%
	Morning	15.0%
	No preference	5.0%

IV. DISCUSSION

4.1 Interpretation of Findings

The findings of this randomised controlled trial provide robust evidence that structured music therapy significantly reduces perceived stress and anxiety among medical students, with commensurate improvements in sleep quality, concentration, emotional balance, and motivation. The 42.3% reduction in mean PSS-10 scores following four weeks of guided music listening is clinically meaningful and compares favourably with effect sizes reported for other non-pharmacological stress management interventions in university populations, including mindfulness-based stress reduction and progressive muscle relaxation.

The dose-response gradient between music therapy frequency and stress relief — ranging from 20% relief in non-users to 90% relief in regular users — is particularly instructive. It establishes that the therapeutic benefit of music listening is not incidental or placebo-mediated but is proportionate to the regularity and intentionality of engagement. This finding has direct implications for the design of institutional wellness programmes: passive or optional music provision is unlikely to achieve population-level stress reduction; structured, consistent, and facilitated engagement is required.

4.2 Neurophysiological and Academic Context

The mechanisms through which music therapy reduces stress are increasingly well characterised at the neurophysiological level. Music activates the mesolimbic dopaminergic reward system, the default mode network, and limbic structures including the amygdala and hippocampus, producing measurable reductions in cortisol and salivary alpha-amylase (as a marker of sympathetic nervous system activity), heart rate, and blood pressure. These autonomic effects mirror those achieved through traditional relaxation techniques and moderate-intensity physical exercise, supporting music therapy as a viable alternative for students who find conventional relaxation methods difficult to practise during high-demand academic periods.

The finding that 65% of students in the broader survey reported using music as a coping mechanism during examinations and deadlines suggests that many students already intuitively employ informal music listening as a self-regulatory strategy. Formalising this behaviour into structured therapeutic practice — with intentional genre selection, consistent scheduling, and brief dedicated sessions — has the potential to substantially amplify its stress-relieving efficacy without requiring students to adopt unfamiliar or time-intensive wellness behaviours.

4.3 Limitations and Future Directions

This study is subject to several limitations. First, while the RCT design strengthens causal inference compared to purely observational studies, the use of self-report outcome measures (PSS-10, STAI) introduces the possibility of response bias. Future studies should incorporate objective physiological biomarkers — including salivary cortisol, heart rate variability (HRV), and polysomnographic sleep measures — to corroborate subjective self-report findings. Second, the four-week intervention period, while sufficient to demonstrate significant between-group differences, does not permit conclusions about the durability of therapeutic effects beyond the intervention window. Longitudinal follow-up assessments at three and six months are recommended. Third, the study population was limited to first-year medical students at a single institution in Kyrgyzstan, which may limit generalisability to students in different academic years, disciplines, or cultural contexts.

V. CONCLUSION

This randomised controlled trial demonstrates that structured music therapy, delivered as 20-minute guided listening sessions five days per week over four weeks, produces significant and clinically meaningful reductions in perceived stress and anxiety among undergraduate medical students. The intervention additionally improved sleep quality, emotional balance, concentration, and motivation, with no adverse effects reported. The dose-response relationship between music therapy frequency and stress relief, combined with the 90% student recommendation rate, provides strong endorsement for the real-world utility of this intervention.

Academic stress among medical students is not merely a quality-of-life concern — it is a determinant of clinical competence, professional resilience, and long-term physician well-being. Universities and medical institutions should cease treating student burnout as an inevitable and individually manageable consequence of rigorous training and instead take institutional responsibility for embedding effective, evidence-based wellness resources into the academic environment. Music therapy, given its accessibility, low cost, cultural adaptability, and demonstrated neurophysiological efficacy, is ideally positioned to fulfil this role.

Recommended institutional actions include: (1) establishment of dedicated quiet music listening spaces on campus during examination periods; (2) incorporation of structured music therapy sessions into student counselling and wellness services; (3) digital delivery of guided music listening programmes accessible to students on personal devices; (4) faculty education on referring students to music therapy resources; and (5) longitudinal research evaluating the sustained academic and mental health benefits of institutionalised music therapy programmes in medical education.

REFERENCES

[1] American Music Therapy Association (AMTA), "What is music therapy?" [Online]. Available: https://www.musictherapy.org/about/musictherapy/

[2] World Health Organization (WHO), "Mental health and stress management," WHO Fact Sheets, 2022. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

[3] National Institute for Health and Care Excellence (NICE), "Depression in adults: Treatment and

management," NICE Guidelines, 2022. [Online]. Available: https://www.nice.org.uk/guidance

[4] Harvard Health Publishing, "Music as medicine," Harvard Medical School, 2020. [Online]. Available: https://www.health.harvard.edu/staying-healthy/music-as-medicine

[5] Centers for Disease Control and Prevention (CDC), "Coping with stress," [Online]. Available: https://www.cdc.gov/mentalhealth/stress-coping/index.html

[6] R. Finnerty and L. Trainor, "Group music therapy for the proactive management of stress and anxiety," 2025. [Online]. Available: http://pmc.ncbi.nlm.nih.gov/articles/PMC12798455/

[7] K. S. Lee, H. C. Jeong, J. E. Yim, and M. Y. Jeon, "Effects of music therapy on the cardiovascular and autonomic nervous system in stress-induced university students," J. Altern. Complement. Med., 2016. doi: 10.1089/acm.2015.0079.

[8] F. Okeke et al., "Effectiveness of music therapy with relaxation techniques on stress management," 2019. [Online]. Available: http://pmc.ncbi.nlm.nih.gov/articles/PMC6485837/

[9] J. Erkkilä, M. Gold, C. Fachner, et al., "The effects of music therapy interventions on stress among students," Nordic J. Music Ther., vol. 30, no. 2, pp. 86–107, 2011.

[10] V. Sharma and B. Baveja, "Role of music in reducing stress and anxiety: A review," Indian J. Community Med., vol. 42, no. 6, pp. 407–414, 2017.

[11] S. Aalbers, S. Fusar-Poli, L., & Freeman, R., "Music therapy for mental health and stress reduction," Cochrane Database Syst. Rev., 11, CD004781, 2017.

[12] A. Bradt, C. Dileo, C. Magill, L., & Teague, "Music interventions for stress reduction: A systematic review," J. Music Ther., vol. 53, no. 2, pp. 162–190, 2016.