



APPLICATION OF 432 Hz FREQUENCY MUSIC THERAPY ON CHANGES IN ANXIETY LEVELS IN PRE-OPERATING HERNIA PATIENTS: A CASE REPORT

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ABSTRACT

Preoperative anxiety is a common psychological response among surgical patients and may be associated with physiological changes, including increased blood pressure, pulse rate, and respiratory rate. Music therapy has been used as a non-pharmacological nursing intervention to promote relaxation; however, evidence on the use of 432 Hz music therapy in preoperative hernia patients remains limited. This case report aimed to describe changes in anxiety levels, information needs, and vital signs following 432 Hz music therapy in a preoperative patient with an inguinal hernia. This study used a descriptive case report design involving one 63-year-old male patient diagnosed with a left lateral inguinal hernia who experienced preoperative anxiety. Data were collected through interviews, observations, vital sign measurements, and medical record reviews. Anxiety and information needs were assessed before and after the intervention using the Amsterdam Preoperative Anxiety and Information Scale (APAIS). The intervention consisted of 10 minutes of instrumental music therapy tuned to 432 Hz in the preoperative room. The data were analyzed descriptively to identify changes in anxiety levels, information needs, and physiological parameters before and after the intervention. After the intervention, the APAIS anxiety score decreased from 18 to 13, although it remained within the preoperative anxiety category. The APAIS information needs score decreased from 8 to 6, indicating a shift from high to moderate information needs. Physiological changes were also observed, including decreases in blood pressure from 170/80 mmHg to 136/84 mmHg, pulse rate from 100 to 92 beats per minute, and respiratory rate from 22 to 18 breaths per minute. The application of 432 Hz music therapy was associated with decreased anxiety scores, information needs, and several vital sign parameters in this preoperative hernia patient. However, because this report involved a single case without a comparison group, the findings should be interpreted cautiously and cannot be generalised.

Keywords: 432 Hz music therapy; case report; inguinal hernia; nursing intervention; preoperative anxiety

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INTRODUCTION

Hernia is a common surgical condition encountered in clinical practice and may affect patients' comfort, physical functioning, and quality of life (Grove et al., 2021). Patients with a hernia may experience pain, discomfort, and limitations in daily activities, and surgical management is often required to prevent further complications (Irnu & Windarti, 2025). Hernia repair can be performed using either open or laparoscopic techniques, depending on the patient's clinical condition, surgical indication, and available resources (Deviyana & Hartoyo, 2025). Although hernia surgery is commonly performed, patients may still experience psychological distress before the procedure, particularly when they have limited previous surgical experience or insufficient information about the operation.

Preoperative anxiety is a common psychological response among patients undergoing surgery. It may arise from fear of pain, concerns about anaesthesia, uncertainty about surgical outcomes, previous negative experiences, or worry about potential complications. This anxiety is clinically

important because it may be accompanied by physiological responses, including increased blood pressure, pulse rate, heart rate, and respiratory rate, which can affect patient comfort and perioperative preparation. Previous studies have reported that a substantial proportion of surgical patients experience preoperative anxiety, with prevalence varying across clinical settings and patient characteristics. In Indonesia, preoperative anxiety has also been reported as a relevant nursing problem, particularly among patients who have not received adequate education, relaxation support, or psychological preparation before surgery (Alamsyah et al., 2025).

International research shows that nearly half of surgical patients experience preoperative anxiety. Studies report that approximately 48% of preoperative patients experience anxiety, with varying degrees of severity. These high rates make preoperative anxiety a significant challenge for perioperative nursing interventions. Other research in Indonesia also shows that most preoperative patients experience anxiety, with as many as 73.3% experiencing severe anxiety, characterised by restlessness, difficulty sleeping, heart palpitations, and increased blood pressure. Other studies report a prevalence of up to 80%, especially among patients who have not received education or relaxation interventions. These data indicate that preoperative anxiety is a significant health problem in Indonesia (Sugiarta, 2021).

The management of preoperative anxiety is an important component of perioperative nursing care. Untreated anxiety may increase patient discomfort, contribute to hemodynamic instability, and affect the overall perioperative experience (Jiwanmall et al., 2020). In addition to pharmacological management when clinically indicated, non-pharmacological interventions are needed because they are relatively safe, simple, low-cost, and feasible to integrate into nursing practice (Agüero- et al., 2023). Several non-pharmacological approaches have been used to reduce preoperative anxiety, including therapeutic communication, preoperative education, breathing relaxation, distraction, and music therapy (Agüero- et al., 2023); (Lu et al., 2021).

Music therapy is one complementary intervention that may promote relaxation and comfort in preoperative patients. Music may influence emotional regulation through the limbic system and autonomic nervous system, thereby supporting relaxation responses and reducing sympathetic stimulation (Lu et al., 2021). Music interventions have been reported to help reduce anxiety levels, stabilize hemodynamic parameters, and improve patient comfort during the perioperative period (Li et al., 2024). These effects are mediated through complex neurophysiological mechanisms involving the limbic system, autonomic nervous system regulation, and hormonal responses, particularly through reduced cortisol levels and increased release of endorphins and serotonin (Li et al., 2024). Music with a slow tempo and a soft melody can provide emotional and physical relaxation for listeners (Menziletoglu et al., 2021). Slow-tempo music can lower blood pressure in patients undergoing surgery, normalize arrhythmias, and have a relaxing effect before pre-operative procedures (Nasso et al., 2021). Therefore, music therapy should be interpreted as a supportive nursing intervention rather than a stand-alone treatment for preoperative anxiety.

One form of music intervention that has received increasing attention is music tuned to 432 Hz. This frequency has been associated with a relaxing auditory experience and may contribute to a sense of calm and comfort in some patients (Hohneck et al., 2025)(Menziletoglu et al., 2021). The frequency of 432 Hz has begun to be researched because it is thought to produce a softer and more comfortable sound perception than the standard frequency of 440 Hz, which is commonly used in modern music (Zaki et al., 2025). Other studies also reported a tendency towards reduced anxiety levels and improvements in several physiological parameters, such as heart rate and blood pressure, after individuals listened to music with a frequency of 432 Hz (Nasso et al., 2021). Music therapy with a frequency of 432 Hz has the potential to be a relatively inexpensive, safe, and easy-to-implement non-pharmacological intervention to help improve pre-operative patient comfort (Menziletoglu et al., 2021). Nevertheless, the scientific evidence regarding the superiority of 432

Hz music compared with other frequencies remains limited and inconsistent. Therefore, studies and case reports exploring its clinical application should be interpreted with caution and avoid making definitive causal claims. In perioperative nursing practice, 432 Hz music therapy may be considered a feasible complementary intervention, but further evidence is required to clarify its potential benefits for anxiety reduction and physiological stability.

The use of 432 Hz music therapy among preoperative hernia patients remains limited, particularly in the form of nursing case reports. There is still limited documentation describing how this intervention is implemented in the preoperative room and how anxiety scores, information needs, and vital signs change before and after the intervention in a patient with a hernia. Therefore, this case report aimed to describe the application of 432 Hz music therapy and the observed changes in anxiety level, information needs, and vital signs in a preoperative patient with an inguinal hernia.

METHOD

This study used a descriptive case report design to describe the application of 432 Hz music therapy and the observed changes in anxiety levels, information needs, and vital signs in a preoperative patient with an inguinal hernia. This approach was chosen because the report focused on a single clinical case and did not aim to test the intervention's effectiveness or establish a causal relationship.

The case involved one adult patient scheduled for hernia repair at a private hospital in Surakarta, Central Java. The patient was selected because he was conscious, cooperative, able to communicate well, and, according to the Amsterdam Preoperative Anxiety and Information Scale (APAIS), experienced preoperative anxiety. Patients with hearing or cognitive impairment, emergency conditions requiring immediate surgery, or those who had received sedation that could interfere with anxiety assessment were not considered suitable for this intervention.

Data were collected through assessment, direct observation, measurement of vital signs, and medical record review. Interviews were conducted to obtain subjective information, including the patient's main complaint, previous surgical experience, perceived anxiety, and concerns about surgery. Observation was used to assess the patient's general condition, behavioural responses, and signs of anxiety before and after the intervention. Medical records were reviewed to obtain information on medical diagnoses, planned surgery, vital signs, and therapies the patient received.

The patient's anxiety level and information needs were assessed using the Amsterdam Preoperative Anxiety and Information Scale (APAIS). Previous validation studies have demonstrated that the APAIS is a valid and reliable instrument for assessing preoperative anxiety, with adequate construct validity and good internal consistency (Cronbach's $\alpha = 0.787-0.806$). The APAIS comprises six items, of which four assess anxiety related to anaesthesia and surgery, and two assess information needs. Each item is rated on a 1-5 Likert scale. The anxiety score ranges from 4 to 20, with ≥ 11 indicating preoperative anxiety. The information needs score ranges from 2 to 10, with 2-4 indicating low information needs, 5-7 indicating moderate information needs, and 8-10 indicating high information needs.

The intervention was conducted in the preoperative room approximately 30 minutes before surgery. Before the intervention, the patient was placed in a semi-Fowler's position and encouraged to relax. The patient listened to instrumental music tuned to 432 Hz for 10 minutes via a mobile phone and headset. The volume was adjusted to the patient's comfort, and the surrounding environment was kept as quiet as possible to support relaxation. No additional relaxation intervention was provided by the researchers during the music therapy session.

Post-intervention evaluation was conducted by reassessing the patient's anxiety level and information needs using the APAIS. Vital signs, including blood pressure, pulse rate, and respiratory rate, were measured before and after the intervention. Sedative administration, analgesic therapy, preoperative education, therapeutic communication, and other clinical factors were documented as potential confounding influences on changes in anxiety and physiological responses. These factors were neither controlled for nor manipulated by the researchers but were considered when interpreting the findings.

Data were analysed descriptively by comparing the patient's anxiety score, information needs score, and vital signs before and after the intervention. As this report involved a single case without a control or comparison group, the findings were interpreted as observed clinical changes in one patient and were not used to conclude the effectiveness of 432 Hz music therapy or to generalise the results to a broader population.

This case report adhered to ethical principles in nursing care by maintaining patient confidentiality, presenting data anonymously, and obtaining the patient's consent for the intervention and for the use of clinical data in scientific reporting. The patient's identity and personal information were not disclosed in this report.

RESULT

The case involved Mr K, a 63-year-old male patient, who was admitted to a private hospital in Surakarta, Central Java, with a diagnosis of a left lateral inguinal hernia. The patient was scheduled to undergo hernia surgery on the same day. During the preoperative assessment, the patient reported feeling anxious, restless, tense, and worried about the procedure. He also stated that he had difficulty sleeping because this was his first experience of surgery.

Before the intervention, the patient's vital signs were as follows: blood pressure 170/80 mmHg, pulse rate 100 beats per minute, respiratory rate 22 breaths per minute, and Glasgow Coma Scale score E4V5M6. The patient's anxiety level and information needs were assessed using the Amsterdam Preoperative Anxiety and Information Scale (APAIS). After the initial assessment, the patient received 432 Hz instrumental music therapy for 10 minutes in the preoperative room. Anxiety level, information needs, and vital signs were reassessed after the intervention. Variations in anxiety levels and physiological parameters are shown in table 1.

Table 1.

Changes in Anxiety Levels and Physiological Parameters Before and After Intervention

Parameters	Pre-intervention	Post-intervention	Change
APAIS anxiety subscale score	18	13	Decreased by 5 points
APAIS information needs subscale score	8	6	Decreased by 2 points
Blood pressure	170/80 mmHg	136/84 mmHg	Systolic blood pressure decreased by 34 mmHg; diastolic blood pressure increased by 4 mmHg
Pulse rate	100 bpm	92 bpm	Decreased by 8 beats/minute
Respiratory rate	22 bpm	18 bpm	Decreased by 4 breaths/ minute

After the intervention, the patient's APAIS anxiety score decreased from 18 to 13. However, the post-intervention score remained within the preoperative anxiety category, as defined by the cut-off of ≥ 11 . The APAIS information needs score decreased from 8 to 6, indicating a shift from high to moderate information needs. Changes in physiological parameters were also observed, with decreases in systolic blood pressure, pulse rate, and respiratory rate, and a slight increase in diastolic blood pressure.

DISCUSSION

This case report described the use of 432 Hz music therapy in a preoperative patient with an inguinal hernia who experienced preoperative anxiety. Before the intervention, the patient reported feeling anxious, restless, tense, and worried, and had difficulty sleeping because this was his first surgery. Elevated physiological parameters, including blood pressure, pulse rate, and respiratory rate, accompanied these psychological responses. After the intervention, the patient's APAIS anxiety score decreased from 18 to 13, although it remained above the preoperative anxiety cut-off score of ≥ 11 . The APAIS information needs score also decreased from 8 to 6, indicating a shift from high to moderate information needs. In addition, systolic blood pressure, pulse rate, and respiratory rate decreased, while diastolic blood pressure slightly increased.

Preoperative anxiety is a common emotional response among surgical patients and may occur due to fear of pain, anesthesia, surgical outcomes, complications, unfamiliar hospital environments, or lack of previous surgical experience (Mukhlis et al., 2025). In this case, the patient's anxiety appeared to be related to his first surgical experience and concerns about the upcoming procedure. This finding is consistent with previous studies showing that previous surgical experience, knowledge, education, family support, and communication with healthcare providers may influence patients' anxiety before surgery (Kassahun et al., 2022). Anxiety is associated with physiological responses such as increased blood pressure, restlessness, insomnia, tremors, and mood swings (Sugiarta, 2021) (Andriani, 2025). Therefore, preoperative anxiety should be recognized as an important nursing problem because it may affect both psychological comfort and physiological readiness before surgery.

The changes in physiological parameters in this case require careful interpretation. After the intervention, systolic blood pressure decreased from 170 mmHg to 136 mmHg, pulse rate from 100 to 92 beats per minute, and respiratory rate from 22 to 18 breaths per minute. These changes may reflect a relaxation response. Previous studies have reported an association between anxiety and haemodynamic responses, including blood pressure, pulse rate, and respiratory rate in preoperative patients (Deol et al., 2026; Wicaksana & Dwianggimawati, 2022; Nabillah et al., 2023). However, diastolic blood pressure increased slightly from 80 mmHg to 84 mmHg, indicating that the changes were not uniform across all parameters. Vital signs in preoperative patients may be influenced not only by anxiety but also by pain, physical condition, adaptation to the preoperative environment, communication with healthcare providers, positioning, medication, and the natural course of preoperative preparation. In this case, therapeutic communication, family support, and semi-Fowler's position may also have contributed to the patient's comfort during the preoperative period (Halimatusyadiah et al., 2025); (Putri et al., 2022) (Sholehah, 2025). Therefore, these findings should not be interpreted as evidence that 432 Hz music therapy directly stabilises haemodynamic status.

Music therapy is a non-pharmacological intervention that may support relaxation and comfort in preoperative patients. Music at this frequency can have a relaxing effect on patients and can stimulate the release of endorphins and serotonin, which play a role in relaxation, reduce sympathetic activity, and help stabilise heart rate and blood pressure (Djohan et al., 2022). In general, music may influence emotional responses through the limbic system and autonomic nervous system regulation, thereby helping to reduce sympathetic stimulation and promote a calmer psychological state (Yadav et al., 2020). Music therapy can modulate emotional responses via the limbic system and increase the release of neurotransmitters such as endorphins and serotonin, which play a role in the relaxation process and stabilise the stress response (Li et al., 2024). However, the specific contribution of the 432 Hz frequency cannot be determined from this case report because there was no comparison with other music frequencies or with standard care alone. Therefore, the observed changes should be interpreted as clinical changes after the intervention, not as definitive evidence of effectiveness.

This case report aligns with previous studies suggesting that music therapy may be a useful complementary intervention to support comfort and reduce anxiety in preoperative patients (Goel et al., 2024). Music therapy is relatively simple, inexpensive, non-invasive, and feasible to implement in nursing practice. For preoperative nursing care, 432 Hz music therapy may be considered a supportive intervention to help create a calmer environment and promote patient comfort before surgery. Nevertheless, it should be integrated with other essential nursing interventions, including therapeutic communication, preoperative education, pain assessment, family support, and collaboration with the surgical and anaesthesia teams.

This case report has several limitations. First, it involved only one patient, so the findings cannot be generalised to all preoperative patients. Second, there was no control or comparison group, so a causal relationship between 432 Hz music therapy and reduced anxiety cannot be established. Third, several potential confounding factors, such as therapeutic communication, patient positioning, adaptation to the preoperative environment, medication, family support, and the patient's psychological condition, may have influenced the observed changes. Fourth, the intervention lasted only 10 minutes, so the duration of its effect could not be evaluated. Future studies with larger samples, comparison groups, standardised intervention protocols, and repeated measurements are needed to evaluate the effectiveness of 432 Hz music therapy in reducing preoperative anxiety.

CONCLUSION

The application of 432 Hz music therapy to this preoperative patient with an inguinal hernia was associated with reductions in the APAIS anxiety score, information needs score, systolic blood pressure, pulse rate, and respiratory rate. Nevertheless, the patient's anxiety score remained above the preoperative anxiety threshold, and diastolic blood pressure showed a slight increase. Given that this report involves a single patient without a comparison group, these observed changes cannot be construed as evidence of efficacy or generalised to all preoperative patients. This case indicates that 432 Hz music therapy may serve as a simple, non-invasive, and supportive nursing intervention to enhance comfort prior to surgery.

REFERENCES

- Agüero-, B., Abajas-, M. R. N. R., & Ortego-, C. (2023). Efficacy of nonpharmacologic interventions in preoperative anxiety : A systematic review of systematic reviews. *Journal of Clinical Nursing*, (January), 6229–6242. <https://doi.org/10.1111/jocn.16755>
- Alamsyah, C. M., Nofita, R., Sabarguna, B. S., Damayanti, S., & Neneng, K. (2025). Analisis Tingkat Kecemasan Pasien Preoperasi Sectio Caesarea Elektif 1 Hari Sebelum Operasi Di Rumah Sakit. *Jurnal Penelitian Keperawatan Kontemporer*, 16–25.
- Andriani, H. A. (2025). Hubungan dukungan keluarga dengan kecemasan pasien pra operasi. *Jurnal Health Society*, 14(2), 166–174. <https://doi.org/10.62094/jhs.v14i2.235>
- Deol, S. S., Yudono, D. T., & Susanto, A. (2026). Hubungan Kecemasan Dengan Tekanan Darah Pada Pasien General Anestesi Di Ruang Pre Operasi Rumah Sakit Umum Daerah Pandega Pangandaran. *Borneo Nursing Journal (BNJ)*, 8, 1829–1837.
- Deviyana, E., & Hartoyo, B. D. (2025). Pengaruh Pengetahuan Pasien Tentang Hernia dan Kecemasan Pre Operasi Laparaskopi Hernia (Studi Kasus RSUD Gading Pluit Jakarta). *Jurnal Pengabdian Masyarakat Dan Riset Pendidikan*, 3(4), 6049–6055. <https://doi.org/https://doi.org/10.31004/jerkin.v3i4.2533>
- Djohan, Tyasrinestu, F., & Sualang, L. A. E. (2022). Pengaruh Mendengarkan Musik terhadap Kondisi Relaksasi. *Jurnal Resital*, 23(3), 190–201.
- Goel, S. K., Kim, V., Kearns, J., Sabo, D., Zoeller, L., Conboy, C., Kelm, N., Jackovich, A. E., & Chelly, J. E. (2024). Music-Based Therapy for the Treatment of Perioperative Anxiety and Pain—A Randomized, Prospective Clinical Trial. *Journal of Clinical Medicine*, 13(20). <https://doi.org/10.3390/jcm13206139>

- Grove, T. N., Brogden, L. J. M. S. G. P. D. R. L., Mills, S. C., & Kontovounisios, C. (2021). Measuring quality of life in patients with abdominal wall hernias : a systematic review of available tools. *Hernia*, 25(2), 491–500. <https://doi.org/10.1007/s10029-020-02210-w>
- Halimatusyadiah, Wardani, L., & Parwati. (2025). Hubungan Dukungan Keluarga dengan Tingkat Kecemasan Pasien Praoperasi di Rumah Sakit Mitra Anugrah Lestari. *Jurnal Integrasi Kesehatan & Sains*, 7(2), 158–163. <https://doi.org/10.29313/jiks.v7i2.6635>
- Hohneck, A., Rodríguez, Á. M., Weingärtner, S., Merx, K., Sarodnick, F., Gagern, F. Von, Mavratzas, A., Burkholder, I., Schumacher, G., Hofmann, W., & Hofheinz, R. (2025). Differential effects of sound interventions tuned to 432 Hz or 443 Hz on cardiovascular parameters in cancer patients : a randomized cross-over trial. *BMC Complementary Medicine and Therapies*, 5.
- Irnu, J. A., & Windarti. (2025). PENATALAKSANAAN NYERI AKUT PADA PASIEN HERNIA Pendahuluan Hernia adalah usus yang keluar dari rongga perut yang membentuk tonjolan yang terlihat. *Indonesian Journal of Nursing Scientific*, 5(2), 7–13. <https://doi.org/DOI:10.58467/ijons.v5i2>
- Jiwanmall, M., Jiwanmall, S., Williams, A., Kamakshi, S., Sugirtharaj, L., Poornima, K., & Jacob, K. (2020). Preoperative anxiety in adult patients undergoing day care surgery: Prevalence and associated factors. *Indian Journal of Psychological Medicine*, 42(1), 87–92. https://doi.org/10.4103/IJPSYM.IJPSYM_180_19
- Kassahun, W. T., Mehdorn, M., Wagner, T. C., Babel, J., Danker, H., & Gockel, I. (2022). The effect of preoperative patient-reported anxiety on morbidity and mortality outcomes in patients undergoing major general surgery. *Scientific Reports*, 12(1), 1–11. <https://doi.org/10.1038/s41598-022-10302-z>
- Li, G., Yu, L., Yang, Y., Deng, J., Shao, L., & Zeng, C. (2024). Effects of Perioperative Music Therapy on Patients with Postoperative Pain and Anxiety: A Systematic Review and Meta-Analysis. *Journal of Integrative and Complementary Medicine*, 30(1), 37–46. <https://doi.org/10.1089/jicm.2022.0803>
- Lu, G., Jia, R., Liang, D., Yu, J., Wu, Z., & Chen, C. (2021). Effects of music therapy on anxiety : A meta-analysis of randomized controlled trials. *Psychiatry Research*, 304(July), 114137. <https://doi.org/10.1016/j.psychres.2021.114137>
- Menziletoglu, D., Guler, A. Y., Cayır, T., & Isik, B. K. (2021). Binaural beats or 432 Hz music ? which method is more effective for reducing preoperative dental anxiety ? *Journal Section: Oral Surgery*, 26(1), 97–101. <https://doi.org/10.4317/medoral.24051>
- Mukhlis, Ayatullah, & Kadafi, A. (2025). Analisis Analisis Faktor Yang Mempengaruhi Tingkat Kecemasan Pasien Pre Operasi Di Rumah Sakit Umum Daerah Kabupaten Dompu Tahun 2023. *Barangko Jurnal Ilmu Kesehatan*, 3(3), 473–497.
- Nabillah, D. P., Susanto, A., & Sebayang, S. M. (2023). Hubungan Tingkat Kecemasan dengan Tekanan Darah pada Pasien Pre Operasi dengan General Anestesi. *Jurnal Keperawatan Malang*, 8(2), 387–396.
- Nasso, L. Di, Nizzardo, A., Pace, R., Pierleoni, F., Pagavino, G., & Giuliani, V. (2021). Influences of 432 Hz Music on the Perception of Anxiety during Endodontic Treatment : A Randomized Controlled Clinical Trial. *Journal of Endodontics*, 1–6. <https://doi.org/10.1016/j.joen.2016.05.015>
- Putri, P., Afandi, A. T., & Lestari, D. K. (2022). Hubungan Komunikasi Terapeutik dengan Tingkat Kecemasan Keluarga Pasien. *Jurnal of Ners Community*, 13(5), 606–615.
- Sholehah, A. (2025). Efektivitas Terapi Relaksasi Nafas Dalam Terhadap Penurunan Tingkat Kecemasan Pasien Praoperasi Di Rumah Sakit Umum Daerah. *Jurnal Ilmu Kesehatan Terpadu Indonesia*, 1(1), 1–6.
- Sugiarta, J. kamayani. (2021). Gambaran Kecemasan Pada Pasien Pra-Operasi. *Community of Publishing in Nursing*, 9, 305–313.

- Wicaksana, D., & Dwianggimawati, M. S. (2022). Tingkat Kecemasan dengan Hemodinamik pada Pasien Pre Anestesi dengan Tindakan Spinal Anestesi di RS Baptis Batu. *Journal Of Global Research In Public Health*, 7(1), 41–52.
- Yadav, N., Singhal, S., & Bharti, D. (2020). Effect of music on preoperative anxiety in patients undergoing laparoscopic cholecystectomy. *Bali Journal of Anesthesiology*, 4(3), 90–94. https://doi.org/10.4103/BJOA.BJOA_19_20
- Zaki, H., Ahmed, S., Qazi, F. U. R., Fatima, N., & Ali, Y. S. (2025). Comparing binaural beats and 432 Hz music for reduction of preoperative anxiety in root canal patients: a randomized controlled trial. *Journal of the Pakistan Medical Association*, 75(04), 540–544. <https://doi.org/10.47391/jpma.21023>