

The Effects of Music, White Noise, and Ambient Noise on Sedation and Anxiety in Patients Under Spinal Anesthesia During Surgery

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Purpose: To compare effects of music, white noise, and ambient (background) noise on patient anxiety and sedation.

Design: Open, parallel, and randomized controlled trial.

Methods: Seventy-five patients aged 18 to 60 years who were scheduled for surgical procedures under spinal anesthesia were randomly assigned to ambient noise (Group O), white noise (Group B), or music groups (Group M). We evaluated patients' anxiety and sedation levels via the Observer's Assessment of Alertness/Sedation (OAA/S) scale and the State-Trait Anxiety Inventory (STAI) questionnaire.

Finding: At 5 minutes before surgery, the STAI-State Anxiety Inventory (SA) value was significantly lower in Group M than the other groups. At 30-minute recovery, Group M showed significantly lower STAI-SA values than the other groups. Patient satisfaction was highest in Group M. OAA/S values were not significantly different between groups during any period ($P > .05$).

Conclusions: We suggest that patient-selected music reduces perioperative anxiety and contributes to patient satisfaction during the perioperative period.

Keywords: music, white noise, ambient noise, patient anxiety.

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THE PERIOPERATIVE PERIOD is not only a cause of physical trauma but also an important source of fear and anxiety among patients. One way to prevent this is to sedate the patient.¹ Patients operated under regional anesthesia are in particular need of sedation during the perioperative period. Awake patients in the operating room (OR) fear

that they will feel pain during the surgical and/or regional anesthetic procedures, which contributes to increased anxiety.² The aim of the sedation is to ensure the comfort, full cooperation, and cardiovascular stability of patients who can maintain a patent airway. However, because of the adverse effects (eg, respiratory depression,

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nausea, vomiting), optimal patient satisfaction is hard to achieve.³⁻⁵ Pharmacological and non-pharmacological methods can be used to decrease anxiety and the need for sedatives in patients under regional anesthesia.^{1,3,6}

In acoustics, noise is defined as any unpleasant sound that interferes with audible voices. Shapiro and Berland⁷ recommended that the noise level in an OR should not exceed 55 to 86 dB. However, in practice, the noise intensity in the OR is between 65 and 120 dB, which unfavorably affects both patients and the operating team.⁸

Music is prevalent at every stage of an individual's life. In addition, its multifaceted impact on humans has led to the use of music therapy. Therapeutic use of music dates back to the sixth century BC.⁹ Music distracts one's attention from negative stimuli toward pleasant feelings and may reduce pain, anxiety, and stress.⁹⁻¹² In addition, music enables patients to flee into their own world that they know very well and where they feel comfortable. Music also focuses the patient's awareness on the music, which provides comfort.¹³

The frequency and signal of white noise generally resembles the sound of waterfalls, ocean waves, or wind sweeping through trees. White noise is prepared by digitally mixing sounds of equal frequencies in a laboratory. Then, all frequencies contained in this sound are calibrated to form a white noise that is pleasant to the senses.⁵ White noise encompasses all characteristics of sounds within the range of human hearing. It has been used in the treatment of tinnitus, insomnia, masking unwanted sounds, and provision of relaxation.^{5,14}

Patients experience anxiety about surgical intervention, regional and local anesthesia, or other procedures. They also fear pain, discomfort, and encounter many audiovisual stimuli when they awaken in an unfamiliar environment. The use of music therapy in addition to conventional methods, or the masking of ambient noise with white noise to alleviate fear and anxiety felt by the patients, can decrease their discomfort, increase their procedural comfort and tolerability, and can favorably affect sedation and anxiety scores.¹⁵⁻¹⁷

A review of the literature found no previous randomized controlled study of the effects of music,

white noise, and ambient noise on patient anxiety, pain, sedation scores, satisfaction, and hemodynamic parameters during the perioperative period among patients undergoing regional anesthesia. Therefore, the present study investigates the effects of music, white noise, and ambient noise on these parameters among patients operated under spinal anesthesia who also received intravenous (IV) infusion of midazolam.

Materials and Methods

This study was conducted in the Department of Anesthesiology and Reanimation and was approved by the Samsun 19 Mayıs University Ethics Committee of Clinical Investigations; informed consent forms were obtained from patients. This trial is registered with the Australian New Zealand Clinical Trials Registry, number ACTRN12613000406707. This is a three-arm parallel study (clinical trial in which three groups of participants receive different interventions), and allocation is not concealed.

The study cohort comprised 80 patients (American Society of Anesthesiologists [ASA] class I to II) aged 18 to 60 years who underwent surgical, urological, and orthopaedic operations. Those with contraindications to regional anesthesia, hearing impairment, history of psychiatric drug use, hepatic, renal, or hormonal dysfunction, or serious cardiopulmonary disorders were excluded from the study. Patients were assigned by simple randomization using a randomization table.¹⁸ Neither the patients nor the treating physicians were blinded to treatment (open label). To avoid interference with the results obtained, the participants were not premedicated. All participants were questioned about their educational levels, whether they liked to listen to music, where and how often they listened to music, and their musical training, if any.

The patients were randomly divided into three groups that listened to ambient noise (Group O), white noise (Group B), or self-selected music (Group M).

Group O: Ambient noise in the OR was augmented using an amplifier (Mini Amplifier, No: 9988; Ekinçioğlu, Istanbul), and the patients used a headset (SN-802; Snopy Segment Computer Foreign Trade

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