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The Therapeutic Effect of Weightless Music to Reduced the Anxiety of Preoperative Patient

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Abstract
The purpose of this study was to determine the effect of tempo elements through the creation of new music played to patients preoperatively to reduce anxiety levels. Anxiety in preoperative patients can be a risk factor for increased postoperative anxiety if not previously given appropriate intervention. Anxiety can cause aggressive reactions and increase the patient's experience of distress and difficulty with pain management. Music creation with tempo manipulation and sedative concepts is used to reduce the anxiety level of preoperative patients because it has a character that can provide a relaxing sensation, especially slow tempo and simple melody (William, 2018). One-shot case study pre-experimental research method was used to determine the therapeutic effect of weightless music. Five participants consisted of randomly selected preoperative patients aged 18-40 years. Each participant listened to slow tempo music for 15 minutes as a form of non-pharmacological intervention to reduce anxiety and there was no placebo. The results show that there is a decrease in anxiety levels in preoperative patients and 80% of participants thought that tempo is the most influential musical element. Tempo with a speed between 50-60 bpm can cause a pleasant sensation for subjects who are treated to listening to music. Based on the experimental results, the effect of music on reducing the level of preoperative anxiety then created new musical works.

Keywords: anxiety, tempo, practice led research, preoperative

Efek Terapeutik Musik Weightless dalam Menurunkan Kecemasan Pasien Praoperasi

Abstrak
Penelitian ini bertujuan untuk mengetahui pengaruh unsur tempo melalui penciptaan musik baru yang diperdengarkan kepada pasien praoperasi dalam menurunkan tingkat kecemasan. Kecemasan pada pasien praoperasi dapat menjadi faktor risiko meningkatnya kecemasan pascaoperasi apabila tidak diberikan intervensi yang tepat sejak awal. Kecemasan dapat memicu reaksi agresif serta meningkatkan pengalaman distres pasien dan kesulitan dalam pengelolaan nyeri. Penciptaan musik dengan manipulasi tempo dan konsep sedatif digunakan untuk menurunkan tingkat kecemasan pasien praoperasi karena memiliki karakter yang mampu memberikan sensasi relaksasi, terutama musik dengan tempo lambat dan melodi sederhana (William, 2018). Penelitian ini menggunakan metode praeksperimen dengan desain one-shot case study untuk mengetahui efek terapeutik musik weightless. Partisipan penelitian berjumlah lima orang pasien praoperasi berusia 18–40 tahun yang dipilih secara acak. Setiap partisipan mendengarkan musik bertempo lambat selama 15 menit sebagai bentuk intervensi nonfarmakologis untuk menurunkan kecemasan, tanpa pemberian plasebo. Hasil penelitian menunjukkan adanya penurunan tingkat kecemasan pada pasien

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praoperasi, dan sebanyak 80% partisipan menyatakan bahwa tempo merupakan unsur musik yang paling berpengaruh. Tempo dengan kecepatan antara 50–60 bpm mampu menimbulkan sensasi menyenangkan bagi subjek yang menerima perlakuan mendengarkan musik. Berdasarkan hasil eksperimen tersebut, disimpulkan bahwa musik berpengaruh dalam menurunkan tingkat kecemasan praoperasi, yang selanjutnya menjadi dasar penciptaan karya musik baru.

Kata kunci: *kecemasan, tempo, practice-led research, praoperasi*

INTRODUCTION

The development of scientific practice involving music is an interesting topic to discuss, especially the use of music in the scope of clinical practice. Several studies have noted that music used in clinical settings is referred to as medical music; through the process of selecting the type of music (song and instrumental) based on client preferences and the process of listening to music. Music listening activity is a form of non-pharmacological intervention that can be an alternative or complement to pharmacological interventions. The term or concept of music therapy is still relatively new and its use is still developing through various studies that apply music in clinical practice.

Sickness or injury and hospitalization can be unpleasant experiences. Hospitalized patients are prone to environmental stressors such as noise, too bright light, pain, and anxiety related to the process of treating their physical and psychological conditions. Environmental stressors that are not conducive and ineffective coping will have an impact on the patient's condition and care so as to prolong the healing process. Thus, psychological responses such as anxiety about physical conditions and environmental stressors can increase if the interventions provided are not holistic.

Generally, when patients undergo treatment in the hospital, they often complain of anxiety about the illness they are suffering from. Even though pharmacological therapy or medical intervention has been given, anxiety will always accompany subjective complaints. Especially for patients who are going to undergo surgery usually experience a high level of anxiety that affects their psychological condition. Because of being separated from the family, the fear of surgery and even death is a trigger factor for preoperative anxiety.

One way to reduce anxiety is listening to music as a form of non-pharmacological therapy. Listening to music can calm the mind, provide positive stimuli, cause joy, and improve one's quality of life. Listening to music is an alternative option for reducing anxiety in addition to medical treatment in the form of pharmacological therapy. Bradt et al. (2013), Adhikari et al. (2023), and Chiu et al. (2023) said that music can help people to focus their attention on something fun and soothing.

Likewise William (2018), in his experiments in creating and choosing the right music to improve health after surgery. The results of his research show that music can positively influence the patient's physiological condition so that musical interventions can be used to manage the patient's heart rate, breathing, blood pressure, endocrine system, emotions, and pain experiences. However, he also said that there were no definite instructions for choosing or creating music in this context (Shukla et al., 2024).

Therefore, he establishes five theoretical frameworks that become references for composing music in a perioperative context, namely distraction, relaxation, physiological entrainment, emotional entrainment, and endogenous analgesia. This framework is a guide to see the possibility of manipulating musical elements for use and a reference for composers who are interested in the health sector, because there is no standard for creating music in a clinical context. In addition, he also identifies musical elements based on systematic literature reviews by categorizing include and exclude factors. Include factors are a group that can be used to create music in clinical practice, while exclude factors are a group of elements that must be avoided (Oh et al., 2024).

Some priority elements as initial factors in the theoretical framework of relaxation music, are rhythm (slow tempo less than 80 bpm, repetition, ostinato, supportive rhythm, simple and minimalist), melody (sustained, and simple), harmony (simple, consonant with change. familiar chords) and dynamics (soft, unvariable and predictable). While the exclude factors, namely heavily accented rhythms, music with complex rhythms and sudden time changes, syncopation, broad complexity of harmony and dissonance, percussion instruments, high notes, and New Age music styles.

Gomez and Danuser (2007) stated that tempo has been identified as a musical element that has a major role in influencing stress response compared to other musical components. Several studies have shown that tempo has a significant effect on the regulation of musical emotions, stress response, heart rate and blood pressure. Slow tempo relaxes or calms the listener, which is indicated by a decrease in heart rate and blood pressure (Kulinski et al., 2022; Xiao et al., 2023).

There is also a research result which states that there is a negative correlation between tempo, melodic complexity, rhythm, ensemble shape and dynamic variation with relaxation. And the occurrence of a significant positive correlation between high notes, complexity of harmony with relaxation as Tan et al. (2012) and Djohan (2010) uses timbre and tempo elements to measure emotional responses using traditional music in Javanese gamelan. Significantly, it shows a reaction in the form of an emotional response on the subject of musicians and non-musicians.

Beatrice Bretherton et al. (2019) also argue that tempo has a very large impact on autonomic function because of its intimate relationship with heart rate.

This is supported by the statement of Watabene et al. (2017) and Jespersen et al. (2022) stated that the direction of changes in heart rate can be influenced by the direction of changes in tempo. The more the tempo increases, the heart rate increases, and vice versa. Therefore, a pleasant impression will occur when the subject is listening to music at a slow tempo.

This shows that music, especially its musical elements, has a very important role in relation to research that aims to measure the influence of music on a person's psychological and physiological conditions. So that through measured experiments it can provide a non-musical discourse for composers to be more aware that the results of research on the influence of musical elements on health can be a source of creating new musical compositions (Ardani & Awaludin, 2025; Wang et al., 2024; Reynaud, 2021).

MATERIAL DAN METHOD

Experiment

This study used a pre-experimental one shot case study to determine the effect of listening to Weightless music on subjects in preoperative conditions. The experimental process was carried out by identifying random samples and generalizing the population. The instrument (questionnaire) used was the HARS (Hamilton Anxiety Rating Scale) to measure the level of anxiety in preoperative patients (Creswell, 2023).

Participants

Subjects in this study were 5 preoperative patients consisting of 3 male with appendicitis, 1 female with uterine myoma and 1 femae with ovarian cysts aged 18-40 years were obtained through purposive sampling according to demographics and medical track record.

Instruments

Subjects were given an informed consent sheet and a questionnaire (Hamilton Anxiety Rating Scale) consisting of 14 questions to measure anxiety levels. HARS is a standard questionnaire to measure anxiety based on the appearance of symptoms in individuals who experience anxiety. A questionnaire on the influence of music was also given to participants to determine the effect of music, especially the elements (tempo and melody) that most influence the participants' anxiety condition.

The questionnaire was administered before the participants received intervention (listening to music). Participants were randomly selected into the experimental group. All participants were patients who had undergone surgery for

the first time, did not experience time and place disorientation, full awareness (composmentis) and were able to work together during the intervention process.

Stimuli

The audio stimulus used in this study was a treatment of listening to Marco Union's Weightless music with a duration of 8 minutes at a tempo of 60 bpm. Music was played to the patient twice with a duration of 16 minutes via an mp3 player and using the Samsung J6 headset. The intensity of the sound that is heard is regulated by the subject with a volume between 3-5dB according to the background ambience and natural sound effects. The audio editing process is carried out using a DAW (Digital Audio Workstation) with FL Studio software. Participants set a comfortable volume according to their preference when listening to music. The choice of the song Weightless as auditory stimuli because of its relaxed and calm intrinsic character. This is evidenced by a slow tempo (60 bpm) and using sound effects such as ambience and natural sound.

Procedure

All participants had received detailed information about the research process. The administration socialization is also assisted by the nurse on duty so that the participants trust and build good relationships with the experimenter. After filling out the questionnaire (HARS), the participants listened to music with their bodies lying on the bed. The experimenters ensure that the participants are calm and not tense during the intervention. After listening to music for approximately 16 minutes, the researcher asked participants to respond by filling out a questionnaire.

Practice Led Research

The process of creating music after obtaining research results is carried out through literature review and practice led research approach. Musical exploration begins with reflecting on personal musical experiences and practices on an ongoing basis. Practice led research is based on practice and repeated reflection, so that practical and reflective parts can stimulate each other (Nimkulrat, 2007; Daly, 2023; Naser & Saha, 2021). The results of musical experimentation that are applied in clinical practice, namely in preoperative patients are a parameter to construct new musical concepts through exploration and improvisation of tempo elements.

The tempo elaboration is used as the idea of creating new music because there are indications of the most significant influence on the patient's psychological condition (anxiety). The tempo in Weightless music is interpreted through the sound of the kick drum on a drum-set set which is a metaphor for normal heart rhythm, which is 60 times per minute.

In addition to focusing on tempo as a main priority, the experimentation process also includes elements of melody, rhythm, and dynamics. The tempo speed execution used is based on the theoretical considerations of sedative music, so that the tempo of 57 is set as the initial speed until it reaches the coda. The tempo setting is based on the results of the patient listening to Weightless music and its correlation with extra-musical aspects. Because the slow implementation of musk tempo in new works offers a pleasant impression (Liu et al., 2021, Liu et al., 2022; Rivera-Tello, 2023).

The experimentation process was carried out through computer media using Sibelius and FL Studio 11 (DAW) software to obtain optimal results, especially determining the tempo and small changes in it. Pe Researchers use local folk music motifs, namely from the Sikka area to compose musical material other than tempo. It is intended that this work can become a clinical implementation medium (as a non-pharmacological intervention) specifically for the Sikka community because it is in accordance with the local culture.

Data and Analysis

Results

The results of this study showed that listening to music can affect the patient's anxiety level preoperatively and that tempo is the most influential musical element. 80% of participants think that tempo is the most influential element in creating the relaxed atmosphere they feel. Based on the results of observations of the treatment given for 15 minutes, the subject also became more relaxed and calm. The results of measuring the level of anxiety showed that all the subjects studied had only mild anxiety levels. This is obtained from the calculation based on the total score of questions consisting of 14 questions with a total score category; 14-20 (mild anxiety), 21-27 (moderate anxiety), 28-41 (severe anxiety), and 42-56 (very severe anxiety).

Table 1. *Hamilton Rating Scale* (HARS)

Gender	**Jumlah Skor Pertanyaan**														**Total Score**
F	1	3	2	2	1	0	2	1	1	1	2	1	1	2	**20**
M	1	1	2	2	2	2	1	0	2	2	1	0	0	1	**17**
F	0	1	1	1	2	2	2	1	1	1	0	1	1	0	**14**
F	1	2	2	3	0	0	1	1	2	1	0	0	2	1	**16**
M	2	2	1	0	0	1	2	2	1	1	1	1	2	2	**18**

The new musical works were created with the aim of being used to reduce preoperative anxiety levels in patients. Because intrinsically and psychologically Weightless's work has therapeutic potential. This is known from the 60 bpm tempo,

electronic samples, natural soundscapes (ambience), guitar and piano's sounds. Overall, these new work is dominated by the sound of a natural soundscape that also provides a relaxing sensation for the participants. The characteristic of this work lies in the tempo of 60 bpm which speed gradually decreases to 50 bpm at the end.

Apart from being based on theory, experimentation also has an impact on musical construction in influencing the psychological aspects of the participants. The tempo in the work Weightless is the element that most influences the participants' anxious condition. Slow tempo characteristics indicate a change or a positive response. This is indicated by the position of the participants listening to music while lying quietly, relaxed, without experiencing distraction in the form of stressors from outside the environment.

Based on the experimental results on anxiety and the elements of tempo that have the most influence, the writer uses this tempo (slow) as a starting point in compiling Leke's work. The creators developed the tempo element into Leke's composition because it is the same as the results which show that the tempo of Weightless's work is the most influential element in reducing preoperative patient anxiety. Apart from that, slow tempo is also a characteristic of sedative music that can have a relaxing effect on the subject (Ding, 2023; Rossi, 2024).

The development of tempo in new music works is realized with the support of several elements, namely melody, rhythm, and dynamics. The melody is formed by local Sikka music motifs with the aim that this work can be used as a medium for therapy for the Sikka community. The idea was obtained from one of the research results that used Gong Waning (Sikka folk music). Then it is used as an intervention medium to reduce anxiety in patients with coronary heart disorders. Furthermore, the author was inspired to make Leke's work with a different concept, namely through theoretical considerations of the use of musical elements, intervention orientation, and the instruments used. The musical instrument used in the creation of this work is the piano based on the research results of Chen et al., 2015 (Zhang, 2025; Yang, 2025) and Di Nasso et al., 2016 (Toyoshima, 2011; Pittman, 2011; Bugos et al., 2007) stated that the piano instrument is one of the appropriate therapeutic media used to assess psychological responses and their effect on anxiety.

DISCUSSION

Preoperative patients who are going to undergo surgery generally experience anxiety. These cases have varying degrees in each person because everyone has different coping with the disorder. Based on the experimental results, participants who experienced mild anxiety and when listening to Weightless turned out to reduce anxiety. All participants were very enthusiastic and followed the

intervention procedure well, even though they admitted the music was “new”. Weightless listening is very effective in reducing preoperative anxiety which is characterized by the behavior of the subjects showing that they feel calmer and more comfortable.

The process of creating a work based on the experimental element of tempo (Weightless) is then used as the idea of creating Leke's music. Through this process of creation, the creator offers several ideas that arise as a result of the treatment of the extra-musical area:

a. The relationship between intra-musical and extra-musical areas in a creation process can be enforced through experimental effects on certain songs.
b. Tempo exploration is a process to build a musical concept with a compositional systematic approach based on the experimental effect on the dependent variable (anxiety).
c. Slow tempo is a musical element that has an important role in reducing preoperative patient anxiety. The slow tempo characteristic shows that the treatment of the intra-musical aspects of the extra-musical is correlated.

Experiment is a parameter to determine the most influential elements in creating Leke's composition to reduce preoperative patient anxiety. The experimental results show that the most influential musical element is tempo. The use of the Sikka folk music motif as the main melody is intended so that the Sikka community who is experiencing preoperative anxiety can be assisted by musical intervention. Therefore, the correlation between music as a therapeutic medium and patients or participants as treatment subjects can be achieved through experiments.

The intra-musical aspect that gives the impression of "fun" for the participants shows that the intervention procedure arrangement has been supported by good verbal and interpersonal communication (Randall et al., 2014; White & Rickard, 2016; Chang, 2020; Bachman, 2022). Interpersonal communication refers to subjective interpretations that pay attention to the privacy area of the subject. The privacy area encourages subjects to be able to increase attention and focus on objects (music) based on administrative procedures conveyed through discussion.

Leke's musical works are compiled based on the results of repeated experiments and reflections, not only as a music creation concept but also through theoretical considerations. When examined from a number of studies that use music as a therapeutic medium, the determination or selection of music is generally only based on patient preferences. This is one of the creator factors of using Sikka motifs from a local cultural background which is explored to obtain novelty.

The extra-musical aspect (the patient's preoperative anxiety level) which shows the level of mild is the influence of musical interventions. The application of the intramusical aspect to clinical practice requires the result of influencing the extra-musical aspect. So that the goals and direction of the intervention are in

accordance with the context, namely the use of music as a non-pharmacological intervention medium (Loureiro et al., 2024; Park & Suh, 2023; Bachman et al., 2022; Tan et al., 2020).

Meanwhile, Leke's new work still needs to be investigated in relation to its use in the medical world, especially the effect on the level of anxiety of preoperative patients (Harney et al., 2023; Randall et al., 2023; Taipale, 2024; Eberhart, 2020; Sathe et al., 2023; Chen et al., 2022; Chen et al. 2021, Lalezari et al., 2022; Elay & Özkaya, 2023; Kakar, 2023). Meanwhile, the musical elements and melodic motifs used are classified as sedative music types, so that in practice, researchers do not need to study the concept of this work theoretically. Because Leke's music composition was created with the aim of reducing preoperative patient anxiety.

CONCLUSION

Musical elements can be used in a musical composition after going through experimentation to find out how much it affects psychological conditions. These experiments resulted in showing that the most influential musical element, was tempo. So that the pleasant impression on the subject can be observed through the changes that occur before and after experimentation. The tempo used is between 50-60 bpm and creates a pleasant sensation for the subject given the intervention. The pleasant sensations arise as a result of increased activity of the parasympathetic nerves that respond to slow tempo music.

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