Effects of Music on Preoperative Anxiety in Patients Undergoing Hair Transplantation: A Preliminary Report

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ABSTRACT

Objective: To study the effects of music on anxiety in patients undergoing hair transplantation.

Materials and Methods: This randomized controlled trial enrolled patients undergoing hair transplantation. The patients were randomized into a music group, who listened to music for 15 minutes during the preoperative period, and a control group, who were not exposed to music. Two scales were used to measure anxiety. One was the State-Trait Anxiety Inventory (STAI), comprised of a state anxiety scale (STAI-S) and trait anxiety scale (STAI-T). The other was the Visual Analog Scale for Anxiety (VASA). Demographic and physical parameters (blood pressure, heart rate, and respiratory rate) were recorded.

Results: The 26 patients had a mean age of 40.8 ± 10.4 years. Twenty-three (88.5%) were men. The 2 groups had no significant differences in their STAI-S or VASA scores, or physical parameters before and after intervention. The STAI-S score of the control group significantly increased with time ($P = 0.027$). Additionally, a significant decrease in the VASA score was observed after the intervention for the music group ($P = 0.039$). No adverse events were noted.

Conclusion: Listening to music is an easy, effective, and safe method of reducing preoperative anxiety in patients undergoing hair transplantation. The method should be employed during the preoperative period for patients undergoing hair transplantation. It may also be considered for use in similar procedures.

Keywords: Anxiety; hair transplantation; music; state-trait anxiety inventory; preoperative (Siriraj Med J 2023; 75: 13-19)

INTRODUCTION

The preoperative period is a worrying event for patients and creates emotional, cognitive, and physiological responses.[1] Waiting for surgery or invasive procedures has been reported to create stress and anxiety, which aggravate and affect physiological and psychological parameters.[2] Preoperative anxiety is a major concern in patients undergoing surgery. It may be attributed to a fear of complications, unfamiliar environments, needles, injections, pain, bleeding, or separation from friends and family.[3] Anxiety has a considerable impact on surgical outcomes. It is associated with an increased requirement for postoperative pain control, a prolonged recovery time, and an increase in postoperative complications.[4]

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Pharmacological and nonpharmacological interventions have been employed to alleviate preoperative anxiety. Pharmacological interventions, such as sedatives and anti-anxiety drugs, are widely used, easy to administer, and effective.[5] However, these drugs frequently cause adverse events like drowsiness and respiratory depression, and they may impair decision-making. As well, patients should not drive as the drugs can affect their judgment.[5,6] Because of the various drawbacks, a pharmacological intervention may not be appropriate for ambulatory surgery. In comparison, nonpharmacological interventions, such as preoperative education and the use of relaxation techniques and music, are being increasingly used.[7] In particular, music is a safe, easy, and noninvasive method of reducing anxiety. Additionally, listening to music has proven to decrease anxiety sufficiently to allow the total dose of sedatives to be reduced.[8]

Hair transplantation, an outpatient procedure performed under local anesthesia, is a treatment option for patients who have failed to respond to standard medical treatment.[9] Although hair transplantation is a minimally invasive surgery, patients have reported severe anxiety levels before the procedure.[10,11] Since preoperative anxiety has substantial adverse influences on postoperative outcomes and given the ease of use, low cost, and safety of music, this study aimed to evaluate the effects of music in reducing preoperative anxiety in patients undergoing hair transplantation. This study used the State-Trait Anxiety Inventory (STAI) questionnaire and the Visual Analog Scale for Anxiety (VASA) to evaluate the effects of music on preoperative anxiety in patients undergoing hair transplantation.

MATERIALS AND METHODS

This prospective, single-blind, randomized controlled trial was conducted at the Hair Clinic, Outpatient Dermatology Unit, in a tertiary hospital in Thailand between February 2018 and August 2021. The study protocol was approved by the Institutional Review Board (COA no. Si 077/2019) and was registered with the Thai Clinical Trials Registry (TCTR20210820004). All patients gave their written informed consent.

Participants

The study enrolled patients aged 18 years or older who underwent hair transplantation with the follicular unit transplantation or follicular unit excision technique and had a waiting time of at least 45 minutes before surgery. Exclusion criteria were patients with any psychological disease, regular use of antidepressant or anxiolytic drugs, an inability to read and understand Thai, a visual impairment or hearing loss that impaired their ability to communicate, and an unwillingness to participate or listen to music. The patients were divided into 2 groups using a simple random sampling method. Participants in a music group received a preoperative music intervention for 15 minutes, whereas those in a control group did not receive the music intervention.

Data collection

Demographic and clinical data were collected using face-to-face interviews. Anxiety levels in the patients were assessed using an STAI questionnaire and a VASA. The STAI is a 40-item, self-report questionnaire developed by Spielberger et al that uses a 4-point Likert-type scale for each item.[12] It comprises 2 parts: a state anxiety scale (STAI-S), which measures the current state of anxiety ("state anxiety"); and the trait anxiety scale (STAI-T), which assesses the general state of anxiety ("trait anxiety"). Each scale has 20 items. The score for each item ranges from 1 ("not at all") to 4 ("very much"), and the total score for each part ranges from 20 to 80 points. Higher scores indicate a greater severity of anxiety.[12,13] The STAI was translated into Thai by Nonthasak and colleagues.[14] The reliability of Thai STAI has been documented (Cronbach's alpha = 0.89).[15,16] With regard to the VASA, it uses a 10-cm horizontal line with a scale ranging from 0 to 10, indicating "not anxious at all" and "extremely anxious," respectively. The scores are categorized to indicate mild (≤ 3), moderate (4–6), and severe (≥ 7) degrees of anxiety.[17] Patients were instructed to indicate their level of anxiety on the line. The distance was then measured and noted.

Intervention

All patients were requested to answer the STAI questionnaire (both the STAI-S and STAI-T components) and rate the VASA independently before the intervention. Nursing staff also recorded the physical parameters of each patient: heart rate, systolic blood pressure, diastolic blood pressure, and respiratory rate. After that, members of the music group were invited to listen to music on YouTube via headphones through mobile telephones that were made available to them. They were allowed to choose 1 set of classical music from a list using the keyword "relaxing instrumental music" and listen for 15 minutes during the preoperative period. The volume of the music was modified by each patient according to their personal preference. In contrast, the members of the control group were instructed to wait in a silent room and were not allowed to listen to any music for 15 minutes. Subsequently, all patients independently redetermined their STAI-S and VASA scores, and the

nursing staff remeasured their physical parameters. The patients then had a 5- to 15-minute wait before the hair transplantation procedure commenced. All processes were performed before the surgery and were completed in a single visit.

Statistical analyses

Demographic data were calculated using descriptive statistics. Categorical data are presented as numbers (percentages). Continuous data with normal distributions are shown as the mean ± SD and were compared by an independent t-test. The Wilcoxon signed-rank test was used to determine the differences between each group before and after the intervention. Spearman's rank correlation coefficient was used to calculate the association between pairs of variables. Data were analyzed using PASW Statistics for Windows (version 18; SPSS Inc., Chicago, IL., USA).

RESULTS

A total of 30 patients were evaluated for eligibility. Four were excluded: 2 had a waiting time less than 45 minutes, 1 regularly used anxiolytic drugs, and 1 declined to participate (Fig 1) Therefore, 26 patients were included in the study (control group, n =14; music group, n = 12). The mean age of the patients was 40.8 years, and 23 of the 26 (88.5%) were men. Most of the patients (96.2%) were diagnosed with androgenetic alopecia, and 1 (3.8%) had scarring alopecia from burns. All patients had educational levels higher than primary school grade 9. The mean trait anxiety scores of the control and music groups were 46.2 ± 4.5 and 47.5 ± 2.7, respectively. There were no statistically significant differences in any of the demographic parameters of the groups, except age and marital status. The demographic data of the 26 patients are detailed in Table 1.

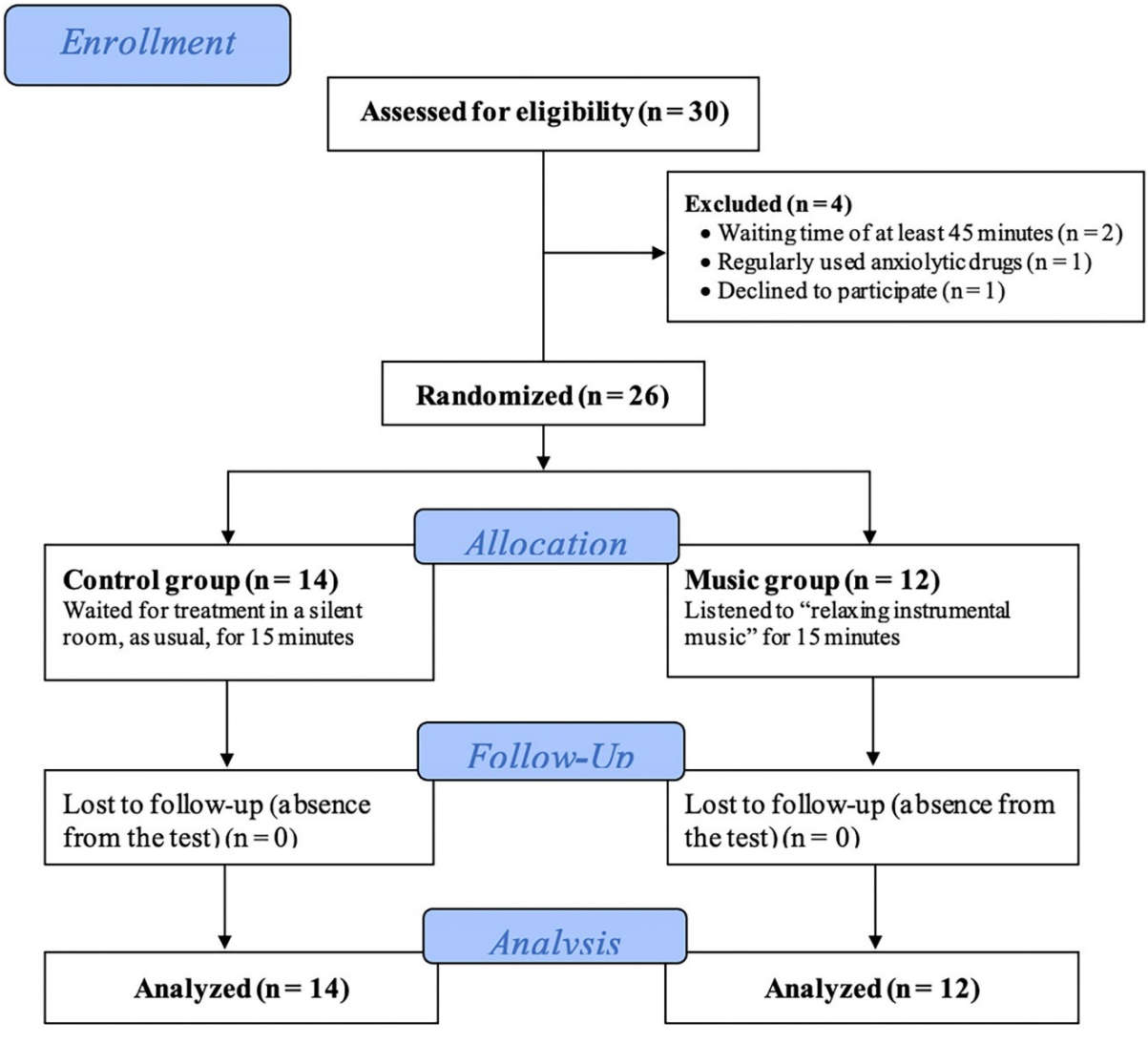

Fig 1. Flowchart outlining patient enrollment, randomization, follow-up, and analysis.

TABLE 1. Demographic data of patients undergoing hair transplantation.

Characteristic	Total (N, 26)	Control group (n, 14)	Music group (n, 12)	*P* value
Sex				
Male	23 (88.5)	12 (85.7)	11 (91.7)	1.000
Female	3 (11.5)	2 (14.3)	1 (8.3)	
Age (years)	40.8 ± 10.4	45.0 ± 9.8	35.9 ± 9.1	0.022*
Age onset (years)	24.2 ± 10.0	25.1 ± 12.5	23.1 ± 6.0	0.609
Body mass index (kg/m^2)	23.5 ± 2.2	23.3 ± 2.4	23.7 ± 2.0	0.653
Marital status				
Single	14 (53.8)	5 (35.7)	9 (75.0)	0.045*
Married	12 (46.2)	9 (64.3)	3 (25.0)	
Living				
With family	20 (76.9)	12 (85.7)	8 (66.7)	0.365
Alone	6 (23.1)	2 (14.3)	4 (33.3)	
Previous hair transplantation				
No	12 (46.2)	4 (28.6)	8 (66.7)	0.052
Yes	14 (53.8)	10 (71.4)	4 (33.3)	
Hair transplantation in this visit				
FUE	19 (73.1)	10 (71.4)	9 (75.0)	1.000
FUT	7 (26.9)	4 (28.6)	3 (25.0)	
Trait anxiety score	46.8 ± 3.8	46.2 ± 4.5	47.5 ± 2.7	0.395

The data are presented as mean ± SD or number (%)
*, statistically significant (P <0.05)
Abbreviations: FUE: follicular unit excision; FUT: follicular unit transplantation

Although patients in the music group were 10 years younger than those in the control group, age was not associated with the baseline STAI-S scores of the music and control groups (r = 0.049; P =0.812). Similarly, while most of the patients were single, there was no difference in the baseline STAI-S scores of single and married patients (P = 0.413). At baseline, the mean state anxiety scores, mean VASA scores, and physical parameters of the 2 groups were similar. After the intervention, there were no statistical differences in any of the data items of the 2 groups (P > 0.050; Table 2). However, a comparison of the changes in the pre- and postintervention values within each group revealed significant differences for 2 items. On the one hand, the mean state anxiety score of the control group significantly increased after the patients waited in the silent room for 15 minutes (before, 45.6 ± 3.5; after, 48.4 ± 4.3; P = 0.027). On the other hand, the VASA score of the music group significantly decreased as a result of listening to music (before, 2.7 ± 2.3; after, 1.9 ± 2.0; P = 0.039). No other significant differences within the groups were revealed. Moreover, no side effects were reported during the study period.

DISCUSSION

Regarding the cognitive behavioral model of social anxiety, exposure to a feared social situation activates assumptions that have been formed by past experiences. These assumptions activate socially anxious individuals to regard certain social situations as dangerous, leading to low self-esteem.[18] According to this theory, the loss of hair can create anxiety and affect self-esteem and self-image. Consequently, effective treatments are sought for patients with hair loss.[19] Several studies have reported hair transplantation to be an effective way to potentially reverse psychosocial problems by reducing anxiety and improving self-confidence.[19,20] However, effective strategies

TABLE 2. Comparison of first- and second-measured state anxiety scores, VASA scores, and physical parameters of control and music groups.

Variable	Mean ± SD Control group (n, 14)	Music group (n, 12)	*P* value
State anxiety score			
1st measurement	45.6 ± 3.5	45.7 ± 3.6	0.946
2nd measurement	48.4 ± 4.3	46.3 ± 3.5	0.173
VASA (n = 19)			
1st measurement	2.2 ± 2.4	2.7 ± 2.3	0.652
2nd measurement	1.6 ± 1.7	1.9 ± 2.0	0.730
Heart rate			
1st measurement	82.6 ± 12.8	82.1 ± 12.9	0.924
2nd measurement	76.8 ± 15.9	80.4 ± 10.9	0.518
Respiration rate			
1st measurement	15.9 ± 0.9	15.5 ± 1.2	0.339
2nd measurement	15.8 ± 1.0	16.2 ± 0.6	0.415
SBP			
1st measurement	126.1 ± 11.2	129.4 ± 13.4	0.495
2nd measurement	126.5 ± 12.3	129.4 ± 10.2	0.535
DBP			
1st measurement	79.3 ± 11.9	78.3 ± 6.2	0.788
2nd measurement	81.2 ± 15.5	77.4 ± 11.7	0.510

The data are presented as mean ± SD

Abbreviations: DBP, diastolic blood pressure; SBP, systolic blood pressure; SD, standard deviation; VASA, visual analog scale for anxiety

to decrease preoperative anxiety in hair transplant patients have not been explored.

Previous studies demonstrated that listening to music significantly reduced anxiety in patients undergoing dermatological procedures.[21-23] Vachiramon and associates found significant reductions in the anxiety of patients who listened to self-selected music while waiting for physicians and during the first stage of Mohs micrographic surgery. This was especially the case for patients undergoing the surgery for the first time.[21] Sorensen and others concluded that listening to classical music during an injection of local anesthesia significantly decreased pain and anxiety in non-Mohs dermatologic procedures.[22] Similarly, Deivasigamani and colleagues found that music intervention reduced anxiety in patients undergoing dermatosurgery under local anesthesia.[23] In contrast, Alam and coauthors reported that relaxing music was not associated with any significant differences in pain, anxiety, blood pressure, or heart rate in patients undergoing excisional surgery for basal and squamous cell carcinoma.[24]

In the present study, listening to music was not associated with reducing the anxiety of the patients undergoing hair transplantation, and it did not affect their physical parameters. There are several possible reasons for this. First, the state anxiety score of the patients in this study was only slightly higher than 40, which is the cutoff score used to detect anxiety symptoms.[25] Similarly, anxiety levels measured by VASA showed mild anxiety. This is contrary to the work by Ahmad and Mohmand, who reported moderate to severe anxiety in patients undergoing hair transplantation.[10] This difference from our study may be because individuals are increasingly using the Internet to access a wide range of health information. Their internet research may cause them to perceive that hair transplantation is a safe and minor surgical procedure with very few complications, leading

them to worry less.[26] Listening to music may therefore be unable to measurably decrease their low level of state anxiety. On the other hand, the patients in our study had a high mean trait anxiety score.[27] This may be because the patients had previous personality or mental health problems. Patients who suffer severely from hair loss experience multiple feelings and emotions due to personal and social pressures. The hair loss may lead to psychological stress out of proportion to the problem.[28] Accordingly, such patients are more likely to have high expectations for their hair transplant results. Therefore, these expectations might also impact the effects of music on their pre-intervention anxiety.

Second, the patients were instructed to listen to classical music and were unable to select the music of their choice. Although classical music was shown to offer greater benefits than other musical genres, some authors reported that the greatest anxiolytic effect may be achieved when patients select familiar music that they enjoy.[6,21] Third, the duration of music intervention in the current investigation may have been a contributing factor. This study administered a 15-minute music intervention. This is shorter than the intervention period of previous studies, in which patients listened to 30 minutes of music in the preoperative setting.[29,30] Further studies with larger sample sizes and longer music interventions may be required to elucidate the effects of music on anxiety in hair transplant patients.

Although this study did not detect significant differences between the music and control groups, significant differences within the groups were reported. There was a significant increase in anxiety measured by STAI-S in the control group. This could be attributed to an increasing trend of preoperative anxiety over time.[31] Additionally, a reduction in anxiety using VASA was demonstrated by the music group after listening to music. The theoretical basis of music in terms of anxiety reduction lies in the impact of music on the autonomic nervous system, which enhances relaxation. The auditory stimulation of music is believed to affect a number of neurotransmitters and alter the experience of anxiety, fear, and pain. Consequently, more positive perceptual experiences, including stimulation of stress and anxiety reduction, are achieved. Additionally, music promotes feelings of physical and mental relaxation by refocusing attention on pleasurable emotional states.[32] While listening to music, patients' awareness of time passing was distracted because their attention was on the music, resulting in greater relaxation.[33] This study demonstrated a trend of reduction in anxiety through music listening. Since music listening is a noninvasive, easy-to-administer, effective, and safe method, its introduction should be considered as a means of reducing the anxiety of patients undergoing hair transplantation or similar procedures.

This study has some limitations. As it was a preliminary study, only 26 patients were included. In addition, the prevalence and severity of androgenetic alopecia have been reported to be higher in males than in females.[34] Consequently, most of the hair transplant patients in this study were men. Validation through a larger sample size and a sex-balanced distribution is needed to conclusively demonstrate the effects of music on preoperative anxiety in patients undergoing hair transplantation. Moreover, the patients in our study could not be blinded to the group assignments. This may have affected their evaluations, resulting in bias. In addition, the unequal waiting times before the commencement of the procedures may have affected the patients' pre- and post-surgery anxiety scores.

In conclusion, music is an easy-to-administer, effective, and safe method to reduce preoperative anxiety in patients undergoing hair transplantation surgery. During the preoperative period, listening to music should be recommended to the patients. The method may also be considered for use in similar procedures.

Conflicts of Interest: All authors declare that there are no conflicts of interest related to any aspect of this research.

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