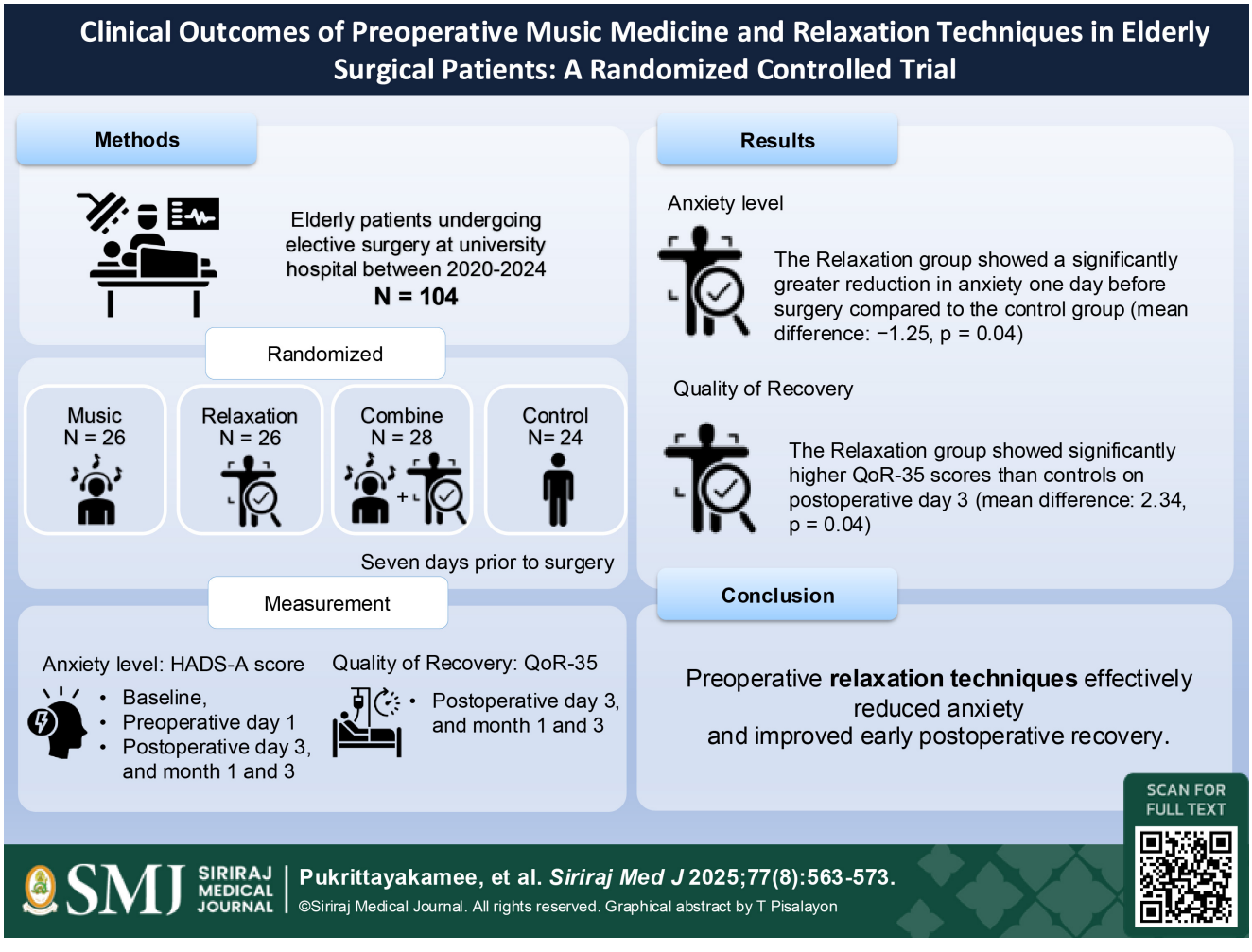
Clinical Outcomes of Preoperative Music Medicine and Relaxation Techniques in Elderly Surgical Patients: A Randomized Controlled Trial

Panate Pukrittayakamee, M.D., M.Sc.[1,*], Arunotai Siriussawakul, M.D., Ph.D.[2], Siriporn Pitimana-aree, M.D.[2], Panida Yomaboot, Ph.D.[1], Gothchawan Charoenprasopsuk, M.D.[3], Thanwalai Pisalayon, M.Sc.[4]

[1]Department of Psychiatry, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, [2]Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, [3]Golden Jubilee Medical Center, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, [4]Siriraj Integrated Perioperative Geriatric (SiPG) Excellent Research Center, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand.



*Corresponding author: Panate Pukrittayakamee
E-mail: panate092@gmail.com
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ORCID ID:http://orcid.org/0000-0002-6564-7433
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ABSTRACT

Objective: This study examined the short- and long-term effects of one week of preoperative music medicine and relaxation techniques on perioperative anxiety and postoperative recovery.

Materials and Methods: Patients aged ≥60 years undergoing elective surgery at a university hospital were randomized into four groups: music medicine, relaxation techniques, combined intervention, and control. Interventions were administered for seven days prior to surgery. Anxiety was assessed using the Hospital Anxiety and Depression Scale–Anxiety subscale (HADS-A) at baseline, one day before surgery, and on postoperative day 3, and months 1 and 3. Postoperative recovery was evaluated using the Quality of Recovery-35 (QoR-35) questionnaire. Data were analysed using a linear mixed model.

Results: Of the 140 enrolled participants, 104 completed the study. Baseline characteristics were comparable across all groups. Compared to the control group, the relaxation group showed a significantly greater reduction in anxiety one day before surgery (mean difference: −1.25, p = 0.04), though no significant differences were found at subsequent time points. The music and combined groups exhibited nonsignificant reductions in anxiety. On postoperative day 3, the relaxation group had significantly higher QoR-35 scores than controls (mean difference: 2.34, p = 0.04), whereas the other intervention groups showed nonsignificant higher QoR-35 scores. By months 1 and 3, QoR-35 scores had slightly increased in all intervention groups, but without statistical significance compared with the control group.

Conclusion: Preoperative relaxation techniques effectively reduced anxiety and improved early postoperative recovery. However, their long-term benefits, along with those of music interventions, were not evident.

Keywords: Anxiety; music therapy; relaxation therapy; perioperative care; geriatric patients (Siriraj Med J 2025; 77: 563-573)

INTRODUCTION

Preoperative anxiety is defined as an unpleasant emotional response to uncertainty regarding surgical outcomes.[1] Its prevalence ranges from 60% to 80%, depending on the type of surgery.[2,3] Causes of preoperative anxiety include fear of unsuccessful surgery, anesthesia awareness, medical errors, pain, financial burden, and concern about family members.[4,5] Preoperative anxiety can lead to increased cortisol levels, which are associated with impaired immune responses, infections, poor wound healing, and electrolyte imbalances. It can also result in poor compliance with treatment and inadequate self-care, contributing to negative postoperative outcomes such as increased pain, prolonged hospital stays, and reduced quality of life.[1] The risks of these adverse outcomes are heightened in elderly patients, as physiological decline increases their vulnerability to physical stress. Therefore, presurgical elderly patients should receive comprehensive care addressing both physical and psychological needs to minimize postoperative complications.[6,7]

Psychological and behavioral interventions with evidence supporting their effectiveness in reducing preoperative anxiety include cognitive behavior therapy, music medicine, massage therapy, and relaxation techniques.[1,8] Among these, music medicine and relaxation techniques may be more feasible for presurgical elderly patients, as these techniques are easy to practice and can be self-administered at home. Music medicine, a subset of music therapy, involves listening to music to enhance health and well-being.[9-11] Focused music listening can alleviate anxiety through psychological and physiological mechanisms, such as synchronizing body rhythms, reducing adrenergic activity, influencing the limbic system, and stimulating endorphin release. These processes promote physical relaxation, as evidenced by decreases in pulse rate and blood pressure.[12] A systematic review study revealed that music medicine was effective in reducing preoperative anxiety.[13]

Practicing relaxation techniques, such as breathing exercises and body scans, is a feasible approach to reducing preoperative anxiety in elderly patients. Deep diaphragmatic breathing—slow inhalation followed by gradual exhalation—enhances parasympathetic activity, promoting relaxation.[14] A body scan, a mindfulness-based stress-reduction technique, involves nonjudgmental awareness of bodily sensations from the toes to the head. This practice helps patients stay present and reduces distraction from negative thoughts and emotions, leading to a calmer state of mind.[15] A systematic review and meta-analysis of 11 clinical trials revealed that relaxation techniques combined with psychological interventions effectively improved negative emotions following surgery.[8]

Although evidence supports the effectiveness of music medicine and relaxation techniques in reducing perioperative anxiety, limitations remain in the literature. First, most studies focus on short-term effects, with limited research on their long-term impact. Second, few studies have examined the effects of these interventions on postoperative outcomes, such as recovery quality. Since anxiety is a known risk factor for negative postoperative outcomes[1], it can be hypothesized that reducing anxiety may also enhance recovery. Finally, most research has focused on short-duration interventions—hours or a single day before surgery—while studies on longer interventions and their potential lasting benefits are scarce. This study aimed to assess the short- and long-term effects of a one-week preoperative intervention involving music medicine, relaxation techniques, or a combination of both on preoperative anxiety, postoperative anxiety, and recovery quality.

MATERIALS AND METHODS

Ethical considerations

Ethics approval was granted by the Siriraj Institutional Review Board. The certificate of approval was Si 471/2020. Documented informed consent was obtained from all participants before they participated in the research. The study has been officially registered with the Thai Clinical Trial Registry under the identifier TCTR20200910002.

Participants

Participants were recruited during their visit to the preanesthetic clinic prior to admission for elective surgery at Siriraj Hospital between August 10th, 2020 and September 26th,2024. Patients aged ≥60 years with American Society of Anesthesiologists (ASA) physical status classification I–III who were scheduled for elective surgery under general or regional anesthesia were eligible for inclusion. Exclusion criteria included a history of dementia, delirium, intellectual disability, or psychiatric disorders; current use of psychiatric medications; or scheduled surgery involving vital organs such as the brain or heart.

Study design

A randomized controlled trial was conducted to examine the effectiveness of music medicine, relaxation techniques, and music medicine plus relaxation techniques on preoperative and postoperative anxiety and quality of recovery after surgery. A total of 140 participants were randomized into 4 groups, including music medicine, relaxation techniques, music medicine plus relaxation techniques, and controls using block-of-4 randomization.

Interventions and control

Music medicine

The participants were provided with a list of classic songs that had been selected by a music therapist. These songs were assessed by a music therapist in terms of relaxation effects and appropriateness for elderly individuals. The characteristics of these songs that can produce relaxation effects are smooth melody and slow tempo without accented beats or percussion.[13] The participants were requested to choose at least 10 songs they liked from the list. They could listen to these songs from their own copyright video compact disc or cassette tape or from online streaming services offering copyright music. They were also given earphones to help them focus on listening to music and to eliminate auditory disturbances. The participants initially practiced listening to music under supervision by a music therapist before they started self-practicing at home. Then, they were assigned to listen to the songs they chose through the earphones at home for 30 minutes daily for 7 consecutive days before surgery.

Relaxation techniques

The participants were trained by a psychologist to practice relaxation techniques, including breathing exercises and body scans, and were provided with a guided video containing instructions and demonstrations of these techniques. The breathing exercises were performed by using a diaphragmatic breathing technique to breathe in and breathe out slowly and deeply.[14] A body scan was performed by nonjudgmentally paying attention to any sensation in each part of the body without any response, sweeping from the toes to the head.[15] The relaxation technique began with a 10-minute breathing exercise followed by a 20-minute body scan. The participants were assigned to practice relaxation techniques at home with a guided video for 30 minutes daily for 7 consecutive days before surgery.

Music medicine plus relaxation techniques

The participants were provided with both music medicine and relaxation technique interventions. They were assigned to practice 30-minute music medicine and 30-minute relaxation techniques at home daily for 7 consecutive days before surgery.

Control

The participants received standard care without any intervention related to music or relaxation techniques.

Instruments

The HADS-A consists of 7 items measured using

a 4-point Likert scale: 0 indicates absence or rarely, 1 indicates mild or occasionally, 2 indicates moderate or often, and 3 indicates extreme or very often/most of the time. Total scores range from 0 to 21, with higher scores indicating greater anxiety. An evaluation of the psychometric properties of both the original and Thai versions of the HADS demonstrated good validity and reliability, with a sensitivity of 100%, specificity of 86%, and internal consistency (Cronbach's alpha) of 0.86.[16,17]

Postoperative recovery quality was assessed using the Thai version of the Quality of Recovery–35 (QoR-35) questionnaire, which covers five domains: physical comfort, emotional state, physical independence, support received, and pain. The QoR-35 includes 35 items rated on a 5-point Likert scale, where 1 = very poor, 2 = poor, 3 = fair, 4 = good, and 5 = excellent. Total scores range from 35 to 175, with higher scores indicating better quality of recovery. Psychometric evaluations of both the original and Thai versions demonstrated strong validity and reliability, with high internal consistency at three time points (Cronbach's alpha = 0.88, 0.89, and 0.91, respectively; $p < 0.01$) and a split-half reliability coefficient of 0.65 ($p < 0.001$).[18]

Data collection

The data collected included demographic characteristics, anxiety level, quality of recovery after surgery, number of participants with adverse effects, and number of drop-out participants. Anxiety level was assessed via the Thai version of the Hospital Anxiety and Depression Scale–Anxiety subscale (HADS-A). The HADS consists of anxiety and depression subscales that measure the severity of anxiety and depression, respectively, in general hospital settings. On the day of recruitment (before starting the interventions), demographic characteristics were collected, and baseline HADS-A scores were assessed (baseline assessment). On the day of admission, which was 1 day before surgery (after the interventions were completed), HADS-A scores were assessed a second time. After surgery, the HADS-A scores and the QoR-35 scores were assessed at postoperative day 3, month 1, and month 3.

Statistical analysis

Sample sizes were calculated via a two-sided *t* test equation on the basis of previous studies.[19-21] The calculated sample size was 30 people per group. To account for potentially incomplete data or participant withdrawal from the research project, data will be collected from an increased number of volunteers, with 35 participants per group, totaling 140 participants.

The data were analyzed by using Stata Statistical Software, release 14 (StataCorp LLC, College Station, TX, USA). The demographic characteristics of the 4 groups were compared via independent *t* tests and chi-square tests. The number of participants with adverse effects and the number of drop-out participants in the 4 groups were compared via the chi-square test. The linear mixed model was used to determine changes in HADS-A scores over time, differences in changes in HADS-A scores between each intervention group and the control group, differences in QoR-35 scores between each intervention group and the control group, and differences in changes in QoR-35 scores between each intervention group and the control group. As the QoR-35 scores were not normally distributed, these data were transformed into logarithmic values for analysis.

RESULTS

Number of participants

A total of 140 participants were recruited for the study. The participants were randomly allocated to the music group, relaxation group, music plus relaxation group, or control group, with 35 participants in each group. Nine participants in the music group, 9 participants in the relaxation group, 7 participants in the music plus relaxation group, and 11 participants in the control group were excluded from the study. Participants in the three intervention groups were excluded because their surgeries were postponed after they had already completed a 7-day intervention. Participants in the control group were excluded because their surgeries were cancelled or postponed for an indefinite period. The remaining number of participants was 104 (26 in the music group, 26 in the relaxation group, 28 in the music plus relaxation group, and 24 in the control group). Fig 1 represents the CONSORT diagram.

Demographic characteristics

The demographic characteristics of the participants are shown in Table 1. The mean age of the participants was 70.81 years. The proportions of males (51%) and females (49%) were nearly equal. Most participants had a history of previous surgery (76.9%). The mean length of stay of all participants was 5.86 days. The mean baseline HADS-A score of all participants was 1.99. The demographic characteristics of the 4 study groups (3 intervention groups and 1 control group) were not significantly different.

Changes in HADS-A scores over time in each study group

The mean changes in HADS-A scores from baseline

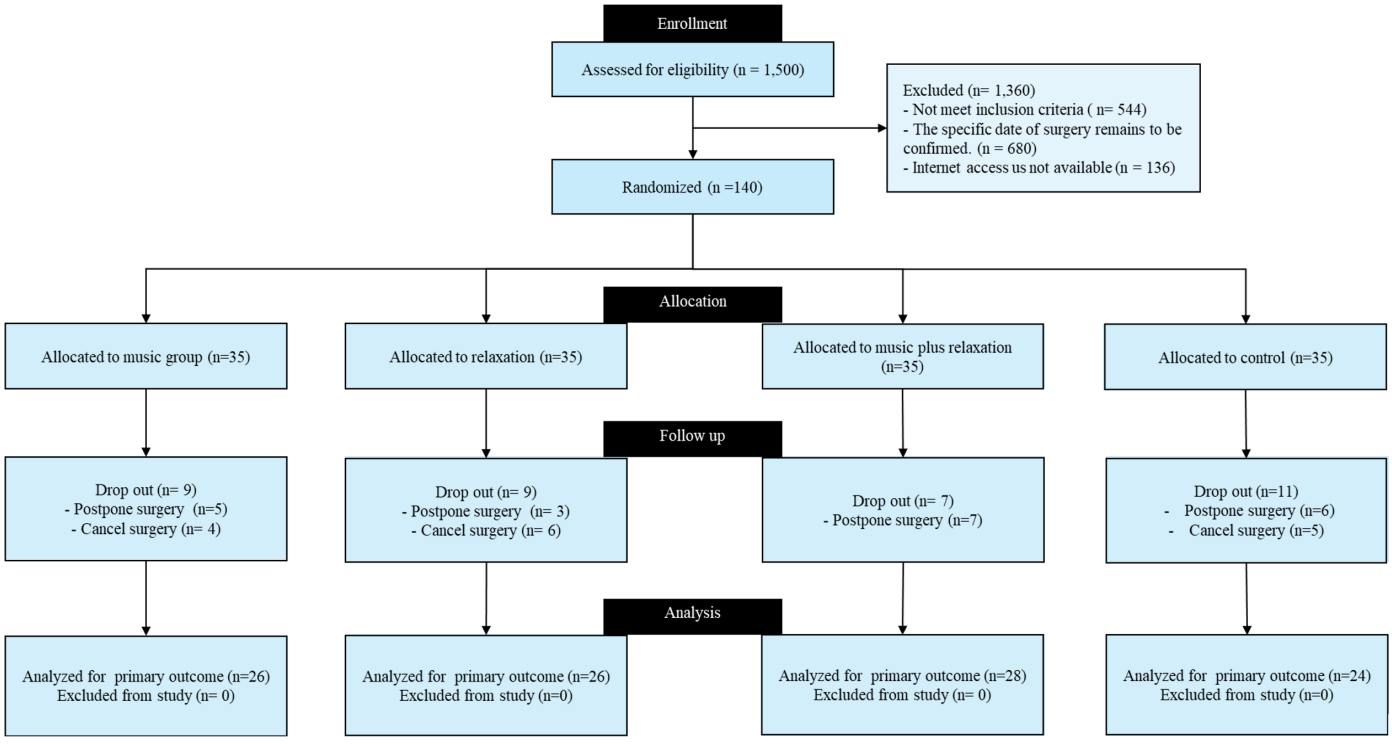


Fig 1. CONSORT diagram
Data collection took place during the COVID-19 pandemic (2020–2024), which impacted participant recruitment and surgical scheduling.

TABLE 1. Baseline demographic and clinical characteristics by study group (n = 104).

Variable	All participants (n = 104)	Music group (n = 26)	Relaxation group (n = 26)	Music plus relaxation group (n = 28)	Control group (n = 24)
Age, mean (SD)	70.81 (6.57)	72.54 (8.44)	70.70 (5.78)	70.04 (5.85)	69.91 (5.85)
Sex, n (%)					
Male, n (%)	53 (51)	14 (26.4)	12 (22.6)	14 (26.4)	13 (24.5)
Female, n (%)	51(49)	12 (23.5)	14(27.5)	14(27.5)	11 (21.6)
ASA					
ASA I, n (%)	15 (14.4)	5 (33.3)	4 (26.7)	3 (20)	3(20)
ASA II, n (%)	49 (47.1)	12 (24.5)	14 (28.6)	13 (26.5)	10 (20.4)
ASA III, n (%)	40 (38.5)	9 (22.5)	8 (20)	12 (30)	11 (27.5)
Experienced surgical procedure, n (%)	84 (80.8)	23 (27.4)	22 (26.2)	22(26.2)	17(20.2)
Length of stay (days), mean (SD)	5.86 (4.01)	5.71 (5.78)	6.52 (4.18)	5.78 (2.67)	5.33 (2.76)
Baseline HADS-A, mean (SD)	1.99 (2.22)	1.96 (2.31)	2.04 (2.26)	2.36 (2.26)	1.52 (2.06)

Abbreviations: ASA, American Society of Anesthesiologists physical status classification; HADS-A, Hospital Anxiety and Depression Scale–Anxiety subscale.

(preintervention) to each time point (postintervention) in each study group are shown in Table 2. The music group, relaxation group, and music plus relaxation group presented significant reductions in the mean HADS-A scores at every postintervention time point (the reduction in the mean scores ranged from −1.15 to −2.18, with *p* values ranging from less than 0.001 to 0.006). The control group showed a nonsignificant reduction in the mean HADS-A score at admission (a reduction in the mean score of −0.29, *p* 0.506) but a significant reduction at postoperative day 3, month 1, and month 3 (a reduction in the mean score ranging from −0.88 to −1.46, *p* values ranging from 0.001 to 0.046).

Comparison of the changes in HADS-A scores between each intervention group and the control group

Differences in the mean changes from baseline HADS-A scores between each intervention group and the control group are shown in Table 3. Relative to the control group, the relaxation group presented a significantly greater reduction in the mean HADS-A score at admission (difference in mean change −1.25, 95% CI −2.44 to −0.05, *p* 0.04) but showed a nonsignificantly greater reduction at postoperative day 3, month 1, and month 3. Compared with the control group, the music group and music plus relaxation group presented nonsignificantly greater reductions in the mean HADS score at every postintervention time point.

Comparison of the QoR-35 scores between each intervention group and the control group at postoperative day 3

Differences in the mean QoR-35 scores between each intervention group and the control group at postoperative day 3 are shown in Table 4. Compared with the control group, the relaxation group had significantly higher mean QoR-35 scores (mean difference 2.34, *p* 0.04). The music group and music plus relaxation group also presented nonsignificantly higher mean QoR-35 scores (mean difference of 1.04, *p* 0.32 in the music group and mean difference of 0.21, *p* 0.68 in the music plus relaxation group).

TABLE 2. Within-group change in HADS-A scores from baseline through 3 months.

Study group	Mean changes in the HADS-A scores from baseline [a]			
	Admission	Postoperative day 3	Postoperative month 1	Postoperative month 3
Music	−1.15 95% CI (−1.98, −0.33) *p* = 0.006	−1.38 95% CI (−2.21, −0.56) *p* = 0.001	−1.77 95% CI (−2.60, −0.94) *p* < 0.001	−1.81 95% CI (−2.63, −0.98) *p* < 0.001
Relaxation	−1.54 95% CI (−2.36, −0.71) *p* < 0.001	−1.69 95% CI (−2.52, −0.87) *p* < 0.001	−1.92 95% CI (−2.75, −1.10) *p* < 0.001	−1.96 95% CI (−2.79, −1.14) *p* < 0.001
Music plus relaxation	−1.43 95% CI (−2.22, −0.63) *p* < 0.001	−1.43 95% CI (−2.22, −0.63) *p* < 0.001	−2.04 95% CI (−2.83, −1.24) *p* < 0.001	−2.18 95% CI (−2.97, −1.38) *p* < 0.001
Control	−0.29 95% CI (−1.15, 0.57) *p* = 0.506	−0.88 95% CI (−1.73, −0.02) *p* = 0.046	−1.38 95% CI (−2.23, −0.52) *p* = 0.002	−1.46 95% CI (−2.32, −0.60) *p* = 0.001

Abbreviations: HADS-A, Hospital Anxiety and Depression Scale–Anxiety subscale.

[a] Change = mean HADS-A score at each postintervention time point minus mean baseline HADS-A score. Negative values indicate anxiety reduction.

TABLE 3. Between-group differences in HADS-A score change: intervention versus control.

Intervention group	Differences in the mean changes in the HADS-A scores between intervention and control [a, b]			
	Admission	Postoperative day 3	Postoperative month 1	Postoperative month 3
Music	–0.86 95% CI (–2.05, 0.33) *p* = 0.16	–0.51 95% CI (–1.70, 0.68) *p* = 0.40	–0.39 95% CI (–1.59, 0.80) *p* = 0.52	–0.35 95% CI (–1.54, 0.84) *p* = 0.57
Relaxation	–1.25 95% CI (–2.44, –0.05) *p* = 0.04	–0.82 95% CI (–2.01, 0.37) *p* = 0.18	–0.55 95% CI (–1.74, 0.64) *p* = 0.37	–0.50 95% CI (–1.70, 0.69) *p* = 0.41
Music plus relaxation	–1.14 95% CI (–2.31, 0.03) *p* = 0.06	–0.55 95% CI (–1.73, 0.62) *p* = 0.35	–0.66 95% CI (–1.83, 0.51) *p* = 0.27	–0.72 95% CI (–1.89, 0.45) *p* = 0.23

Abbreviations: HADS-A, Hospital Anxiety and Depression Scale–Anxiety subscale.

[a] Difference = (change in HADS-A score in the intervention group) minus (change in HADS-A score in the control group).

[b] Change in HADS-A score = mean score at each postintervention time point minus mean baseline score. More-negative values denote a greater decrease in anxiety in the intervention group relative to control.

TABLE 4. Quality of recovery (QoR-35) on postoperative day 3: intervention versus control.

Study group	Mean QoR-35 score (SD)	Differences in the mean QoR-35 score between intervention and control at postoperative day 3 [a]		
		Differences in mean	Logarithmic values	*p* value
Music	170.58 (5.57)	1.04 95% CI (–1.37, 3.45)	0.008 95% CI (–0.008, 0.023)	0.32
Relaxation	171.88 (3.97)	2.34 95% CI (–0.07, 4.75)	0.016 95% CI (0.0004, 0.031)	0.04
Music plus relaxation	169.75 (4.63)	0.21 95% CI (–2.16, 2.58)	0.003 95% CI (–0.012, 0.018)	0.68
Control	169.54 (10.60)	–	–	–

Abbreviations: QoR-35, Quality of Recovery-35 questionnaire

[a] Difference = mean QoR-35 score in the intervention group minus that in the control group. Positive values represent better perceived recovery in the intervention group.

Comparison of the changes in the QoR-35 scores between each intervention group and the control group

All study groups had increased their mean QoR-35 scores from postoperative day 3 to both postoperative months 1 and 3. Differences in the mean changes from postoperative day 3 in the QoR-35 scores between each intervention group and the control group are shown in Table 5. Compared with the control group, the music group, relaxation group, and music plus relaxation group presented nonsignificant increases in the QoR-35 score at both postoperative months 1 and 3.

Feasibility and adverse effects of the interventions

No participants dropped out during the intervention period or after the postoperative period. No participants experienced adverse effects.

DISCUSSION

This study revealed that practicing relaxation techniques, such as breathing exercises and body scans, for 7 days preoperatively reduced anxiety and improved recovery in elderly patients undergoing elective surgery. Compared with the control group, the relaxation group presented a significantly greater reduction in preoperative anxiety scores after completing the intervention. Additionally, the quality-of-recovery score was significantly greater in the relaxation group than in the control group on postoperative day 3. Similar findings have been reported in systematic reviews and meta-analyses, which demonstrated the effectiveness of relaxation techniques in reducing postoperative anxiety, depression, pain, and recovery duration across various surgeries—including head and neck, cardiac, gastrointestinal, gynecological, and orthopedic procedures. The duration of relaxation interventions in these studies ranged from 1 to 7 days.[8,22] The beneficial effects of relaxation techniques on both psychological and physical recovery may stem from psychological and neuroimmunological mechanisms. Psychologically, reducing anxiety lowers pain perception and encourages health-promoting behaviors, such as early ambulation and exercise.[8,23] Neuroimmunologically, decreased stress supports wound healing through sympathomedullary and hypothalamic–pituitary–adrenal pathways, which regulate inflammatory cytokines.[24]

This study revealed that multiple sessions of music medicine, relaxation techniques, and a combination of both were feasible for elderly patients, with no adverse effects. Feasibility was assessed on the basis of participant retention, and all participants completed daily 30- to 60-minute sessions over 7 days without dropouts. Feasibility is crucial in elderly populations, as long-duration interventions may be challenging to tolerate.

TABLE 5. Between-group differences in QoR-35 improvement from postoperative day 3 to months 1 and 3.

Intervention group	Differences in the mean changes in the QoR-35 scores between intervention and control [a,b]					
	Postoperative month 1			Postoperative month 3		
	Differences in mean changes	Logarithmic values	*p* value	Differences in mean changes	Logarithmic values	*p* value
Music	–0.87 95% CI (–3.49, 1.76)	–0.007 95% CI (–0.02, 0.01)	0.44	–0.98 95% CI (–3.61, 1.64)	–0.008 95% CI (–0.03, 0.01)	0.40
Relaxation	–1.63 95% CI (–4.26, 0.99)	–0.012 95% CI (–0.03, 0.01)	0.19	–1.91 95% CI (–4.53, 0.71)	–0.013 95% CI (–0.03, 0.004)	0.14
Music plus relaxation	–1.39 95% CI (–3.97, 1.18)	–0.010 95% CI (–0.03, 0.01)	0.24	–1.11 95% CI (–3.69, 1.46)	–0.008 95% CI (–0.03, 0.01)	0.33

Abbreviations: QoR-35, Quality of Recovery-35 questionnaire

[a] Difference = (change in QoR-35 score in the intervention group) minus (change in QoR-35 score in the control group).

[b] Change = mean QoR-35 score at postoperative month 1 or postoperative month 3 minus the mean score on postoperative day 3. More-negative values indicate a smaller gain in recovery score in the intervention group compared with control.

A previous study on relaxation techniques in elderly individuals reported a high attrition rate (35%), despite the effectiveness of relaxation techniques in reducing anxiety and depression. Common barriers included unclear instructions, low motivation, insufficient time, lack of privacy, and physical discomfort. Conversely, factors promoting compliance included normalizing anxiety experiences and immediate relaxation benefits.[25,26] In this study, several factors likely contributed to high compliance. Patients received clear instructions and ample opportunities for questions before starting the interventions. They initially practiced under expert supervision, allowing them to experience immediate relaxation and learn to manage discomfort. Additionally, potential barriers, such as time constraints and a lack of private space, were addressed collaboratively among patients, caregivers, and researchers.

This study did not demonstrate the effects of music medicine or music medicine plus relaxation techniques in reducing preoperative anxiety. This outcome may be attributed to low baseline anxiety levels among participants, which could limit the ability to detect treatment effects due to floor effects.[27] Additionally, participants in the control group with low anxiety may have managed their symptoms independently without requiring intervention. As a result, anxiety improvement did not significantly differ between the music/music plus relaxation groups and the control group.

This study did not demonstrate the long-term postoperative effects of any intervention on anxiety or recovery quality, possibly due to the participants' uncomplicated surgical conditions. Since they underwent elective procedures, their surgeries were classified as uncomplicated, leading to favorable clinical outcomes and recovery. These positive outcomes may have reduced postoperative anxiety and enhanced recovery, even without intervention. This explanation aligns with a previous study, which reported that successful surgery alleviated depression in 48% of patients with preoperative depression.[28] Thus, the beneficial effects of favorable surgical outcomes in the control group may have diminished the ability to detect long-term treatment effects in the intervention groups.

Owing to limitations in participant characteristics—including low baseline anxiety and uncomplicated surgical conditions—detecting the effects of interventions was challenging. Future research should address these limitations. First, studies should recruit participants with higher anxiety levels, such as those with HADS scores above 7, indicating possible anxiety disorders.[17] Since severe anxiety is less likely to be self-managed, music medicine may be effective in reducing symptoms. Second, future studies should include participants with more complicated surgical conditions. Because unfavorable postoperative outcomes are more common in complex cases, the confounding effects of positive recovery can be minimized. Reducing these confounding effects may increase the sensitivity needed to detect long-term treatment benefits of music medicine and relaxation techniques if they are effective. Lastly, data collection took place during the COVID-19 pandemic (2020–2024), which impacted participant recruitment and surgical scheduling. Due to a relatively high dropout rate, we consulted a statistician to guide data analysis. Consequently, a linear mixed model was employed to address the presence of missing data. Despite the slightly smaller sample size than originally planned, the results indicated that the study retained sufficient statistical power.[29] Furthermore, a previous study highlighted the impact of the COVID-19 pandemic on the mood states of individuals with anxiety.[30] However, anxiety is often shaped by a variety of contextual stressors. Future research should therefore aim to assess anxiety in relation to a broader spectrum of challenges, including economic instability, social disruption, emerging infectious diseases, and natural disasters. Such an approach would provide a more nuanced and comprehensive understanding of the complex factors influencing mental health, particularly among vulnerable populations.

CONCLUSIONS

The study demonstrated that a 1-week preoperative relaxation technique intervention was feasible and had immediate effects on reducing preoperative anxiety and improving the quality of recovery after surgery in elderly patients without adverse effects. However, further research should be conducted by recruiting patients with higher levels of anxiety and with more complicated surgical conditions to clearly determine the short-term effects of music medicine as well as the long-term effects of music medicine and relaxation techniques in reducing perioperative anxiety and improving the quality of recovery after surgery.

Data Availability Statement

The authors confirm that the data supporting the findings of this study are available within the article.

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DECLARATIONS

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Conflicts of Interest

None.

Registration Numbers of the Clinical Trial

The study has been officially registered with the Thai Clinical Trial Registry under the identifier TCTR20200910002.

Author Contributions

Conceptualization and methodology: PP, SP, PY, AS; Investigation: PP, PY, GC,AS; Data analysis: PP , TP, AS; Visualization and writing–original draft: PP; Writing–review and editing: AS, TP; Supervision: AS.; Essentially Intellectual Contributor: AS. All the authors read and agreed with the final version of the manuscript.

Use of Artificial Intelligence

None.

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