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Effect of music therapy on nursing students' first objective structured clinical exams, anxiety levels and vital signs: A randomized controlled study

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ABSTRACT

Background: Music is a tool that can be used to reduce stress and anxiety, maintain vital signs at normal levels, and increase exam success.
Objectives: This study aimed to determine the effect of music therapy on nursing students' first objective structured clinical exam success, anxiety levels, and vital signs, and to reveal their views about music therapy in the context of an exam.
Design: Mixed-pattern single-blind randomized controlled qualitative study.
Setting: Department of Nursing, Faculty of Health Sciences, Ankara, Turkey.
Participants: First-year students enrolled in the Fundamentals of Nursing II course were randomly assigned to an experimental (n = 61) or control group (n = 64). Twenty-two (22) experimental group students provided the sample for the qualitative stage.
Methods: Data were collected between February and June 2018 using the Informative Features Form, State-trait Anxiety Inventory, Vital Signs Assessment Form, Skill Checklists, and Focus-group Interview Form. All students completed the theoretical classes, laboratory classes, and small-group studies. The experimental group participated in five music therapy sessions two weeks before the exam. All students' vital signs were measured before and after the exam. Three focus group interviews were conducted with the 22 experimental group students in the week after the exam.
Results: The blood pressure values of the experimental group before and after the exam were significantly lower than those of the control group ($p < 0.05$). No significant difference was observed between exam success and anxiety levels between the two groups. In the focus group interviews, students said they found music therapy suitable for reducing anxiety in their daily lives, but not before the exam.
Conclusions: Music therapy had positive effects on the students' blood pressure but had no effect on exam success or anxiety levels. This study suggests that more music therapy sessions be conducted with different groups of students in greater numbers before different exams.

1. Introduction

Theoretical knowledge, laboratory practise, and clinical practise are inseparable parts of the Fundamentals of Nursing course. During the course, students gain many psychomotor skills with different levels of difficulty. The objective structured clinical exam (OSCE) is one of the

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approaches used to evaluate psychomotor skills (Goh et al., 2019). For students, OSCE is a fair, effective, and motivating way of assessing learning, but they experience a great deal of stress and anxiety during it (Johnston et al., 2017; Goh et al., 2019; Majumder et al., 2019).

Many studies have been conducted on reducing students' pre-exam stress and anxiety. In Yalcin et al.'s (2015) study, medical students who undertook deep breathing exercises while listening to music before the OSCE experienced less anxiety and had better rates of success. İnce and Çevik (2017) found that nursing students who practised venesection for the first time while music was playing in the laboratory experienced less anxiety and that there was a positive effect on their skills. In Akpınar et al.'s (2020) study, nursing students who listened to classical Western and Turkish music regularly and just before the exam had lower exam anxiety. However, these studies did not clearly distinguish between music performance and music therapy. Certain criteria differentiate music therapy from simply listening to music and other applications of music for health-related matters (*music medicine*): Therapeutic interventions in music therapy are led by a professional therapist working in a clinical, evidence-based, and therapeutic relationship with specific subjects (American Music Therapy Association, 2016). However, participants can get involved in music-making by using musical instruments individually and in groups, playing structured group games with a didactic orientation in specific goal-targeted music therapy (Wigram, 2004). Thus, music therapy provides a non-verbal form of self-expression and communication. It establishes a bridge between the nonverbal and verbal channels of communication. It provides a safe and acceptable way to reveal contradictions and feelings that are difficult to explain (Bruscia, 2016).

In this context, this study, unlike other trials in the literature about listening to music, is the only study that has been conducted to determine the effects of specific goal-targeted music therapy on first OSCE success as well as the anxiety levels and vital signs of nursing students in Turkey.

1.1. Background

The OSCE was defined by Harden et al. (1975) as a way of evaluating the clinical skills of senior medical students, and was first implemented at McMaster University in 1988 (Ross et al., 1988). Stations are prepared at which each skill in the OSCE is evaluated. The performance and competencies of the students at each station are evaluated by the educators filling out checklists prepared in advance. It provides the opportunity to evaluate many students objectively in a short time; however, students experience a lot of stress and anxiety during the OSCE (Johnston et al., 2017; Goh et al., 2019; Majumder et al., 2019).

The literature suggests that students use meditation (Song and Lindquist, 2015), aromatherapy (Son et al., 2019), guided imagery (Kaur et al., 2017), as well as music (Yalcin et al., 2015; İnce and Çevik, 2017; Akpınar et al., 2020; Gallego-Gómez et al., 2020) to reduce their anxiety and increase their rate of success.

In addition, the positive effect of music on students' exam stress and anxiety has been shown to have positive effects on blood pressure in pre-hypertensive pregnant women (Sundar et al., 2015), cancer patients experiencing pain (Krishnaswamy and Nair, 2016), patients receiving mechanical ventilation support (Lee et al., 2017), and patients with hypertension (Mitrovic et al., 2020). It also affects the respiratory rate (Lee et al., 2017), pain score (Mitrovic et al., 2020; Krishnaswamy and Nair, 2016), heart rate (Sundar et al., 2015; Lee et al., 2017), and levels of anxiety (Lee et al., 2017; Mitrovic et al., 2020; Krishnaswamy and Nair, 2016).

In music therapy, music (for example, improvisation with an instrument and/or the voice, composing, song writing, sound/music games, and listening to and interpreting music) serves non-musical purposes (for example, neurological rehabilitation; support for gaining academic skills in special education; and support for mental, emotional, spiritual, and physical health). Before, during, and after the therapeutic use of musical instruments and various elements of combined sound and movements, the medical files, individual and social needs, musical preferences, and life history of the person receiving therapy are examined according to standard criteria, and a structured music therapy program is developed. Music therapy, therefore, has a very different function than the mere recreational use of music or playing relaxing music in a hospital setting (Özyıldız and Uçaner-Çifdalöz, 2019).

This study aimed to determine the effect of music therapy on nursing students' first OSCE success, anxiety levels, and vital signs, and to reveal their views about the experiences of music therapy in the context of an OSCE.

2. Materials and methods

2.1. Participants

The study population consisted of 251 students enrolled in the Fundamentals of Nursing II course in the Nursing Department of a University Faculty of Health Sciences in February–June 2018.

Inclusion criteria:

- Enrolled in the Fundamentals of Nursing II course for the first time.
- Be a volunteer.

Exclusion criteria:

- Having a diagnosed chronic disease.
- Having difficulty in understanding and speaking Turkish.
- Having graduated from a health-related high school or a university.
- Having experience with the OSCE.
- Substance use, such as smoking/alcohol (because of the impacts on vital signs and ineffective coping methods).

Removal criteria:

- Not participating in the music therapy for more than two sessions.
- Not participating in the music therapy session on the day of the OSCE.
- Not attending the OSCE.
- Being absent for more than 20% of the Fundamentals of Nursing II practical hours.
- Being absent for more than 30% of the Fundamentals of Nursing II theoretical hours.
- Wanting to leave the study.

After exclusions, according to gender, 132 students were randomly assigned to control (n = 66) and experimental (n = 66) groups using the simple randomisation method. Four students who did not participate in music therapy sessions on the day of the OSCE and one student who did not participate in more than two music therapy sessions were excluded from the experimental group during the follow-up phase, and two students who did not fill out the data collection forms were excluded from the control group during the analysis phase. The research was completed with 125 students (Fig. 1).

In the qualitative phase, after explaining the aim and method of the interviews, all of the experimental group members (n = 61) were invited to focus group interviews. No sample selection was performed. Twenty-two students who volunteered to participate in the interviews constituted the sample. They were coded using their university numbers after the number allocated to them on the seating plan.

Written approval was obtained from the university ethics board (May 14,2018, no. 4) and from the institution involved (December 07, 2017, no. 174620). The students were informed of the aim and method of the study, and their written informed consent was obtained.

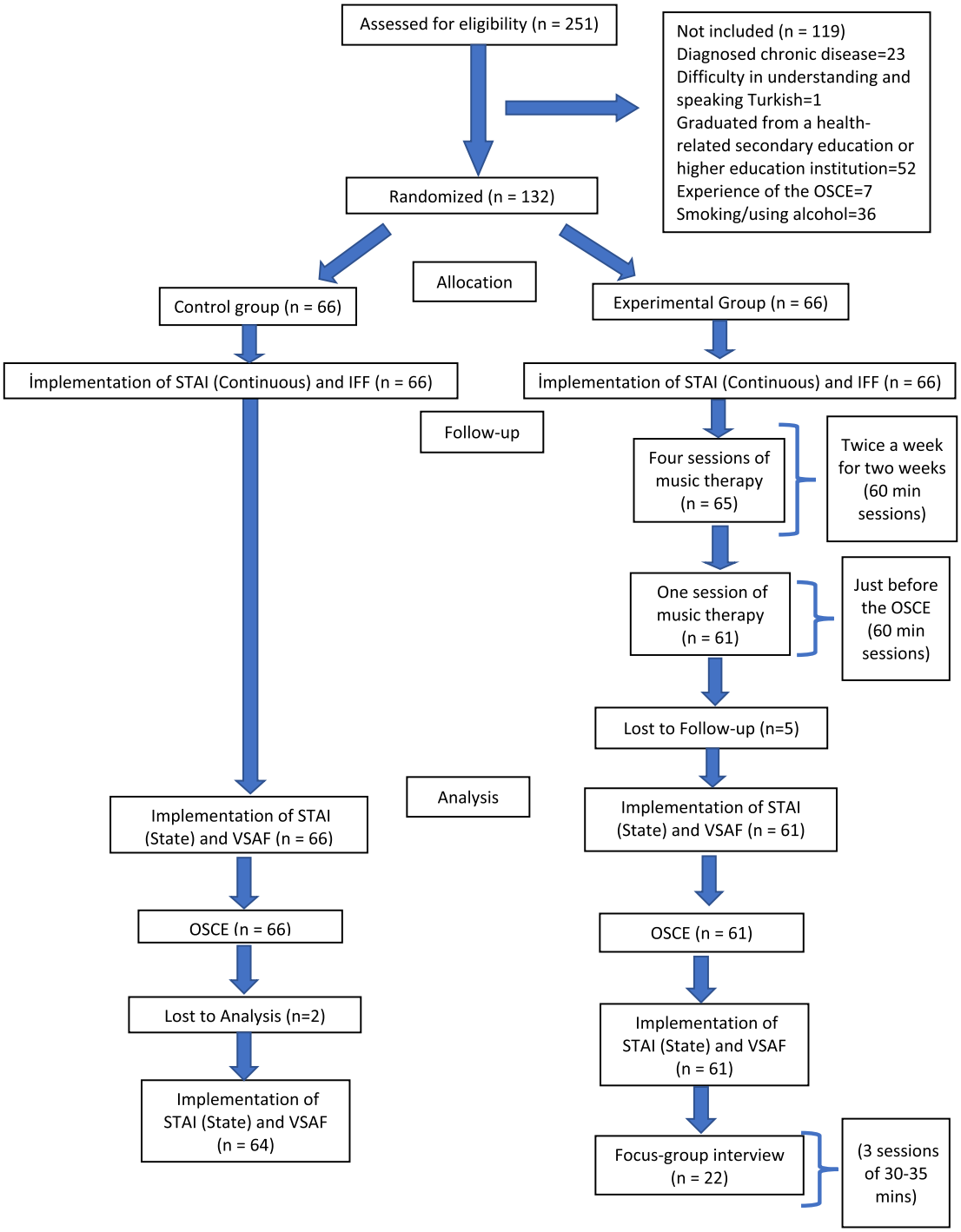

Fig. 1. CONSORT diagram of this study.

2.2. Data collection and instruments

The data were collected by the researchers (n = 7) using the Informative Features Form (IFF), which contained 11 questions in total; the State-Trait Anxiety Inventory (STAI); the Vital Signs Assessment Form, which recorded the students' heart rate, respiration, and blood pressure values; the Skill Checklists (SC); and the Semi-Structured Focus Group Interview Form, which had eight open-ended questions regarding students' experiences of music therapy and the OSCE.

The STAI was used to assess students' state (transient status) and continuous (more general and prolonged) anxiety levels (Johnson and Spielberger, 1968). Each test consisted of 20, 4-point Likert-type questions. Scores from each form varied between 20 and 80, with higher scores indicating greater anxiety. The average score ranged from 36 to 41. Öner and Le Compte (1983) determined the STAI's Turkish reliability (Cronbach's alpha = 0.93) and validity (Cronbach's alpha = 0.94). Yalcin et al. (2015) revealed that the STAI had a Cronbach's alpha value of 0.91 for reliability and 0.89 for validity.

The SC was created based on the literature by researchers who were experts in the Fundamentals of Nursing. The SC consisted of three separate skill checklists, including three advanced nursing skills from fluid requirements, administering medications, and respiratory topics in Fundamentals of Nursing II. The first was intravenous (IV) catheter application and initiation of IV fluid therapy; the second was drug

withdrawal from the bulb and application of intramuscular (IM) injection in the ventrogluteal region; and the third was tracheostomy aspiration. They were designed to record the evaluation of each step of the procedure ('excellent' denoted mastering the procedure [2], 'satisfactory' indicated use of the recommended technique [1], and 'needs practice' indicated not using the recommended technique [0]). Each checklist was rated over 100 points in total.

2.3. Preliminary application of the study

Pre-application was done with 16 students who successfully passed the Fundamentals of Nursing II course. The consistency of the scores given by the six observers who participated in the OSCE during the study was evaluated. The SC was finalised based on the pre-application, and it was determined that the students would be allowed 7 min to demonstrate the required skill at each station.

2.4. Intervention

After their random assignment to the experimental and control groups, the IFF and STAI (continuous) were applied to the students (n = 132). The Fundamentals of Nursing II theoretical lessons were taught by the researchers, who are experts in the subject, in which the skill was demonstrated and studied in small groups. No interventions were made in the control group, while the experimental group participated in five sessions of music therapy led by music therapists, including two sessions each week during the two weeks before the OSCE, and one session immediately before the OSCE. Students were asked to prepare a shortlist of their musical preferences before the sessions began. Each music therapy session started with both free and imitative physical-musical warmups (one example of free warmup: participants moving around the room while stretching various body parts and accompanying this with improvised vocalisations; one example of imitative warmup: each member, in turn, associating their name with an object or concept having the same first letter as their name—for example, 'jockey' for John—and saying the name of the concept while 'dancing' it while the other group members imitate him/her right afterwards) and ended with verbal group feedback and sharing. A session lasted for 60 min. In the sessions, a thematic approach was adopted and various forms of music therapy that focussed on the perception of success, feelings of anxiety, and techniques related to these were applied. These included the experimental use of musical instruments individually and in groups, as well as free association studies related to this process; structured group games with a didactic and pedagogical orientation aimed at processing anxiety; group improvisations (instrumental and vocal) accompanied by a thematic approach (Wigram, 2004); one of Wigram's clinical improvisation protocols, 'M.U. S. I.C.', which included verbal evaluation of the psychosocial effects of improvisation by the group members; and other recreational activities.

On the day of the OSCE, students attended the fifth session of music therapy. Immediately before the OSCE, the experimental and control groups filled out the STAI and their blood pressure, pulse, and respiratory rates were measured. Blood pressure was measured using a digital blood pressure instrument with a sleeve on the upper arm. Each student's blood pressure and pulse values were measured using the same device, and their respiration rates were measured by the researchers. Following this, the students sat the OSCE, which involved initiating fluid therapy with an IV catheter, then IM injection with drug withdrawal from the bulb, and finally tracheostomy aspiration. Immediately after the OSCE, the students filled out the STAI again and their vital signs were measured once more. Single blinding was performed in the study. The researchers who conducted the randomisation and measured the vital signs, and the observers of the OSCE, did not know which students were in the experimental or control group. All observers had a master's degree in the Fundamentals of Nursing.

During the qualitative phase, three focus group interviews were conducted the week after the OSCE to learn the students' thoughts about the effect of music therapy on their success in the OSCE and in reducing their anxiety. A total of 22 students took part and each of the focus group interviews lasted 30–35 min.

2.5. Data analysis

The data were analysed using the SPSS version 23.0 software package. Kappa and correlation analyses were conducted to determine consistency among the observers. The number, percentage, mean, and standard deviation were used in descriptive statistical evaluations. The Shapiro-Wilk test was used to evaluate data with a normal or non-normal distribution. Parametric tests were used to indicate a normal distribution (df = 125, $p > 0.05$). The independent *t*-test was used to assess differences between groups. The differences between the two dependent variables were tested using the paired *t*-test. The data were evaluated at a 95% confidence interval and at a $p < 0.05$% significance level.

Raw data from the focus group interviews were thematically analysed. Through detailed and repeated readings, different researchers independently determined the codes from the raw data. They created draft tables of themes, sub-themes, and codes for frequently repeated phrases and original statements. The researchers then came together and discussed the draft tables that they had created. Finally, the thematic table was structured using the induction method.

3. Results

3.1. Quantitative findings of the study

The consistency between two observers in fluid requirements ($\kappa = 0.831$, $p = 0.002$), administering medications ($\kappa = 0.581$, $p = 0.021$), and respiration ($\kappa = 0.601$, $p = 0.039$) was statistically significant. The correlations between two observers in fluid requirements ($r = 0.84$, $p = 0.000$), administering medications ($r = 0.64$, $p = 0.000$), and respiration ($r = 0.81$, $p = 0.000$) were statistically significant in the positive direction.

The mean age of the control group (n = 64) was 18.94 ± 1.74 (min: 18, max: 30) and the experimental group (n = 61) was 18.57 ± 0.67 (min: 17, max: 20); 93.8% of the control group and 91.8% of the experimental group were female. The control and experimental groups were similar in terms of age and gender distribution ($p > 0.05$).

No statistically significant difference was observed between the pre- and post-OSCE average anxiety scores of the experimental and control groups ($p > 0.05$). However, both the control and experimental groups' pre-OSCE average anxiety scores were significantly lower than their post-OSCE average anxiety scores ($p < 0.05$; Table 1).

The pre- and post-systolic and diastolic blood pressure values of the

Table 1
Distribution of continuous and state-trait anxiety score averages of the students in the experimental and control groups.

	Control group	Experimental group	*t**	*p*
	X ± SS	X ± SS		
Constant anxiety	41.53 ± 4.77	41.79 ± 3.43	0.343	0.732
State-trait anxiety before OSCE	37.30 ± 3.38	37.57 ± 4.62	0.384	0.702
Post-OSCE state-trait anxiety	41.39 ± 6.34	41.70 ± 5.45	0.296	0.767
p	**0.0001**	**0.0001**		
*t**	−6.01	−5.8		
Change between state-trait anxiety	−4.09 ± 5.41	−4.13 ± 5.54	−0.038	0.97

* *t*-Test.

experimental group were significantly lower than those of the control group ($p < 0.05$). The pulse rates of the control and experimental groups were significantly higher than before the OSCE ($p < 0.05$; Table 2).

No statistically significant difference was observed between the total OSCE average scores and the application of IM injections, IV fluid therapy, and tracheostomy aspiration of the control and experimental groups ($p > 0.05$;Table 3).

3.2. Qualitative findings of the study

The three contexts and themes and sub-themes obtained in the research are given in Table 4.

3.2.1. Methods of coping with anxiety

The students stated that they used methods such as sleeping, praying, and listening to music to deal with daily life anxiety. To handle anxiety related to the exams, they tried to have a positive mindset (for example assuring themselves that they would be successful during the exam), listen to music, continue daily life routines, and spend time with positive-minded friends. On the other hand, some students said that nothing would reduce their anxiety about the exams. The students' opinions about this topic were as follows:

'*I don't think I'm the only person experiencing stress…I pray a lot.*' [OG1/Ö1].

'*I listen to music without any words, like classical music. It calms me down, brings me back to myself.*' [OG1/Ö7].

'*I usually sleep in stressful times, but I think I also need music.*' [OG1/Ö4].

Table 2
Distribution of the vital findings of the students in the experimental and control groups.

	Control group	Experimental group	t*	p
	X ± SS	X ± SS		
Systolic BP before OSCE	124.16 ± 12.09	119.52 ± 13.68	−2	**0.047**
Systolic BP after OSCE	124.75 ± 11.99	119.67 ± 12.78	−2.2	**0.024**
p	0.657	0.096		
*t**	−0.446	−0.119		
Change between systolic BP	0.59 ± 10.65	0.15 ± 9.72	−0.24	0.807
Diastolic BP before OSCE	72.83 ± 10.08	66.08 ± 9.48	−3.8	**0.0001**
Diastolic BP after OSCE	70.08 ± 10.47	67.43 ± 10.67	−1.4	0.163
p	**0.031**	0.293		
*t**	2.2	1.06		
Change between diastolic BP	−2.75 ± 9.90	1.34 ± 9.90	2.3	**0.022**
Pulse before OSCE	99.08 ± 17.39	97.46 ± 16.22	−0.538	0.123
Post-OSCE pulse	104.52 ± 16.28	105.93 ± 16.28	0.487	0.627
p	**0.001**	**0.0001**		
*t**	−3.54	−5.05		
Change between pulse values	5.44 ± 12.27	8.48 ± 13.09	1.33	0.183
Respiratory rate before OSCE	22.22 ± 3.03	22.49 ± 2.30	0.566	0.572
Post-OSCE respiratory rate	22.86 ± 2.94	22.75 ± 2.26	−0.224	0.823
p	0.068	0.484		
*t**	−1.85	−0.704		
Change between respiratory rates	0.64 ± 2.76	0.26 ± 2.91	−0.747	0.457

* *t*-Test.

Table 3
Distribution of the OSCE average scores of the students in the experimental and control groups.

	Control group	Experimental group	t*	p
	X ± SS	X ± SS		
Intramuscular injection	76.84 ± 9.47	78.24 ± 7.78	0.901	0.369
IV fluid therapy	63.28 ± 12.19	61.20 ± 11.92	−0.966	0.336
Tracheostomy aspiration	83.18 ± 9.68	82.83 ± 8.51	−0.218	0.828
OSCES averages	74.43 ± 7.43	74.09 ± 7.51	−0.259	0.796

* *t*-Test.

Table 4
Context, themes, and sub-themes.

Context	Themes	Sub-themes
Methods of coping with anxiety	Coping methods related to daily life	• Sleeping • Praying • Listening to music
	Coping methods for the exam	• Self-motivation • Listening to music • Continuing daily routines • Spending time with positive-minded peers
Views on music therapy	Impact on daily life	• Reducing anxiety in daily life • Engaging in a social activity • Engaging in a pleasant and fun activity • Mental relaxation
	Effect on OSCE	• Relaxing breathing and muscle exercises • Not affecting anxiety about OSCE • Inability to distinguish positive/negative effect • Perceived as a waste of time
Recommendations for reducing anxiety about OSCE	Suggestions for social activities	• Relaxation exercises • Performing sports activities • Listening to classical music
	Suggestions for education	• Detailed information about OSCE • More practical applications

3.2.2. Students' views about music therapy

The students stated that the music therapy reduced their anxiety in daily life, was a social activity, was enjoyable and fun, and was mentally relaxing. The students' views on the effects of music therapy on the OSCE included the opinions that the breathing exercises were relaxing, that it did not affect their anxiety about the OSCE, that the effects could not be discerned, and that it was a waste of time. In addition, some students stated that they wanted to study more instead of having a final music therapy session immediately before the OSCE and that they were unable to focus on this session due to their exam stress. The students' opinions about this were as follows:

'*I think it has also affected communication between us. I think it has affected our ability to feel comfortable in our surroundings.*' [OG2/Ö16].

'*It was fun, but I couldn't tell if it had any effect on my stress. And I have had intense stress again.*' [OG3/Ö21].

'*In that last session, we also did breathing control and muscle exercises. I think they relaxed me a lot.*' [OG1/Ö1].

3.2.3. Students' suggestions for reducing anxiety about the OSCE

Relaxation exercises, sports activities, and listening to classical music were suggested as social activities, while further training related to the OSCE, which would provide more detailed information and allow for more practical applications, was suggested in terms of education. Some students' suggestions on the subject were as follows:

'*For example, it helps the muscles to relax, so there could be exercise, there could be different sports …*' [OG1/Ö6].

'*We'd feel more comfortable if we could practise more. I am more comfortable doing something I have done a lot of. It gives you more self-confidence to have tried something before.*' [OG3/Ö21].

'*…It can be music, so classical music makes one very comfortable, for example.*' [OG1/Ö7].

4. Discussion

This study determined that the OSCE increased the anxiety of students. The literature indicates both the OSCE's contributions to supporting learning as well as the fact that it causes stress and anxiety for students. In Bani-issa et al.'s (2019) study, 94% of students agreed that the OSCE was very stressful. İnangil et al. (2020) stated that students may experience anxiety, pressure, and fear when transforming knowledge into skills during the OSCE.

One way for students to reduce their anxiety during the OSCE or other exams is by listening to music (Yalcin et al., 2015; İnce and Çevik, 2017; Akpınar et al., 2020; İnangil et al., 2020). Yalcin et al. (2015) found that the anxiety levels of students who were given a deep breathing exercise accompanied by music before the OSCE were significantly lower after the OSCE. In a study by İnangil et al. (2020), the situational anxiety levels of students who listened to music 15 min before the OSCE were significantly lower after the exam. In this study, music therapy was given to students with some activities such as song writing, playing in groups, and breathing exercises, rather than simply allowing them to listen to music. Music therapy has different functions than listening to music and is conducted by an experienced professional trained in the relevant field. However, it did not significantly change the group's state-trait anxiety. A person's feeling of anxiety is not necessarily an emotional state that can change over a short period. In this regard, five sessions of music therapy in two weeks may not have been enough to reduce anxiety about the OSCE. Adopting and implementing techniques to deal with this kind of anxiety may thus require a longer process. de Witte et al. (2020) stated that we should focus on the frequency of music therapy sessions to determine the effects on stress reduction. In the focus group interviews, some of the students also stated that they were unable to fully distinguish whether music therapy had positively contributed to reducing their anxiety about the OSCE or not. In this context, the number of therapy sessions should be increased to be better able to assess any differences that music therapy has on individuals' emotions.

In the qualitative findings, most students noted that music therapy was more effective in reducing anxiety in daily life than for exams like the OSCE. In addition, the qualitative findings demonstrated that having to practise at many different stations on the same day and experiencing anxiety about the time allotted in the OSCE negatively affected the students. These results are consistent with Quigley and Regan's (2020) study, which stated that the excessive number of stations and the limited time given were some stressors in the OSCE. The students' consideration of the OSCE regarding the organisation, number of stations, and the time attributed to each station played a crucial role in the OSCE (Oliveira et al., 2019).

In this study, the experimental group's systolic and diastolic blood pressure values before the OSCE and the systolic blood pressure values after the OSCE were significantly lower. Based on these results, music therapy is thought to have contributed significantly to the positive change in students' blood pressure values. Our results are consistent with those in the literature. de Witte et al.'s (2020) meta-analysis stated that music interventions have been associated with decreases in physiological arousal, as shown by a decrease in heart rate and blood pressure. They found that the second strongest effect of music interventions on physiological stress-related outcomes was measured by blood pressure. In this study, it was determined that music therapy sessions positively affected the blood pressure values of the students in the short term.

This study found no significant difference between the groups' OSCE scores. It is helpful to look at the focus group interviews regarding the reasons for this result. Students stated that they wanted to study more and practise with their friends immediately before the OSCE. Similarly, Johnston et al.'s (2017) study stated that to adequately prepare, they needed considerable time to practise. In addition, in Massey et al.'s (2017) study, students stated that the digitised OSCE exemplars were a useful preparation resource before the OSCE. It is thought that music therapy did not make an important contribution to the students' performance on the OSCE, as it did not have an immediate effect on their ability to control their anxiety.

5. Limitations of the study

Several limitations of this study must be acknowledged. The study was conducted with only first-year nursing students of one university. The sample was not representative of the entire population because convenience sampling was used. There was a power imbalance because the researchers were the students' teachers. Another limitation is that the music therapy was only administered for two weeks before the OSCE, for a total of four sessions, with one additional session immediately before the exam.

6. Conclusions

Music is a universal language that plays a crucial role in physical, psychological, social, and emotional development (İnce and Çevik, 2017). Therefore, it is likely that music therapy would positively contribute to students' ability to control their anxiety levels if they were willing to participate in it and undertake more sessions. If students can demonstrate a better ability to control their anxiety, their success in the OSCE will likely be higher. Nurse educators must engage in supportive strategies to improve students' academic achievement by recognising exam stress. It is suggested that similar studies be conducted with different groups of students and a greater number of samples, before different exams, and with more sessions of music therapy.

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Ethics of study

Written approvals were obtained from the Gazi University ethics board (May 14, 2018, decision no: 4) and from the institution involved (December 07, 2017, no: 174620). Informed consent was obtained from the students.

CRediT authorship contribution statement

Gülcan Eyüboğlu: Conceptualization, Methodology, Resources, Project administration, Supervision, Investigation, Writing - original draft, Writing - review & editing. **Zehra Göçmen Baykara:** Conceptualization, Supervision, Project administration, Resources, Methodology, Writing - original draft. **Nurcan Çalışkan:** Conceptualization, Resources, Methodology, Writing - original draft. **Evrim Eyikara:** Investigation, Resources, Writing - original draft, Writing - review & editing. **Nevin Doğan:** Investigation, Resources, Writing - original draft, Writing

- review & editing. **Sinan Aydoğan:** Investigation, Software, Validation, Formal analysis, Writing - review & editing. **Burçin Uçaner Çifdalöz:** Methodology, Resources, Investigation, Writing - original draft. **Aslı Özyıldız:** Methodology, Resources, Investigation. **Ceyda Su Gündüz:** Writing - original draft, Investigation, Resources. **Banu Cihan Erdoğan:** Software, Investigation. **Nefise Cevriye Sucu Çakmak:** Software, Investigation. **Neslihan Istek:** Software, Investigation.

Declaration of competing interest

There is no financial, personal or academically conflict of interest.

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