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# The effect of listening to the music of the patient's own or others' choice during cesarean sections on pain, and its contribution to anesthesia technicians

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**Abstract**

To investigate the effect of listening to the music of the patient's own or others' choice during the cesarean section on the intraoperative pain of the expectant mother and its contribution to the anesthesia technicians' practice. This study is a single-centre, controlled and randomized trial involving 92 patients. During cesarean section, pregnant women in the intervention group listened to music of their own or our choice with headphones. We placed headphones on the patients in the control group but played no music. We performed cesarean sections under regional anesthesia. We collected a variety of subjective (visual analog and numerical scale for pain) and objective parameters (heart rate, blood pressure and amount of medication leftover from postoperative PCA) during the incision and suturing of the skin. We found no differences between the groups in terms of systolic-diastolic blood pressure and heart rate. However, we observed that the VAS scores in the group listening to music in the Acemashiran maqam (a melody type in Turkish classical music) were lower than the control group ($p=0.02$). On the other hand, there was no difference between the VAS scores of patients listening to the music of their own choice and that of the group listening to music in the Acemashiran maqam or from the control group ($p>0.05$). At the end of the study, 87.5% of the patients liked the music preferences, while 93.8% desired to listen to music during the next cesarean section. Listening to music reduces patients' pain during cesarean section. Comparisons with the control group showed that the effect of music in the Acemashiran maqam on pain was even more pronounced than that of the patient's own choice.

**Keywords:** Cesarean section, pain, music therapy, visual analog pain scale

## 1. Introduction

The overall cesarean section rate worldwide is 53% and increasing even more due to the perceptions and wishes of pregnant women about childbirth, the detection of risky pregnancies through intensified antenatal follow-ups, and the need for patients who have had a cesarean section before to have a cesarean section again (1). Cesarean section can be performed under general or regional anesthesia. Regional anesthesia has become more preferred with its both intraoperative and postoperative comfort (2).

Despite the increased comfort provided by regional anesthesia, patients' concerns about the unborn baby and surgical intervention cause pain during and after cesarean section (3). Many pharmacological procedures effective on pain are performed as a routine clinical practice (4). However, the search for effective non-pharmacological pain treatment has been continuing for a long time to counter the side effects of pharmacological procedures on the mother and the baby to be breastfed after delivery (5-8).

As a non-pharmacological treatment, music has an effect on pain as known since ancient times. Today, music is utilized professionally in health services. There are many studies about the effect of listening to music on reducing acute and chronic pain (6, 9-11).

Studies conducted with functional MRI and EEG to explain the effect of music on pain suggest that sounds have a general modulation effect on pain and specifically reduce pain unpleasantness induced by a positive emotional impact (12). Moreover, listening to music has been associated with dopamine release (which has a role in central analgesia) from the caudate and nucleus accumbens (13). Music modulates pain responses in the brain, brain stem, and spinal cord (14). All this evidence suggests that music-induced analgesia can be regarded as a central type of analgesia (9).

In both western and eastern cultures, music has been used for therapeutic purposes for centuries (15). However, music has a special place in treatment in Turkish culture (16).

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Because of the close relation of music with culture, listening to the music of the patient's own culture is considered to be more effective on pain (17). Similarly, it is possible to suggest that the music of the patient's own choice would be more effective on pain (10). It has also been argued that classical music with its rhythm and harmony could be more effective on pain and anxiety, even if there are no cultural affinities or personal preferences (18). Among the maqams (melody types) in classical Turkish music, especially Acemashiran maqam has been preferred because of its effect on pain. Various studies have shown that the Acemashiran maqam facilitates delivery and reduces pain (19).

It is pretty difficult to evaluate the results of effective procedures on pain. It would not be adequate to use subjective data to evaluate pain, a subjective phenomenon. Therefore, studies have involved the evaluation of both subjective and objective pain indicators.

The primary endpoint of our study was the evaluation of the effect of music on pain in patients having a cesarean section. The secondary endpoint of our study was the investigation of the effectiveness of the Acemashiran maqam on pain.

## 2. Materials and methods

### 2.1. Patient and data collections

After the approval of the local ethics committee (Lokman Hekim University non-interventional clinical research ethics committee, date: 25/12/2019, decision no: 2019/80), the study enrolled patients, who were followed up at Etlik Lokman Hekim Hospital between 01/2020 and 12/2020, and for whom cesarean section was planned due to various reasons during their antenatal follow-up. We did not regard patients' cesarean section indication as an inclusion criterion. However, we excluded patients who had maternal-fetal risk detected during pregnancy follow-up, cardiovascular disease, anxiety disorder, hearing impairment, and those not suitable for spinal anesthesia, considering that these conditions could affect the results. We explained the purpose of the study and the entire procedure to be performed within the scope of the study to all patients and obtained written consent from them.

We performed randomization according to the patients' arrival order at the polyclinic. We divided patients in the music group into two groups: Patients who would listen to classical Turkish music in the Acemashiran maqam (G1), and the music of their own choice (G2), according to the order of their arrival at the polyclinic. We asked the patients in group 2 to create a music archive on their mobile phones with 15 tracks they liked before they came for the cesarean section. We included 32 patients who arrived later as the control group (G3) in the study.

There were no patients on routine drug therapy before surgery in any group. After taking aseptic precautions, we stained and covered the patients while they were sitting or lying on their left side. We located the L3-L4 or L4-L5 disk space, inserted a 27G Whitacre spinal needle into the subarachnoid space, and confirmed its position by observing the free flow of clear cerebrospinal fluid. We administered 2.8-3 mL of 0.5% hyperbaric bupivacaine using a nasal oxygen cannula at 2-3 L/min, with the patient in the supine position. At this stage, we placed double-sided headphones covering the entire ear to prevent the operating room sounds from interfering with the operation. Patients in the group listening to classical Turkish music in the Acemashiran maqam used headphones connected to an MP3 player, while those in the group listening to the music of their own choice used headphones connected to their mobile phones. We only removed the headphones at the moment of delivery so that the mother could hear the baby's voice.

After the mother's contact with her baby, we took the baby out of the operating room, placed the headphones again and played the music until completing the suturing and dressing processes. We recorded blood pressure and heart rate parameters immediately after completing the preoperative preparations and incision after regional anesthesia (T1). We applied the numerical analog scale (NAS) to patients orally and asked them to describe the pain sensation assigning a score from 0 to 10. However, since the patient might have difficulty assessing the pain because of the excitement of having given childbirth and the stress caused by the intervention, an anesthesia technician evaluated her facial expression simultaneously, scoring the patient's pain sensation based on the Wong-Baker face scale (VAS). After suturing the skin incision (T2), we immediately evaluated and recorded the patient's blood pressure, heart rate, and NAS and VAS scores. After the operation, we asked the patients in the G1 and G2 groups questions about their musical experience before leaving the operating room. We also asked anesthesia technicians questions about the benefit of listening to music during a cesarean section in terms of anesthesia procedures. We administered IV PCA (500 mg tramadol hydrochloride in 100 cc) adjusted at a constant infusion rate of 3 ml per hour to reduce postoperative pain. With the button attached to the PCA, the patients could take an extra dose of 3 ml every half hour if feeling excessive pain. At the 24th postoperative hour, we terminated PCA and checked the remaining fluid.

### 2.2. Statistical analysis

We statistically analysed the results using the IBM SPSS 27.0 (SPSS Inc., Chicago, IL, USA) package program and evaluated the conformity to normal distribution with the Kolmogorov-Smirnov Test. We gave numerical variables showing normal distribution as mean +/- standard deviation, the numerical variables not showing a normal distribution as a median (minimum-maximum) value, and the categorical variables as frequencies (percentages). We used the Wilcoxon Test to compare the differences between the T1 and T2 values

of NAS and VAS data not showing a normal distribution. We used the Kruskal Wallis analysis of variance to compare the groups while analysing comparisons with the post hoc test for Kruskal-Wallis analysis. We conducted mixed ANOVA to analyse the differences between the groups in terms of T1 and T2 values regarding systolic and diastolic blood pressure and heart rate measurements that showed normal distribution. In cases where the interaction was not significant, we evaluated the comparison of repeated measurements for each group with the Dependent Samples T-Test. Using Spearman's correlation coefficient, we analysed the relationship between VAS-NAS scores and between systolic blood pressure values and VAS and NAS scores. We used the Pearson Chi-Square Test and Fisher's Exact Test to compare the groups' categorical variables and considered $p<0.05$ sufficient for statistical significance.

## 3. Results

We excluded 12 patients as two from G1 and one from G2 encountered a system failure of their audio player; one patient from each group wanted the earphones removed; and one patient from G1, two from G2, and four from G3 were operated under general anaesthesia. The study enrolled 92 patients, including 32 from G1, 32 from G2 and 28 from G3.

Table 1 shows the patients' demographic data, including their age and educational background, with no statistically significant differences.

**Table 1.** Comparison of G1, G2 and G3 in terms of age and educational status

| | G1 | G2 | G3 | p |
|---|---|---|---|---|
| **Age** | 32.22±5.21 | 31.53±5.32 | 31.82±4.53 | 0.862 |
| **Educational Status** | | | | - |
| **Primary school** | 1 (3.1%) | 1 (3.1%) | 1 (3.1%) | |
| **Middle school** | 3 (9.4%) | 4 (12.5%) | 2 (7.1%) | |
| **High school** | 15 (46.9%) | 10 (31.2%) | 12 (42.9%) | |
| **University** | 13 (40.6%) | 17 (53.1%) | 13 (46.4%) | |

G1: who would listen to classical Turkish music in the Acemashiran maqam, G2: who would listen to the music of their own choice, G3: control group

We found no differences between G1, G2 and G3 regarding the remaining amounts of PCA ($\chi2 = 0.434$, $p>0.05$).

Table 2 shows the comparison between the three groups in terms of T1-VAS and T2-VAS values. We found a difference between G1, G2 and G3 in T1-VAS values (p=0.003). In post-hoc comparisons, there was a difference between G1 and G3 (p=0.002). The T1-VAS values of patients in G3 were significantly higher than those in G1. There was no difference between G1 and G2 or G2 and G3 (p=0.218 and p=0.313, respectively), while there was a difference between G1, G2 and G3 regarding T2-VAS values (p=0.011). Post-hoc comparisons revealed a difference between G1 and G3 (p=0.011). T2-VAS values in G3 were significantly higher than in G1. We found no difference between G1 and G2 or G2 and G3 (p>0.999, p=0.095, respectively). There was a statistically significant difference between the T1-VAS and T2-VAS measurement values of G1 and G3 patients (p=0.025, p=0.010, respectively), while none between these two values in G2 patients (p=0.611).

**Table 2.** Comparison of G1, G2 and G3 in terms of T1-VAS and T2-VAS scores

| | G1 | G2 | G3 | |
|---|---|---|---|---|
| **Time** | **Mean±Sd Median (Min-Max)** | **Mean±Sd Median (Min-Max)** | **Mean±Sd Median (Min-Max)** | **p** |
| **T1** | 0.0±0.0<br>0 (0-0) | 0.41±1.24<br>0 (0-5) | 0.32±0.48<br>0 (0-1) | **0.003** |
| **T2** | 0.31±0.74<br>0 (0-2) | 0.47±1.02<br>0 (0-5) | 0.79±0.92<br>1 (0-4) | **0.011** |
| **p** | **0.025** | 0.611 | **0.010** | |

G1: who listened to classical Turkish music in the Acemashiran maqam, G2: who listened to the music of their own choice, G3: control group. T1: incision start time T2: skin suturation time VAS: visual analog scale

Table 3 shows the comparison between the groups in terms of T1-NAS and T2-NAS values. There was a difference between G1, G2, and G3 regarding T1-NAS values ($p<0.001$), while post-hoc comparisons evinced a difference between G1 and G3 ($p<0.001$). The T1-NAS values of patients in G3 were significantly higher than those in G1. We found no difference between G1 and G2 or G2 and G3 (p=0.299 and p=0.053, respectively). There was no difference between G1, G2 and G3 in terms of T2-NAS values (p=0.092). We found a statistically significant difference between G1, G2 and G3 regarding measurement values of T1-NAS and T2-NAS (p=0.018, p=0.003 and p=0.006, respectively).

**Table 3**. Comparison of G1, G2 and G3 in terms of T1-NAS and T2-NAS scores

| | G1 | G2 | G3 | |
|---|---|---|---|---|
| **Time** | **Mean±Sd Median (Min-Max)** | **Mean±Sd Median (Min-Max)** | **Mean±Sd Median (Min-Max)** | **p** |
| **T1** | 0.0±0.0<br>0 (0-0) | 0.22±0.61<br>0 (0-3) | 0.46±0.64<br>0 (0-2) | **<0.001** |
| **T2** | 0.88±1.91<br>0 (0-8) | 0.78±1.10<br>0 (0-4) | 1.11±1.47<br>1 (0-7) | 0.092 |
| **p** | **0.018** | **0.003** | **0.006** | |

G1: who listened to classical Turkish music in the Acemashiran maqam, G2: who listened to music of their own choice, G3: control group. T1: incision start time T2: skin suturation time NAS: numerical analog scale

The study revealed statistically significant correlations between T1-VAS and T1-NAS scores and between T2-VAS and T2-NAS scores (r=0.751, p<0.001; r=0.832 and p<0.001, respectively). In order to ascertain which of the VAS and NAS scores best represent the pain, we evaluated the correlation between these values and systolic blood pressure (Table 4). We found no correlation between T1-systolic blood pressure values and T1-VAS or T1 NAS scores or between T2-systolic blood pressure values and T2-VAS or T2-NAS scores (P=0.767, p=0.701, p=0.146 and p=0.444, respectively).

**Table 4.** Correlation between systolic blood pressure and NAS and VAS values in all patients

| | VAS (T1 and T2) | | NAS (T1 and T2) | |
|---|---|---|---|---|
| | r | p | r | p |
| T1-Systolic Blood Pressure | 0.031 | 0.767 | 0.041 | 0.701 |
| T2-Systolic Blood Pressure | 0.153 | 0.146 | 0.081 | 0.444 |

T1: incision start time T2: skin suturation time VAS: visual analog scale NAS: numerical analog scale

Table 5 shows the comparison of patients in all three groups in terms of T1 and T2 systolic blood pressure, diastolic blood pressure, and heart rate values. We found a difference between systolic blood pressure, diastolic blood pressure and heart rate values in T1 and T2 values (p<0.001) but no difference between the groups (G: p=0.741, G: p=0.438 and G: p=0.379, respectively). The interaction was insignificant as well (GxT; p=0.672, GxT; p=0.516 and GxT; p=0.842, respectively).

**Table 5.** Comparison of G1, G2 and G3 in terms of systolic blood pressure, diastolic blood pressure and heart rate values in T1 and T2

| | Time | G1 | G2 | G3 | |
|---|---|---|---|---|---|
| | | Mean±Sd | Mean±Sd | Mean±Sd | |
| Systolic Blood pressure | T1 | 131.34±14.39 | 129.94±16.44 | 131.11±13.53 | T: p<0.001 G: p=0.741 |
| | T2 | 119.81±15.64 | 117.22±16.49 | 115.71±11.96 | GxT; p=0.672 |
| Diastolic Blood pressure | T1 | 82.25±9.29 | 78.53±10.30 | 79.96±9.04 | T: p<0.001 G: p=0.438 |
| | T2 | 71.12±10.96 | 70.37±10.72 | 72.89±10.39 | GxT; p=0.516 |
| Heart rate | T1 | 94.91±16.39 | 100.16±17.82 | 98.54±13.53 | T: p<0.001 G: p=0.379 |
| | T2 | 86.09±14.42 | 89.19±10.76 | 88.21±10.96 | GxT: p=0.842 |

G1: who listened to classical Turkish music in the Acemashiran maqam, G2: who listened to music of their own choice, G3: control group. T1: incision start time T2: skin suturation time

Since the music groups had no effects on the changes in systolic blood pressure, diastolic blood pressure and heart rate measurements that occurred over time, we analysed measurements of T1 and T2 systolic blood pressure, T1 and T2 diastolic blood pressure, and T1 and T2 heart rate in the music groups separately with the dependent samples t-test (Table 6). We found a statistically significant difference between the measurement results of T1 and T2 systolic blood pressure of all three groups (G1 mean difference: 11.53, 95% CI (5.70-17.36), p<0.001; G2 mean difference: 12.71, 95% CI (5.54-19.89), p=0.001; and G3 mean difference: 15.39, 95% CI (9.93-20.84), p<0.001). The three groups' systolic blood pressure measurement results at T2 time were statistically significantly lower than at T1 time. We found a statistically significant difference between all three groups' measurement results of T1 and T2 diastolic blood pressures (G1 mean difference: 10.56, 95% CI (5.54-15.58), p<0.001; G2 mean difference: 8.15, 95% CI (4.00-12.30), p<0.001; and G3 mean difference: 7.07, 95% CI (3.07-11.07), p=0.001).

**Table 6.** Comparison of the groups in terms of systolic blood pressure, diastolic blood pressure and heart rate values in T1 and T2

| | Time | G1 | G2 | G3 |
|---|---|---|---|---|
| | | Mean±Sd | Mean±Sd | Mean±Sd |
| Systolic Blood pressure | T1 | 131.34±14.39 | 129.94±16.44 | 131.11±13.53 |
| | T2 | 119.81±15.64 | 117.22±16.49 | 115.71±11.96 |
| | p | **<0.001** | **0.001** | **<0,001** |
| Diastolic Blood | T1 | 82.25±9.29 | 78.53±10.30 | 79.96±9.04 |
| | T2 | 71.12±10.96 | 70.37±10.72 | 72.89±10.39 |
| | p | **<0.001** | **<0.001** | **0.001** |
| Heart rate | T1 | 94.91±16.39 | 100.16±17.82 | 98.54±13.53 |
| | T2 | 86.09±14.42 | 89.19±10.76 | 88.21±10.96 |
| | p | **0.007** | **<0.001** | **<0.001** |

G1: who listened to classical Turkish music in the Acemashiran maqam, G2: who listened to music of their own choice, G3: control group. T1: incision start time T2: skin suturation time

**Table 7.** Comparison of the responses of patients in both music groups about their experiences of listening to music during caesarean section

| | G1 | | G2 | | p |
|---|---|---|---|---|---|
| | n | % | n | % | |
| The effect of music on pain during cesarean section | | | | | |
| Yes | 28 | 87.5 | 21 | 65.6 | **0.039** |
| No | 4 | 12.5 | 11 | 34.4 | |
| The effect of music on stress during cesarean section | | | | | |
| Yes | 30 | 93.8 | 24 | 75 | 0.039 |
| No | 2 | 6.2 | 8 | 25 | |
| Desire to listen to music during the next cesarean section | | | | | |
| Yes | 30 | 93.8 | 24 | 75 | **0.039** |
| No | 2 | 6.2 | 8 | 25 | |
| Liking classical Turkish music in the Acemashiran maqam in music selection | | | | | |
| Yes | 28 | 87.5 | | | |
| No | 4 | 12.5 | | | |

G1: who listened to classical Turkish music in the Acemashiran maqam, G2: who listened to music of their own choice, G3: control group.

The three groups' diastolic blood pressure measurement results at T2 time were statistically significantly lower than at T1 time. We found a statistically significant difference between all three groups' measurement results of T1 and T2 heart rates (G1 mean difference: 8.81, 95% CI (2.56-15.06), p=0.007; G2 mean difference: 10.96, 95% CI (5.46-16.47), p<0.001; and G3 mean difference: 10.32, 95% CI (5.85-14.78), p=0.001). The three groups' measurement results of heart rate at T2 time were statistically significantly lower than at T1 time.

Compared to the patients in G2, those in G1 were more willing to listen to music again during the next caesarean section and believed to a greater extent that music affected pain and anxiety (p=0.039). 87.5% of the patients who listened to classical Turkish music in the Acemashiran maqam liked the music selection. Table 7 shows the comparison of patients' responses in both music groups.

Although the effect of listening to music during a caesarean section on patient's compliance and agitation and its usefulness rate in terms of the practice of anaesthesia technicians were higher in G1 than in G2, we found that the difference was not statistically significant. Table 8 shows a comparison of the responses of the anaesthesia technician.

**4. Discussion**

Cesarean delivery has been increasingly common in recent years (1). Despite the availability of pharmacological methods that can be used in the postoperative period, physicians search for non-pharmacological pain relief methods (5-7, 17). Music is one of the most preferred non-pharmacological methods used for pain relief because it is easily accessible, has no side effects, and does not require additional cost and effort during its application (8). Due to the close relationship of music with culture, the music types preferred by researchers in their studies differ from each other (6, 10, 17, 20, 21). In our study that conducted to evaluate the effect of the classical Turkish music in the Acemashiran maqam on pain, we ascertained with VAS scores that this maqam (melody type) was effective on pain during cesarean sections (p=0.002).

The number of studies in the literature conducted using various types of music and musical instruments increase each passing day (8). In 2018, A study evaluating differences between meditation music, binaural rhythm, and the control group revealed that the VAS values of the two groups listening to music were lower than that of the control group during the evaluations made at the $6^{th}$ and $24^{th}$ hours (p<0.05) (2). Furthermore, In a study conducted by Farzaneh in 2019, patients who delivered by cesarean section were divided into 3 groups (patients wearing silent headphones, patients wearing headphones to listen to music (musical group) and patients not wearing headphones (control group)). Pain intensity was measured and the VAS scores were significantly lower in the music group than in the control group (p<0.001). A study conducted on three groups consisting of patients wearing silent headphones, patients wearing headphones to listen to music (music group), and patients not wearing any headphones (control group) evinced that the VAS scores were significantly lower in the music group than in the control group (p<0.001).(6) However, In another study conducted by Diri et al. in 2019 to evaluate the effect of music therapy on perceived anxiety and pain during outpatient urodynamic study (UDS) found no differences between the music and control groups in VAS values (p=0.76) another study conducted for urodynamic evaluation found no difference between the music and the control groups in terms of VAS values (p=0.76) (21).

A 2006 study conducted using VAS scores to assess the tolerance to pressure pain classified participants into three groups: Listening to white noise, relaxation music, and music of their own choice. The above study found that the participants' VAS scores listening to the music of their own choice were significantly lower than those listening to white noise and relaxation music (p<0.001) (10). In 2020, 150 patients undergoing cesarean delivery listened to the music of their own choice or Mozart's music, starting from the preoperative period until the end of the first postoperative hour, and they were then compared in terms of postoperative pain with the patients in the control group, who did not listen to any music. The study mentioned above found no difference between the group who listened to the music of their own choice and the control group in terms of postoperative pain (p=0.10), while patients who listened to Mozart's music had a lower pain rate than the control group (p=0.03) (22). Consistent with the abovementioned study, we found VAS values of G1 lower than that of G3 (p=0.011). However, we observed no differences between G1and G2 or between G2 and G3 in terms of VAS scores (p>0.999 and p=0.095, respectively).

Although it is possible to evaluate pain with VAS scores, subjective data interpretation would not be sufficient. Therefore, studies conducted to evaluate pain used objective criteria. A meta-analysis conducted in 2020, including 55 studies and 4,968 patients, concluded that listening to perioperative music reduces the need for postoperative opioids (p<0.001) (23). A controlled study conducted in 2010 providing postoperative music to patients undergoing cesarean delivery found significantly lower VAS scores in the group listening to music, while the need for a postoperative opioid was also significantly reduced (p<0.05) (24). However, we did not observe in our study any positive effect of listening to music on the need for postoperative opioids ($\chi 2$ = 0.434, p>0.05).

Changes in the cardiovascular system are often used to evaluate the patient's pain level. In a randomized controlled trial conducted in 2018 to investigate the effect of listening to music on pain and stress during cesarean sections, systolic blood pressure and heart rate during skin incision were significantly lower in the study group than in the control group

($p<0.05$); while there were no significant differences in diastolic blood pressure ($p=0.197$). The study mentioned above found no difference between the groups in terms of suturing (25). Another study investigating the effect of listening to music on anxiety and vital signs in patients who had multiple cesarean sections observed a decrease between the heart rates recorded at the beginning and the end of the operation in the study group, while there was no such change in the control group ($p<0.05$) (26). In a 2004 study, A study, evaluating the effect of listening to music before and after gynecological operations on the postoperative pain of patients performed there was no difference between blood pressure values in the music group and the control group ($p>0.05$), while observing a significant difference in heart rates ($p=0.02$) (27). A 2012 study comparing the preoperative stress and vital signs of patients listening to music in the waiting room before cesarean section with the control group, observed significant decreases in systolic ($p<0.05$) and diastolic ($p<0.01$) blood pressures in patients listening to music compared to the control group, but no significant change in heart rates ($p>0.05$) (28). Our study evinced that the music groups had no effects on the changes that occurred over time in the results of systolic and diastolic blood pressures and heart rate measurements ($p>0.05$).

Even studies showing that music does not affect pain and anxiety, patients found their experience of listening to music during the procedure favorable and were more willing to listen to music again in the next operation than the control group ($p = 0.005$) (21). In a study conducted with patients who underwent colonoscopy, the desire to listen to music again during the potential repetition of the operation was 63.2% (6). In another study, A meta-analysis to evaluate the effect of perioperative music on medication requirement, length of stay, and cost 95.5% of the participants stated that they wanted to listen to music again during the next cesarean section, while 89.7% said that music made the situation more enjoyable, and 73.4% that music calmed them (23). Our study revealed that 87.5% of the patients liked the music selection, while 93.8% in G1 and 75% in G2 desired to listen to music again during the next cesarean section ($p=0.039$). A higher rate of patients in G1 stated that music affected pain and stress during cesarean section than in G2 ($p<0.05$).

In addition to the burden and stress they create for the patient, surgical procedures are also a troublesome process for the operating team. The patients' awareness about what is being done during the procedures performed under regional anesthesia and their reactions to actions complicate the practice of anesthesia technicians, who are already busy providing medical treatment and monitoring the patient's vital signs. Various studies suggest that listening to music during surgical procedures eases the job of anesthesia technicians (29, 30). We observed in our study that listening to music during cesarean sections had a beneficial effect on anesthesia technicians' practices by improving patients' compliance and reducing their operation-induced agitation. In this respect, we found no statistically significant difference between both musical groups ($p=0.098$).

As a non-pharmacological, easily accessible, and cost-free method, music can be safely used to relieve pain during cesarean sections. Individual and cultural differences make it impossible to standardize which musical style is more effective in achieving the best results. Classical Turkish music in the Acemashiran maqam is one of the types of music that can be played for patients during cesarean sections.

**Conflict of interest**

The authors declared no conflict of interest.

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**Authors' contributions**

Concept: E.T., Design: E.T., Data Collection or Processing: E.T., Analysis or Interpretation: E.T., Literature Search: E.T., Writing: E.T.,

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