Volume: 4 **Issue: 2**
Year: 2023
DOI: 10.53811/ijtcmr.1313782

International Journal of Traditional and Complementary Medicine Research

Publisher
Duzce University

ORIGINAL RESEARCH

The Effects of Sacral Massage and Music Therapy Applied to Primaparous Women in Labor on Labor Pain, Postpartum Comfort, and Posttraumatic Growth: A Randomized Controlled Trial

Hatice Gul Oztas[1], Nilay Gokbulut[2], Emine Ibici Akca[3]

[1]Kahramanmaraş Sütçü Imam University, Faculty of Health Sciences, Department of Midwifery, Kahramanmaraş, Türkiye
[2]Cankırı Karatekin University, Faculty of Health Sciences, Department of Midwifery, Cankırı, Türkiye
[3]Amasya University, Faculty of Health Sciences, Department of Midwifery, Amasya, Türkiye

* Corresponding Author: Emine Ibici Akca, e-mail: emine.akca@amasya.edu.tr

Received: 13.06.2023 Accepted: 17.07.2023

Abstract
Objective: In this study, the researchers investigated the effects of sacral massage and music therapy applied to primiparous women in labor on labor pain, postpartum comfort, and posttraumatic growth.
Materials-Methods: This randomized controlled study was conducted with 105 primiparous women admitted to the delivery room of a public hospital in a province south of Türkiye. Data from the study was collected with the "Visual Analog Scale (VAS)", "Postpartum Comfort Questionnaire (PPCQ)", and "Posttraumatic Growth Inventory (PTGI)".
Results: After the intervention, the latent, active, and transitional phases' VAS scores of the pregnant women in the massage, music, and control groups were compared, and the difference between the groups was statistically significant ($p<0.001$). It was determined that the PPCQ total mean scores were 127.0 (119.0-136.0) in the massage group, 121.0 (113.0-127.0) in the music group, 112.0 (106.0-115.0) in the control group, and the difference between the groups was statistically significant ($p<0.001$). It was determined that the PTGI total mean scores were 69.0 (62.0-75.0) in the massage group, 57.0 (49.0-72.0) in the music group, 55.0 (40.0-65.0) in the control group, and the difference between the groups was statistically significant ($p<0.001$).
Conclusion: Sacral massage and music therapy applied to primiparous women in labor were found to be effective in reducing the pain levels of pregnant women and increasing postpartum comfort and posttraumatic growth levels.
Keywords: Comfort, Music Therapy, Posttraumatic Growth, Primiparous Women, Sacral Massage.

INTRODUCTION

Although labor pain is a stressful and frightening experience for some women, it is an important part of the physiological and natural birth processes.[1] Failure to manage labor pain may cause pregnant women to perceive birth negatively and decrease their satisfaction with birth.[2] There are pharmacological and non-pharmacological interventions to cope with labor pain.[3-5] As an alternative to the possible side effects of pharmacological interventions (fever, headache, hypotension, urinary retention, bladder distention, fetal respiratory depression, etc.) and some negative consequences (delay in the second stage of labor, delivery with intervention, cesarean section, etc.), the use of non-pharmacological methods is both cost-effective and can help women cope with the labor pain.[4-9] Non-pharmacological methods used to cope with labor pains include breathing techniques, yoga, hypnosis, moving and positioning, hydrotherapy, acupuncture, acupressure, aromatherapy, massage, and music therapy.[2,5,8]

Insufficient support provided for the woman during labor can lead to a negative birth experience.[10] The application of massage and music practices in labor are among the most effective strategies to prevent negative birth experiences.[11] Massage is one of the complementary treatment methods used in labor that helps relieve pain, increase relaxation, and reduce emotional stress.[4,12] Massage can be applied to the woman's back, hips, thighs, or sacral region to cope with labor pain.[1,4,13-15] Türkmen & Tuna-Oran (2020) stated that sacral massage is an effective intervention that reduces the pain perception of women in labor and increases their comfort.[15] Akköz-Çevik & Karaduman (2020) similarly reported in their study that sacral massage applied in labor reduces the labor pain, agitation, and anxiety levels of women,

increases the satisfaction levels associated with labor, and positively affects the perception of birth.[14]

Music therapy can reduce the feeling of anxiety and pain by distracting the senses and reducing the individual's stimulus concentration.[9] In addition, music supports the mother-baby relationship and improves mothers' courage and self-confidence.[2] It has been stated in the literature that music reduces pain and anxiety in labor.[16-19] Music therapy applied in labor is an application that increases maternal satisfaction while reducing anxiety, pain, and early depression rates in the postpartum period. Therefore, music therapy is recommended as an alternative and safe method for postpartum well-being.[20]

Labor pain may cause discomfort in the mother or may be perceived as traumatic by some mothers.[21] In addition, labor pain can prepare the ground for many disorders that affect the mother and baby during the postpartum period.[22-23] Some non-pharmacological methods used to cope with labor pain increase postpartum comfort levels.[24,25] Postpartum comfort and post-traumatic growth are closely related[26], and the mental and physical health of the mother plays an important role in post-traumatic growth.[27] Labor is a challenging life event with the potential to experience positive and negative experiences. Growth is not limited to traumatic experiences, but life events such as birth also have the potential to encourage growth.[28] The most important aspect of midwifery is to relieve and care for women during labor pain.[12,14] Therefore, midwives should support and encourage women to use non-pharmacological methods.[2,7] To the best of our knowledge, no research has been found on the effects and comparison of sacral massage and music therapy, which are supportive and alternative methods in labor, on both labor pain, postpartum comfort, and post-traumatic growth. It is aimed that the results of this research, which was conducted to determine the effects of sacral massage and music therapy applied to primiparas in labor on labor pain, postpartum comfort, and post-traumatic growth, will provide important contributions to midwives who provide care services in the labor, delivery, and postpartum services regarding the effectiveness of non-pharmacological methods.

MATERIALS AND METHODS

Research design

This study was conducted in a randomized controlled manner to determine the effects of sacral massage and music therapy applied to primiparas in labor on labor pain, postpartum comfort, and posttraumatic growth. The research was conducted with primiparous women who were admitted to the delivery rooms of a public hospital in a province in the south of Türkiye between April and July 2022. There are 11 beds in the delivery room of the relevant hospital, and 19 midwives work here. In hospital routine care, non-pharmacological coping methods are not used to cope with pain.

Population and sample of the research

The population of the research consisted of pregnant women who were admitted to the delivery room of a public hospital in a province in the south of Türkiye. When the power analysis was performed, the sample size was calculated with a 5% error level, bidirectional significance level, 95% confidence interval, and 80% ability to represent the universe. It was found that at least 32 participants for each group and 96 primiparous women in total were needed (32 participants for the massage group, 32 participants for the music group, and 32 participants for the control group), assuming that the intervention would create 11 points increase in the PPCQ total mean score (115.43±15.51).[29] A total of 114 primiparous pregnant women (38 participants for the massage group, 38 participants for the music group, and 38 participants for the control group) were planned to be included in the study, considering possible losses (approximately 20%). Pregnant women who were pregnant at the term, primiparous, expecting a single baby, and voluntarily accepted to participate in the study were included in the study. Pregnant women who had hearing problems, impaired skin integrity, using analgesia/anesthesia during labor, and delivery by caesarean section were excluded from the study.

Columns between 1 and 114 were created using the Random Integer Generator method in the Numbers subheading of the random.org site for women who met the sampling criteria. Numbers 1, 2, and 3 for massage, music, and control groups were observed in the column. Which number would represent the massage group, music group or control group was determined by drawing a lot at the beginning of the study. As a result of the drawing lots, women who were matched with the number 1 were assigned to the massage group, those who were matched with the number 2 were assigned to the control group, and those who were matched with the number 3 were assigned to the music group.[30]

Data collection tools

Data of the study was collected using the "Personal Information Form", "Visual Analog Scale", "Postpartum Comfort Questionnaire" and "Posttraumatic Growth Inventory".

Personal information form

It is a form consisting of 9 questions developed by

researchers in line with the literature in order to determine some sociodemographic and obstetric (age, educational level, employment, location of residency, income level, family structure, the status of having regular health check-ups during pregnancy, etc.) characteristics of pregnant women.[1,4,16,19,20]

Visual analog scale (VAS)

The visual analog scale was developed by Price et al. (1983). VAS is used to assess pain severity. It is used to self-evaluate perceived pain on a 10-cm ruler scale, where 0 indicates no pain, and 10 indicates the most severe pain. High scores indicate more severe pain.[31]

Postpartum comfort questionnaire (PPCQ)

The "General Comfort Questionnaire" developed by Kolcaba (1992) was adapted to Turkish society by Kuğuoğlu & Karabacak (2004). The "Postpartum Comfort Questionnaire" was developed by Karakaplan in 2007 from the Turkish form of the General Comfort Questionnaire. The PPCQ is a five-point Likert-type questionnaire consisting of 34 items and 3 subscales: physical comfort, psychospiritual comfort, and sociocultural comfort. Each item is scored between 1 and 5, and a score of 34-170 can be obtained from the questionnaire. If the scores obtained from the questionnaire are close to 170, it means that the comfort is high. The Cronbach's Alpha coefficient of the questionnaire was 0.78.[32-34] In this study, the Cronbach's Alpha coefficient was found to be 0.77.

Posttraumatic growth inventory (PTGI)

It was developed by Tedeschi & Calhoun (1996) to measure perceived positive changes after traumatic life events. In addition, the inventory was adapted into Turkish by Dirik & Karanci (2008). The Posttraumatic Growth Inventory is a six-point Likert-type inventory consisting of 21 items and 3 subscales: A Changed Sense of Relationships with Others, A Changed Philosophy of Life, and Perceived Changes in Self. The inventory's items are scored between 0-5, and a score between 0-105 can be obtained. As the score obtained from the inventory increases, it is thought that the level of posttraumatic growth is higher. The Cronbach's Alpha coefficient of the inventory was 0.94.[35-36] In this study, the Cronbach's Alpha coefficient was found to be 0.95.

Procedures

The data was collected by the researchers through face-to-face interviews with pregnant women admitted to the delivery rooms of a public hospital in a province in the south of Türkiye.

Massage Group; The sacral massage was applied to pregnant women in the massage group by the researcher (H.G.Ö.), who received training in the field of pregnant massage (10 hours). Before the application, the pregnant women were informed, their consent was taken, and gloves were worn. A lubricant that does not contain any harmful substances was used to provide lubricity during the massage. The sacral massage was applied to the pregnant women in this group three times, in the latent (1-4 cm), active (5-7 cm), and transitional phases (8-10 cm). Pregnant women cling to the bed, sitting or lying on their left side, to the area where the sacral (S1-S4) vertebrae are. The massage was applied to the right and left 4-5 cm lateral parts of the midline with effleurage and friction techniques. The massage application was continued for 10 minutes without interruption. Each application took an average of 10 minutes.

Music Group; The pregnant women in the music group were informed about the music application, and their consent was obtained. Headphones were used during the music application. In addition, suitable disposable caps were attached to the earplugs before the application. The pregnant women in this group listened to music in Rehavi mode for 20 minutes, 3 times in the latent (1-4 cm), active (5-7 cm), and transitional phases (8-10 cm). The Rehavi mode was preferred for the study as it is a mode that gives people the idea of eternity and is thought to be effective on labor pain.[37]

Data analysis

The obtained data was analyzed in the statistical package program "Statistical Package for Social Sciences" (SPSS) for Windows 25.0. Kolmogorov Smirnov test was used for the normality analysis of the data, and it was seen that the data were not normally distributed. Descriptive statistics (number, percentage distribution, median, and Q1-Q3), chi-square test, Kruskal Wallis test, and Wilcoxon test were used in the analysis of the data. The Post-Hoc Tamhane test was used for further analysis. The error level of $p<0.05$ was considered statistically significant when interpreting the results.

Ethics

Ethical approval was obtained from the Scientific Research and Publication Ethics Committee of Inonu University (Decision Number: 2022/2889), and the study was registered at the Clinical Trials (registration number: NCT05317052). In addition, necessary permissions were obtained from the relevant institution in order to conduct the research. Informed consent was obtained from the pregnant women who participated in the study, and they were informed that they were free to participate in the study and could withdraw from the study at any time.

RESULTS

Nine pregnant women were not included in the study because three pregnant women in the massage group did not want to continue the research, three pregnant women in the music group received an emergency cesarean section, and one pregnant woman in the control group received an emergency cesarean section, and two pregnant women in the control group did not want to continue the research. The study was completed with 105 primiparous women (Figure 1. Research Consort Diagram).

The comparison of pregnant women in massage, music, and control groups in terms of descriptive characteristics is given in Table 1. In the analysis made, it was determined that there was no statistical difference in terms of descriptive characteristics such as age, educational level, employment, age of spouse, educational level of spouse, income level, location of residency, family structure, the status of having regular health check-ups during pregnancy, and all three groups had similar characteristics ($p>0.05$).

Intra-group comparison of the pre-test and post-test VAS scores of pregnant women in labor in the massage, music, and control groups is presented in Table 2. When the pre-application VAS scores of the pregnant women in the massage, music, and control groups were compared in the latent, active, and transitional phases, it was determined that the difference between the groups was not statistically significant. The pregnant women in all groups had similar pain levels before the application ($p>0.05$).

After the intervention, when the latent, active, and transitional phases' VAS scores of the pregnant women in the massage, music, and control groups were compared, the VAS scores in the latent phase were 2.0 (1.0-2.0) in the massage group, 2.0 (2.0-3.0) in the music group, and 3.0 (3.0-4.0) in the control group. The difference between the groups was statistically significant ($X^2=40.021$, $p<0.001$). As a result of the further analysis performed to determine which group caused the difference, it was determined that the VAS score of the pregnant women in the massage group was lower than those in the music and control groups. The VAS score of the pregnant women in the music group was lower than those in the control group ($1<2<3$). It was determined that the VAS scores after the intervention in the active phase were 5.0 (3.0-5.0) in the massage group, 6.0 (5.0-7.0) in the music group, and 6.0 (6.0-7.0) in the control group. The difference between the groups was statistically significant ($X^2=32.124$, $p<0.001$). As a result of further analysis performed to determine from which group the difference originated, it was determined that the VAS score of the pregnant women in the massage group was lower than those in the music and control groups ($1<2$, $1<3$). In the transitional phase, the post-intervention VAS scores were 8.0 (6.0-9.0) in the massage group, 9.0 (8.0-9.0) in the music group, and 9.0 (8.0-10.0) in the control group, and the difference between the groups was statistically significant ($X^2=28.228$, $p<0.001$). As a result of further analysis performed to determine from which group the difference originated, it was determined that the VAS score of the pregnant women in the massage group was lower than those in the music and control groups ($1<2$, $1<3$).

When the pre- and post-application VAS scores of the pregnant women in the massage group were compared within the group in the latent, active, and transitional phases, it was determined that the post-test measurements were statistically significantly reduced compared to the pre-test ($p<0.001$). When the pre- and post-application VAS scores of the pregnant women in the music group were compared within the group, it was seen that the post-test measurements decreased statistically significantly compared to the pre-test ($p<0.05$). However, the VAS scores in the transitional phase did not create a statistically significant difference between the pre-test and post-test measurements ($p>0.05$).

When the pre- and post-application VAS scores of the pregnant women in the control group were compared within the group in the latent, active, and transitional phases, it was seen that there were no statistically significant differences between the pre-test and post-test measurements ($p>0.05$).

The inter-group comparison of the postpartum PPCQ and PTGI scores of the women in the massage, music, and control groups is presented in Table 3. It was determined that the scores of PPCQ's subscale of *physical comfort* were 50.0 (48.0-55.0) in the massage group, 47.0 (43.0-48.0) in the music group, and 42.0 (40.0-45.0) in the control group. The difference between the groups was statistically significant ($X^2=39.609$, $p<0.001$). As a result of the further analysis carried out to determine which group caused the difference, it was determined that the score of PPCQ's subscale of the *physical comfort* of the women in the massage group was higher than those in the music and control groups. The score of PPCQ's subscale of the *physical comfort* of the women in the music group was higher than those in the control group ($1>2>3$). It was determined that the scores of PPCQ's subscale of the *psychospiritual comfort* were 46.0 (43.0-48.0) in the massage group, 42.0 (39.0-46.0) in the music group, 40.0 (37.0-43.0) in the control group.

Volume: 4 **Issue: 2**
Year: 2023
DOI: 10.53811/ijtcmr.1313782

International Journal of Traditional and Complementary Medicine Research

Publisher
Duzce University

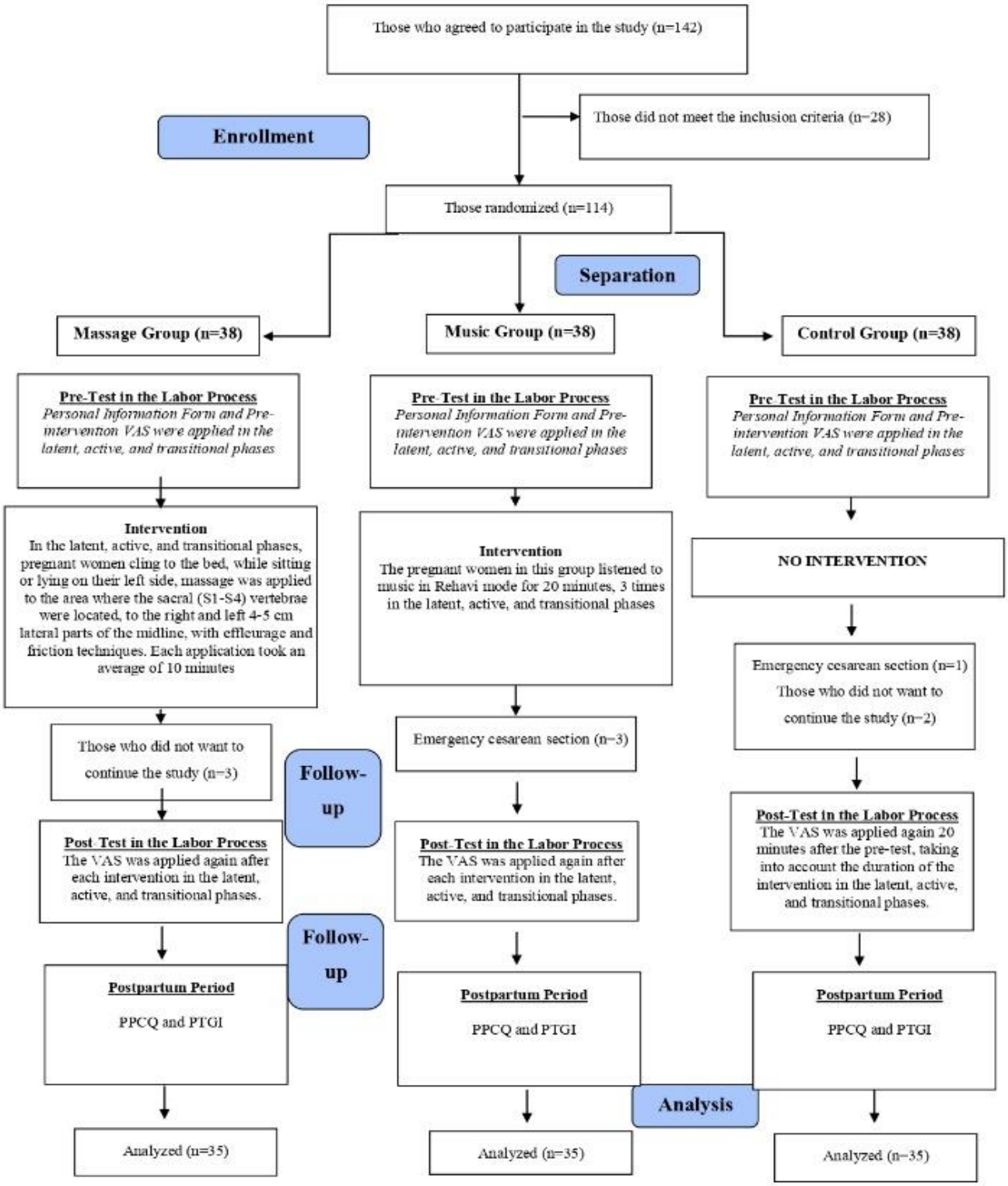

Figure 1. Research Consort Diagram

Volume: 4 **Issue: 2**
Year: 2023
DOI: 10.53811/ijtcmr.1313782

International Journal of Traditional and Complementary Medicine Research

Publisher
Duzce University

Table 1. The Comparison of Pregnant Women in Massage, Music, and Control Groups in terms of Descriptive Characteristics (n=105)

Descriptive Characteristics	**Massage Group (n=35)**		**Music Group (n=35)**		**Control Group (n=35)**		**Test and p Values**
	N	**%**	**N**	**%**	**N**	**%**	
Educational Level							
Literate	-	-	-	-	1	2.9	
Primary School	6	17.1	5	14.3	7	20.0	X^2=6.291
Middle School	6	17.1	10	28.6	10	28.6	p=0.615
High School	19	54.3	14	40.0	11	31.4	
University and Higher	4	11.4	6	17.1	6	17.1	
Employment							
Unemployed	4	11.4	6	17.1	8	22.9	X^2=1.609
Employed	31	88.6	29	82.9	27	77.1	p=0.447
Educational Level of the Spouse							
Illiterate	-	-	2	5.7	-	-	
Literate	-	-	-	-	2	5.7	
Primary School	4	11.4	3	8.6	8	22.9	
Middle School	7	20.0	7	20.0	7	20.0	X^2=14.410
High School	20	57.2	18	51.4	11	31.4	p=0.155
University and Higher	4	11.4	5	14.3	7	20.0	
Income Level							
Income is less than expenses	7	20.0	7	20.0	11	31.4	
Income is equal to expenses	26	74.3	28	80.0	20	57.2	X^2=6.685
Income is more than expenses	2	5.7	-	-	4	11.4	p=0.153
Location of Residency							
Province	23	65.8	23	65.8	19	54.3	X^2=1.455
District	6	17.1	6	17.1	9	25.7	p=0.835
Village	6	17.1	6	17.1	7	20.0	
Family Structure							
Core	29	82.9	31	88.6	32	91.4	X^2=1.229
Traditional	6	17.1	4	11.4	3	8.6	p=0.541
The status of having regular health check-ups during pregnancy							
Regular	35	100.0	33	94.3	33	94.3	X^2=2.079
Irregular	-	-	2	5.7	2	5.7	p=0.354
	Med (Q1-Q3)		**Med (Q1-Q3)**		**Med (Q1-Q3)**		
Age (years)	22.0 (20.0-25.0)		22.0 (20.0-24.0)		22.0 (20.0-25.0)		*X^2=0.210 p=0.900
Age of the spouse (years)	26.0 (24.0-30.0)		26.0 (24.0-29.0)		27.0 (25.0-29.0)		*X^2=0.678 p=0.713

X^2: Chi-square test, *X^2:Kruskal Wallis test, Med: Median, N:Number

Volume: 4 **Issue: 2**
Year: 2023
DOI: 10.53811/ijtcmr.1313782

International Journal of Traditional and Complementary Medicine Research

Publisher
Duzce University

The difference between the groups was statistically significant (X^2=22.757, p<0.001). As a result of further analysis carried out to determine which group caused the difference, it was determined that the score of PPCQ's subscale of the *psychospiritual comfort* of the women in the massage group was higher than those in the music and control groups (1>2, 1>3). It was determined that the scores of PPCQ's subscale of the *sociocultural comfort* were 32.0 (28.0-35.0) in the massage group, 32.0 (30.0-34.0) in the music group, and 29.0 (27.0-32.0) in the control group. The difference between the groups was statistically significant (X^2=7.811, p<0.05). As a result of further analysis carried out to determine from which group the difference originated, it was determined that the score of PPCQ's subscale of *sociocultural comfort* of the women in the music group was higher than those in the control group (2>3). It was determined that the PPCQ total scores were 127.0 (119.0-136.0) in the massage group, 121.0 (113.0-127.0) in the music group, 112.0 (106.0-115.0) in the control group, and the difference between the groups was statistically significant (X^2=34.159, p<0.001). As a result of the further analysis performed to determine which group caused the difference, it was determined that the PPCQ total score of the women in the massage group was higher than those in the music and control groups. The PPCQ total score of the women in the music group was higher than the women in the control group (1>2> 3).

Table 2. Intra-Group and Inter-Group Comparisons of the Pre-Test and Post-Test VAS Scores of Pregnant Women in Labor in the Massage, Music, and Control Groups (n=105)

Scales		Massage Group (n=35) Med (Q1-Q3)	Music Group (n=35) Med (Q1-Q3)	Control Group (n=35) Med (Q1-Q3)	[a]Test and p Values	Significance[*]
LATENT PHASE (1-4 cm)	**VAS** Pre-Test	4.0 (3.0-4.0)	3.0 (3.0-3.0)	3.0 (3.0-4.0)	X^2=3.954 p=0.138	
	VAS Post-Test	2.0 (1.0-2.0)[1]	2.0 (2.0-3.0)[2]	3.0 (3.0-4.0)[3]	X^2=40.021 **p=0.000**	1<2<3
	[b]Test and p Values	Z=-5.514 **p=0.000**	Z=-4.823 **p=0.000**	Z=-1.000 p=0.317		
ACTIVE PHASE (5-7 cm)	**VAS** Pre-Test	6.0 (6.0-8.0)	6.0 (5.0-7.0)	6.0 (6.0-7.0)	X^2=1.236 p=0.539	
	VAS Post-Test	5.0 (3.0-5.0)[1]	6.0 (5.0-7.0)[2]	6.0 (6.0-7.0)[3]	X^2=32.124 **p=0.000**	1<2,1<3
	[b]Test and p Values	Z=-5.194 **p=0.000**	Z=-2.236 **p=0.025**	Z=-1.000 p=0.317		
TRANSITIONAL PHASE (8-10 cm)	**VAS** Pre-Test	9.0 (8.0-9.0)	9.0 (8.0-9.0)	9.0 (8.0-10.0)	X^2=2.599 p=0.273	
	VAS Post-Test	8.0 (6.0-9.0)[1]	9.0 (8.0-9.0)[2]	9.0 (8.0-10.0)[3]	X^2=28.228 **p=0.000**	1<2,1<3
	[b]Test and p Values	Z=-4.606 **p=0.000**	Z=-1.000 p=0.317	Z=-1.342 p=0.180		

[a]X^2: Kruskal Wallis test, [b]Wilcoxon test, [*]Post-Hoc Tamhane test, Med: Median

Volume: 4 **Issue: 2**
Year: 2023
DOI: 10.53811/ijtcmr.1313782

International Journal of Traditional and Complementary Medicine Research

Publisher
Duzce University

Table 3. The Comparison of Postpartum PPCQ and PTGI Scores of Women in Massage, Music, and Control Groups (n:105)

	Scales	Massage Group (n=35) Med (Q1-Q3)	Music Group (n=35) Med (Q1-Q3)	Control Group (n=35) Med (Q1-Q3)	[a]Test and p Values	Significance[*]
PPCQ's Subscales	Physical Comfort	50.0 (48.0-55.0)[1]	47.0 (43.0-48.0)[2]	42.0 (40.0-45.0)[3]	X^2=39.609 **p=0.000**	1>2>3
	Psychospiritual Comfort	46.0 (43.0-48.0)[1]	42.0 (39.0-46.0)[2]	40.0 (37.0-43.0)[3]	X^2=22.757 **p=0.000**	1>2,1>3
	Sociocultural Comfort	32.0 (28.0-35.0)[1]	32.0 (30.0-34.0)[2]	29.0 (27.0-32.0)[3]	X^2=7.811 **p=0.020**	2>3
	PPCQ TOTAL	127.0 (119.0-136.0)[1]	121.0 (113.0-127.0)[2]	112.0 (106.0-115.0)[3]	X^2=34.159 **p=0.000**	1>2>3
PTGI's Subscales	A Changed Sense of Relationships with Others	23.0 (20.0-26.0)[1]	20.0 (17.0-24.0)[2]	17.0 (12.0-23.0)[3]	X^2=15.528 **p=0.000**	1>2>3
	A Changed Philosophy of Life	16.0 (13.0-18.0)[1]	12.0 (10.0-16.0)[2]	13.0 (8.0-16.0)[3]	X^2=10.110 **p=0.006**	1>2,1>3
	Perceived Changes in Self	29.0 (27.0-31.0)[1]	25.0 (22.0-31.0)[2]	24.0 (17.0-28.0)[3]	X^2=14.774 **p=0.001**	1>3
	PTGI TOTAL	69.0 (62.0-75.0)[1]	57.0 (49.0-72.0)[2]	55.0 (40.0-65.0)[3]	X^2=15.237 **p=0.000**	1>2,1>3

[a]X^2=Kruskal Wallis test, [*]Post-Hoc Tamhane test, Med = Median

It was determined that the scores of PTGI's subscale of *a changed sense of relationships with others* were 23.0 (20.0-26.0) in the massage group, 20.0 (17.0-24.0) in the music group, 17.0 (12.0-23.0) in the control group. The difference between the groups was statistically significant (X^2= 15.528, p<0.001). As a result of the further analysis carried out to determine from which group the difference originated, it was determined that the women in the massage group had a higher score on PTGI's subscale of *a changed sense of relationships with others* than those in the music and control group. It was determined that the score of PTGI's subscale of *a changed sense of relationships with others* of the women in the music group was higher than the women in the control group (1>2>3). It was determined that the scores of PTGI's subscale of *a changed philosophy of life* were 16.0 (13.0-18.0) in the massage group, 12.0 (10.0-16.0) in the music group, 13.0 (8.0-16.0) in the control group. The difference between the groups was statistically significant (X^2=10.110, p<0.05). As a result of further analysis carried out to determine from which group the difference originated, it was determined that the score of PTGI's subscale of *a changed philosophy of life* of the women in the massage group was higher than those in the music and control groups (1>2, 1>3). It was determined that the scores of the PTGI's subscale of *perceived changes in self* were 29.0 (27.0-31.0) in the massage group, 25.0 (22.0-31.0) in the music group, 24.0 (17.0-28.0) in the control group. The difference between the groups was statistically significant (X^2=14.774, p<0.05). As a result of further analysis carried out to determine from which group the difference originated, it was determined that the score of PTGI's subscale of *perceived changes in self* of women in the massage group was higher than those in the control group (1>3). It was determined that the PTGI total scores were 69.0 (62.0-75.0) in the massage group,

57.0 (49.0-72.0) in the music group, 55.0 (40.0-65.0) in the control group, and the difference between the groups was statistically significant (X^2=15.237, p<0.001). As a result of further analysis performed to determine which group caused the difference, it was determined that the PTGI total score of the women in the massage group was higher than those in the music and control groups (1>2, 1>3).

DISCUSSION

Massage is a traditional method that has been used for centuries in many cultures to relieve and alleviate many illnesses.[38] Music therapy, on the other hand, is an application that is simple to apply and has no side effects, and it is used for physical, psychological, emotional, and spiritual healing.[39] Sacral Massage and music therapy are among the non-pharmacological interventions used to relieve labor pain.[14,15,40,41] In this study, which was conducted to determine the effects of sacral massage and music therapy applied to primiparas in labor on labor pain, postpartum comfort, and posttraumatic growth, it was determined that the labor pain scores of the pregnant women in the sacral massage and music therapy groups decreased. In contrast, their postpartum comfort and posttraumatic growth levels increased.

In the current study, it was determined that there were no statistically significant differences between the descriptive characteristics of the pregnant women in the massage, music, and control groups. In line with these results, it can be said that the groups were homogeneously distributed. In the current study, it was determined that the pain levels of the pregnant women in the massage group decreased in the latent, active, and transitional phases, and in the latent and active phases of the music group after the application. It was determined that massage application in the latent phase was an effective application compared to music therapy, and music therapy was an effective application compared to the no intervention in the control group. Additionally, it was determined that the massage application in the active and transitional phases was a more effective application than the music therapy in the music group, and there was no intervention in the control group. Taghinjad et al. (2010), in a study comparing massage and music therapies to relieve the severity of labor pain in primiparous women, stated that massage is an effective method to lower level and relieve labor pain compared to music therapy.[9] Furthermore, Kimber et al. (2008), in their pilot study in which they examined the effectiveness of massage and music in relieving labor pain, stated that although there was no statistically significant difference, the pregnant women in the massage group had lower pain scores than the music and control groups.[42] Studies in which sacral massage and music interventions were examined separately were found in the literature. In the study of Phumdoung & Good (2003), music provided relief during severe pain in primiparous women[41]; in the study of Türkmen & Tuna-Oran (2021), sacral massage was found to be effective in reducing the perception of the pain of pregnant women.[15] Additionally, Akköz-Çevik & Karaduman (2020) also stated in their study that sacral massage applied during labor reduced the labor pain of women.[14] Although our results were similar to the literature, it has been determined that both sacral massage and music therapies are effective as non-pharmacological techniques. For this reason, it is possible to say that these methods can be used as an alternative application, especially in the delivery rooms, starting with the latent phase.

Postpartum comfort is very important in ensuring the adaptation of the mother to the postpartum process, early initiation and continuation of breast milk, a healthy mother-infant relationship, ensuring recovery in a short time, and the care to be given to both mother and baby by preventing risk factors that may occur.[43] In our study, it was determined that the scores of PPCQ's subscales of *physical comfort*, *psychospiritual comfort*, and the total PPCQ of the primiparous women in the massage group were statistically significantly higher than the music and control groups. Moreover, it was determined that the scores of PPCQ's subscales of *physical comfort*, *sociocultural comfort*, and the total PPCQ of the primiparous women in the music group were statistically significantly higher than the control group. Although there is no study in the literature in which both sacral massage and music application were performed, and postpartum comfort levels were evaluated; however, in studies where different massage techniques were applied to different groups, it was stated that deep tissue massage, which was applied to the back after cesarean section, increased the comfort levels of women; furthermore, İçke & Genç (2021) stated that foot massage improved the comfort level of mothers after vaginal delivery.[44,45] According to these results, it is possible to say that the application of sacral massage and music therapy is an effective intervention that increases the postpartum comfort levels of primiparous women.

The positive psychological change that occurs after struggling with difficult life crises is called post-traumatic growth.[46] Post-traumatic growth is an

important concept to address in the postpartum period.[47] No studies on this subject have been found in the literature. In the study of Nishi & Usuda (2017), it was determined that the birth experience could positively affect physical pain and psychological distress, as well as emotions such as joy and success.[47] In our study, while the scores of PTGI's subscales of *a changed sense of relationships with others*, *a changed philosophy of life*, and the total PTGI of the primiparous women in the massage group were found to be statistically significantly higher than the music and control groups, it was determined that the score of PTGI's subscale of *perceived changes in the self* of the primiparous women in the massage group was significantly higher than the control group. In addition, the score of PTGI's subscale of *a changed sense of relationships with others* of the primiparous women in the music group was found to be statistically significantly higher than the control group. In line with the results, it is possible to say that sacral massage and music therapy are effective interventions in increasing the positive effects, such as post-traumatic growth as well as in decreasing the negative effects, such as anxiety, stress, and depression caused by labor.

CONCLUSION

According to the results of the study, sacral massage and music therapy applied to primiparous women both reduced pain levels and increased their postpartum comfort and posttraumatic growth levels. It is recommended to include sacral massage and music therapy practices as non-pharmacological methods in midwifery care practices in order to facilitate women's coping with labor pain and to improve their well-being in the postpartum period.

Limitations

This study has some limitations. First, the findings cannot be generalized to all pregnant women since the study was conducted only with primiparous women admitted to the delivery rooms of a public hospital in a province south of Türkiye. Another is that all pregnant women were primiparous and were admitted to the delivery rooms in the latent phase. Therefore, the results of the research are limited to this group only.

ACKNOWLEDGEMENTS

We would like to thank the pregnant women who participated in and completed this questionnaire.

Author contributions: Conceptualization: [HGÖ, NG, EİA]; Design: [HGÖ, NG, EİA]; Writing: [HGÖ, NG, EİA]; Investigation/Data collection: [HGÖ, NG, EİA]

Conflict of interest: The authors declare that there were no potential conflicts of interest with regard to the research, authorship, and/or publication of this article.

Funding: No financial support.

REFERENCES

1.Susanti I, Anggraini D, Purwaninigsih A. Touch and massage on labor pain intensity during first stage of active phase. *INJEC.* 2020;5(1):76-81.
2.Başgöl S, Koç E. Non-Pharmacological techniques in labor pain management. *JoSHES.* 2020;5(1):1–5.
3.Boateng EA, Kumi LO, Diji AK-A. Nurses and midwives' experiences of using non-pharmacological interventions for labour pain management: A qualitative study in Ghana. *BMC Pregnancy Childb.* 2019; 19:168.
4.Khoirunnisa FN, Indrianingrum I, Tristanti I. The effectiveness of circular hip massage and knee press massage toward intensity change of labor pain. *KEMAS.* 2019;15(1):44–52.
5.Mwakawanga DL, Mselle LT, Chikwala VZ, Sirili N. Use of Non-Pharmacological methods in managing labour pain: experiences of nurse-midwives in two selected district hospitals in Eastern Tanzania. *BMC Pregnancy Childb.* 2022;22:376.
6.Guo H, Que M, Shen J, et al. Effect of music therapy combined with free position delivery on labor pain and birth outcomes. *Appl. Bionics Biomech.* 2022;8963656,6 pages.
7.Ingram MA, Brady S, Peacock AS. The barriers to offering non-pharmacological pain management as an initial option for laboring women: A Review of the Literature. *Eur J Midwifery.* 2022;6(37).
8.Sapna M, Devi AM, Deepak M, Shalu M. Effectiveness of back massage in first stage labour pain among pregnant women. *Eur J Mol Clin Med* 2020;7(11):6644-52.
9.Taghinejad H, Delpisheh A, Suhrabi Z. Comparison between massage and music therapies to relieve the severity of labor pain. *Women's Health.* 2010;6(3):377–81.
10.Nilsson L, Thorsell T, Wahn EH, Ekström A. Factors influencing positive birth experiences of first-time mothers. *Nurs Res Prac.* 2013;349124.
11.Taheri M, Takian A, Taghizadeh Z, Jafari N, Sarafraz N. Creating a positive perception of childbirth experience: systematic review and meta-analysis of prenatal and intrapartum interventions. *Reprod Health.* 2018;15:73.
12.Rawat V, Parashar AK, Sharma SK. Management of Labour Pain by Using Non-Pharmacological Measures**.** *Int J Innov Educ Res.* 2021;9(10):380–91.
13.Ambarita HFR, Ulfah K. Effect of deep back massage method on intensity of pain in the first stage of labor. *Journal Kesehatan Siliwangi.* 2022;2(3):1041–48.

14.Akköz Çevik S, Karaduman S. The effect of sacral massage on labor pain and anxiety: a randomized controlled trial. *Jpn J Nurs Sci.* 2020;17(1):e12272.
15.Türkmen H, Tuna Oran N. Massage and heat application on labor pain and comfort: A quasirandomized controlled experimental study. *Explore.* 2021;17(5):438-45.
16.Gönenç İM, Alan Dikmen H. Effects of dance and music on pain and fear during childbirth. *J Obstet Gynecol Neonatal Nurs* 2020;49(2):144–53.
17.Liu Y-H, Chang M-Y, Chen C-H. Effects of music therapy on labour pain and anxiety in taiwanese first-time mothers. *J Clin Nurs.* 2010;19(7-8):1065–72.
18.Santiváñez-Acosta R, Tapia-López ELN, Santero M. Music therapy in pain and anxiety management during labor: a systematic review and meta-analysis. *Medicina*. 2020;56(10):526.
19.Simavli S, Gumus I, Kaygusuz I, Yildirim M, Usluogullari B, Kafali H. Effect of music on labor pain relief, anxiety level and postpartum analgesic requirement: A randomized controlled clinical trial. *Gynecol Obstet Invest.* 2014;78(4):244–50.
20.Simavli S, Kaygusuz I, Gumus I, Usluogulları B, Yildirim M, Kafali H. Effect of music therapy during vaginal delivery on postpartum pain relief and mental health. *J Affect Disord.* 2014;156:194–99.
21.Joensuu J, Saarijärvi H, Rouhe H, et al. Maternal childbirth experience and pain relief methods: a retrospective 7-year cohort study of 85 488 parturients in Finland. *BMJ Open.* 2022;12:e061186.
22.Boudou M, Teissèdre F, Walburg V, Chabrol H. Association between the intensity of childbirth pain and the intensity of postpartum blues. *L'encéphale.* 2007;33(5):805–10.
23.Hakimi S, Hajizadeh K, Hasanzade R, Ranjbar M. A Systematic Review and meta-analysis of the effects of music therapy on postpartum anxiety and pain levels. *J Caring Sci.* 2021;10(4):230-237.
24.Akin B, Yurteri Türkmen H, Yalnız Dilcen H, Sert E. The effect of labor dance on traumatic childbirth perception and comfort: a randomized controlled study. *J Clin Nurs.* 2022;31(5):909–17.
25.Kirca AŞ, Gul DK. Effects of Acupressure and Shower Applied in the delivery on the intensity of labor pain and postpartum comfort. *Eur. J. Obstet. Gynecol. Reprod. Biol.* 2022;273:98–104.
26.Aksoy Derya Y, İbici Akça E, Kamalak H, Gökbulut N. The effect of parity, mode of birth and planned pregnancy on posttraumatic growth and comfort in puerperants. *Mersin Univ Health Sci J.* 2021;14(3):366-377.
27.Turan SB, Aksoy Derya Y. The effects of midwifery care provided to primiparous mothers during the postpartum period on maternal attachment and post-traumatic growth. *Midwifery.* 2021;103140.
28.Sawyer A, Ayers S. Post-traumatic growth in women after childbirth. *Psychology and Health.* 2009;24(4):457-71.
29.Öztürk R, Yağız R, Er Güneri S. Investigation of The relationship between postpartum comfort and readiness for hospital discharge and affecting factors. *Med J West Black Sea.* 2021;5(2):272–80.
30.Random.org.AccessAddress:https://www.random.org/integers/?num=114&min=1&max=3&col=5&base=10&format=html&rnd=new Access Date: 01.01.2022
31.Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. *Pain.* 1983;17:45–56.
32.Kolcaba KY. Holistic comfort: operationalizing the construct as a nurse-sensitive outcome. *ANS Adv Nurs Sci.* 1992;15(1):1-10.
33.Kuğuoğlu S, Karabacak Ü. Turkish version of the general comfort questionaire. *Florence Nightingale J Nurs.* 2008;16(61):16–23.
34.Karakaplan S, Yıldız H. A study on developing a postpartum comfort questionnaire. *Maltepe University Journal of Nursing Science and Ar.* 2010;3(1):55-65.
35.Tedeschi RG, Calhoun LG. The posttraumatic growth inventory: Measuring the positive legacy of trauma. *ISTSS* 1996;9:455-71.
36.Dirik G, Karancı AN. Variables related to posttraumatic growth in Turkish rheumatoid arthritis patients. *J Clin Psychol Med Settings.* 2008;15:193-203.
37.Aydın R, Güven DY, Karahan N. Let You Listen: The effect of music therapy on coping with stress in high risk pregnancies. *Necmettin Erbakan University Faculty of Health Sciences Journal.* 2019;2(1):19-24.
38.Ak Sözer G, Altuntuğ K, Ege E. The Labor Pain and Massage. *Akdeniz Med J.* 2019;5(3):389-93.
39.Kılıç A, Can Gürkan Ö. Evidence-Based Use of Music Therapy During Pregnancy, Birth and Postpartum. *KTO Karatay Uni J Health Sci.* 2021;2(1):47-60.
40.Akın B, Karaca Saydam BA. New approach to reducing the perceived birth pain: Labor dance. *Gümüşhane Univ J Health Sci.* 2017. 6(3):218-24.
41.Phumdoung S, Good M. Music reduces sensation and distress of labor pain. *Pain Manag Nurs.* 2003;4(2):54-61.
42.Kimber L, McNabb M, Mc Court C, Haines A, Brocklehurst P. Massage or music for pain relief in labour: a pilot randomised placebo controlled trial. *Eur. J. Pain.* 2008;12:961–69
43.Birgili F. The Birth of Comfortable Women and The Effective Factors. *Anatolian J Health Res.* 2020;351-60.
44.Güney E, Uçar T. Effects of deep tissue massage on pain and comfort after cesarean: A randomized controlled trial. *Complement Ther Clin Pract.* 2021;43: 101320.
45.Icke S, Genc R. Effect of foot massages on postpartum comfort and pain level of mothers after vaginal delivery: A

randomized trial. *Holistic nursing practice.* 2021;35(3):140–9.

46. Tedeschi RG, Calhoun LG. Posttraumatic growth: conceptual foundations and empirical evidence. *Psychol Inq.* 2004;15(1):1-18.
47. Nishi D, Usuda K. Psychological Growth After Childbirth: An Exploratory Prospective Study. *J Psychosom Obstet Gynaecol.* 2017;38(2):87-92.