

# Effect of Music Therapy on Intensity of Labor Pain among Primigravid Mothers admitted in a Tertiary Level Hospital

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## ABSTRACT

**Background:** Childbirth is a most welcomed and positive life experience for the majority of women, despite the pain. Most of them manage it well with minimal assistance while few of them require some intervention to reduce the pain. The objective of this study was to find out the effect of music therapy on intensity of labor pain among primigravid women.

**Methods:** A quasi-experimental pre-test post-test non-equivalent control group design was used. Sample consisted of 42 primigravid women admitted in labor room of a teaching hospital in Kathmandu. The intensity of labor pain was measured using Visual Analogue Scale and Behavior Rating Scale in latent and active phase of labor in both experimental and control groups. Then 30 minutes of music therapy was provided to the experimental group in the latent and active phase of labor. The post-test was carried out in both groups after the music therapy to experimental group during the latent and active phase using the same instruments. The collected data was entered in Statistical Package for Social Sciences version 16. Descriptive statistics and inferential statistics were used to describe the findings.

**Results:** The mean difference of total pain between experimental and control groups during latent phase was 1.9 ( $t=2.31$ ,  $p=0.023$ ) in pre-test and 6.57 ( $t=3.91$ ,  $p=0.000$ ) in post-test. The mean difference of total pain between experimental and control groups during active phase was 1.00 ( $t=1.08$ ,  $p=0.286$ ) during pre-test and 6.95 ( $t=3.744$ ,  $p=0.001$ ) during post-test.

**Conclusions:** Music therapy tends to reduce labor pain both during the latent and active phase of labor.

**Keywords:** Active phase; labor pain; latent phase; music therapy; primigravid

## INTRODUCTION

Labor is a unique experience associated with childbirth which is normally a meaningful and welcomed event in the life of a woman. At the same time, process of the labor tends to be unpleasurable because of the distinctive pain associated with it. The labor can be a smooth and satisfying experience if its pain is controlled through pain relieving methods. Non-pharmacological methods are one among them that permits women to experience the delivery in a more natural way. Moreover, these methods are non-invasive, low-cost and without adverse effects.<sup>1-4</sup>

Among the different non-pharmacological methods, music therapy has been shown to be an effective measure to cope with labor pain and improve wellbeing during the labor in other countries.<sup>5</sup> However, no study so far is known to be conducted in Nepalese context. Therefore, this study was carried out to find out the effect of music therapy on intensity of labor pain among

primigravid women.

## METHODS

This study was carried out using a quasi-experimental pre-test post-test non-equivalent control group design. The study was carried out in maternity unit of Tribhuvan University Teaching Hospital (TUTH), Kathmandu during the period of 4 weeks from April 4 to 30, 2021.

Ethical approval for the study was taken from the Institutional Review Committee (IRC) of the Nepalese Army Institute of Health Sciences (NAIHS) (Regd. No 384, January 2021). Written permission for data collection was obtained from the research committee of TUTH. In-charge and staffs of the labor room were informed about the study and their cooperation was sought for the study. Informed written consent was obtained from each eligible participant for participation in the study and for recording of the behavioral responses during contraction and vital signs after contraction.

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Inclusion criteria set were the primigravid women admitted at latent phase of labor with cervical dilatation of one to three centimeter (as per the most recent PV examination done by the on duty doctor), whose period of gestation was between 37- 42 weeks and who were planning for vaginal delivery. Exclusion criteria set were women who were receiving epidural for painless labor, having hearing problem and those who would be unwilling to participate in the study. Census method was used to include a total of 42 women as the study participants. Of these, 21 were included in the experimental group and remaining 21 were included in the control group.

To avoid sample contamination, alternate days were assigned for experimental and control group. Which group to include on first day, was decided through lottery method and all eligible women admitted on the first day were assigned to experimental group and all admitted on the next day to control group and so on.

Instruments used for data collection were interview schedule and behavior rating scale (BRS). Interview schedule consisted of items on socio-demographic variables and Visual Analogue Scale (VAS) for pain assessment (for both group) and questions related to music (for experimental group only). VAS for pain consisted of a 10 cm line (having 11 points from 0-10) which was drawn horizontally with the descriptors 'no pain' at the extreme left and 'unbearable pain' at the extreme right. Participants indicated in VAS, the level of pain felt in the immediate previous contraction and researcher marked the appropriate level of pain on the VAS scale.

Behavior Rating Scale (BRS) was a modified observation schedule that measured behaviors like screaming, grimace, grasping, clenching and restlessness during contraction and systolic and diastolic blood pressure, pulse rate (PR) and respiration immediately after contraction. Modified BRS was developed on the basis of FLACC (Face, Legs, Activity, Cry, Consolability) and Behavioral Assessment Tool.<sup>6</sup> Behavior rating scale was validated with the validity index 1 by different 5 experts from the field of nursing, obstetrics and gynecology. The VAS was shown to be reliable in Nepalese adults with acute pain who could count numbers between 0 and 10 with an excellent 2-week test-retest reliability (intra-class correlation coefficient = 0.81).<sup>7</sup> Pre-testing of the music therapy indicated it to be practicable with modification to low volume speaker instead of headset or earphone.

During pre-test of latent phase of labor, interview schedule; BRS and VAS were implemented. In the

remaining measurements namely post-test of latent phase and pre-test and post-test of active phase, only BRS and VAS were implemented. Questions related to music were asked to experimental group only during pretest. Post-test with BRS and VAS respectively during and immediately after contraction was done. Both experimental and control group received routine care but only experimental group received additional music therapy based on client's preference (i.e., Nepali songs, Hindi songs and soothing music) using low volume speaker for 30 minutes both in the latent phase and active phase of labor after pre-test data collection. As in the experimental group, the post-test in control group was done 30 minutes after the pre-test but without music therapy. But control group received routine care during labor i.e., ambulation, back massage, verbal counseling, encouraging warm drinks etc.

Microsoft Excel was used for data entry, cleaning, and classification of data. Statistical Package for Social Science versions 16 was used for data analysis and tabulation. Regarding descriptive statistics, categorical measurements were expressed in numbers and percentages whereas numerical measurements were described using mean and standard deviation. Mean labor pain score and mean difference was calculated between experimental group and control group in latent phase and active phase. Level of significance was set at  $\leq 0.05$ . After ensuring normality of the data through Whisker box plot and homogeneity of the samples through standard deviation calculation, independent t-test was applied. Analysis of t-test of difference in behavior and vital signs was done separately in latent and active phase of labor because of the different intensity of pain.

## RESULTS

In this study, 52.4% and 61.9% of the participants in experimental group and control group were aged 25 years or below with the mean age of 24.92 years ( $SD \pm 3.34$ ). More than half (57.1%) of the participants from experimental and control group had bachelor or above level of education. More than half (57.1%) of the participants of experimental group preferred to listen to modern Nepali songs/music followed by Hindi songs/music (19.0%).

As can be seen from table 1, the mean difference of intensity of pain was 1.24 ( $t=2.751$ ,  $p<0.009$ ) during pre-test and 1.43 ( $t=3.136$ ,  $p<0.003$ ) during post-test of latent phase between experimental and control group. But the mean difference of intensity of pain was 0.14 ( $t=0.364$ ,  $p<0.718$ ) during the pre-test and 0.34 ( $t=0.941$ ,  $p<0.352$ ) during post-test of active phase between experimental

and control group using VAS.

**Table 1. Pretest and Posttest Differences in VAS Scores between Experimental and Control Group during Latent and Active Phase of Labor.**

Phase of labor	Group#	Mean	SD##	MD###	t-value	p-value
<b>Latent phase</b>						
Pre-test	E (n=21)	2.24	1.14			
	C (n=21)	3.47	1.72	1.24	2.751	0.009*
Post-test	E (n=21)	2.57	1.36			
	C (n=21)	4.00	1.58	1.43	3.136	0.003*
<b>Active Phase</b>						
Pre-test	E (n=21)	6.62	1.25			
	C (n=21)	6.76	1.30	0.14	0.364	0.718
Post-test	E (n=21)	7.00	1.18			
	C (n=21)	7.34	1.11	0.34	0.941	0.352

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

Table 2 reveals the differences in behaviors during contraction between experimental and control groups during latent phase. Findings are significant over screaming, grimace, grasping and restless behavior except clenching behavior during post-test of latent phase in experimental group. So, music therapy is effective during latent phase of labor.

According to table 3, findings regarding screaming, grimace, grasping, clenching and restlessness were not significantly different in experimental and control group during active phase of labor (p value >0.05).

As per table 4, the mean score of pulse rate in control group was 85.77 beats/minute whereas the mean score of pulse rate in experimental group was 49.44 beats/minute. So the mean difference of pulse rate between experimental and control group was 36.33 beats/minute which was significant with t-value =2.233 and p-value= 0.031.

**Table 2. Pretest and Posttest Item-wise Differences in BRS Scores between Experimental and Control Group during Latent Phase of Labor.**

Test	Group#	Behaviors	Mean	SD##	MD###	t-value	p-value
Pre-test	E (n=21)	Screaming	.14	.36			
	C (n=21)		.42	.51	.28	2.11	.41
	E (n=21)	Grimace	.67	.66			
	C (n=21)		1.00	.63	.34	1.673	.102
	E (n=21)	Grasping	.00	.00			
	C (n=21)		.09	.31	.95	1.451	.155
	E (n=21)	Clenching	.05	.22			
	C (n=21)		.09	.30	.05	.587	.560
E (n=21)	Restlessness	.24	.44				
C (n=21)		.34	.48	.09	.67	.56	
Post-test	E (n=21)	Screaming	.24	.44			
	C (n=21)		.81	.75	.57	3.02	.004*
	E (n=21)	Grimace	.43	.59			
	C (n=21)		1.05	.67	.62	3.162	.003*
	E (n=21)	Grasping	.05	.22			
	C (n=21)		.38	.49	.34	2.811	.008*
	E (n=21)	Clenching	.05	.22			
	C (n=21)		.09	.30	.05	.587	.560
E (n=21)	Restlessness	.23	.44				
C (n=21)		.62	.49	.38	2.63	.02*	

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

**Table 3. Pretest and Posttest Item-wise Differences in BRS Scores between Experimental and Control Group during Active Phase of Labor.**

Test	Behaviors	Group#	Mean	SD##	MD##	t-value	p-value
Pre-test	Screaming	E (n=21)	1.76	.77			
		C (n=21)	2.00	.89	.24	0.93	.360
	Grimace	E (n=21)	1.53	.52			
		C (n=21)	1.62	.49	.95	0.611	.544
	Grasping	E (n=21)	.80	.51			
		C (n=21)	.95	.38	.14	1.023	.313
	Clenching	E (n=21)	.57	.51			
		C (n=21)	.53	.52	-.05	-.303	.764
Restlessness	E (n=21)	.90	.31				
	C (n=21)	1.00	.00	0.09	1.45	.16	
Post-test	Screaming	E (n=21)	1.76	.70			
		C (n=21)	2.00	.71	0.24	1.09	.28
	Grimace	E (n=21)	1.38	.49			
		C (n=21)	1.53	.52	0.14	0.917	.365
	Grasping	E (n=21)	.86	.36			
		C (n=21)	.91	.31	0.05	0.466	.644
	Clenching	E (n=21)	.43	.51			
		C (n=21)	.62	.49	0.19	1.229	.226
Restlessness	E (n=21)	1.00	.00		-	-	
	C (n=21)	1.00	.00	0.0			

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

**Table 4. Differences in Vital Signs after Contraction between Experimental and Control groups in Latent Phase of Labor.**

Test	Vital Signs	Group#	Mean	SD##	MD##	t-value	p-value
Pre-test	Systolic BP	E (n=21)	126.19	.00		-	-
		C (n=21)	126.19	.00		-	-
	Diastolic BP	E (n=21)	83.09	.00	-	-	-
		C (n=21)	83.09	.00	-	-	-
	Pulse Rate	E (n=21)	81.95	.00	-	-	-
		C (n=21)	81.95	.00	-	-	-
Respiration	E (n=21)	22.47	.00	-	-	-	
	C (n=21)	22.47	.00		-	-	
Post-test	Systolic BP	E (n=21)	116.09	62.25			
		C (n=21)	140.49	70.67	24.4	1.168	.25
	Diastolic BP	E (n=21)	65.92	54.84			
		C (n=21)	84.47	52.91	18.55	1.109	.274
	Pulse Rate	E (n=21)	49.44	51.36			
		C (n=21)	85.77	54.08	36.33	2.233	<.031*
Respiration	E (n=21)	21.05	13.56				
	C (n=21)	27.12	10.94	6.07	1.595	.119	

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

**Table 5. Differences in Vital Signs after Contraction between Experimental and Control groups in Active Phase of Labor.**

Test	Vital Signs	Group#	Mean	SD##	MD##	t-value	p-value
Pre-test	Systolic BP	E (n=21)	126.19	.00	0.00	-	-
		C (n=21)	126.19	.00		-	-
	Diastolic BP	E (n=21)	83.09	.00	0.00	-	-
		C (n=21)	83.09	.00		-	-
	Pulse Rate	E (n=21)	81.95	.00	0.00	-	-
		C (n=21)	81.95	.00		-	-
Respiration	E (n=21)	22.47	.00	0.00	-	-	
	C (n=21)	22.47	.00		-	-	
Post-test	Systolic BP	E (n=21)	86.23	80.34	58.05	2.627	<.012*
		C (n=21)	144.28	61.83		58.05	2.627
	Diastolic BP	E (n=21)	37.12	54.84	72.28	4.609	<.000*
		C (n=21)	109.4	70.67		72.28	4.609
	Pulse Rate	E (n=21)	78.13	57.64	24.58	1.284	0.206
		C (n=21)	102.71	66.93		24.58	1.284
Respiration	E (n=21)	20.67	16.03	3.22	0.719	0.476	
	C (n=21)	20.67	16.03		3.22	0.719	0.476

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

As per table 5, the mean difference of systolic blood pressure between experimental and control group was 58.05mmofHg (t- 2.627 and p-value 0.012) while the mean difference of diastolic blood pressure between experimental group and control group was 72.28mmofHg (t-4.609 and p-value <.000). Hence the findings reveal that music therapy helps to significantly reduce systolic blood pressure and diastolic blood pressure in experimental group in compared to control group during the active phase of labor.

Table 6 reveals that the mean difference between the experimental and control group in total BRS Scores during pre-test of latent phase was 0.76 and post-test was 5.95 with high level of significance i.e., .000 ( $\leq 0.05$ ). Similarly, the mean difference in total behavior ratings during pre-test of active phase was 0.72 and in post-test was 5.81 with high level of significance i.e., 0.001 ( $\leq 0.05$ ). This shows that music therapy is effective in reducing different behavioral responses during latent phase of labor.

**Table 6. Pretest and Posttest Differences in Total BRS Scores between Experimental and Control Groups in Latent and Active Phase of Labor**

Phase of labour	Group#	Mean	SD##	MD##	t-value	p-value
<b>Latent phase</b>						
Pre-test	E (n=21)	13.19	1.40	0.76	1.576	0.123
	C (n=21)	13.95	1.72			
Post-test	E(n=21)	9.91	3.59	5.95	4.526	<.000*
	C (n=21)	15.86	4.84			
<b>Active phase</b>						
Pre-test	E (n=21)	17.28	2.13	0.72	1.103	0.277
	C (n=21)	18.00	2.07			
Post-test	E (n=21)	14.38	5.73	5.81	3.717	.001*
	C (n=21)	20.19	4.29			

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

**Table 7. Pretest and Posttest Differences in Total Pain using VAS and BRS Scores between Experimental and Control Groups during Latent and Active Phase of Labor**

Phase of labor	Group#	Mean	SD##	MD##	t-test	p-value
<b>Latent phase</b>						
Pre-test	E (n=21)	15.43	2.16	1.9	2.31	.023
	C (n=21)	17.34	3.12			
Post-test	E (n=21)	19.05	6.44	6.57	3.91	<.000*
	C (n=21)	12.47	4.23			
<b>Active phase</b>						
Pre-test	E (n=21)	23.76	3.12	1.00	1.08	.286
	C (n=21)	24.76	2.88			
Post-test	E (n=21)	20.52	7.12	6.95	3.75	.001*
	C (n=21)	27.47	4.67			

#E=Experimental and C= control group; SD##= Standard Deviation; MD###= Mean Deviation

Table 7 shows that the mean difference of total pain score from VAS and BRS between the two groups during pre-test of latent phase was 6.57 ( $t=3.910$ ,  $p$ -value  $<0.000$ ) while the mean difference of total pain between the two groups during post-test of active phase was 6.95 ( $t=3.744$ ,  $p$ -value  $0.001$ ). These findings revealed the effectiveness of music therapy in both latent and active phase of labor ( $p$ -value  $\leq 0.05$ ).

## DISCUSSION

Music may be used as an intervention for relief against anxiety, stress and pain for many years in the field of medicine. In the field of obstetrics also, music interventions resulted in a reduction of pain and stress during childbirth, as supported by various studies.<sup>8-10</sup> Music-therapy during labor increases tolerance to pain, decrease anxiety, increases parturition and uterine activity, and shorten labor duration.<sup>11</sup> In the present experiment also, there was a significant decrease of intensity of labor pain in the experimental group in comparison to the control group. Similar findings were reported in various studies conducted in Italy, Thailand, Turkey and India.<sup>1,2,12,13</sup>

In the present study, the mean difference of intensity of pain in VAS between experimental and control groups between post-test and pre-test during latent phase was 1.42 ( $t= 3.136$ ) and music therapy seems to be highly significant in latent phase since  $p$ -value is  $0.003$  ( $\leq 0.05$ ). This finding is comparable with the study conducted among Taiwanese first time mothers where the music group mothers experienced significantly less pain during the latent phase of labor in compared to non-music group.<sup>14</sup>

In the present study, pain intensity measured using VAS was slightly decreased during active phase also but the mean difference between post-test and pre-test during active phase measured in VAS was not significant after the music therapy in experimental group. Contrary to this study, the study conducted in Iran where women exposed to soft music reported decreased in sensation and distress of active labor pain measured in visual and numeric pain scale.<sup>9</sup> This difference in findings may be due to sample size difference i.e. 30 women and they were not primigravid also. Contrary to this study, a study done in Italy in which the intensity of pain during the active phase of labor was scored as  $8.8 \pm 0.9$  in the music group, and  $9.8 \pm 0.3$  in the control group ( $MD=1.00$ , 95% CI;  $P < 0.01$ ).<sup>12</sup> Contrary to the present study, another study done at tertiary care hospital of Kochi, India where the mean post-test pain score of the experimental group was significantly lower than the post-test score of the

control group at 30<sup>th</sup> minute during active phase which was measured using VAS.<sup>3</sup> The compared study used headset whereas in the present study, music was played through low volume speaker.

In the present study, pain was significantly reduced in experimental group in latent phase of labor ( $p < 0.000$ ) and in active phase of labor ( $p < 0.001$ ) which was measured using VAS and BRS. Similar to this study, another study done at a Women's Hospital in Boston, USA among primigravid mothers also found that the music therapy group had a lower level of pain compared with those in the control group at all stages of labor ( $p < 0.001$ ) which was also measured using VAS and BRS.<sup>15</sup>

In the present study, most of the findings of behaviors like screaming ( $t=3.02$ ,  $p < 0.004$ ), grimace ( $t=3.162$ ,  $p < 0.003$ ), grasping ( $t=2.811$ ,  $p < 0.008$ ) and restlessness ( $t=2.63$ ,  $p < 0.02$ ) had decreased significantly in post-test in experimental group during latent phase. Findings were not significant over clenching behavior neither in latent phase nor in active phase in experimental group. Researchers could not be able to identify similar studies to compare these findings.

In this study, systolic blood pressure had significantly decreased in experimental group in post-test during active phase of labor ( $t=2.627$ ,  $p$ -value=  $0.012$ ) but findings are not significant during latent phase. Similarly, diastolic blood pressure had significantly decreased in experimental group during active phase of labor ( $t=4.609$ ,  $p$ -value=  $0.000$ ) but findings are not significant in post-test during latent phase. Similar to this study, in Boston, during active phase, systolic blood pressure (mm of Hg) was  $p$ -value  $< 0.001$  and diastolic blood pressure (mm of Hg) was  $p$ -value  $< 0.001$  after intervention.<sup>15</sup> Contrary to this study, during latent phase, systolic blood pressure (mm of Hg) was  $p < 0.03$  and diastolic blood pressure (mm of Hg) was  $p < 0.008$  after intervention.<sup>2</sup> The difference in the result of latent phase may be probably due to sample size difference where 156 primiparas were taken for the study.

In the present study pulse rate had decreased significantly in experimental group during latent phase of labor ( $t= 2.333$ ,  $p$ -value  $< 0.031$ ). But, during active phase of labor, findings are not significant. Similarly, study done at Boston, USA, pulse rate is decreased with  $p < 0.004$  after intervention during latent phase of labor. In this study, findings are not significant regarding respiration in experimental group.<sup>15</sup>

Due to use of non-equivalent control group design, the possibility of the threats to experimental validity could

not be eliminated.

## CONCLUSIONS

Based on the findings of this study it is concluded that music therapy tends to reduce the perceived intensity of labor pain during latent as well as active phase of labor. So this therapy can be used as a non-pharmacological measure to reduce the perception of labor pain.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest

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