

Effects of the combination of small dose analgesic and music on labor pain

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Abstract:

A factorial randomized control trial study was undertaken to examine the effect of the combination of small dose analgesic and music on labor pain. A random block design was used to assign participants to each of four groups: control (n=45), small dose analgesic (n=43), regular dose analgesic (n=45), and music plus small dose analgesic (n=47). Women in the control group received standard care in the labor room; women in the small dose analgesic group received intramuscular meperidine 25 mg; women in the regular dose group received intramuscular meperidine 50 mg. Women in the last group received instrumental music without lyrics combined with small dose analgesic. Women entered the study when cervical dilation was 3-4 cm and contractions lasting 40-60 seconds occurred. One-way repeated measures analysis of variance (ANOVA) indicated that there were significantly different sensations and distress of labor pain among the four groups [$F(3,176) = 3.651, p < .05, \text{power } .80$ and $F(3,176) = 4.888, p < .01, \text{power } .90$ respectively]. Pairwise comparisons showed that the regular analgesic group and the music plus small dose analgesic group had lower sensation of pain and distress of labor pain than the control group. The results suggest that the use of music together with small amounts of analgesic can decrease labor pain, similar to the use of regular doses of an analgesic drug alone. The use of either dose of the analgesic drug had no adverse effect on Apgar scores of the infants in all groups.

Key words: pain, labor pain, music therapy, analgesic

บทคัดย่อ:

การศึกษาวินิจฉัยเชิงทดลองมีวัตถุประสงค์เพื่อทดสอบเกี่ยวกับการใช้ยาลดปวดขนาดต่ำร่วมกับดนตรีต่อความปวดทางกายและความตึงเครียดต่อความปวดในระยะก้าวหน้าของการคลอด สุ่มตัวอย่างเข้ากลุ่มควบคุม 45 ราย ได้รับการดูแลตามมาตรฐานของห้องคลอด กลุ่มยาลดปวดขนาดต่ำได้รับยา meperidine 25 mg ทางกล้ามเนื้อ 43 ราย กลุ่มยาลดปวดขนาดปกติ ได้รับยา meperidine 50 mg ทางกล้ามเนื้อ 45 ราย กลุ่มสุดท้ายได้รับยาลดปวดขนาดต่ำร่วมกับดนตรีบรรเลงเพลงคลาสสิก 47 ราย เริ่มการทดลองเมื่อมารดามีการเปิดช่องปากมดลูก 3-4 cm มดลูกหดตัว 40-60 วินาที/ครั้ง ใช้สถิติ one-way repeated measures ANOVA พบว่ามีความปวดทางกายแตกต่างกันอย่างมีนัยสำคัญของทั้ง 4 กลุ่ม [$F(3,176) = 3.651, p < .05, \text{power } .80$] และมีความตึงเครียดต่อความปวดทางกายแตกต่างกันอย่างมีนัยสำคัญของทั้ง 4 กลุ่ม [$F(3,176) = 4.888, p < .01, \text{power } .90$] ใช้ pairwise comparison พบว่ามารดาในกลุ่มยาลดปวดขนาดปกติและกลุ่มยาลดปวดขนาดต่ำร่วมกับดนตรีมีความปวดทางกายและความตึงเครียดน้อยกว่ากลุ่มควบคุมอย่างมีนัยสำคัญ ผลการวิจัยแสดงให้เห็นว่าการใช้ยาลดปวดขนาดต่ำร่วมกับดนตรีช่วยลดปวดได้ใกล้เคียงกับการใช้ยาลดปวดขนาดปกติ ไม่พบผลกระทบต่อทารกทุกกลุ่มมีคะแนน Apgar score ดีไม่มีความแตกต่างกัน

คำสำคัญ: ความปวด, การเจ็บครรภ์, ดนตรีบำบัด, การลดปวด

Introduction

During labor, many women experience a high level of pain which can be described as sharp, cramping, dull and stabbing, occasionally with sensation of heat, tiredness, and severe fatigue.¹ Labor pain is severe, compared to pain from cancer, digit amputation, toothache and arthritis.² Severe labor pain increases cardiac output, blood pressure, use of oxygen,

respiratory rate, and catecholamine levels.³⁻⁵ Severe labor pain can lead to loss of control during labor⁶ which can cause emotional trauma.⁷⁻⁸ Melzack⁹ found that 60% of primiparas and 40% of multiparas experienced extremely severe labor pains. The use of analgesic medication, such as, an epidural block may not help women to experience comfort in labor and may cause side effects, such as bladder retention and postural

hypertension¹⁰, low Apgar scores¹¹ and developmental problems in infants.¹²⁻¹⁴

Studies have shown that music reduces postoperative pain¹⁵⁻¹⁸, cancer pain¹⁹ and pain from gynecological procedure.²⁰ The use of music is a choice in reducing labor pain. One study showed that music significantly reduced the sensation of labor pain and the distress of labor pain.²¹ Another study showed that women who used music intermittently during labor had greater pain relief than those who did not.²²

It is desirable to reduce labor pain and enhance the safety of mothers and protect infants from the possible side effect of analgesic drug. Because there is a lack of research on this topic, studies are required on the effects of the combination of small dose analgesic and music on labor pain, which may offer a new means of relieving labor pain with less risk than normal analgesics. This study began with the hypothesis that during the first 3 hours of the active phase of labor, women who used music and small dose analgesic would have significantly lower sensation and distress of pain scores than those who did not.

Materials and methods

Sample

A convenience sample of 265 primipara women was recruited from a regional hospital in southern Thailand. There was no difference on demographic and obstetric information of women who completed the three hour study and those who did not. Of the 265 only 180 (68%) primipara completed the three hour study. The rest did not complete the three hours because of rapid progress of labor, prolonged latent phase and had rapid progress of labor. Participants were married primiparas, ages 18 to 35 years, who had been in the latent phase of labor for no more than 10 hours and were delivering a single fetus. Women were excluded if before entering the study they had received analgesic medication, had had labor induced, had had spontaneous membranes rupture more than 20 hours previously, or had a history of psychiatric problems, taking major antipsychotic medications, difficulty hearing the spoken word, infection, HIV, asthma, or any past negative reactions while listening to music. The fetal characteristics

required for inclusion were cephalic presentation and 38 to 42 weeks' gestation with an estimated fetal weight of 2,500 to 4,000 grams. Women who met the criteria were randomly assigned to 4 groups: control, small doses analgesic, regular dose analgesic, and small dose analgesic plus music by using a random block design.

Experimental intervention

Interventions for the 3 experimental groups were: 1) the small dose analgesic group received intramaucular meperidine 25 mg 2) the regular dose analgesic group received intramuscular meperidine 50 mg, 3) the music and small dose analgesic group used music for 3 hours and received intramuscular meperidine 25 mg, and 4) the control group received standard care in the labor room, and women could ask for analgesics as needed. For the music group, the music was soft and soothing without lyrics, played on synthesizer, harp, piano, orchestra, and jazz²³, and included CD of Cloud Twelve, the Magic of Pan Pipes (Disc 2) and the Natural Stress Relief CD. The intervention began when the cervical dilation reached 3-4 cm with uterine contractions lasting 40-60 seconds. The music was used for 3-4 hours in the active phase.

Measures

Sensory pain was defined as the unpleasant feeling of hurt in the abdomen and back related to the intensity of uterine contractions and was measured by self report on a horizontal 100 mm Visual Analogue Sensation Pain Scale. Affective pain was the reported emotional distress related to the sensation of labor pain and was measured by self-report on a horizontal 100 mm Visual Analogue Distress Pain Scale.¹⁵ Good and colleagues²⁴ demonstrated 15-minute test-retest reliability for both Visual Analogue Scales (VAS) in postoperative patients ($r=.73$ to $.92$). In comparison to a 0 to 10 numerical rating scale, Good and colleagues²⁴ demonstrated support for convergent validity, $r=.90$ to $.92$, as well as construct validity, $r=.72$ to $.85$. The scores ranged from zero (no sensation or no distress) to 100 (the most sensation or distress imaginable). Pain was measured at the start of the study before the treatment was started, and then every hour during the study for 3 hours. Women were asked to rate pain from the last contraction.

Procedure

The study was approved by the Ethics Committee of the Faculty of Nursing, Prince of Songkla University, and the regional hospital where the study task place. Women were screened and approached after they were admitted to the labor room, where written informed consent was obtained. Women in the control group and small dose analgesic group were informed that they could ask for analgesic as needed. After randomization, participants in the music and small dose analgesic group chose the preference music.

Results

Sample Characteristics

The 180 primiparas in the final sample had an average age of 23 years, SD 3.96 years. One hundred thirty five (82.3%) were Bhuddhist and 28 (17.1 %) were Islamic. Twenty-eight percent completed middle high school (9 years) and 17% completed high school (12 years). The majority (46.5%) of the participants were housewives and 25.5% were employed. The majority reported low income, 40% less than 5,001 Baht/month and 43% between 5,001-10,000 Baht/month. Most were 38 to 40 weeks gestation (87.5%) and had received antenatal care a mean of 9.5 times. The majority 74.3% had a history of painful menstruation. Membrane rupture before the study had occurred in 10.1%, and during the study in 24.7%. More than three-fourths had a normal vaginal delivery without instrumentation, 74.4% had a fetus in left occipital position and 24.4% had a fetus in right occipital position. Participants in the control group did not ask for analgesic medication, thus no one in the control group received analgesic medication.

Extraneous variables

There were no differences in the participants between the two groups demographically or regarding obstetric data, such as age, maternal weight, weight/height ratio, use of fetal monitoring, maternal position, fetal presentation, gestational age, fetal weight, time that the nurses and relatives spent with the participants and helped in relieving labor pain. There were

no differences among groups in the pretest of sensation of labor pain and distress of labor pain. Also the size of cervical dilation and duration of uterine contractions were not different at the starting point of the study. The mean time of all groups in the active phase of labor was 312 minutes with a SD of 132 minutes with no differences among groups. Figures 1 and 2 show the level of sensation of labor pain and distress of labor pain from the pretest to the third hour of the study.

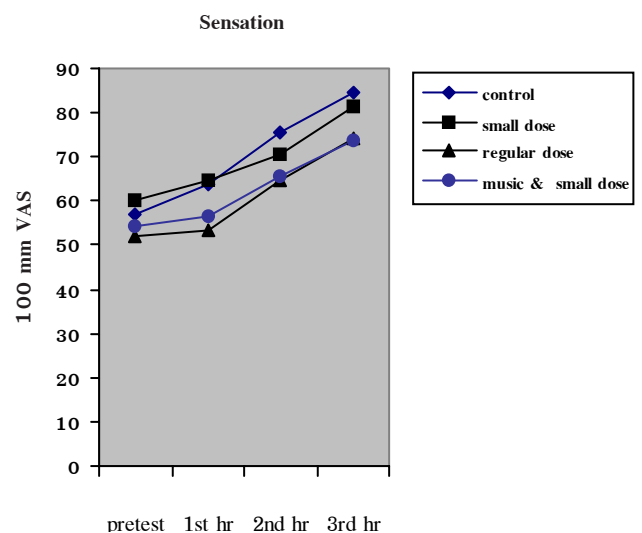


Figure 1 Sensation of pain in each group

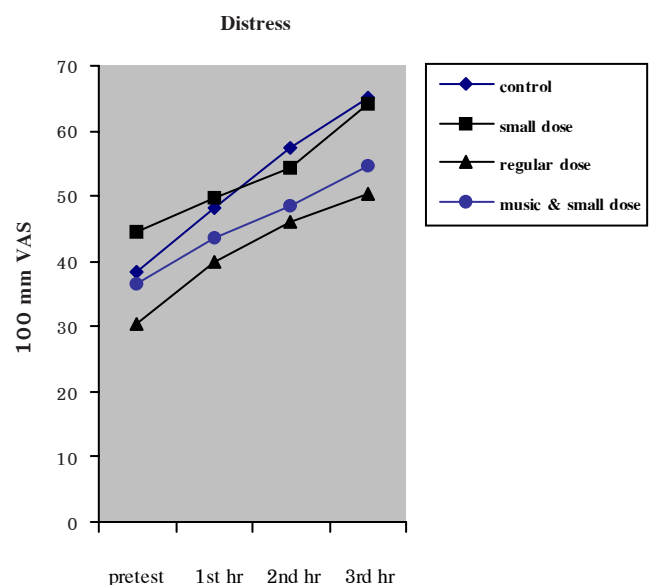


Figure 2 Distress of labor pain in each group

Hypothesis testing

One-way repeated measures ANOVA showed that the four groups had significant differences of sensation of labor pain during the three hours of the study [F(3,176)=3.651, p <.05, power .80]. Pairwise comparisons showed that the regular dose group and music plus small dose analgesic group had lower levels of sensations of pain than the control group: the mean differences were 10.52, p<.01 and 9.41, p<.05 respectively. This supported the hypothesis. However, the sensation of pain in the music and small dose analgesic group was not significantly lower than that in the small dose group.

One-way repeated measures ANOVA showed that the four groups had significant differences of distress of labor pain during the three hours of the study [F (3,176)=4.888, p<.01, power .90]. Pairwise comparisons showed that the regular dose group and music plus small dose analgesic group had lower levels of distress of pain than the control group: the mean differences were 11.56, p<.01 and 7.57, p<.05 respectively. This supported the hypothesis. However the

distress of pain of the music plus small dose analgesic group was not significantly lower than that in the small dose group.

The level of sensation of pain increased significantly over the three hours of the study except in the first hour of the experimental groups (Table 1). The level distress of labor pain increased significantly over the three hours of the study except in the first hour of small dose analgesic and the second hour of the music and small dose analgesic group (Table 2).

In regard to the status of the infants, only 5 infants had a rapid respiration rate (rate >60 times/minute): two in the control group, two in the small dose analgesic group, and one in the regular dose analgesic group. One infant in the music and small dose analgesic group experienced distress. Using chi-square showed no differences of Apgar scores among the four groups at one and five minutes. The scores at one minute and five minutes were 9 to 10, which were normal Apgar scores. Also, the women that gave birth before 3 hour study had low Apgar score (7) one in the small dose analgesic group and one in the music plus small dose analgesic group.

Table 1 The differences of sensation pain each hour

Sensation pain	Control		Small dose		Regular dose		Music & small dose	
	t	P-value	t	P-value	t	P-value	t	P-value
pretest-1st hr	4.095	.000	1.954	.058	.184	.855	.966	.339
1st hr-2nd hr	4.889	.000	3.033	.004	4.315	.000	4.004	.000
2nd hr-3rd hr	3.367	.000	4.275	.000	4.216	.000	4.969	.000

Table 2 The differences of distress pain each hour

Distress pain	Control		Small dose		Regular dose		Music & small dose	
	t	P-value	t	P-value	t	P-value	t	P-value
pretest-1st hr	2.615	.012	1.771	.084	4.360	.000	2.104	.041
1st hr-2nd hr	4.370	.000	2.472	.018	3.133	.003	1.830	.074
2nd hr-3rd hr	4.484	.000	4.363	.000	2.301	.026	3.420	.001

Discussion

There were significantly different levels of sensation of pain and distress of pain among the four groups: control, small dose analgesic, regular dose analgesic, and music plus small dose analgesic. The regular dose analgesic group and music and small dose analgesic group had lower sensation of pain than the regular group. These results showed that the combination of small dose analgesic and music decreased sensation and distress of labor pain. The results are similar to the study conducted by Phumdoung and Good.²¹ This may be because the present study recruited participants aged 18–35 years and in the study of Phumdoung and Good²¹ participants' ages ranged from 20–30 years²⁵ and used similar music in both studies.

During the three hour period of the current study, sensation and distress of pain increased over time except for the first hour in the experimental groups. The distress of pain did not increase in the first hour in the small dose analgesic group or in the second hour of the music plus small dose analgesic group. This showed that the participants in the small dose analgesic group had some adaptation in perception of pain and also music may have had some pain mitigating effect in the music plus small dose analgesic group. The increase in pain over time is consistent with the finding of some other studies.^{21, 26-27}

Infants in the four groups did not have significantly different Apgar scores. This may have been because the mothers were in the active phase of labor for longer than the three hours of the study, so no trace of the analgesic drugs remained in their systems.²⁸ The mean time in the active phase of labor was 312 minutes and the SD was 131.79 minutes.

Conclusion

In conclusion, the results suggest that the use of music together with small amount of analgesic provides some relief from labor pain similar to the use of a regular dose of an analgesic drug. Labor pain usually increased over time. The use of the analgesic drugs had no effect on the Apgar scores of the infants. Because the majority of the sample had low income, it may be difficult to apply the findings of this study to the general population.

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