

# EFFECT OF MUSIC THERAPY ON PAIN, ANXIETY AND CORTISOL LEVEL IN PRIMIGRAVIDA DURING ACTIVE PHASE BASED ON KOLCABA'S THEORY

**Yurike Septianingrum**\*) , **Hermanto Tri Juwono**\*\*) , **Mira Triharini** \*\*\*)

\*)FKK Universitas Nahdlatul Ulama Surabaya

\*\*) SMF Obsgyn RSUD Dr. Soetomo Surabaya

\*\*\*) Fakultas Keperawatan Universitas Airlangga Surabaya

Email: [yurikesepti1209@unusa.ac.id](mailto:yurikesepti1209@unusa.ac.id)

## ABSTRACT

**Background:** Labor pain and anxiety are closely interrelated with each other. Pain and anxiety together can increase level of cortisol, may result in a decrease uterine contractions so that the risk of causing prolonged labor. The purpose of this study were to examine the effect of music therapy in pain, anxiety, and cortisol level in primigravida during active phase of first stage labor. **Method:** This study was an experimental research approach with pre-test post-test design at Delivery room Puskesmas Jagir Surabaya. Research subjects of this study was recruited using simple random sampling who was included inclusion criterias. Research subjects in this study was of 32 people who were then divided into two groups, 16 mothers into intervention group and 16 mothers into control group. Data were collected by using observation with VAS and VAAPS, also took venous blood sampling for laboratory test of cortisol serum. Data were analyzed by using paired t-test and independent t-test. **Result:** The results showed that: 1) Score of VAS in intervention group was less than control group ( $p=0,000$ ), 2) Score of VAAPS in intervention group was less than control group ( $p=0,000$ ), 3) There was no significant differences cortisol level between intervention group and control group ( $p=0,305$ ). **Discussion:** Music therapy could reduce pain and anxiety, but could not reduce level of cortisol in primigravida during active phase of first stage labor. Further research, music therapy should be given since the beginning of third trimester so that primigravida more prepared for childbirth.

**Keywords:** *labor, pain, anxiety, cortisol, music therapy*

## **INTRODUCTION**

The delivery process often cause discomfort or pain. Labor pain in the first stage or when first-epoch is felt during uterine contractions which cause dilation and thinning of the cervix and uterine ischemia due to contraction of the myometrium (Hughes, 1992 in Bobak, 2005). Primiparous experience pain longer than multiparous mother for the duration of the first stage of a longer primiparas is 13-14 hours, while multiparas about 7 hours (Wiknjosastro, 2006). Labor pain that lasts longer at risk of maternal emotional fatigue that affects among others, tension, anxious, and fearful. (Mozurkewich et al, 2000, in Hosseini et al, 2013). Problems with labor pain is still not getting the attention of health workers, especially nurses and midwives. Results of a preliminary study conducted by researchers at the Puskesmas Jagir Surabaya there is no SOP yet to address labor pain, during this midwife only teaches relaxation breath in and was considered still not optimal. Pain management

is absolutely necessary in order to make the mother feel comfortable during labor, but in reality there is no labor pain management in Indonesia. Puskesmas as health care center level 1 expected to cope with labor pain that is accompanied by anxiety so that she can live a normal delivery. Several non-pharmacological alternative methods that can be used to reduce labor pain and anxiety are acupuncture, breathing techniques, acupressure, touch, water therapy, massage, and music (Taghinejad et al, 2010). Music therapy offers a method of distraction that is proven to reduce pain and improve the state of deep relaxation that can distract the mother of pain during childbirth (Martini, 2011). Until now, the effect of music therapy on pain, anxiety and cortisol levels in the first stage of labor primigravidas active phase based Kolcaba theory can not be explained.

Oktavia study (2013) showed that 90% of maternal experiencing severe labor pain and 10% had labor pain severe or very severe.

Primiparous mothers tend to experience labor pains are more severe than multiparous mothers. Approximately 85-95% of maternal report severe pain during the first stage of labor (Tournaire 2007 in Harahap, 2009).

One form of delivery method non-pharmacological pain relief is music therapy. Easy birthing music helps the brain to release endorphins that can reduce pain during childbirth incorporating quantum mind programming methods to help birth mothers give birth to relax and minimize the pain during labor (Erwin, 2011). Music therapy is given to stimulate the theta brain waves is able to balance other brain waves. The theta brain waves can stimulate the release of endorphins. The release of endorphins will make a maternity body to relax so would hamper Hypothalamic-Pituitary-Adrenal Axis (HPA Axis). Hypothalamic CRF lower expenditures that will affect the pituitary gland to reduce secretion of ACTH. The decrease ACTH secretion may affect the adrenal cortex to inhibit the secretion of cortisol and other stress hormones (Ventura, 2011)

## **METHOD**

This research is an experimental study with the approach of the pre-test and post-test group design. Research conducted in the Delivery Room Puskesmas Jagir Surabaya during the months of April-May 2015. Subjects in this study were primigravida met the inclusion criteria, namely primigravida inpartu entering the active phase (opening > 4), ages 20-35, scheduled for vaginal delivery, single fetus, life, cephalic presentation, pregnant women at low risk according to the Puji Rochjati score card, Javanese, minimal education junior, did not have a hearing loss, willing to study and signed an informed consent, are not experienced family violence, disasters. Exclusion criteria in this study were primigravida inpartu who received spinal anesthesia/epidural or pain-lowering medications, requiring induction of labor since the latent phase, and place of residence near the airport, stations and

terminals. The process of taking the research subjects in the present study using simple random sampling.

Samples (research subjects) in this study amounted to 32 people who were then divided into two groups, 16 of the intervention group and 16 control group. Observation of pain using the Visual Analogue Scale (VAS), anxiety using the Visual Analog Scale of Pain Anxiety (VAAPS), while the measurement of cortisol serum levels using ECLIA.

Primary data on the number of pregnant women who had antenatal care (ANC) adapted to schedule pregnant woman during ANC is every Wednesday and Thursday. After getting the number of potential birth mothers, researchers took 32 samples randomly shuffled (randomized) to be formed into two groups: the intervention group and the control group. When that came out at odd count (first, third, and so on.) For the intervention group and the even-numbered (second, fourth, and so on.) For the control group. In the intervention group, if the mother is willing to become respondents, the birth mothers will be given tester birthing easy music first. After the birth mothers agree with the music that will be given then he defined as research subjects for the intervention group and signed informed consent. Before being given music therapy, both groups performed the pre-test, observation by VAS pain and anxiety VAAPS. At the time when I entered the active phase (opening 4-7 cm) in the intervention group music therapy given for 3 hours with a 10 minute break every hour, whereas in the group controls of getting action according to SOP health center in the form of deep breathing relaxation. Evaluation (post test) pain, anxiety, and cortisol serum levels performed in both groups (intervention group and the control group) after 3 hours after entering the active phase of the first stage by the observer midwives in the delivery room (single-blinded).

The statistical test used in this study were paired t-test to analyze maternal pain and anxiety, and test independent t-test to analyze the levels of cortisol serum.

## RESULT

Data frequency characteristics of the study subjects are distributed in the following table:

Table 1. Distribution characteristics of research subjects

Characteristics of research subjects	Intervention Group		Control Group	
	F	%	F	%
<b>Ages</b>	16	100	16	100
20-24 years	8	50	7	43,5
25-29 years	7	43,5	7	43,5
30-34 years	1	6,3	2	12,5
<b>Education</b>	16	100	16	100
High School	11	68,8	12	75
Diploma/Bachelor	5	31,3	4	25
<b>Occupation</b>	16	100	16	100
Housewife	11	68,8	9	56,3
Private	4	25	7	43,8
Business	1	6,3	0	0

Table 2. VAS and VAS difference score in the intervention group and the control group

	Pre test			Post test	
Intervensi	VAS	(9,6875±0,28723)	P = 0,000	VAS	(8,8813±0,21975)
	VAAPS	(9,4188±0,39870)		VAAPS	(8,5313±0,35538)
					P = 0,024
Kontrol	VAS	(9,7313±0,27981)	P = 0,000	VAS	(9,5688±0,29148)
	VAAPS	(9,2563±0,44116)		VAAPS	(9,1063±0,43584)
					P = 0,046

Table 2 shows that there are significant differences in the average difference in VAS values in each intervention group ( $p = 0.000$  or  $p < 0.05$ ) and the control group ( $p = 0.024$  or  $p < 0.05$ ). Both groups showed no significant differences, but there are differences between the mean in each group. In the intervention group who received music therapy is the

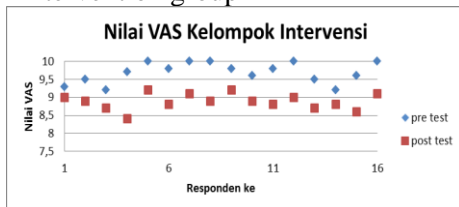
average difference is quite large (mean  $\pm$  SD =  $0.80625 \pm 0.27195$ ), whereas in the control group (mean  $\pm$  SD =  $0.16250 \pm 0.25788$ ). It showed that the intervention group decreased VAS scale larger than the control group.

Table 1 also shows the scale VAAPS in the intervention group and the control group showed a significant difference, namely in the

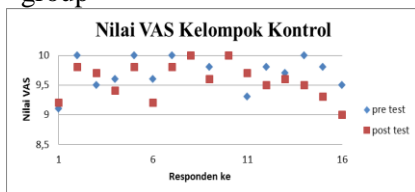
intervention group ( $p = 0.000$  or  $p < 0.05$ ) and in the control group ( $p = 0.046$  or  $p < 0.05$ ). Although the results of statistical calculations showed significantly different in the two groups, but there are differences between the mean difference in value VAAPS in the intervention group and the control group. The intervention group showed greater mean

difference (mean  $\pm$  SD =  $0.88750 \pm 0.27295$ ) than the control group (mean  $\pm$  SD =  $0.15000 \pm 0.27568$ ). This shows a decrease in scale VAAPS greater in the intervention group than the control group. VAAPS VAS scale distribution and pre-test and post-test in the intervention group and the control group shown in Pictures 1, 2, 3, 4, 5, 6, 7, 8 below:

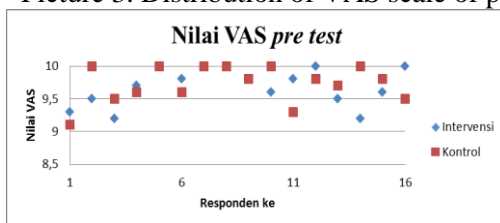
Picture 1. VAS scale distribution of the intervention group



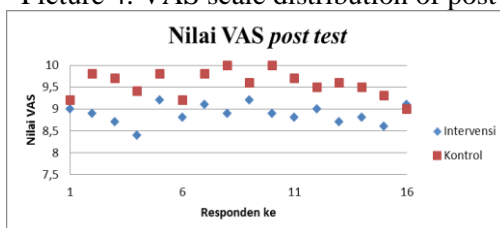
Picture 2. VAS scale distribution of control group



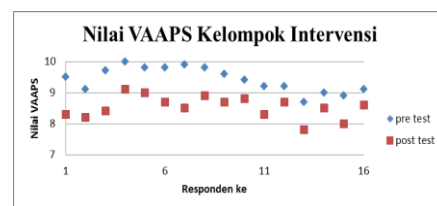
Picture 3. Distribution of VAS scale of pre-test



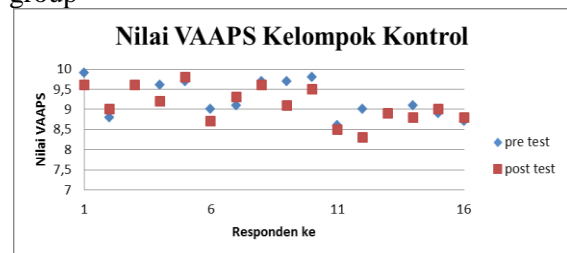
Picture 4. VAS scale distribution of post test



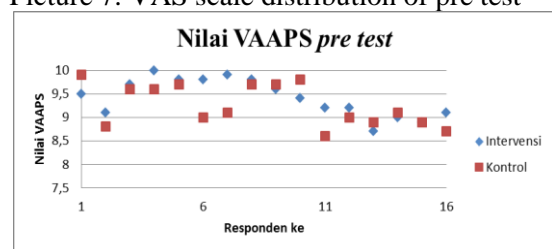
Picture 5. VAS scale distribution of the intervention group



Picture 6. VAS scale distribution of control group



Picture 7. VAS scale distribution of pre test



Picture 8. VAS scale distribution of post test

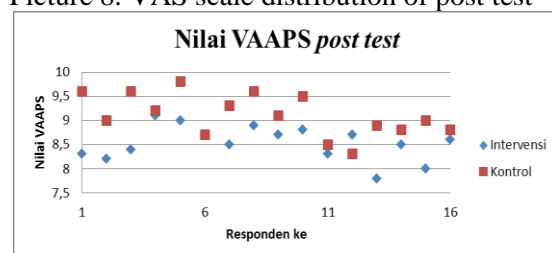


Table 3. Differences in cortisol serum levels in the intervention group and the control group

Group	n	Cortisol Serum Levels		P
		Mean	Standard Deviation	
Intervention	8	463,9500	66,90669	0,305
Control	8	502,3750	77,16087	

Picture 9. Distribution of cortisol serum levels of post test

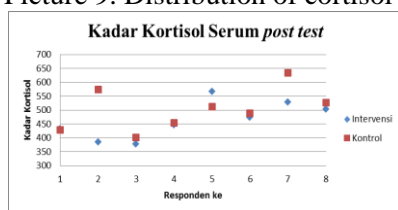


Table 3 shows that there was no significant difference in the intervention group and the control group ( $p = 0,305$  or  $p > 0.05$ ). This shows that music therapy is given for 3 hours while the active phase had no effect on maternal cortisol levels decrease, but there are differences between the mean in the intervention group (mean  $\pm$  SD =  $463.9500 \pm 66.90669$ ) and the control group (mean  $\pm$  SD =  $502.3750 \pm 77.16087$ ). The mean difference indicates that cortisol levels are lower in the intervention group than the control group. Figure 9 showed no significant differences in serum cortisol levels between the intervention group and the control group.

## DISCUSSION

Based on Figure 3 shows that the VAS scale research subjects were in the range 9-10 scale. This may imply all pregnant women can not control labor pain well. Suspected labor pains caused by ischemic muscle of the uterus, pelvic floor muscles and the perineum. With increasing both the volume and frequency of the uterus, the pain that will be felt stronger, peak pain occurs in the active phase (Reeder et al, 2012). Research Oktavia (2013) proved that 90% of maternal experiencing severe labor pain and 10% had labor pain severe or very severe. Primiparous mothers tend to experience labor pains are more severe than multiparous mothers. Approximately 85-95% of maternal

report severe pain during the first stage of labor (Tournaire 2007 in Harahap, 2009).

In figure 7 shows VAAPS scale study subjects were in the range of 8-10 scale. It is caused by several factors such as parity. All the subjects of this study were mothers primiparous process effacement in primiparous usually occurs earlier than cervical dilatation. This process causes the intensity of the contractions felt heavier than multipara primipara, especially in the first stage of labor (Sherwen et al, 1999). Primiparas tend not to adapt to the pain of childbirth compared multiparas. This causes primiparas can not tolerate labor pain causing anxiety. Anxiety and fear lead to increased muscle tension and disruption of blood flow to the brain and muscles. This causes tension in the muscles of the pelvic, uterine contractions are impaired, the loss of the driving force of the mother during the second stage of labor. Old tensions will lead to fatigue in the mother and increase the perception of pain and prevent mother to control the pain (Martini, 2011).

Convenience according Kolcaba (2003) includes physical comfort, psychospiritual, social and environmental. These four components are interconnected to one another. First stage of labor is a condition that is filled with stressors, fear, and intermittent pain in a long time. It can interfere and psychic physical comfort. Music therapy is

one way to reduce pain and anxiety and provide comfort, make a person relax. Music of easy birthing is one of music therapy where this music has a slow rhythm and low frequency. This music is the instrumental music accompanied by sounds of nature like water gurgling sound so impressed soothing music. Entire mothers who become subjects of this research enjoy music easy birthing yng given. The results of interviews with several researchers showed research subjects them music menikmti given because of her voice soothing and can make them relax. Research from Martini (2011) proved that music easy birthing can reduce pain and blood pressure, as well as increase endorphin levels in the blood. Measurement of maternal labor pain with a VAS scale after birthing easy music therapy for 3 hours, according to figures 1 and 4, showed that study subjects pain after getting music therapy decreased the VAS scale. Decrease in VAS scale in the study subjects did not use the category of pain (pain mild, moderate, severe, and severe) due to a decrease in VAS scale only slightly and most of the study subjects were still in the same level with the pain before music therapy. The test results of analysis by paired t-test showed that the intervention group performed music therapy significantly different. In the intervention group experienced a reduction in VAS scale more than the control group. The results of this study within their research hypothesis that there is an influence of music therapy on labor pain in the active phase of the first stage primigravidas based Kolcaba theory.

Both groups, both the intervention group and the control group, showed no significant differences that need to be analyzed more deeply. Some of the research subjects were included in the control group stated accompaniment conducted by researchers when enough data retrieval assist them in controlling pain and anxiety for the family not allowed into the maternity room before the complete opening.

Music therapy is given during the active phase for 3 hours at primigravida inpartu proven to reduce labor pain decline although not too large. This is in accordance study of Phumdoung & Good (2003) that listening to music at the active phase during the first 3 hours is proven to reduce the sensation of pain and distress towards labor. Research Hosseini et al (2013) also proved that music can lower the

first stage of labor pain in the active phase, but the music does not give effect on serotonin levels.

Giving music therapy using earphones slightly affect maternal comfort in listening to music therapy because when the contractions several research subjects chose to release the earphones and put them on again when the contractions stop. It also affects the decrease focus of mother to the relaxation effects produced by music therapy. Music therapy offers a relaxation method that is proven to reduce pain and improve the state of deep relaxation that can distract the mother of pain during childbirth (Martini, 2011). Research Salem (2004) showed that 92% or 34 maternity states music can help reduce labor pain. Easy birthing music helps the brain to release endorphins that can reduce pain during childbirth incorporating quantum mind programing methods to help birth mothers give birth to relax and minimize the pain during labor (Erwin, 2011). Timing of easy birthing music also affects the decrease in the level of pain and anxiety. Music during labor helps mothers to concentrate, relax, and breathe regularly, decreases anxiety and can distract from the pain that is felt (Phumdoung, 2003). But in this study music easy birthing given at the time of entry of the active phase in which the possibility of the mother or less focus on greater pain than to focus on the music provided so the decrease of pain scale is not too large.

Gate control theory to explain how music can reduce pain in childbirth by releasing endorphins. Endorphins will work as neurotransmitters and neuromodulators that would inhibit the transmission of pain impulses to the brain by closing the "gate control" in the dorsal horn. At the time of the peripheral pain neurons send signals to the synapse, synapses between neurons occurs and the peripheral pain neurons to the brain where it should have substance P will conduct impulses (a neurotransmitter). At that time the endorphins to block the release of substance P from sensory neurons and endorphins bind to the opiate receptors are located in the synapse ( $\mu$ ) so that pain impulses are not transmitted to the brain (Tamsuri, 2007).

Figure 8 shows that the level of anxiety after doing music therapy in the study subjects experienced a decrease, either the intervention group or the control group. The test results of analysis by paired t-test showed that the

intervention group performed music therapy significantly different. In the intervention group decreased VAAPS scale more than the control group. These results are consistent with the hypothesis of research that there is an influence of music therapy on anxiety in the first stage of labor primigravidas active phase based Kolcaba.

The results of the analysis by paired t-test in the control group also showed a significant difference, it needs to be analyzed in the grama. Similarly, the observation data retrieval pain, anxiety at the time of data collection, study subjects stated accompaniment conducted by researchers during data retrieval can reduce maternal anxiety in the face of labor. This shows the environmental and social (interaction with the midwife and researcher) greatly affects the perceived convenience of maternal. In this case the mother's physical and psychological discomfort, but the mother feel comfortable with the presence of social and environmental support from midwives and mentoring by researchers.

Stress in childbirth is the psychological stress arising as a combination of fear and pain experienced by women during childbirth (Abushaikha & Sheil, 2006). Anxiety delivery not only resulted in the mother, but also to the fetus. For mothers who are experiencing stress, the signal goes through the HPA axis (hypothalamo-pituitary-adrenal) can cause the release of stress hormones, among others, ACTH, cortisol, catecholamines,  $\beta$ -Endorphin, GH, prolactin and LH / FSH. The result is a systemic vasoconstriction, including constriction of vasa utero placental cause interruption of blood flow in the womb, so that the oxygen delivery (DO<sub>2</sub>) into the myometrium disturbed, resulting weakening of the muscle contraction. uterus. The incident led to the more lengthy process of delivery (prolonged labor) so that the fetus can experience gravity (fetal- distress). Besides, with the increase in cortisolplasma, resulting in lowering maternal and fetal immune responses. Thus the stress of labor may harm the fetus and the mother. The result carried over until the postpartum period, for example, disruption of the milk production, slowing wound healing labor, force the baby to suckle the mother weakened so slow infant weight gain. The end result of physical contact disturbed mothers and

children, with various consequences (Schats, 1986 in Mulyata, 2007).

Music of easy birthing designed to stimulate brainwaves (brainwave entertainment) as induction medium to reach a receptive state of mind (theta), with a frequency of about 4-8 Hz, this music is able to slow down and balance brain waves (Erwin, 2011). This is consistent opinion of Campbell (2002) that the peak periods of creativity, meditation, and sleep is characterized by theta waves having a frequency of 4-7 Hz. Theta waves in the brain is believed to release endorphins which is an endogenous opiate body that can make the condition a person to relax so would hamper Hypothalamic-Pituitary-Adrenal Axis (HPA Axis). Hypothalamic CRF lower expenditures that will affect the pituitary gland to reduce secretion of ACTH. The decrease ACTH secretion may affect the adrenal cortex to inhibit the secretion of cortisol and other stress hormones (Ventura, 2011)

## CONCLUSION AND RECOMMENDATION

Giving music therapy of easy birthing for 3 hours while the active phase of labor may reduce pain and anxiety, but does not reduce cortisol serum levels in the first stage of labor primigravidas active phase. Music therapy is expected to be used as a standalone intervention nurses in reducing pain and anxiety in maternal especially primigravida. Puskesmas as Health care centers level I are expected to apply labor pain management, one with music therapy. For further research, music therapy should be given for a period longer that mothers are more relaxed and better prepared to face the labor.

## REFERENCES

- Bobak, Lowdermilk, & Jensen, 2005. *Buku Ajar Keperawatan Maternitas*. Jakarta: Penerbit Buku Kedokteran EGC, hal: 103-121
- Campbell, D, 2002. *Efek Mozart: Memanfaatkan Kekuatan Musik untuk Mempertajam Pikiran, Meningkatkan Kreatifitas, dan Menyehatkan Tubuh*. Jakarta: Gramedia Pustaka Utama
- Erwin, 2011. *Persalinan Tanpa Rasa Sakit dengan Easy Birthing*, retrieved from <http://www.terapimusic.com>, on 12 Januari 2015 at 09.00 WIB)

- Harahap, D, 2009. *Pengaruh Teknik Relaksasi Hipnotis Diri terhadap Tingkat Nyeri dan Lama Persalinan Ibu Primipara di RS Ananda Bekasi. Tesis Magister, Universitas Indonesia Jakarta.*
- Hosseini, S.E, Bagheri, Honarpharvaran, 2013. *Investigating The Effect of Music on Labor Pain and Progress in the Active Stage of First Labor. European Review for Medical and Pharmacological Science. 17: 1479-1487*
- Kolcaba, K., 2003. *Comfort Theory and Practice: A Vision For Holistic Health Care and Research. New York: Spinger Publishing*
- Martini, D.E., 2011. *Pengaruh Terapi Musik terhadap Respon Nyeri, Tanda-tanda Vital, dan Kadar  $\beta$ -Endorphin Ibu Bersalin Fase Aktif Kala I di RS Muhammadiyah Lamongan. Tesis not publishing. Universitas Airlangga*
- Martini, S., 2011. *Pengaruh Psikoedukasi Dukungan pada Keluarga terhadap Tingkat Kecemasan dan Kadar Kortisol Ibu Bersalin Primigravida Fase Laten di RSE Batam. Tesis tidak dipublikasikan. Universitas Airlangga*
- Mulyata, S., 2007. *Paket penyuluhan kognitif dan senam prapersalinan pada primigravida mengurangi cemas dan nyeri persalinan, meningkatkan skor APGAR bayi, serta mempercepat menyembuhkan luka persalinan, (Online),(<http://digilib.uns.ac.id>, diakses pada tanggal 22 Januari 2015 jam 16.00 WIB)*
- Oktavia, N.S., Gandamiharja, S., Akbar, I.B., 2013. *Perbandingan Efek Musik Klasik Mozart dan Musik Tradisional Gamelan Jawa terhadap Pengurangan Nyeri Persalinan Kala I Fase Aktif pada Nullipara. MKB. Vol. 45 No. 4. hal: 218-225*
- Phumdoung, S., & Good, M., 2003. *Music Reduces Sensation and Distress of Labor Pain. Pain Management Nursing Journal, Vol. 4, No.2. pp: 54-61*
- Reeder, Sharon J., 2012. *Keperawatan Maternitas: Kesehatan Wanita, Bayi, dan Keluarga, Ed.18, Vol.1. Jakarta: EGC, hal: 595-602*
- Salem, SG. (2004). *The Effect of Music on Pain during The First Stage of Labor in Egypt.* (Online), ([www.proquest.com](http://www.proquest.com), diakses pada 20 Januari 2015 jam 14.30 WIB)
- Sherwen,L., Scoloveno, M.A., Weingarten, C., 1999. *Maternity Nursing: Care of The Childbearing Family.* (3rd ed.). Stamford: Appleton Lange
- Taghinejad, H., 2010. *Comparison between message and music therapies to relieve the severity of labor pain. Journal of Women's Health, Vol. 6, p: 377-381*
- Tamsuri, A., 2007. *Konsep dan Penatalaksanaan Nyeri.* Jakarta: EGC
- Ventura, T., Gomes, M.C., Carreira, T., 2011. *Cortisol and Anxiety Response to a Relaxing Intervention on Pregnant Women Awaiting Amniocentesis. Journal of Psychoendocrinology, p: 148-156*
- Wiknjosastro, 2005. *Ilmu Kebidanan.* Jakarta: Yayasan Bina Pustaka Sarwono Prowirohardjo, hal: 189-101