ICASH-A015

EFFECTIVENESS OF ENDORPHINS MASSAGE AND ICE PACKS TO RELIEVE THE FIRST STAGE OF LABOR PAIN AMONG THE PREGNANT WOMEN IN CANDIMULYO HEALTH CENTER, INDONESIA

Mariza Mustika Dewi*, Tuti Sukini, Nurul Aziza Ath Thaariq, Niken Wahyu Hidayati

Postgraduate Applied Science Program in Midwifery, Poltekkes Kemenkes Semarang, Semarang, Indonesia,

*Corresponding author's email: dewimariza1803 @ gmail.com

ABSTRACT

Background: More than 90% of women experience severe labor pain. Endorphin massage and applying ice packs have been well known as non-pharmacological methods for pain reduction faced during delivery.
Aims: This study is to determine the effectiveness of endorphins massage and ice packs to the first stage of labor pain.
Methods: This study was a quasi-experiment with non-equivalent control group and pretest-posttest design. This research involved 30 pregnant mothers at the first stage in Candimulyo Health Center, Indonesia. The labor pain level at the first stage was measured before and after the intervention either by endorphins massage or ice packs. Data from Visual Analog Scale (VAS) sheet was employed to define the labor level, and was then analyzed statistically using Mann-Whitney Test.
Results: Either endorphin massage or ice pack application decreased the pain level among the pregnant women in Candimulyo Health Center, Indonesia, respectively, at difference level of 0.008 and 0.000. The number of mother experienced massive pain level decreased from 20% to 0% by given endorphin massage, and 13.3% to 6.7% after applying ice packs. In addition, in the group who received endorphin massage, 9 mothers declared having heavy labor pain, however, after the treatment, only 3 mothers declared the heavy labor. It also happened at the group who given ice pack application where the number of mother claimed heavy pain decreased from 10 to only 6. The results highlighted that the endorphin massage (18.50) is more effective to decreasing labor pain than the ice pack application (12.50), and the difference was significant (p value < 0.05).
Conclusion: The highlight of endorphin massage and ice pack application in reducing the labor pain becomes evidence suggesting the other non-pharmacological methods as alternative treatments. The results shows the importance to provide endorphin massage and ice pack application for reducing labor pain among the pregnant women.

Keywords: labor pain, endorphins massage, ice packs

INTRODUCTION

Stress or physiological fear can cause uterine contractions become noticeably more painful. When a woman in a state of labor is experiencing stress, the body will automatically release the hormone adrenaline and catecholamines [1] which cause the uterus to become increasingly tense and reducing the blood flow and oxygen to its muscles due to narrowing arteries. The pain in childbirth also causes fear associated with

childbirth and increases the length of time of delivery with caesarean section [2, 3]. It has been reported that 60% of women are experiencing severe pain that drives them to end a pregnancy by a caesarean section [4]. This can happen when women with labor pain are not taken care of properly. Prevention of delivery by caesarean section is sometimes done by administering analgesics [4].

Labor pain also causes hyperventilation [5] that increase oxygen demand, blood pressure, and loss of bowel and bladder motility. This situation will stimulate an increase in catecholamines which may cause the strength of uterine contractions resulting in inertia uteri which can result in maternal mortality [6].

One of the non-pharmacological treatments to reduce the labor pain is by endorphins massage. Endorphins massage is a touch and light massage technique that can normalize the heart rate and blood pressure, and increase relaxation in the pregnant woman's body by inducing a feeling of comfort through the skin surface [7]. Endorphins massage can affect the surface of the skin, soft tissue, muscle, tendons, ligaments, and fascia and can help provide a sense of calm and comfort both when the baby is approaching and when the delivery process take place. The emergence of endorphins in the body can be triggered through activities such as deep breathing and relaxation as well as medication. Because the endorphins are produced by the human body itself, the endorphins are regarded as the best natural pain reliever [3, 7].

Applying ice is a pain reduction method that has been used for many years for its useful properties for slowing down the transmission of pain impulses through the sensory neurons in the joint and musculoskeletal pain or numbness in the affected area [8, 9] due to the effects of the cold [8, 10]. Ice therapy can be used as an alternative to relief pain by allegedly stimulating pain's non-receptors or non-nociceptors in the field of the same receptor. Ice therapy can decrease prostaglandins that strengthen the sensitivity of other pain and subcutaneous receptors [11, 12].

Candimulyo Health Center covers 19 villages in Magelang Regency and has an average of 59 births a month. In March-April 2014, an estimate of 94 births were recorded. The preliminary study conducted by researchers through an interview with midwives in the Surojoyo village, District Candimulyo, Magelang noted that during the first stage of labor, most mothers experience pain during the first stage of labor. It is also founded that the midwives did not take any action to alleviate the pain in the latent and active phases of the first stage of labor. Through this study, the researchers wanted to compare the effectiveness of endorphins massage and ice packs in the first stage of labor pain.

METHODS

This study was a quasi-experiment with non-equivalent control group with pre-test and post-test design. The observation was conducted twice times before the experiment and after the experiment in each group, totaling four observations. This study was conducted on 20 January to 10 May 2014. Samples were all mothers who were in the first stage of labor in Candimulyo Magelang Health Center. Drawn from the data, pregnant women with Estimated Delivery Date (EDD) on March-April 2014 totaled 30 people. Those who met the inclusion and exclusion criteria by division of each treatment are 15 for endorphins massage treatment and 15 for treatment with an ice packs. The inclusion criteria for this study are mothers who were willing to become respondents, whose labor had no maternal and fetal abnormalities, and who was accompanied by her husband. Meanwhile, the exclusion criteria were mothers who are hypersensitive to cold and who do not want to continue the therapy.

In this study, the sampling technique was taken from non-random sampling technique with purposive sampling method. The tools of the data collection is the observation sheet that is about the scale of pain intensity during the first stage of labor before and after the respective treatments using the Visual Analog Scale (VAS) for pain measurement. The VAS scale is filled by the researchers before and after the intervention. Before the intervention, researchers observed and asked the respondents about the level of pain that they experienced. After the intervention, the researchers observed and asked the same questions

again. The VAS scale is chosen for this study due to its wide recognition in clinical research and setting. Many researchers have also approved the validity and reliability of the VAS questionnaire [13].

In endorphins massage group, the endorphins massage was performed gently and lightly toward the left and right shoulder V shape to the coccyx during the active phase of labor, and can be done sitting or lying. The massage was performed for five minutes and then move to the arm and hand on one side and then switch to the other side. Meanwhile, in ice pack group, the ice pack was applied during the active phase of labor. The compress tool used is a bag filled with ice up to two-thirds of the bag. The compress was then placed on the lower back part at the lumbar II and with pillows to prop up for five minutes.

The analysis in this study were univariate form and frequency distribution characteristics of respondents. In this study, the comparison on how the two paired groups are correlated (knowing the difference in pain intensity scale of the first stage of labor before and after the endorphins massage or ice packs treatment), were analyzed using Wilcoxon test with a confidence level 95%, which means the degree of guilt of 5% or $\alpha = 0.05$. Meanwhile, to test the hypothesis of the comparative two groups that are not paired (determine the intensity of the pain scale of the first stage of labor respondents between *endorphins massage* and ice packs), were analyzed using Mann Whitney test with a confidence level that is used by researchers is 95%, which means the degree of guilt of 5% or $\alpha = 0.05$.

RESULTS

Table 1. Characteristics of Respondents

Characteristics	Endorphins		Ice Packs	
	N	Percentage (%)	N	Percentage (%)
Age				
20-35 years old	13	86.7	12	80
>35 years old	2	13.3	3	20
Gravida				
Primiparous	3	20	4	26.7
Multiparous	12	80	11	73.3
Occupation				
Housewives	2	13.3	4	26.7
Farmer	5	33.3	2	13.3
Public	4	26.7	3	20
Private	4	26.7	5	33.3
Student			1	6.7
Educations				
3th Diploma	1	6.7	2	13.3
Bachelor	3	20	7	46.7
Senior High School	6	6.7	3	20
Junior High School	4	40	3	20
Elementary School	1	26.7		

All respondents in this study are mostly at the reproductive age. Only five (16.6%) of them are at high risk of pregnancy in both groups. Most respondents are multiparous. A total of seven (23.3%) were primiparous. Most of the respondents, 23 (76.6%), were employed outside of their home. Generally, the respondents have attained good level of education, as seen from the table, with most have attended senior high school or higher.

Table 2. Frequency Distribution

Pain degree	Endorphins				Compress			
	Pre		Post		Pre		Post	
	N	Percentage (%)	n	Percentage (%)	N	Percentage (%)	N	Percentage (%)
Mild			6	40			1	6.7
Moderate	3	20	6	40	3	20	7	46, 7
Heavy	9	60	3	20	10	66.7	6	40
Severe	3	20			2	13.3	1	6.7

Table 2 shows the average pain before and after the performance of endorphins massage or ice pack. The table also shows a pain decrease after treatment in either groups, where most reported that their pain are lessen to a category below or two.

Table 3. Pain Degree Before and After Endorphin Massage and Ice Packs

Group	Treatment	Mean ± SD	*p*
Endorphins Massage	Pre	4.0000 ± .65465	.008
	Post	2.8000 ± .77460	
Ice Packs	Pre	3.9333 ± .59362	.000
	Post	3.4667 ± .74322	

Table 3 shows no difference in the pain scale before and after intervention with the Wilcoxon test with p-value <0.05.

Table 4. The Significant Difference in Degree of Pain Before and After Endorphin Massage and Ice Packs

Group	Treatment	p	Mean Range
Endorphin Massage	Post	.029	18.50
Ice Packs	Post		12.50

The Table 4 shows the result of the Mann-Whitney test, which is used to demonstrate if there were any significant differences between the first stages of labor's pain using endorphins massage and ice packs. Endorphins massage appeared to be more effective than ice packs in the first stage of labor pain by the higher mean of 18.50 compared to ice packs' 12.50.

DISCUSSION

In this study, the use of endorphins is able to reduce the pain in the first stage of labor. After the endorphins massage, the pain intensity of the respondents is reduced. It can be seen from the table that there are three respondents who experienced severe pain prior to the treatment while none reported after. Endorphins massage technique can increase the release of oxytocin and endorphins substances which could facilitate the delivery process [6, 14]. This finding is consistent with research conducted by Hosseini et al [15], which states that massage can lower the cortisol hormone and affect the brain to reduce pain, provide psychological support, reduce anxiety, and increase the production of oxytocin and endorphins hormone [6, 15]. Opioid endorphin has an important role in generating positive feelings and reducing pain, reducing stress and providing peace [15].

Endorphins are derived from the word *"endogenous"* and *"morphine"* which are protein molecules produced by cells of the nervous system and other body parts that work with the receptor sedatives to relieve pain.

The analgesic receptors are produced in the spinal cord and nerve endings. These touching techniques include very light massages which could make the tiny hairs stand up on the skin surface [7, 16].

Endorphins massage is done in the back area around the thoracic bone-7 and -8 for fibers motor nerves of the uterus leaving the spinal cord as high as vertebrae thoracic bone-7 and -8. So, theoretically each method blocks sensory does not block the motor pathways into the uterus may be used for analgesia during labor [7]. This finding is consistent with research conducted by Aryani. Back massage that begins on the outside of cervical-7 to the side of the ribs can activate the nerve fibers to close the gate-carrying portion of the pain carried by other nerve fibers, so as to limit the delivery of sensation into the cerebral cortex and cause the pain to decrease [17].

This study showed that ice packs can also reduce labor pain. The results showed that prior to ice pack compress, the pain experienced by the mothers is of moderate, heavy, and severe level of pain, while after the ice pack the pain perceived by respondents were in the category of mild, moderate, heavy, and severe. Although there were respondents who experienced severe pain, more respondents felt a decrease in pain after the intervention of an ice pack. This study is consistent with research that has been done by Maulana that states that 16 of 30 (53.3%) experienced severe pain, then after an ice pack the number decreased to 5 of 30 (16.7%) [18].

Apply ice is part of a cold compress can be done using an ice bag, ice collar, gloves, and disposable refrigerant packs placed to obtain a local effect [8]. This study consistent with research by Felina [19]. A cold compress is a constricting the flow of pain impulses and raising the threshold of one's pain [19].

Applying ice is a pain reduction method that has been used for many years for its useful properties for slowing down the transmission of pain impulses through the sensory neurons in the joint and musculoskeletal pain or numbness in the affected area [8, 9] due to the effects of the cold [8, 10]. This study is consistent with research by Purwaningsih [21]. Cold compress placed on the outside of the body has the effect of reducing pain by reducing nerve and muscle activity. The cold compress analgesic effect can slow down the speed of the pain impulse conduction nerve in the brain [21].

The results of the comparative test Mann-Whitney obtained significant p-value amounted to 0.029, which means there is a significant difference between the first stage of labor pain scale using endorphins massage and ice packs. Endorphins massage appeared to be more effective than ice packs in the first stage of labor pain by the higher mean of 18.50 compared to ice packs' 12.50.

In this study, the intervention time was five minutes each in both the endorphins massage group and ice packs group. This is because researchers can't equate the opening and depletion of every mother in maternity, and in the Surojoyo villages, a mother who want to give birth will not be examined by the midwives unless there are signs of the second stage. In addition, researchers fear that if the compress is being left too long, the mothers will feel uncomfortable, experience frostbite or frozen phenomenon and cause the phenomenon of reflection that should turn constriction vaso to be dilatation vaso.

Although the treatment has been carried out to reduce pain, in both groups there are respondents with heavy pain or severe pain. This is because the mother's subjectivity and perception to the pain itself [22]. In addition gravida, age, and size of the fetus are also influential in labor pain. This research was conducted in Independent Practice Midwives in Candimulyo District. Although studies are concentrated in one district, domicile and place of birth also affect the mothers' psychology [23].

The limitation of this study is that the researchers did not observe the factors that cause pain apart from what is already listed on the observation sheets, which are age, gravida, education, and occupation of the mother.

CONCLUSION

From this study, it can be concluded that endorphins massage is more effective than an ice pack to reduce pain during the first stage of labor. For further research, it is recommended to examine the role of endorphins in reducing labor pain supported by blood test and to increase the number of enumerators participating in the training to avoid subjectivity and bias. Midwives as the executors are expected to develop their skills through endorphin massage training and to perform it as a natural (non-pharmacologic) intervention that does not cause side effects in reducing the pain in the first stage of labor.

CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES

[1] Haghighi NB, Masoumi SZ, Kazemi f. Effect of Massage Therapy on Duration of Labour : A Randomized Controlled Trial. Journal of Clinical and Diagnostic Research. 2016;10(4):QC12-QC5.
[2] Judha M, Sudarti, Fauziah A. (Teori Pengukuran Nyeri dan Nyeri Persalinan). Yogyakarta: Nuha Medika; 2012.
[3] Taghinejad H, Delpisheh A, Suhrabi Z. Comparison between Massage and Music Therapy to Relieves the Severity of Labor Pain. Women's Health. 2010;6(3):377-81.
[4] Eshkevari L, Trout KK, Damore J. Managemen of Postpartum Pain. Journal of Midwifery and Women's Health. 2013;58:622-31.
[5] Gorji H, Nesami B, Ayyasi, Ghafari, Yazdani. Comparison of Ice Packs Application and Relaxation Therapy in Pain Reduction during Chest Tube Removal Following Cardiac Surgery. North American Journal of Medical Sciences. 2012;6(1):19-24.
[6] Azizah IN, Widyawati MN, Anggraini NN. (Pengaruh Endorphin Massage terhadap Intensitas Nyeri Kala I Persalinan Normal Ibu Primipara di BPS S dan B Demak). Jurnal Kebidanan Universitas Muhammadiyah Semarang. 2013;2(1):90-6.
[7] Aprilia Y, Ritchmond B. Gentle Birth. Jakarta: Gramedia Widiasarana Indonesia; 2011.
[8] Kozier B. (Buku Ajar Praktik Keperawatan Klinik). Jakarta: EGC; 2009.
[9] Rahmawati ES. (Pengaruh Kompres Dingin terhadap Pengurangan Nyeri Luka Perineum pada Ibu Nifas di BPS Siti Alfirdaus Kingking Kabupaten Tuban) Jurnal Sains Med. 2013;5(2):43-6.
[10] East CE, Begg L, Henshall NE, Marchant P, Wallace K. Local Cooling for Relieving Pain from Perineal Trauma Sustained during Childbirth. The Cochrane Collaboration and Published 2009(1):1-84.
[11] Maryunani A. (Nyeri dalam Persalinan, Teknik, dan Cara Penanganannya). Jakarta: CV. Trans Info Media; 2010. 10 p.
[12] Rosyid FN, Putra DDP. (Perbandingan Keefektivan Stimulasi Saraf Elektrik TENS dan Terapi Es terhadap Penurunan Intensitas Nyeri pada Pasien Simple Fraktur). Jurnal Ilmu Kesehatan Gaster. 2010;7(2):564-73.
[13] Kusumaningsih R, Hasan M, Kusuma IF. Relationship between Obesity and Degree Pain in Knee Osteoarthritis Patients at Bina Sehat Hospital Jember. e-Jurnal Pustaka Kesehatan 2015;3(2):253-6.
[14] Rodgers NJ, Cutshall SM, Dion LJ, Dreyer NE, Hauschulz JL, Ristau CR, et al. A Decade of Building Massage Therapy Services at an Academic Medical Center as Part of A Healing Enhancement Program. Complementary Therapies in Cllinical Practice 21. 2015;21:52-6.
[15] Hosseini E, Asadi N, Zareei F. Effect of Massage Therapy on Labour Progress and Plasma Levels of Cortisol in the Active Stage of First Labor. Zahedan Journal of Research in Medical Sciences. 2013;15(9):35-8.
[16] Aprilia Y. 2011. [cited 2013]. Available from: http:www.bidankita.com.
[17] Aryani Y, Masrul, Evareny L. (Pengaruh Masase pada Punggung terhadap Intensitas Nyeri Kala I Fase Laten Persalinan Normal melalui Peningkatan Kadar Endorphin). Jurnal Kesehatan Andalas. 2015;4(1):70-7.
[18] Rusdiatin IE, Maulana D. (Pengaruh Pemberian Teknik Akupressur terhadap Tingkat Nyeri Persalinan Kala I di RS Rajawali Citra Potorono Banguntapan Bantul 2007). Seminar Nasional Teknologi 2007. 2007:1-10.
[19] Felina M, Masrul, Iryani D. (Pengaruh Kompres Panas dan Dingin terhadap Penurunan Nyeri Kala I Fase Aktif Persalinan Fisiologis Ibu Primipara). Jurnal Kesehatan Andalas. 2015;4(1):58-64.
[20] Nurlis E, Bayhakki, Erika. (Pengaruh Terapi Dingin Ice Massage terhadap Perubahan Intensitas Nyeri pada Penderita Low Back Pain). Jurnal Ners Indonesia. 2012;2(2):185-91.
[21] CS A, Hadi, Widyawati MN. Aromatherapy Massage As An Alternative in Reducing Cortisol Level and Enhancing Breastmilk Production on Primiparous Postpartum Women in Semarang. 4th Asian Academic Society International Conference (AASIC) 2016. 2015:381-8.
[22] Wenniarti, Muharyani PW, Jaji. (Pengaruh Ice Pack terhadap Perubahan Skala Nyeri pada Ibu Post Episiotomi). Jurnal Kedokteran dan Kesehatan. 2016;3(1):377-82.
[23] Utami RN, Widyawati MN. (Perbedaan Efektivitas Lama Pemberian Rose Effleurage terhadap Intensitas Nyeri Kala I Fase Aktif pada Persalinan Normal Primigravida di Kota Semarang Tahun 2013). 2089-7669. 2013;2(4):20-30.