Similarity - Effect of Regiosacralis Counterpressure Treatment on the Pain

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Effect of Regiosacralis Counterpressure Treatment on the Pain and Interleukin-6 Levels Among Primigravid Mothers During the First Stage Labor

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BACKGROUND: Severe pain experienced by mother during the labor can cause fear and anxiety which can interfere with the overall labor process. Controlling pain during the labor process is important. Regiosacralis counterpressure pain management without altering the interleukin-6 (IL-6) level is expected to reduce the pain.

OBJECTIVE: This study was aimed to investigate the effects of regiosacralis counterpressure on the pain and IL-6 levels during the first stage of labor among primigravid mothers.

METHOD: A quasiexperiment method with pretest–posttest control group design was applied. Regiosacralis counter-pressure pain management was applied to all study participants who non-randomly recruited by consecutive sampling methods. A total of 52 primigravid mothers were selected and divided into both the intervention group (n = 26) and the control group (n = 26).

RESULT: The statistical analysis of the intervention on the pain and IL-6 level revealed a significant difference between the pretest and posttest in the intervention group (p < .001; M pretest pain = 8.96 ± .528; M posttest pain = 6.96 ± .774; M pretest IL-6 = 175.539 ± 92.281; M posttest IL-6 = 170,764 ± 70,026).

CONCLUSION: Regiosacralis counterpressure treatment is effective in controlling and reducing the pain level during the first stage labor.

KEYWORDS: labor pain; counterpressure; interleukin-6

INTRODUCTION

Most laboring mothers (90%) encounter pain varying from mild to severe (Ashagrie et al., 2020; Orr et al., 2017). Pain during labor is commonly associated with physiological and psychological processes. Pain during the labor process can induce stress. That situation triggers the release of the catecholamines and steroid hormones (Danhakl et al., 2019). Subsequently, those two hormones could stimulate smooth muscle tension and blood vessels vasoconstriction resulting in the decrease of uterine contractions, uteroplacental circulation, blood and oxygen flow to the uterus, and the emerging of uterine ischemia. Consequently, those conditions increase pain impulses (Lee & Neumeister, 2020).

During the first stage of labor, pain impulses are transmitted through the lower thoracic spinal nerves (T_{10-12}) and the upper lumbar spinal nerve (L_1). These neural afferent fibers originate from the uterine and cervical corpus. Sensory impulses from the uterus are transmitted through the synapse in the posterior horn of the spinal cord from the thoracic segments 10, 11, 12, and lumbar 1. The neural cells within the spinal cord, brainstem, and cerebral cortex can regulate the pain impulses through an inhibition mechanism (Braz et al., 2014). The pain sensation is carried along

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the sensory nerve to the brain. Only a certain amount of sensation or message can be transmitted through this neural line at the same time (Kang et al., 2011; Murray & McKinney, 2014).

Several theories of labor describe biochemical changes involved in labor, such as increased estrogen and progesterone levels which increase the prostaglandin level, oxytocin receptors in the myometrium, and uterine volume (Ryan & McCarthy, 2019). These factors conduce uterine muscles ischemia and an uteroplacental disruption, which causes placental maturation. Moreover, there are various factors considered as labor mediator initiation according to the literature such as Tumor Necrosis Factor-alpha (TNFα), interleukin-1β (IL-1β), and interleukin-6 (IL-6). IL-6 was found in the placenta, decidua, chorion, and amniotic fluid. A previous study reported that administering IL-6 in amnion cell culture and human decidua increased prostaglandin formation (Ellison, 2017).

IL-1β is the primary cytokine that rapidly is produced in response to infection and immunological changes. It will stimulate other IL-6 cytokines as an implantation mediator which plays a vital role in stimulating production of prostaglandin, especially PG-E_2. Moreover, the presence of psychological changes (stress, fear, and anxiety during the labor process) trigger catecholamine production, which also stimulates IL-6. Then, it also triggers prostaglandin production as an important mediator in labor. Prostaglandins from *amnion* and *decidual* cells play an important role in the initiation phase of acute responses, which could trigger pain through uterine contractions (Ellison, 2017; Lee & Neumeister, 2020).

Uterine contraction pain also causes anxiety and fear which could interfere with the labor process. Effective pain management is critical for mothers during normal labor process (Boys & Bamber, 2019). Management of labor pain can be applied by using pharmacological and nonpharmacological techniques (Hensley et al., 2017). Pain involves complex interactions between messages sent from the peripheral nervous system to the central nervous system and vice versa (Lee & Neumeister, 2020). Applying pressure in certain areas can reduce pain (Alimoradi et al., 2020; Raana & Fan, 2020). Some alternative interventions for labor pain may help, but this needs further investigations (Levett et al., 2014).

Regiosacralis counterpressure (CP) therapy is a combination of acupressure therapy with gate-control theory pain management. Therefore, the study's aim was to investigate the effect of regiosacralis CP on pain and IL-6 levels during the first stage labor among primigravida mothers.

METHODS

A quasiexperiment method with pretest–posttest control group design was applied in this study. The data was collected at Soewondo Hospital, Kendal, Central Java from February to July 2018. All of the participants were recruited by using a nonrandomization consecutive sampling method. Slovin formula was applied to determine the sample size.

PARTICIPANTS

A total of 52 primigravid mothers ranged from 20 to 30 years old were selected and divided into both intervention (26 participants) and control groups (26 participants). The inclusion criteria of participants in this study were primigravida mother, long pregnancy, monopregnancy, active phase in the first stage of labor, 4–9 cm cervical dilatation which was determined by vaginal examination. All of the study participants were patients who had been registered and regularly performed prenatal care examinations at Soewondo Hospital.

DATA COLLECTION AND INTERVENTION

The intervention procedure was started by selecting participants from the study population according to the inclusion criteria set by researchers. Prior to the intervention, all participants were informed about pain level based on the McCaffery and Beebe numeric rating scale (Orr et al., 2017) to measure the level pain as the pretest data. The pain scale ranged from 0 to 10 (0 = no pain; 1–3 = mild pain, 4–6 = moderate pain; 7–10 = severe pain).

The regiosacralis CP treatment was applied by giving a pressure to the regiosacralis region by using the palm-tip of the hand for approximately 30 seconds during uterine contractions until the patient feels less pain. The pressure was given three times during the contractions and the pain level was measured after the third pressure. Afterward, cervicovaginal fluid samples were taken directly after the treatment with a sterile pipette and stored at the −7°C temperature. Subsequently, the sample was diluted using a centrifuge machine before an enzyme-linked immunosorbent quantitative assay

(ELISA) test was performed. The IL-6 level assessment was carried out in the "GAKI" clinical laboratory at Diponegoro University, Semarang. Serum IL-6 levels were measured by an ELISA and the results were interpreted by using ELISA Reader (MaxSignal TM 6000, Bioo Microplate Reader).

The interpreted outcome of the ELISA test was considered as the sample absorbance value which can be calculated using a standard curve formulation. The final result was an IL-6 (pg/mL) concentration value contained in vaginal cervical fluid. These analyses only detected human cytokines. The minimum detectable concentration in our laboratory was 1.1 pg/mL for IL-6.

STATISTICAL ANALYSIS

Data of this study was analyzed using SPSS software version 17 and presented in tables and figures. Mann–Whitney and Wilcoxon test with 95% confidence intervals were obtained to analyze the comparison of the intervention effect where *p* value was set to be considered significant at <.05 value.

ETHICAL CONSIDERATION

This study was approved by Ethics Committee Review Board from the Faculty of Medicine of Sultan Agung University (Institutional Review Board [IRB] Number 193/V/2017/Bioethics Committee). Informed consent was obtained from every participant and carried out directly by research team members during the prenatal care examination at the hospital. The participants were given full knowledge of the study procedures and could refuse or withdraw from the study at any time. They were assured that their personal data would remain confidential and that only the researchers would have full access to this data. A package of the gift was given to all of the participants for their willingness to participate in the study.

RESULTS

A total of 52 from the original sample of 78 laboring mothers met the inclusion criteria in this study.

Participants' Age

Tables 1 shows the analysis results of the participants' age on the treatment and control groups.

Pain Intensity

The average of pain intensity before and after three occasions of treatment were given to the intervention group. The average pain level shows significant differences before (M = 8.96) and after (M = 6.96) the treatment was applied in the intervention group (see Table 2).

TABLE 1. The Average Age of Respondent in Both Treatment and Control Group (n = 52)

Group(s)	Mean and Standard Deviation	*p*
Intervention	25.77 ± 3.141	.001[a]
Control	25.38 ± 3.612	
Total	25.50 ± 3.979	

Note. Median = 25.00; Minimum age = 17.00; Maximum age = 29.00.

[a]Mann–Whitney test.

TABLE 2. The Average Pretest and Posttest Pain Intensity During the First Stage of Labor

Group(s)	Before	After	Δ	*p*
Intervention	8.96 ± 0.528	6.96 ± 0.774	2.00 ± 0.800	.001[a]
Control	8.23 ± 0.951	7.88 ± 1.033	0.35 ± 0.797	.041
	p = .001	p = .001	p = .001	
Total	8.670.777±	7.42 ± 1.042	1.25 ± 1.102	

[a]Wilcoxon correlation test.

TABLE 3. Average IL-6 Before and After Treatment

Group(s)	Before (mean ± *SD*)	After (mean ± *SD*)	Δ	*P*
Intervention	175.539 ± 92.281	170.764 ± 70.026	4.776 ± 71.112	.001
Control	253.398 ± 128.681 *p* = .001	251.910 ± 131.315 *p* = .001	1.488 ± 17.962 *p* = .001	.001[a]
Total	217.615 ± 112.561	214.694 ± 104.721	2.921 ± 71.092	

[a]*t*-dependent test (paired test).

IL-6 Levels

ELISA test was performed to measure IL-6 levels. The results of *t*-dependent test describes no statically difference before and after the treatment.

DISCUSSION

Normal delivery is a difficult mission for a mother. During the process a mother mostly experiences pain. Pain experienced by the mother can affect the delivery process. Discovering evidence to reduce pain is crucial (Boys & Bamber, 2019; Hensley et al., 2017). The findings of this study indicate the regiosacralis CP significantly reduces the pain level and affects the IL-6 level during the first stage of labor.

Natural Reduction of Labor Pain

Most women want to experience normal delivery without implementing use of drugs. Some of them apply natural methods to reduce pain and discomfort sensation during the labor process. There are several natural techniques could be applied to reduce the pain and stress during labor. It can help the mothers divert their mind from the pain, increase calm sensation, and stimulate the body to eliminate endorphins (Danhakl et al., 2019; Hensley et al., 2017). This study's findings prove that regiosacralis CP treatment has a significant impact as a nondrug treatment to reduce labor pain. It also supported by previous study that investigated nondrug therapy to relief the labor pain by applying guide imagery treatment (Hajiamini et al., 2012), relaxation therapy (Chen et al., 2019; Hamdamian et al., 2018; Rosmiarti, Ria, et al., 2020), and pressure point treatment on the specific body (Alimoradi et al., 2020; Çevik & Taşcı, 2020; Levett et al., 2014; Rosmiarti, Marlin, et al., 2020). Previous study also described that CP treatment is effective to reduce the pain because it is integrating between distraction method and acupuncture technique. This treatment is performed by applying a pressure in the regiosacralis area (part of vertebra) which is the line of nerve impulse toward the central nerve (Braz et al., 2014; Ellison, 2017; Lee & Neumeister, 2020). By manipulating this line will affect the pain responses

Pain Intensity

Pain is subjective sensation and an unpleasant emotional and sensory experience which arises from actual or potential tissue damage. Pain also defines as the experience of protective mechanisms for the body which causes the person reacts in order to eliminate pain stimulation (Ellison, 2017). The labor pain is caused by several factors such as the cervical dilatation, uterine contractions, the pelvic joints displacements, and the baby position (Hensley et al., 2017).

The current results showed the labor pain intensity among all participants was in the severe level before the intervention and reduced to a moderate level after the intervention. Previous studies mentioned that during the labor process, mothers mostly experienced moderate to severe level of pain (Endalew et al., 2020; Yazdkhasti & Pirak, 2016). A study conducted by Lingling et al. (2017) also added that level of pain during labor process pointed at the severe level.

Another finding of this study is that the majority of participants were experiencing pain intensity in the level of moderate to severe levels. The results were in line with Murray and McKinney (2014) which explained that scientifically labor pain intensity experienced by mothers is highly individualized depend on how the particular stimulation is accepted and interpreted (Miron-Shatz et al., 2020; Whitburn et al., 2019). The stimulation can be modified, rely on how the person could receive it, which can be perceived as emotional, cognitive, social, and cultural issues (Pillay et al., 2014). The labor pain perception is also affected by the mothers' knowledge about pain management. Inadequate

knowledge received during prenatal care can cause mother lack of preparation facing the labor process (Ampofo & Caine, 2015). Therefore, it is advised to the labor assistants are required to have abilities on relieving labor pain.

Moreover, this study also discovered that pain intensity was decreased after the regiosacralis CP treatment. The treatment was seemed to be effective to create comfort feeling and pain relief during the first stage of labor. In addition, some of the participants also mentioned that applying regiosacralis CP was efficacious to reduce pain during the first stage of labor. Those findings are similar with study conducted by Rosmiarti, Marlin, et al. (2020) outlined that applying back massage can reduce the labor pain. Gallo et al. (2018) in there study also pointed out that performing lumbosacral massage can be effectively reduce pain severity.

In this study, regiosacralis CP treatment can significantly decrease the pain intensity because pain impulses appear to be reduced to the central nerve through pressure. According to the gate-control theory, pain impulses can be regulated and inhibited by the defense mechanisms throughout the central nervous system. The defense mechanism is originated in substantial gelatin cells within the dorsal horn of the spinal cord, thalamus, and limbic system (Ellison, 2017). It was supported by prior study conducted by Ozgoli et al. (2016) described that giving a pressure on the lumbar area can block and reduce the labor pain.

IL-6 Levels and CP Methods

The cervicovaginal fluid could be used as an alternative examination to determine IL-6 levels in the amniotic fluid which can detect the placental membrane damages prior the labor (Musilova et al., 2016). The reason of employing the amnion fluid in this study was preventing another pain experienced by mothers because of the use of venous blood sample to examine the levels of IL-6.

This study findings indicated the IL-6 levels among the intervention group decreased. According to the literature, that condition needs to be considered. One of the IL-6 functions is to enhance the cervical dilatation process. In the stage of matured pregnancy, the IL-6 levels are elevated (Herrera-Muñoz et al., 2017). As the labor mediation initiator, IL-6 can increase prostaglandin synthesis during labor process. It can stimulate uterine contraction and cervical dilatation (Jones et al., 2014). The decrease of IL-6 influenced the labor process. Furthermore, this study demonstrated that regiosacralis CP is efficacious to reduce labor pain. Pain is the sign of tissue damages and inflammations (Rodriguez, 2015). IL-6 is the pro-inflammation cytokine which can be elevated when the inflammations occurred (Akhtar et al., 2020; Jaworska & Janowski, 2019). Decreased pain level could be an indicator of decreased IL-6 levels.

CONCLUSION

Regiosacralis CP treatment is significantly reduce the level of labor pain and IL-6 levels in primigravida mothers during labor process. Therefore regiosacralis CP treatment is strongly suggested as a treatment and intervention in reducing labor pain.

Although the intervention in this study found an effective treatment for pain management during the labor process, a possible side effect requiring evaluation includes decreasing uterine contractions or delayed cervical dilation. Therefore, further studies need to be conducted to examine the most effective duration and frequency of regiosacralis CP treatment on labor pain management that results in minimum side effects.

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