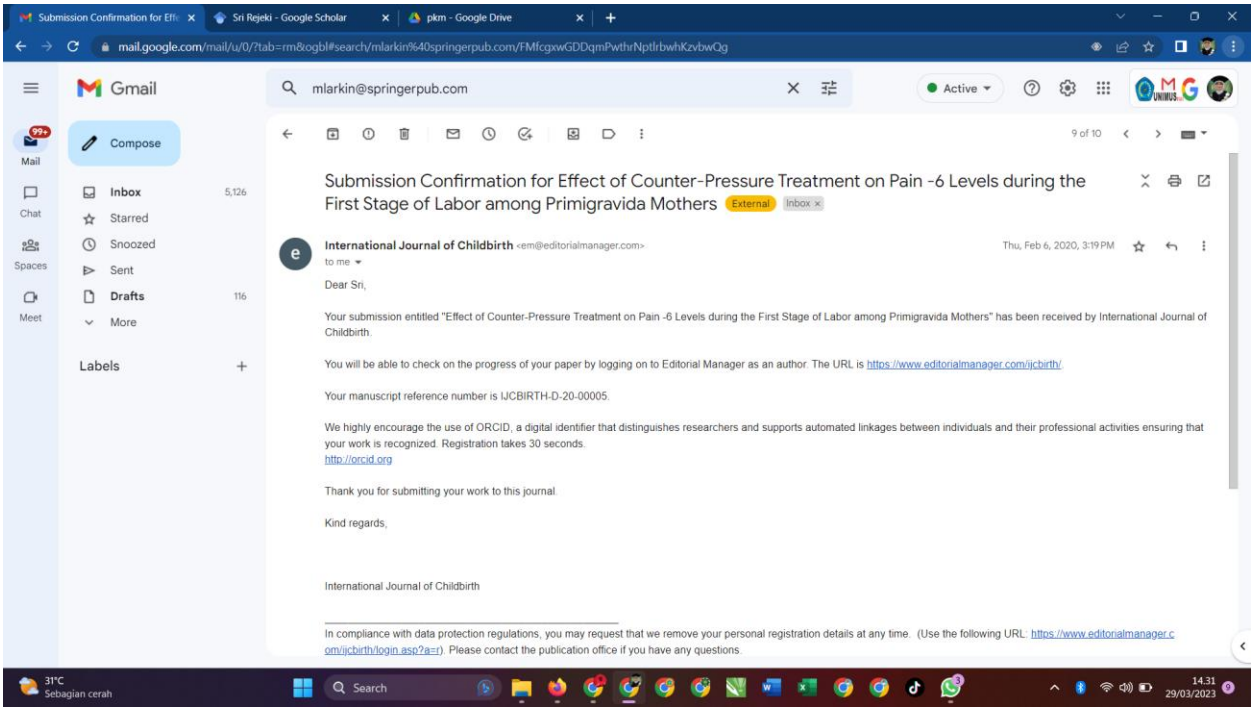
Submission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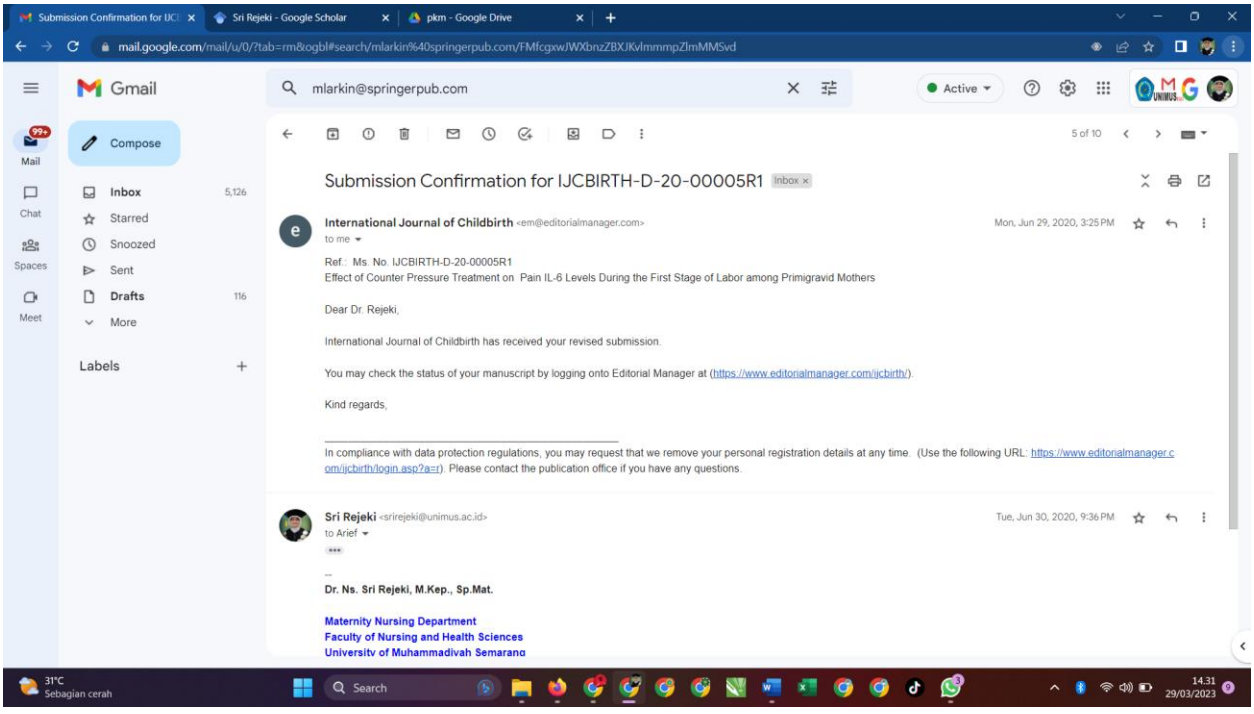
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Faculty of Nursing and Health Sciences
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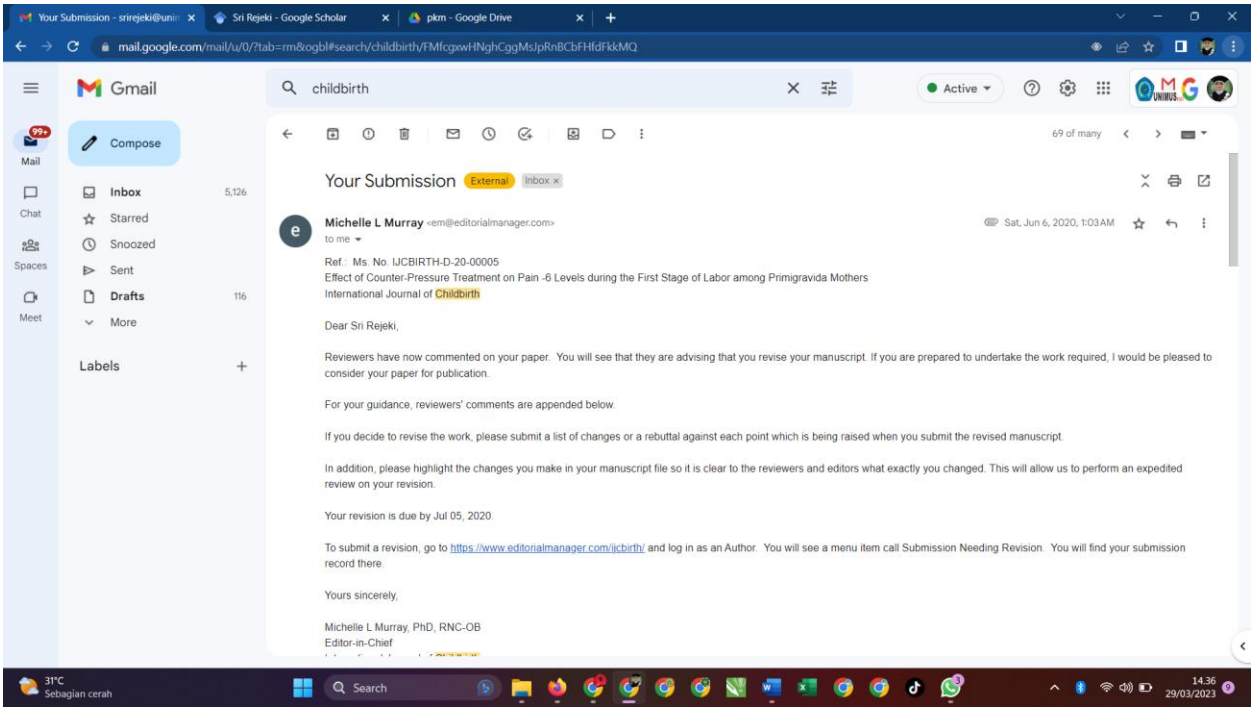
Review



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Your Submission External Inbox ×

Michelle L Murray <em@editorialmanager.com> Sat, Jun 6, 2020, 1:03 AM

to me

Ref.: Ms. No. IJCBIRTH-D-20-00005
Effect of Counter-Pressure Treatment on Pain -6 Levels during the First Stage of Labor among Primigravida Mothers
International Journal of Childbirth

Dear Sri Rejeki,

Reviewers have now commented on your paper. You will see that they are advising that you revise your manuscript. If you are prepared to undertake the work required, I would be pleased to consider your paper for publication.

For your guidance, reviewers' comments are appended below.

If you decide to revise the work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript.

In addition, please highlight the changes you make in your manuscript file so it is clear to the reviewers and editors what exactly you changed. This will allow us to perform an expedited review on your revision.

Your revision is due by Jul 05, 2020.

To submit a revision, go to https://www.editorialmanager.com/ijcbirth/ and log in as an Author. You will see a menu item call Submission Needing Revision. You will find your submission record there.

Yours sincerely,

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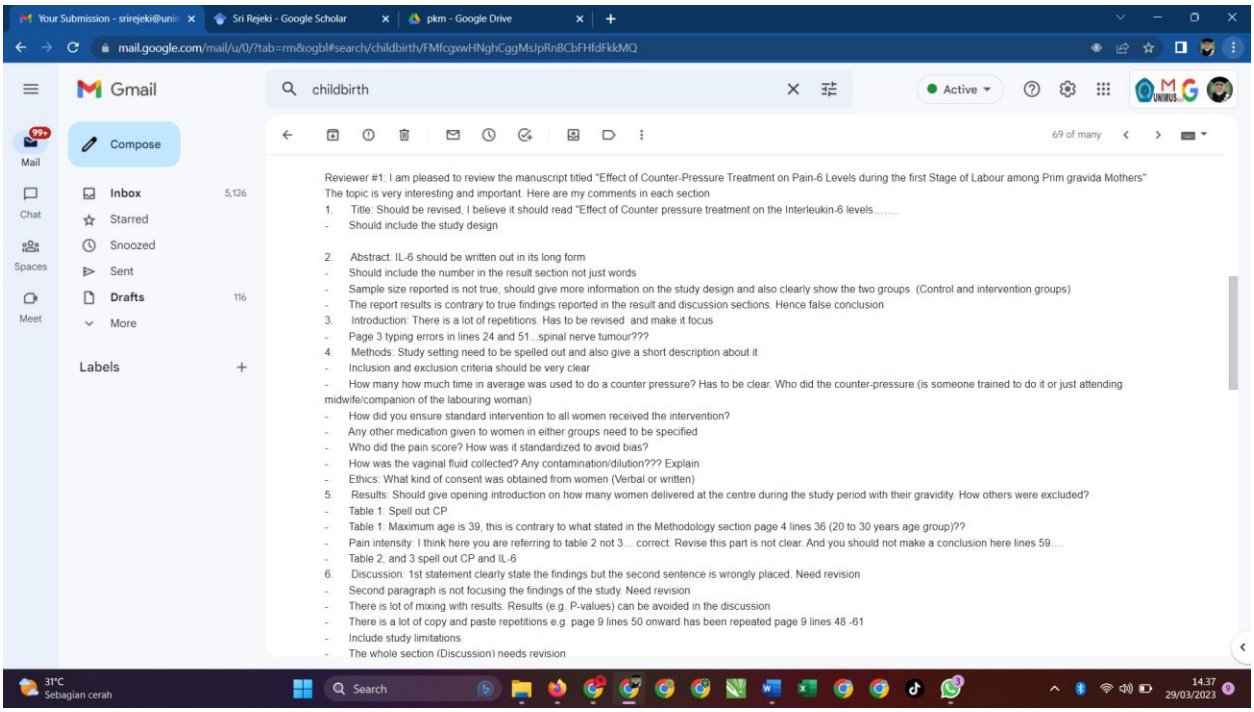

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Reviewer #1: I am pleased to review the manuscript titled "Effect of Counter-Pressure Treatment on Pain-6 Levels during the first Stage of Labour among Prim gravida Mothers"
The topic is very interesting and important. Here are my comments in each section

1. Title: Should be revised, I believe it should read "Effect of Counter pressure treatment on the Interleukin-6 levels.....
- Should include the study design

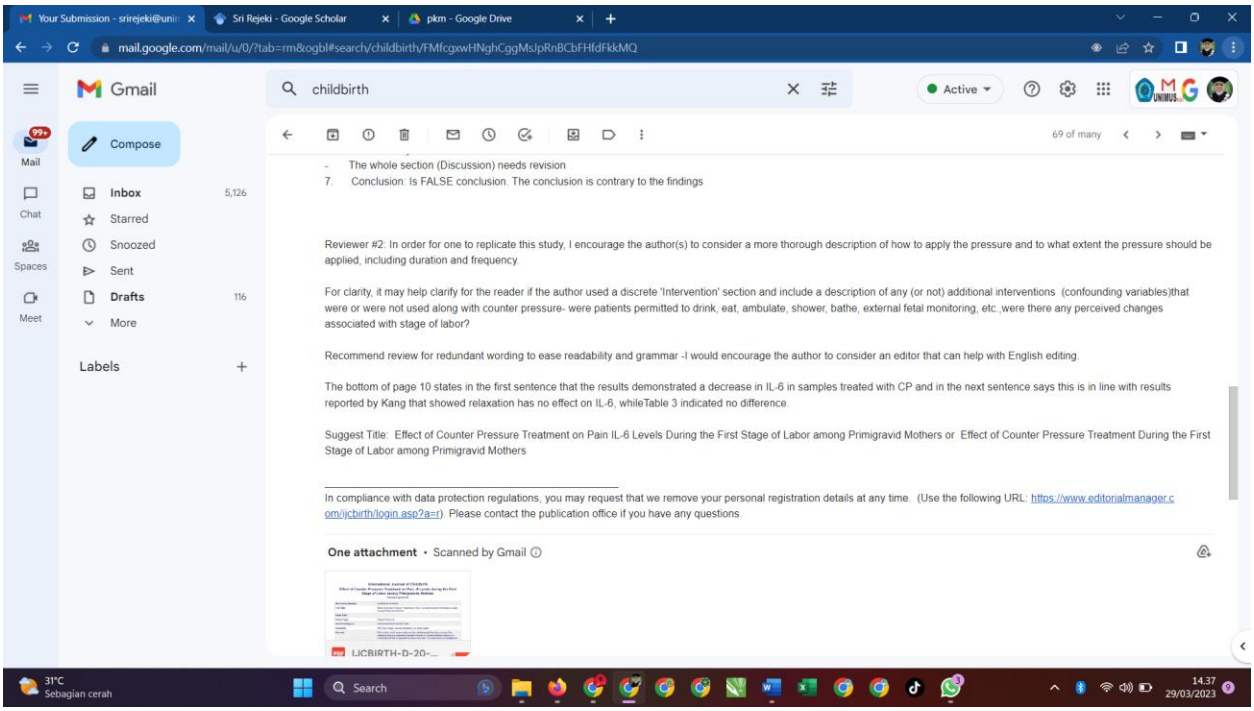
2. Abstract: IL-6 should be written out in its long form
- Should include the number in the result section not just words
- Sample size reported is not true, should give more information on the study design and also clearly show the two groups (Control and intervention groups)
- The report results is contrary to true findings reported in the result and discussion sections. Hence false conclusion

3. Introduction: There is a lot of repetitions. Has to be revised and make it focus
- Page 3 typing errors in lines 24 and 51...spinal nerve tumour???

4. Methods: Study setting need to be spelled out and also give a short description about it
- Inclusion and exclusion criteria should be very clear
- How many how much time in average was used to do a counter pressure? Has to be clear. Who did the counter-pressure (is someone trained to do it or just attending midwife/companion of the labouring woman)
- How did you ensure standard intervention to all women received the intervention?
- Any other medication given to women in either groups need to be specified
- Who did the pain score? How was it standardized to avoid bias?
- How was the vaginal fluid collected? Any contamination/dilution??? Explain
- Ethics: What kind of consent was obtained from women (Verbal or written)

5. Results: Should give opening introduction on how many women delivered at the centre during the study period with their gravidity. How others were excluded?
- Table 1: Spell out CP
- Table 1: Maximum age is 39, this is contrary to what stated in the Methodology section page 4 lines 36 (20 to 30 years age group)??
- Pain intensity: I think here you are referring to table 2 not 3... correct. Revise this part is not clear. And you should not make a conclusion here lines 59....
- Table 2, and 3 spell out CP and IL-6

6. Discussion: 1st statement clearly state the findings but the second sentence is wrongly placed. Need revision
- Second paragraph is not focusing the findings of the study. Need revision
- There is lot of mixing with results. Results (e.g. P-values) can be avoided in the discussion
- There is a lot of copy and paste repetitions e.g. page 9 lines 50 onward has been repeated page 9 lines 48 -61
- Include study limitations
- The whole section (Discussion) needs revision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69 of many
- The whole section (Discussion) needs revision
7. Conclusion: Is FALSE conclusion. The conclusion is contrary to the findings
Reviewer #2: In order for one to replicate this study, I encourage the author(s) to consider a more thorough description of how to apply the pressure and to what extent the pressure should be applied, including duration and frequency.
For clarity, it may help clarify for the reader if the author used a discrete 'Intervention' section and include a description of any (or not) additional interventions (confounding variables)that were or were not used along with counter pressure- were patients permitted to drink, eat, ambulate, shower, bathe, external fetal monitoring, etc.,were there any perceived changes associated with stage of labor?
Recommend review for redundant wording to ease readability and grammar -I would encourage the author to consider an editor that can help with English editing.
The bottom of page 10 states in the first sentence that the results demonstrated a decrease in IL-6 in samples treated with CP and in the next sentence says this is in line with results reported by Kang that showed relaxation has no effect on IL-6, whileTable 3 indicated no difference.
Suggest Title: Effect of Counter Pressure Treatment on Pain IL-6 Levels During the First Stage of Labor among Primigravid Mothers or Effect of Counter Pressure Treatment During the First Stage of Labor among Primigravid Mothers
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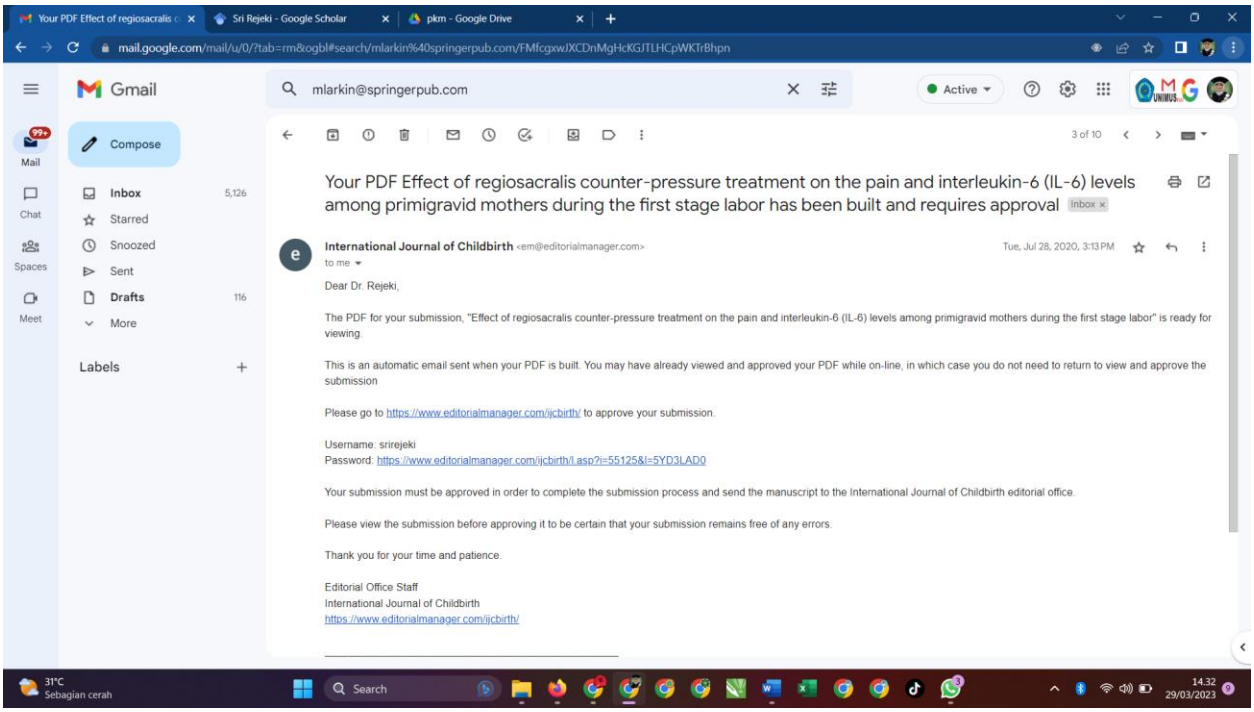
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Effect of Counter-Pressure Treatment on Pain -6 Levels during the First Stage of Labor among Primigravida Mothers

--Manuscript Draft--

Manuscript Number:	IJCBIRTH-D-20-00005
Full Title:	Effect of Counter-Pressure Treatment on Pain -6 Levels during the First Stage of Labor among Primigravida Mothers
Short Title:	
Article Type:	Original Research
Section/Category:	Non-Randomized Controlled Trial
Keywords:	Pain level of labor; counter-pressure; IL-6; sacral region
Abstract:	Pain in labor could cause anxiety and fear interfering with the labor process. Pain reduction using the respiratory relaxation method or Counter-Pressure method or a combination of both is expected to reduce such pain. This study aims to investigate the effects of Regio-Sacralis Counter-Pressure treatment, on pain intensity and IL-6 levels during first stage of labor among primigravida mothers. This research use the quasi-experiment method. Regio-sacralis Counter-Pressure treatment was given to 52 primigravida mothers selected as research sample based on consecutive sampling technique. The results showed that regio-sacralis Counter Pressure could significantly decrease pain level without affecting IL-6 levels during first stage of labor. Regio-Sacralis Counter-Pressure could be considered as part of labor pain management, particularly to reduce labor pain.

Effect of Counter-Pressure Treatment on Pain -6 Levels during the First Stage of Labor among Primigravida Mothers

Abstract

Pain in labor could cause anxiety and fear interfering with the labor process. Pain reduction using the respiratory relaxation method or Counter-Pressure method or a combination of both is expected to reduce such pain. This study aims to investigate the effects of Regio-Sacralis Counter-Pressure treatment, on pain intensity and IL-6 levels during first stage of labor among primigravida mothers. This research use the quasi-experiment method. Regio-sacralis Counter-Pressure treatment was given to 52 primigravida mothers selected as research sample based on consecutive sampling technique. The results showed that regio-sacralis Counter Pressure could significantly decrease pain level without affecting IL-6 levels during first stage of labor. Regio-Sacralis Counter-Pressure could be considered as part of labor pain management, particularly to reduce labor pain.

Keywords: Pain level of labor, counter-pressure, IL-6, sacral region

INTRODUCTION

Pain due to labor could bring stress, which, in the next process might trigger the release of catecholamine and steroid hormones (Niven & Gijsbers, 1984). Both hormones later could stimulate smooth muscle tension and vasoconstriction of the blood vessels resulting in decreases in uterine contractions, utero-placental circulation, blood and oxygen flow to the uterus, and the onset of uterine ischemia, which make the pain impulse increase and multiplying the pain (Grenache, Hankins, Parvin, & Gronowski, 2004; Niven & Gijsbers,

1984). On the other hand, labor pain, as a result of uterine contractions, could cause cervical dilatation and uterine ischemia leading to decreased blood flow. This condition could consequently cause deficit of local oxygen due to myometrial contraction.

Impulses of pain during the first stage of labor are transmitted through the lower thoracic spinal nerve (T_{10-12}) and the upper lumbar spinal nerve (L_1). These neural afferent fibers come from the uterine and cervical corpus. Sensory impulses from the uterus are transmitted through the synapse in the posterior horn of the spinal cord of the thoracic segments 10, 11, 12 and lumbar 1. Certain neural cell groups within the spinal cord, brainstem, and cerebral cortex can regulate the pain impulse through an inhibition mechanism (Gate Control Theory) (Grenache et al., 2004; Melzack, Kinch, Dobkin, Lebrun, & Taenzer, 1984; Murray & McKinney, 2014). According to 'Gate Control' theory, the sensation of pain is carried along the sensory nerve to the brain, and only a certain amount of sensation or message can be transmitted through this neural pathway at the same time (Kang et al., 2011; Melzack et al., 1984; Murray & McKinney, 2014).

Labor pain could stimulate the release of chemical mediators such as prostaglandins, leukotrienes, thromboxane, histamine, bradykinin, P substance, and serotonin. It causes stress leading to secretion of hormones such as catecholamines and steroids causing vasoconstriction of the blood vessels, which weakens uterine contraction (Kishida et al., 2003; Niven & Gijsbers, 1984; Trébéden et al., 2001). Excessive secretion of these hormones will cause impaired uteroplacental circulation resulting in fetal hypoxia. Therefore, an intervention to reduce labor pain is necessary to mitigate fetal hypoxia.

Several theories of labor explain that the mechanism of labor is caused by biochemical changes, such as increased estrogen and progesterone levels, resulting in increased prostaglandin levels, increased oxytocin receptors in the myometrium, increased uterine volume (Niven & Gijsbers, 1984). These factors result in ischemia in the uterine muscles

and cause uteroplacental disturbance, so the placenta degenerates. In addition, baby's head pressure helps to dilate the uterine and perineal and cervical areas. Other factors also widely known as initiation of labor mediator are *Tumor Necrosis Factor-alpha*(TNFα), interleukin-1β (IL-1β) and interleukin-6 (IL-6). The IL-6 could be found in the placenta, decidua,chorion, and amniotic fluid. It was reported in an *in vitro* trial study that the administration of IL-6 in amnionic cell culture and human decidua will increase prostaglandin formation (Lashay, Gilson, Joffe, Qualls, & Curet, 2000; McCaffery & Beebe, 1989; Murtha, Greig, Jimmerson, & Herbert, 1998).

Interleukin-1βis the primary cytokine produced rapidly in response to infection and immunological changes. It will stimulate other cytokines IL-6 as an implantation mediator playing a vital role in stimulating prostaglandin production, especially PG-E_2.In addition, the presence of psychological changes (stress, fear, and anxiety in facing labor) triggers catecholamine production, which also stimulates IL-6. Then, it also triggers prostaglandin production as an important mediator in labor. Prostaglandins from *amnionic* and *decidual* fluids play an important role in the initiation phase of acute responses, which could trigger uterine contractions (the Transduction Process) (Grenache et al., 2004; Niven & Gijsbers, 1984).

Myometrial contractions cause the uterine tissue to become deprived of oxygen (ischemia) resulting in pain) (Niven & Gijsbers, 1984). Pain response is transmitted to the central nervous system through the spinal nerve tumors T_{10-12} and L_1 (Transmission Process). Thoughts and emotions can affect the perception of pain. Through Gate Control Theory, the perception of this pain can be adjusted so that before reaching the central nervous system, the pain stimulus can be enlarged by small fibers or reduced by large fibers (modulation). Counter-pressure plays a role in triggering large fibers that inhibit pain stimulus before it reaches the central nervous system.

Most labors (90%) are along with pain, varying from mild pain, moderate pain, severe pain, to extremely severe pain. Pain in labor is common, associated with physiological and psychological processes. Pain could cause anxiety and fear, which could interfere with the ultimate labor process. Reducing the pain with the respiratory relaxation method or regio-sacralis Counter-Pressure (CP) method or a combination of both is expected to reduce such pain, without altering PG-E_2 and IL-6 levels. Ideally, it should also not interfere with maternal and fetal health, during labor process. This study aims to investigate the effect of Regio-sacralis Counter-Pressure on the pain intensity and IL-6 levels during first stage of labor among primigravida mothers.

METHODS

Subjects and Setting

This study was conducted among 52 primigravida mothers at RSUD Soewondo Hospital, Kendal, Central Java. The age group from 20 to 30 years was selected as the productive age because at the physiologically productive age, it is more possible to maintain strong labor pain. The individuals were selected sample obtained using consecutive sampling technique without randomization. The sample size was determined using the Slovin formula by comparison the population and the margin of error. Sample distribution for each group consist of 26 as an intervention group and 26 as a data control group based on purposive sampling with inclusion criteria are primigravida during the first stage of labor are *aterm*s Pregnancy, live fetus, single, the active phase of *inpartu* at first stage (opening 4-9 cm). Statistical analysis was conducted using SPSS using the Mann Whitney and Wilcoxon tests where confidence interval 95% and $p< 0.05$ considered as significant.

Experimental Design

This study was conducted from February to July 2018 using Quasi-experimental design with Pre-post Experiment and Control Group Design. The experiment was started by selecting sample as research subjects of the population meeting the inclusion criteria. Prior to treatment, subjects were informed about pain level based on numeric rating scale by McCaffery, M Beebe (McCaffery & Beebe, 1989) ranging from 0-10 (0 = no pain; 1-3 = light pain, 4-6 = medium pain; 7-10 = severe pain). A non-*pharmacological* method, Counter-pressure treatment with emphasis on sacral region by the end part of palm was applied aiming to reduce labor pain. Assessment of IL-6 levels was carried out at the 'GAKI' Clinic laboratory at Diponegoro University of Semarang. Serum IL-6 levels were measured by enzyme-linked immunosorbent quantitative assay (ELISA) and the result will be read using ELISA Reader (MaxSignal ^{TM} 6000, Bioo Microplate Reader). The outcome of the ELISA reader is the sample absorbance value that can be calculated using a formula from the standar curve. The final result is an IL6 (pg/ml) concentration value contained in vaginal cervical fluid. These assays detected only human cytokines and the minimum detectable concentrations in our laboratory was 1.1pg/mL for IL-6. Statistical analysis on obtained test results was conducted using SPSS ver. 17 using the Mann Whitney - Wilcoxon tests where confidence interval 95% and $p< 0.05$ considered as significant.

Research Ethics

The stages for the fulfillment of ethics are as follows: Respondents were given *Informed consent*, *Confidentiality in which the* researcher have guaranteed the confidentiality of all information obtained from parturient that was only reported the certain data on research results. *Right to withdraw* by the *Ethical clearance*was submitted by investigators to the

Ethics Committee of the Medical Faculty of Sultan Agung University (No. 193/V/2017/Bioethics Committee).

RESULTS

Age of Respondents

Table 1 shows analysis results on age of respondents used in both treatment and control groups in this study.

Table 1. the Average age of respondent in both treatment and control group (n = 52)

Treatment	Average+ Standard deviation	p
CP	25,77 ±3,141	0,842 *
Control	25,38± 3,612	
Total	25,50 ± 3,979	

Median: 25,00 Min age: 17,00 Max age: 39, 00

* Mann Whitney test

Pain Intensity

Pain intensity was measured using the *Numeric Rating Scale* before and after the treatment, which were presented as average number of measurement conducted in triplicates for each group. In Table 3, it could be seen that before treatment, most respondents were under moderate to severe pain levels. Generally, there was decrease in pain intensity after obtaining each treatment. Before and after treatment of counter-pressure, P was 0,000and before and after treatment of respiratory relaxation and counter-pressure, *p was 0*,000, as well as in the control group, p was 0.041. It was concluded that there was a very significant difference in pain levels before and after in the counter-pressure treatment group and significant differences in the control group.

Table 2: The average of pain intensity during the first stage of labor before and after treatment.

Treatment	Before	After	Δ	p
CP	8.96±0.528	6.96±0.774	2.00±0.800	0.001 *
Control	8.23± 0.951	7.88± 1.033	0.35±0.797	0.041
	P=0.001	P=0.001	P=0.001	
Total	8.670.777±	7.42 ±1.042	1.25±1.102	

*) Wilcoxon correlation test

IL-6 levels

IL-6 levels were measured using the ELISA test. As displayed in Table 3, test results of *t-dependent* test showed no difference before and after CP treatment.

Table 3: Average IL-6 before and After Treatment

Treatment	Before (mean± SD)	After (mean± SD)	Δ	P
CP	175.539±92.281	170.764±70.026	4.776 ±71.112	0.001
Control	253.398±128.681	251.910±131.315	1.488±17.962	0.001*
	P=0.001	P=0.001	P=0.001	
Total	217.615±112.561	214.694±104.721	2.921±71.092	

*) *t-dependent test (paired test)*

DISCUSSION

Results in this study showed that regio-sacralis Counter Pressure could not significantly decrease pain level without affecting IL-6 levels during first stage of labor. Regio-sacralis Counter Pressure could be considered as part of labor pain management, particularly to reduce labor pain.

Pervaginamdelivery of baby is a difficult job for a mother. The hardest part of this job is how to bear and overcome the pain during the first stage of labor. There are numerous ways could be used overcome the pain of labor. The key is to provide pregnant mother with as much as counter possible how to relieve pain (Kishida et al., 2003; McCaffery & Beebe, 1989).

Natural Reduction of Labor Pain

Many women want to assume that childbirth is a natural process without the aid of medication. Some women use natural means to reduce discomfort at the onset of labor and then add narcotic drugs to relieve labor pain. There is also a direct choice of epidural injections to cope with the pain during the first stage of labor. There are many drug-free ways to reduce the pain and stress the person gives birth to. These ways include help to divert the mind from the pain of giving birth (destruction), calm down and relaxation when going into labor and help the body to remove pain relievers such as endorphin (Kurkinen-Raty et al., 2001; Lashay et al., 2000; Murtha et al., 1998).

Pain Intensity

Based on results of this study, pain intensity decreased after the CP treatment ($p < 0.001$) with $\Delta = 2.00$. The CP method seems to give a sense of relief to women during the first stage of labor. Gate Control theory can give reasons why this action works. Gate control theory from Melzack and Wall (1965) stated that pain impulses could be regulated or even inhibited by defense mechanisms along the central nervous system. The defense mechanisms can be found in substantial gelatinous cells within the dorsal horns of the spinal cord,

thalamus, and limbic system. Pain impulses are delivered when a defense is opened and an impulse is inhibited when a defense is closed. Attempts to close the defenses are the basis of pain relief therapy.

The average of pain intensity during the first stage of labor with active phase measured using Numeric Rating Scale found that most of the respondents were in moderate pain level to severe pain level ranging from 4 to 10, but the majority was in severe pain level. The results were in line with those of Murray (2002), Lowe (2002) stressing that scientifically the experience of labor pain is highly individualized depending on how this particular stimulation is accepted and interpreted (Murray & McKinney, 2014). This stimulation can be modified, depending on how to receive it, it can be emotional, cognitive, social and cultural issues. The diversity and experience of each various women cause the expectant mothers and caregivers to have limitations in anticipating labor pain. Therefore, it is advisable if the birth attendants are equipped with many ways of relieving labor pain.

The subjects in this study were primiparas. Shener (1998) reported that there was a difference in the level of pain felt during labor in nulliparas that was reported higher than multiparas (Kishida et al., 2003; Trébéden et al., 2001). This is also in line with results of study conducted by Aya (2004) (Sheiner, Sheiner, & Shoham-Vardi, 1998). The results obtained there is a decrease in pain levels after each treatment.

Pain intensity decreased after the CP treatment ($p = 0.000$) with $\Delta = 2.00$. The CP method seems to give a sense of relief to women during the first stage of labor. Gate Control theory can give reasons why this action works. Gate control theory from Melzack and Wall (1965) stated that pain impulses could be regulated or even inhibited by defense mechanisms along the central nervous system (Melzack et al., 1984). The defense mechanisms can be found in substantial gelatinous cells within the dorsal horns of the spinal cord, thalamus, and limbic

system. Pain impulses are delivered when a defense is openedand an impulse is inhibited when a defense is closed. Attempts to close the defenses are the basis of pain relief therapy. The CP method could greatly help reduce the pain of the first stage of labor. CP could be done by parturients themselves by massaging certain parts of their body, usually the abdomen. Some parturients say that counter-pressure (hard massaging of tense muscles) in the sacral region or lower back can significantly help reduce pain in the first stage of labor.

Pain is a subjective sensation and an unpleasant emotional and sensory experience arising from actual or potential tissue damage. Pain is the experience of protective mechanisms for the body and causes the individual to react in order to eliminate excitatory pain.

Thoughts and emotion can affect the perception of pain. Through the Gate Control Theory, the perception of this pain can be adjusted so that before reaching the central nervous system the pain stimulus can be enlarged by small fibers or reduced by large fibers. Counter-pressure plays a role in triggering large fibers that inhibit pain stimulus before it reaches the central nervous system. Back pain during labor is about 25% more, and this happens because of the baby's position, which is called the occiput posterior position. Counter-pressure for patients is felt more comfortable, even patients suggest Counter-pressure more up or down to be comfortable.

IL-6 Levels and Counter-Pressure Methods

Results of this study demonstrate a decrease in IL-6 levels in samples treated with CP method in experiment. This is in line with results reported by Kang (2011), where practical relaxation method has no effect on IL-6 (Kang et al., 2011). Even if the method is conducted continuously, it could give positive effect to multiple immune responses and may be recommended in women with high stress.

Interleukin-6 is a cytokine playing role as biomarkers, which could stimulate prostaglandin synthesis during the labor. It can be found in the amniotic fluid and may penetrate the

cervicovaginal fluid. The use of cervicovaginal fluid provides a suggestion as an alternative test for amniotic fluid, since it correlates mechanically or inflammatory media for damage to the placental membrane prior to birth (Aya et al., 2004).

Theoretically, IL-6 levels should not decrease during labor, because it plays a role in stimulating PG-E2, which plays a role in causing uterine contractions. It could be found in the placenta, decidua, chorion and amniotic fluid, and it is reported in an *in vitro* trial that the administration of IL-6 in *amnionic* cell culture and human decidua will increase prostaglandin formation (Aya et al., 2004; Murtha et al., 1998).

The uterus will suffer from tissue injury and inflammation, leading to a change in the chemical environment at the end of the nociceptor. The damaged cell releases components such as adenosine triphosphate, K^+ ions and decreased pH. Inflammatory cells produce cytokines, chemokines, and growth factors. Some of these components will stimulate nociceptors (nociceptor activators), and other components cause the nociceptor to be more hypersensitive to subsequent stimuli from injury (Greig et al., 1997; Lashay et al., 2000; Murtha et al., 1998).

CONCLUSION

Regio-Sacralis Counter Pressure significantly ($p = 0.001$) decreases pain intensity during the first stage of labor among primigravida mothers with no effect of action ($p = 0{,}001$) to the changes of IL-6 levels. Hence, the Regio-Sacralis Counter Pressure could be considered as part of labor pain management, particularly to reduce the associated pain intensity.

SUGGESTIONS

Normal birth attendants/ helpers should be equipped with as many techniques as possible to reduce labor pain including Counter-pressure method. In the next study, mother's mental

support in the delivery process (accompaniment of husband, family or patient nearest) could be assessed. It is suggested to test level of labor pain after counter pressure treatment in longer labor stage. Creation of mechanical/electrical device allowing semi-manual sacral region suppressor which could be easily used by patient, helper/nanny, husband/family escort is recommended.

CONFLICT OF INTEREST

The authors have disclosed no conflict of interest, financial or otherwise.

ACKNOWLEDGMENT

We wish to express our appreciation to all patients who participated in this study and to the intra- natal nurses for valuable assistance during data collection.

REFERENCES

Aya, A. G. M., Vialles, N., Mangin, R., Robert, C., Ferrer, J. M., Ripart, J., & de La Coussaye, J. E. (2004). Chronobiology of labour pain perception: an observational study. *BJA: British Journal of Anaesthesia*, *93*(3), 451–453. https://doi.org/10.1093/bja/aeh223

Greig, P. C., Murtha, A. P., Jimmerson, C. J., Herbert, W. N. ., Roitman-Johnson, B., & Allen, J. (1997). Maternal Serum Interleukin-6 During Pregnancy and During Term and Preterm Labor. *Obstetrics & Gynecology*, *90*(3), 465–469. https://doi.org/10.1016/S0029-7844(97)00294-9

Grenache, D. G., Hankins, K., Parvin, C. A., & Gronowski, A. M. (2004). Cervicovaginal interleukin-6, tumor necrosis factor-α, and interleukin-2 receptor as markers of preterm delivery. *Clinical Chemistry*, *50*(10), 1839–1842. https://doi.org/10.1373/clinchem.2004.034280

Kang, D.-H., Mcardle, T., Park, N.-J., Weaver, M. T., Smith, B., & Carpenter, J. (2011). *Dose Effects of Relaxation Practice on Immune Responses in Women Newly Diagnosed With Breast Cancer: An Exploratory Study* (Vol. 38).

Kishida, T., Yamada, H., Furuta, I., Kobayashi, N., Hirayama, E. K., Ebina, Y., … Fujimoto, S. (2003). Increased Levels of Interleukin-6 in Cervical Secretions and Assessment of the Uterine Cervix by Transvaginal Ultrasonography Predict Preterm Premature Rupture of the Membranes. *Fetal Diagnosis and Therapy*, *18*(2), 98–104.

https://doi.org/10.1159/000068069

Kurkinen-Raty, M., Ruokonen, A., Vuopala, S., Koskela, M., Rutanen, E.-M., Karkkainen, T., & Jouppila, P. (2001). Combination of cervical interleukin-6 and -8, phosphorylated insulin-like growth factor-binding protein-1 and transvaginal cervical ultrasonography in assessment of the risk of preterm birth. *BJOG: An International Journal of Obstetrics and Gynaecology*, *108*(8), 875–881. https://doi.org/10.1111/j.1471-0528.2001.00199.x

Lashay, N., Gilson, G., Joffe, G., Qualls, C., & Curet, L. (2000). Will cervicovaginal interleukin-6 combined with fetal fibronectin testing improve the prediction of preterm delivery? *Journal of Maternal-Fetal Medicine*, *9*(6), 336–341. https://doi.org/10.3109/14767050009018422

McCaffery, M., & Beebe, A. (1989). *Pain: Clinical Manual for Nursing Practice*. Retrieved from https://books.google.co.id/books?id=95BtAAAAMAAJ

Melzack, R., Kinch, R., Dobkin, P., Lebrun, M., & Taenzer, P. (1984). Severity of labour pain: influence of physical as well as psychologic variables. *Canadian Medical Association Journal*, *130*(5), 579–584. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/6697268

Murray, S. S., & McKinney, E. S. (2014). *Foundations of maternal-newborn and women's health nursing* (6th editio). St. Louis, Missouri: Elsevier.

Murtha, A. P., Greig, P. C., Jimmerson, C. E., & Herbert, W. N. . (1998). Maternal Serum Interleukin-6 Concentration as a Marker for Impending Preterm Delivery. *Obstetrics & Gynecology*, *91*(2), 161–164. https://doi.org/10.1016/S0029-7844(97)00602-9

Niven, C., & Gijsbers, K. (1984). A study of labour pain using the MCGILL pain questionnaire. *Social Science & Medicine*, *19*(12), 1347–1351. https://doi.org/10.1016/0277-9536(84)90023-6

Sheiner, E., Sheiner, E. K., & Shoham-Vardi, I. (1998). The relationship between parity and labor pain. *International Journal of Gynecology & Obstetrics*, *63*(3), 287–288. https://doi.org/10.1016/S0020-7292(98)00164-7

Trébéden, H., Goffinet, F., Kayem, G., Maillard, F., Lemoine, E., Cabrol, D., … Batteux, F. (2001). Strip test for bedside detection of interleukin-6 in cervical secretions is predictive for impending preterm delivery. *European Cytokine Network*, *12*(2), 359–360.