

Effect of Static Contraction on Pain Reduction in *Postpartum* Mothers with *Perineal* Tears

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ABSTRACT

Introduction: Static contraction is a form of contraction exercise in muscles that uses static principles, where the muscles trained will experience changes in muscle length while the joints remain in a static or stationary state. Static contractions are useful for reducing pain, one of which is for perineal pain due to tearing during childbirth. Perineal pain is pain felt in the genital area associated with lacerations or tears in the perineum. The purpose of this study was to determine the effect of giving static contraction exercises on reducing pain in spontaneous birth *postpartum* mothers with *perineal* tears. **Methods:** This study utilized a *quasi-experimental* design involving 20 respondents, who were divided into treatment and control groups. The treatment group was given static contractions 2 times a day and the control group was given *stretching* 2 times, the pain level was measured using NRS (*Numerical Rating Scale*). **Results:** based on the results of the *paired t test* for the treatment group showed a p value = 0.000 while in the control group showed a p value = 0.000 which indicates an effect. The *independent t test* found a value of p = 0.001 indicating a difference in influence between the treatment group and the control group. **Conclusion:** there is an effect of giving static contraction exercises on reducing pain in spontaneous birth *postpartum* mothers with *perineal* tears. The results of this study can be used as a reference in conducting subsequent research on larger samples and populations.

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INTRODUCTION

Spontaneous birth occurs due to contractions of the mother's uterus. Spontaneous birth is purely using the direct power of the baby's mother. Because the encouragement of the mother's strength to remove the baby has the potential to cause injury or tears in the

perineum (Sulfianti *et al.*, 2020). The pain that arises after spontaneous birth occurs due to injury to the perineum. Every *postpartum* mother feels pain with different severity depending on the perception of each mother. Because basically the severity of pain is different in each person (Choirunissa *et al.*, 2019).. Some studies mention that around 20 to 25% of *postpartum* women experience pain for 2 weeks and 10% feel pain for 3 months. Another study mentioned that *post partum* mothers continue to feel pain until the 10th day after giving birth. More than a third of mothers feel pain in the *post partum* period when walking, sitting, and sleeping with severe pain intensity (Kim *et al.*, 2020).

According to the *International Continence Society* (ICS), perineal pain is a complaint of pain in the *posterior fourchette* and anus. A number of researchers define perineal pain as pain that lasts in the perineum, muscles, and fibrous tissue that extends from the *pubic symphysis* to the tailbone. Damage to perineal tissue is one of the risk factors for perineal pain after childbirth (Neels *et al.*, 2017).

To reduce perineal pain due to spontaneous birth can be treated *pharmacologically* and *non-pharmacologically*. *Pharmacological* methods are carried out by administering painkillers (*analgesics*) (Octa & Afni, 2021). Meanwhile, *non-pharmacological* methods can be done with early mobilization. It is important to do early mobilization after childbirth because it can increase blood flow and accelerate wound healing so that it can reduce the intensity of perineal pain (Suciani Pujiningrum, 2019).

One example of *exercise* that can be done for early mobilization is static contraction exercises using *Kegel exercise*. The benefits of providing static contractions of the pelvic floor muscles with *Kegel exercise* can help to improve blood circulation to the perineum and improve the wound healing process so that the perception and intensity of pain felt by the mother can be reduced. Based on research conducted by (Octaviani & HS, 2020) The results of the study state that static contractions given to the pelvic floor muscles, *transversus abdominis*, and *inferior extremities* can effectively reduce pain with changes in the pain scale before being given an intervention of 8 and after being given an intervention to 2. Based on research conducted by Makzizatunnisa, et al in 2014 in Boyolali stated that static contractions with *Kegel exercise* given for 3 days effectively reduce pain in *postpartum* mothers after spontaneous birth process. (Makzizatunnisa *et al.*, 2014)..

LITERATURE REVIEW

Labor is a process that begins when the uterus contracts regularly which results in the opening of the cervix and the fetus will descend on the birth canal. Labor generally occurs at the end of the third trimester or at 37 to 42 weeks gestation. (Soeparno *et al.*, 2020). The *post partum* period occurs after the discharge of the placenta and will last until the physiological recovery of various systems is complete. The *post partum* period or *puerperium* period is a period that occurs after childbirth and will end when the mother's anatomy has returned to its pre-pregnancy state (Chauhan & Tadi, 2022)..

During labor, the pushing of the baby, episiotomy or the use of vacuum can cause trauma in labor. Where this trauma in labor has the potential to cause a birth canal tear. Birth canal tears due to both rupture and episiotomy can cause perineal injuries. (Suwardi & Mouliza, 2019). *Perineal* wounds can cause different pain perceptions in each mother. If this is not addressed, it will cause a feeling of discomfort in the mother when doing daily activities. Short-term distress from the pain can cause sleep disturbance, disruption in the care and feeding of the baby. In the long term, it can cause depression and anxiety disorders in the mother (Senol & Aslan, 2017).

Different perceptions of pain can be measured using the NRS. *Numerical rating scale* (NRS) is a scale used to measure the severity of pain. Where the NRS scale is in the form of a line and there are numbers 0-10. This 0-10 number describes the intensity of pain. Score 0 reflects no pain, and score 10 indicates severe / severe pain. The classification of NRS pain values is divided into 3, namely; scale 1-3 (mild pain), scale 4-6 (moderate pain), and 7-10 (severe pain) (Pinzon, 2016). One of the exercises to reduce perineal pain is static contraction.

Static contraction exercise is a muscle contraction exercise that uses static principles. In *static contraction* exercises there is a change in muscle length, but the joints are at rest or not moving (Pratama, 2021). When muscle contraction occurs, muscle fibers will shorten actively due to the interaction of actin and myosin proteins in the muscle fibers. In the mechanism of muscle contraction, the interaction between actin and myosin proteins is regulated by troponin and tropomyosin proteins. Tropomyosin acts as an access to bind actin to myosin filaments. While troponin plays a role in regulating changes in the shape of tropomyosin and access to binding actin to myosin filaments. Troponin and tropomyosin will regulate the interaction between actin and myosin proteins and control the binding of actin to myosin filaments that occur in the mechanism of muscle contraction (Gash *et al.*, 2023)..

Static contractions given to mothers after childbirth can have a pain-reducing effect. This pain reduction occurs because when static contraction exercises are performed, it will increase blood flow and improve circulation and provide oxygen and nutrients to the painful area. In addition to improving blood flow in the pain area, static contractions can have a relaxing effect on muscles that are tense in the pain area. Thus, it can reduce the severity of pain felt by the patient (Makzizatunnisa *et al.*, 2014)..

If *Kegel exercise* is routinely performed by postpartum mothers, it can increase the strength of the pelvic floor muscles, blood circulation becomes smooth so that the wound healing process can increase. If the speed of the wound healing process increases, the intensity of the pain felt will also decrease. And the mother's functional activities will also gradually improve (Aminah *et al.*, 2019).

In postpartum conditions, in addition to providing some benefits, static contraction also has some contraindications. Static contraction exercises given with high intensity (too high a training dose) and for a long period of time can increase pressure on the cardiovascular system. This is because when the muscle is contracted continuously, it can result in a greater increase in systolic and diastolic blood pressure. Sometimes it can also result in a sudden drop in blood pressure. So it can be risky for women after childbirth with cardiovascular disorders (Alpsoy, 2020).

RESEARCH METHODS

This study applied a *quasi-experimental* research design, by conducting 2 measurements using NRS, namely before the intervention and after the intervention in the treatment group and control group. The treatment group received an intervention in the form of static contraction 2 times a day and the control group was given *stretching* for 2 times a day. This study has received ethical approval by KEPK UMM No.E.5.a/312/KEPKUMM/XI/2023. This research was conducted at the Rina Blimbing Midwife House, Malang City, which was carried out from November to December 2023.

This study used a population of postpartum mothers with spontaneous births at the Rina Midwife House, totaling 24 people. This study uses a sample collection technique, namely *probability sampling* with a *simple random sampling* method by taking samples from a random population. Where in this study taking samples from a

population that meets the predetermined inclusion criteria. The inclusion criteria in this study were spontaneous birth *post partum* mothers with *perineal* tears 6 hours after delivery and willing to become respondents. As for the exclusion criteria, namely mothers who are not willing to become respondents and mothers who give birth spontaneously with complications. Complications in post partum mothers with spontaneous birth are mothers who give birth with preeclampsia, because physical exercise can increase blood pressure and worsen conditions. The treatment group was given exercises in the form of static contractions 2 times a day for 3 days, with a dose of 6 seconds of contraction and 6 seconds of relaxation for 15-20 minutes. For the control group, *stretching* exercises on upper limbs and lower limbs were given 2 times a day for 3 days.

The independent variable in this study was static contraction and the dependent variable was pain. Pain intensity was measured using the *Numerical Rating Scale (NRS)*. The data obtained were tested for effect using *paired t test*. Furthermore, an *independent t test* was conducted to assess the difference in effect between the treatment group and the control group.

RESULTS AND DISCUSSION

In this study there was a population of 24 people and 20 people as respondents. With a division of 10 people in the treatment group and 10 people in the control group. From the studies that have been carried out, data are obtained:

Table 1. Respondent Characteristics Table

Variables	Category	Frequency	Percentage (%)
Degree of Perineal Tear	1st degree	6	30
	2nd degree	14	70
	3rd degree	0	0
	4th degree	0	0
Age	<20 years	1	5
	20-35 years	18	90
	>35 years old	1	5
Parity	Primiparous	4	20
	Multiparous	15	75
	Grandemultipara	1	5
Birth Distance	<2 Years	2	20
	≥2Years	14	75
Take Anti-Pain Medicine	Yes	20	100
	No	0	0
Degree of Pain Before Intervention	No Pain	0	0
	Mild Pain	4	20
	Moderate Pain	13	65
	Severe Pain	3	15
	Severe Pain	0	0

Based on table 1, the majority of mothers who gave birth with spontaneous techniques experienced perineal tears of degree 2 as much as 70%, and the majority of respondents who experienced tears during childbirth were aged 20-35 years with a percentage of 90%. Based on parity or number of pregnancies, the majority of respondents with multiparous pregnancies with a percentage of 75%. Based on the birth interval between the first child and the second child, the majority of birth distance is ≥2 years with

a percentage of 75%. All respondents who gave birth spontaneously with perineal tears took painkillers with a percentage of 100%. And most of the pain severity felt by respondents before getting the intervention was in the moderate pain category with a percentage of 65% (Table 1).

Table 2. Data Analysis Result Table

	Treatment	Control	P
Average Pretest Pain	5	5.4	
Average Posttest Pain	1.3	3.9	
Paired <i>t</i> -test	P = 0.000	P = 0.000	0.001
Pre-Post Pain Difference	-3.7	-1.5	
SD Pretest Pain	1.763834	1.837873167	
SD Post-Test Pain	1.418136	1.663329993	

The test results using *paired t test* in the treatment group obtained a value of $p = 0.000$ and in the control group obtained a value of $p = 0.000$. Static contraction and *stretching* exercises have an effect on reducing pain in mothers after giving birth to spontaneous birth with *perineal* tears. And based on the *independent t test*, the p value = 0.001 was obtained, indicating that there was a significant difference in influence between the treatment group given static contraction training and the control group given *stretching*. The effect of giving *stretching* is not as great as the effect of giving static contractions in the treatment group. The pre-post pain difference in the treatment group was -3.7. While the difference in pre-post pain in the control group was -1.5. Because the effect of *stretching* is only relaxation, when *stretching* is done on muscles that experience spasm, the muscle will relax due to an increase in *prostaglandins*. When *prostaglandins* increase, there will be vasodilation and increased circulation in the area where the spasm occurs (Desi, 2021). Static contractions given to mothers after childbirth can have a pain reducing effect. This can happen because when the muscles contract, it will cause blood flow to increase and more oxygen and nutrients will reach the painful area. So that it will accelerate the wound healing process, if the wound heals then the pain will disappear. In addition, when the muscles contract, they will respond to the release of *endorphin* chemical compounds which act as a natural pain reduction (Makzizatunnisa *et al.*, 2014)..

The results of this study are in accordance with the results of a study conducted by (Suciani Pujiningrum, 2019) in Makassar, where the study stated that there were 37 *postpartum* mothers who were given early mobilization 6 hours after giving birth. after being given the intervention, it was found that as many as 35 *postpartum* mothers (94.6%) experienced a decrease in pain intensity, with the difference in median pain values before and after being given the intervention being 10.00. These results mean that there is a significant change in pain intensity before and after the intervention. (Suciani Pujiningrum, 2019).

Perineal tears can occur during spontaneous childbirth. The degree of *perineal* tears can range from Grade 1, which is a mild degree involving only skin tears, to Grade 4, which involves the *anorectal* mucosa and anal *sphincter*. It is estimated that 85% of spontaneous deliveries are associated with *perineal* tears of some degree. There are many factors that can be associated with *perineal* tears during spontaneous labor. These factors include *primogeniture*, increasing maternal age, forceps and vacuum, *macrosomia* in the baby, long duration of labor in Stage II, and maternal position during labor (Milka *et al.*, 2023). Based on the results of a study, it is stated that primiparity and maternal age are factors that often lead to *perineal* tears during childbirth. The study found that

primiparous mothers aged 26 to 35 years were very at risk of tearing the perineum during spontaneous childbirth. This is because young primiparous mothers have less experience in preventing and maintaining the *perineum*. However, the results of the study state that multiparous mothers have a low risk of tearing during spontaneous childbirth. This is because multiparous mothers have had a good experience when giving birth and have understood how to push or expel the baby properly and effectively (Cakwira *et al.*, 2022)..

Parity or number of pregnancies consists of primipara, namely first-time mothers, multipara, namely mothers who give birth 2 or more times, and grandemultipara, namely mothers who give birth 5 or more times. In this study there were 4 primiparous mothers, 15 multiparous mothers, and 1 grande multiparous mother. In a study mentioned that perineal tears can occur in 3.5% of multiparous mothers and 27.5% of primiparous mothers, which means that primiparous mothers are at higher risk of tearing the perineum during childbirth (Lucena da Silva *et al.*, 2023). In this study, it was found that the majority of respondents who experienced tearing during childbirth were multiparous mothers aged 20-35 years. There is 1 primiparous mother with the age of 19 years experiencing tearing during childbirth and 1 respondent grandemultipara mother aged > 35 years experiencing tearing during childbirth.

Perineal tears can cause pain, infection and bleeding. Generally, the pain arises due to the tearing of the *perineum* and also depends on the degree of the tear. The higher the degree of tearing, the more severe the pain intensity will be (Rodrigues *et al.*, 2023). In this study, the majority of mothers experienced tearing during the birthing process at degree 2 as many as 14 people and those who experienced *perineal* tears of degree 1 were 4 people. *Perineal* pain is pain felt in the genital area associated with lacerations or tears in the perineum. The incidence of *perineal* tears during spontaneous childbirth is around 35-85%. This can cause *perineal* pain, limitations in sexual intercourse, and can also cause urinary incontinence (Chen *et al.*, 2022). In this study, the majority of mothers felt pain at a moderate pain intensity with the NRS pain scale range of 4-6. Pain due to *perineal* tears can last for hours after the birth process. This can cause discomfort during activities, sleep disturbances, and interference in breastfeeding and caring for the baby. In the long term, the pain can result in stress urinary incontinence, dyspareunia, depression and even anxiety disorders in the mother (Senol & Aslan, 2017).

The benefits of giving static contractions to mothers after giving birth with *perineal* tears can help to improve blood circulation to the *perineum* and improve the wound healing process so that the perception and intensity of pain can be reduced. This can occur because static contractions can stimulate the release of endorphin compounds, endorphin compounds are neurotransmitters that have anti-pain effects. So that increased production of endorphins can reduce pain. In addition, static contraction can also have a relaxing effect on tense muscles in the pain area. So that when patients routinely do static contraction exercises, the intensity of the pain they feel will decrease (Makzizatunnisa *et al.*, 2014). Early mobilization with static contraction techniques is one of several *norpharmacological* treatment techniques that can be applied in reducing the intensity of pain due to *perineal* tears during spontaneous childbirth (Karo Karo *et al.*, 2022).

CONCLUSION

From the studies that have been carried out, it can be concluded that the provision of static contraction exercises in spontaneous birth *postpartum* mothers with *perineal* tears has an effect in reducing pain intensity. Due to the fact that in the field there are not many who apply static contraction exercises to *postpartum* women, it is hoped that this study can be an action against the pain that arises in *postpartum* women due to tears in the *perineum*.

The results of this study can be used as a reference in conducting subsequent research on a larger sample and population.

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