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Original Article

The Effect of Counter Pressure and Birthball on The Time of The First Stage of Labor and Prevention of Perineal Rupture

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ABSTRACT

Mothers with prolonged labor have a higher risk of bleeding. This study aimed to determine the effect of the counterpressure technique with a birthball on the length of the first stage of perineal rupture. This type of research is quantitative with a quasi-experimental design using an observation form conducted in Kendari City Hospital from May to August 2023. The design used was a two-group-only post-test, with a control group. The study population comprised multiparous mothers in the first active stage. The sample size consisting of 20 who were given the counterpressure technique with birthball, 20 who were only given the counterpressure technique, and 20 who received no treatment. The inclusion criteria were mothers who were willing to become respondents and mothers who gave birth with normal births. The samples were collected using purposive sampling. The t-test was used to determine the differences between the three groups. The results of the difference test in the length of active phase I between the group given the counterpressure technique with birthball (intervention I) and the control group were p-value (0.000). The results of the analysis for the group given the counterpressure technique (Intervention II) with the control group were p-value (0.000). The results of the analysis for the group given the counterpressure technique with birthball (Intervention I) with the counterpressure technique (Intervention II) were p-value (0.759). In Conclusions, Providing counterpressure techniques with a birthball or simply providing counterpressure techniques is effective in reducing the incidence of perineal ruptures.

Keywords: *Counter Pressure, Birthball, First Stage, Perineal Rupture*

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INTRODUCTION

Most normal births are associated with trauma to the baby [1]. Anterior perineal trauma is an injury to the labia, anterior vagina, urethra, or clitoris, and is usually associated with low morbidity. Posterior perineal trauma is an injury to the posterior vaginal wall, perineal muscles or anal sphincter [2,3]. There is considerable variation in the number of reported incidences of perineal trauma between countries, due in part to differences in definitions and reporting practices [4,5,6]. Studies with limited use of episiotomy reported perineal trauma rates requiring suturing between 44% and 79% [7,8,9], and a recent Cochrane Review found no evidence to support the routine use of episiotomy[10]. Higher rates of perineal injury are consistently noted in first vaginal deliveries and instrumental deliveries[11].

The cause of complications in childbirth, which causes increased mortality and

morbidity in the mother and fetus, is prolonged labor. Mothers with prolonged labor have a higher risk of bleeding due to uterine atony (33%), laceration of the birth canal (26%), infection (16%), fatigue (15%), and shock (10%). Meanwhile, in the fetus, it can increase the risk of severe asphyxia, cerebral trauma, infection, and injury due to the procedures [12]. The incidence of prolonged labor is caused by several factors such as the position of the fetus, pelvic abnormalities, histological abnormalities, wrong direction of labor, large fetus, congenital abnormalities, grand multipara, and premature rupture of membranes [13].

Several physiological efforts can be made to speed up and facilitate the opening of the cervix, such as walking, emptying the bladder, applying counterpressure techniques around the sacrum, sitting on a birth ball, stimulating the nipples, having intimate relationships, calming down, and consuming fruit. This could stimulate the opening of the cervix [14]. The counterpressure technique for 20 min on the sacrum area will reduce the sensation of pain, provide a sense of comfort, and speed up labor. This is supported by the research of Abdolahian, Ghavi, Abdollahifard and Sheikhan which resulted that mothers who were massaged either on the back or sacrum in the first stage of labor or on the perineum in the second stage, reported a decrease in pain and also had a much shorter labor, staying at home shorter illness and less postpartum depression. Movement when pushing the pelvis can help change the baby's position to a more appropriate position (back of the head) so that it can speed up the progress of labor [15].

Another effort to prevent prolonged labor is the birthball method because sitting on a birthball can stimulate postural reflexes and maintain spinal posture in good condition, thus facilitating the descent of the fetal head and reducing the length of the first stage [16]. The birthball technique by applying pelvic rocking, apart from reducing inflammation and speeding up labor, can also prevent perineal rupture, which is one of the causes of mortality and morbidity. The mother's movement on the birthball with guided guidance increases the elasticity of the perineal muscles, thereby reducing the risk of perineal rupture [17].

There are still many mothers who experience prolonged labor in the first stage of the active phase, so the author is interested in conducting research at Kendari City Regional Hospital by combining counterpressure techniques with a birthing ball to speed up the first stage of the active phase and prevent perineal rupture. This study aimed to determine the effect of the counterpressure technique with a birthball on the length of the first stage of perineal rupture. The novelty of this study is the combination of counterpressure techniques with a birthing ball to speed up the first stage of the active phase and prevent perineal rupture.

METHOD

This type of research is quantitative with a quasi-experimental design, namely, by looking at the length of the first active phase and perineal rupture using an observation sheet. The design used in this study was a two-group-only post-test, with a control group. The intervention group used the counterpressure technique with a birthball or counterpressure technique alone, while the control group received no treatment. This study was conducted at Kendari City General Hospital. This study was conducted from May to August 2023. The study population comprised multiparous mothers in the first active phase. Based on initial studies, 91 mothers gave birth between January and March of 2023. The research sample consisted of multiparous mothers in the first active phase. Based on the results of calculations using the sample size formula, the sample size was 60 respondents, consisting of 20 who were given the counterpressure technique with birthball, 20 who were only given the counterpressure technique, and 20 who received no treatment. The samples were collected using purposive sampling. The inclusion criteria were mothers who were willing to become respondents and mothers who gave birth with normal births. Meanwhile, the exclusion criteria in this study were pathological/abnormal birth and primiparous mothers. This research received permission from the Kendari Ministry of Health Polytechnic Research Ethics Committee (No. D.P. 03.04/056/2023. Univariate analysis showed the mean, standard deviation, maximum, and minimum values of each variable. Bivariate analysis showed differences in the duration of the first stage of the active phase by looking at the independent T test, and to see the birth canal tear, the chi-square test was used. The conclusion from hypothesis

testing is that there is a difference/influence if the p-value is <0.05, and there is no difference/influence if the p-value is ≥0.05.

RESULTS

Table 1. Characteristics of Respondents

Category	Group			p-value
	Intervention I	Intervention II	Intervention III	
Age				
20-35	17 (85%)	17 (85%)	17 (85%)	0,1
>35	3 (15%)	3 (15%)	3 (15%)	
Parity				
2	14 (70%)	14 (70%)	14 (70%)	0,1
3	6 (30%)	6 (30%)	6 (30%)	
Opening				
4	7 (35%)	12 (60%)	9 (45%)	
5	7 (35%)	5 (25%)	5 (25%)	0.7
6	4 (20%)	1 (5%)	4 (20%)	
7	2 (10%)	2 (10%)	2 (10%)	

Table 1 shows that the majority of respondents from all groups have an age range– 20-35 years. Seventeen mothers (85%) were included in each group. Three mothers (15 %) were older than 35 years in all groups. The results of the difference test analysis using the chi-square test showed that there were no differences among the three groups in the age category (p =0.1). Respondent characteristics based on parity mostly had parity two in all groups. In each group, 14 mothers (70%) had a parity of 2. Six mothers (30%) in each group had a parity of 3. These results showed that the respondents were homogeneous, and it was also seen in the results of the analysis of differences using chi-square that they did not have a difference with the p-value, namely 0.1. Characteristics of respondents based on opening in the group given the counterpressure technique with birthball were 7 mothers (35%) who came with 4 openings, 7 mothers (35%) who came with 5 openings, 4 mothers (20%) who came with 6 openings, and 2 mothers (10%) came with an opening of 7. In the group that was only given the counterpressure technique, it showed that the majority came with an opening of four with a total of 12 mothers (60%), respondents who came with an opening of five were five mothers (25%), one mother who came with an opening of six (5%), and two mothers who came with an opening of seven.

Table 2. Differences in the length of the first active phase for mothers giving birth

Variable	Mean Difference	T Value	p-value
Intervention I- Control	70,70	4,315	0,000
Intervention II- Control	65,65	4,021	0,000
Intervention I - Intervention II	5,05	0,309	0,759

Based on Table 2, the results of the difference test (independent T test) in the length of active phase I between the group given the counterpressure technique with birthball (intervention I) and the control group were p-value (0.000) > α with a T value of 4.315. The results of the analysis for the group given the counterpressure technique (Intervention II) with the control group were p-value (0.000) > α with a T value of 4.021. The results of the analysis for the group given the counterpressure technique with birthball (Intervention I) with the counterpressure technique (Intervention II) were p-value (0.759) > α with a T value of 0.309.

Based on Table 2, the results of the difference test (independent T test) in the length of active phase I between the group given the counterpressure technique with birthball (intervention I) and the control group were p-value (0.000) > α with a T value of 4.315. The results of the analysis for the group given the counterpressure technique (Intervention II) with the control group were p-value (0.000) > α with a T value of 4.021. The results of the analysis for the group given the counterpressure technique with birthball (Intervention I) with the counterpressure technique (Intervention II) were p-value (0.759) > α with a T value of 0.309.

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Based on Table 3, it can be seen that out of 60 respondents, the incidence of birth canal tearing was 16 (27%), consisting of 2 mothers from the group given the counterpressure technique with a birthball, 3 mothers from the group given the counterpressure technique, and 11 mothers from the control group. The results of the analysis of differences using the chi-square test showed that there were differences in the incidence of birth canal lacerations between the three groups.

Table 3. Differences in the incidence of Vaginal tears

Variabel	Grup			p-value
	Interve-ntion I	Interve-ntion II	Control	
Vaginal Tears				
Exist	2 (10%)	3 (15%)	11 (55%)	0,002
Not Exist	18 (90%)	17 (85%)	9 (36%)	

The frequency distribution of respondent characteristics based on age revealed that 51 respondents (85%) and 9 respondents (15%) gave birth in Kendari City Hospital in the range of 20-35 years.

DISCUSSIONS

These results show that the majority of respondents fall into the healthy reproductive age category. The age range of 20-35 years is known as the healthy reproductive age or a safe age for pregnancy and childbirth. At this age, the reproductive organs and psychology are more mature so they are ready to face childbirth[18].

Mothers are said to be at high risk if the pregnant woman is under 20 years old and over 35 years old [19]. Maternal age < 20 years and > 30 years is a risk factor for birth complications [20]. Age greatly determines the health of the mother giving birth and influences the length of the first stage of labor. Age during the healthy reproductive period is associated with reproductive organs that are still healthy, and the elasticity of the muscles is good, especially in the perineum [21]. Increasing age affects muscle elasticity, especially in perineal muscles. Too old an age affects low elasticity [22]. However, there are other factors that influence the length of the first stage and the incidence of perineal rupture, including parity.

The characteristics of the respondents based on parity were parities 2 and 3. Most of the respondents were parity 2, namely 42 mothers, 70%). Parity number 2-3 are the safest numbers for pregnant women and giving birth women. Unpleasant experiences of pregnancy and childbirth will affect subsequent pregnancies and childbirths. The results of the independent t-test analysis showed a p-value of 0.000 <α. Based on these values, Ha is accepted and statistically there is a difference in the length of the first active phase in mothers giving birth between the groups given the counterpressure technique and the birthball versus the control group.

This is supported by research conducted by Abdolahian, Ghavi, Abdollahifard and Sheikhan who said that mothers who had massage either on the back or sacrum in the first stage of labor or on the perineum in the second stage, reported a decrease in pain and also had a much shorter labor. years, shorter hospital stay, and less postnatal depression. The mother's movements when pushing the pelvis can help change the baby's position to a more appropriate position (back of the head) so that it can speed up the

progress of labor [15].

Training using birthball is very effective in the birthing process. Most respondents who were given birthball exercises completed spontaneous labor [23]. His research showed that there was a difference in the length of labor in the control group who underwent birthball exercises compared to the control group. Birthball has also been shown to be effective for uterine contractions. Various benefits that can be obtained from sitting upright on the ball are increasing blood flow to the uterus, placenta, and baby, reducing pressure and increasing pelvic area, providing comfort to the ankle, pushing the baby's head down, relaxing the pelvis, and providing comfort to the mother. Using a birth ball in a squatting position causes the perineum to stretch optimally, so that blood flow to the baby becomes smooth. In addition, the pelvis widens, thereby speeding up the baby's descent [24].

Based on the research results, it was found that there was a difference in the length of the first active phase between the counterpressure group and the control group. It was found that the mean difference in the length of the first stage of the active phase between the treatment and control groups was 65.65 minutes with a p-value of 0.000 ($p < 0.05$), which means that counterpressure massage influenced the length of the first stage of the active phase of labor. The research results are in line with research [25], which showed that there was a difference in the length of the first stage between mothers who were given the counterpressure technique and those who did not receive treatment ($p = 0.039 < 0.05$). Unhandled physiological pain and maternal anxiety during childbirth can result in prolonged labor in the mother and asphyxia in the baby, leading to death of the mother and baby [26].

The results of the analysis of differences using the chi-square test showed that the p-value was $0.002 < \alpha$. This shows that there were differences in the incidence of perineal rupture among the three groups. The results of the research are in line with the study conducted by [22], showing that the test analysis of the control group and the birthball group showed a p-value = 0.000, which means that there was a difference between the control group and the birthball group in the tearing of the birth canal in mothers giving birth. The perineum is the skin and muscles located between the vagina and the anus. Perineal rupture can occur in almost all first births (primiparous) and is not uncommon in subsequent births [27]. This research also shows that multiparity, where respondents have parity 2 and 3, does not guarantee that perineal rupture will not occur. Many factors can prevent tears, one of which is providing counterpressure therapy with a birthball.

Mothers in labor who receive counterpressure therapy with a birthball will perform pelvic movements using the pelvic rocking technique. This technique makes the mother move in circles, right and left, forward and backward on the birthing ball, and also provides counterpressure that can provide a feeling of comfort to the mother. Apart from having an impact on reducing pain and accelerating labor, this action can also provide relaxation to the perineal muscles so that they are not stiff and can directly prevent perineal rupture.

The results of the study showed that there were differences between the intervention group and the control group and also showed that the group that was not given counterpressure care had a longer average length of the first active phase, namely 287 minutes, but the group that was given counterpressure care with the use of a bithball or without the average duration of active phase I was faster, namely 217 and 222 minutes, respectively. This proves that counterpressure has an effect on speeding up the first stage of labor in the active phase. This is in line with research [25]. The results showed that women giving birth who were given a counterpressure massage experienced the first stage of the active phase faster than the control group who were not given a counterpressure massage. Research conducted at the Wongsonegoro Regional Hospital regarding the use of counterpressure techniques on the duration of the second stage showed that there was a significant influence where respondents who received this technique had quicker second-stage labor compared to respondents who did not receive treatment using only standard care [28].

In this study, counterpressure was statistically able to help mothers adapt to pain. When the mother feels calm and relaxed, the fear that arises can be overcome so that excessive adrenaline production can be anticipated, and substances that inhibit pain stimuli can be secreted properly. By reducing

adrenaline levels, blood vessels can vasodilate properly, thereby facilitating blood flow, which carries oxygen to the uterus. When there is sufficient oxygen in the uterus, contractions can run well so that the mother is able to push optimally, resulting in smooth delivery, especially during the first active phase [15][16].

Massage sends neurotransmitter impulses to the limbic system and amygdala. The hypothalamus then passes to the anterior pituitary. With this massage, the anterior pituitary body produced higher amounts of endorphins. Endorphins not only help reduce labor pain but also increase the work of endogenous oxytocin in helping stimulate myometrial contractions in the process of cervical dilation [31,32]. This shortened the first period of the active phase.

The results of this study are supported by research [33] showing that massage techniques help mothers feel more refreshed, relaxed, and comfortable during labor. One study stated that mothers who are massaged for 20 minutes every hour during the labor stages will be freer from pain. This is because massage stimulates the body to release endorphin compounds, which are natural pain relievers. Endorphins can also create feelings of comfort and pleasure, thereby reducing mothers' anxiety [30]. The massage technique used is counterpressure, which is a strong pressure massage that places the heel or flat part of the hand.

During labor, massage also makes the mother feel closer and cared for by the person caring for her. The touch of someone who cares for and wants to help is a source of strength when a mother is sick, tired, or anxious. When massaging, attention must be paid to the mother's response, whether the applied pressure has been applied. This is in accordance with research in Iran showing that continuous support provided by midwives during labor reduces pain intensity, length of labor, and the incidence of postpartum depression [34]. During the birthing process, a birthball is an important tool that can be used in various positions. Movement exercises using a birth ball by slowly rocking and swinging the pelvis forward, backward, right and left can relieve pressure and increase the area of the pelvis, encourage the descent of the baby's head, help the uterus contract more effectively, accelerate cervical dilatation, and help relax the ligaments on the pelvis [35]

This research is in line with studies conducted by [36] that from the results of the correlation test analysis of the pelvic rocking exercise variable with the incidence of perineal rupture using the Chi-square test, a ρ value of 0.028 ($\rho<0.05$) was obtained, which can be interpreted as a relationship between pre-therapy and the incidence of perineal rupture with a moderate level of significance. This study shows that pre-therapy with a birthball can reduce the incidence of perineal rupture in mothers giving birth. The use of a birth ball can play a key role as a non-pharmacological method for relieving pain and anxiety, as well as enhancing positive birth experiences by achieving good labor progress and outcomes. The maternity ball exerts and even pressure on the perineum can be reduced thus stimulating dilatation and widening of the pelvic outlet more effectively [37].

CONCLUSION

There was a difference in the length of the first active phase in mothers giving birth between the group given the counterpressure technique with a birthball and the control group, as well as between those given only counterpressure. There were differences in the incidence of perineal rupture among parturient mothers in the three groups. Counterpressure techniques with a birthball or just giving counterpressure techniques each for 20 min/h until complete opening is effective in speeding up the first stage of labor in the active phase. The counterpressure technique with a birthball has an influence on perineal rupture. Providing counterpressure techniques with a birthball or simply providing counterpressure techniques is effective in reducing the incidence of perineal ruptures.

This research will be very useful for treating perineal rupture in pregnant women by using a birth ball. The use of a birth ball should measure the size of the birth ball itself. It is hoped that measuring the size of the birth ball can be done before using it. It is hoped that the limitations of this research can be complemented by future researchers.

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