

## Perineal Warm Compresses During the Second Stage of Labour Decrease Incidence and Degree of Perineal Laceration in Primiparous

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### ABSTRACT

**Introduction:** Women during their first vaginal birth commonly get perineal trauma, induced by spontaneous laceration and episiotomy. Perineal warm compresses during the second stage of labour have been shown to decrease risk of perineal laceration or the need for episiotomy in primiparous, but the role between perineal body length with incidence and degree of perineal laceration is still in debate.

**Objective:** The aim of this study was to evaluate correlation between perineal warm compresses and perineal body length during the second stage with incidence and degree of perineal laceration in primiparous.

**Methods:** It was a nonrandomized controlled trial conducted at teaching hospital of Department of Obstetrics & Gynecology, Hasanuddin University from January to May 2018. There were 62 samples for perineal warm compresses group and 62 samples for control group.

**Results:** Chi-Square test showed significant correlation between perineal warm compresses during the second stage with perineal laceration incidence ( $p=0.030$ ) and perineal laceration degree in primiparous ( $p=0.004$ ). Perineal body length has no correlation with the incidence of perineal laceration ( $p=1.000$ ) and degree of perineal laceration ( $p=0.149$ ). Perineal warm compresses were effective in decreasing the degree of perineal laceration, particularly in primiparous with perineal body length of  $<3.3\text{cm}$  ( $p=0.006$ ).

**Conclusion:** Perineal warm compresses during the second stage decrease the incidence and degree of perineal laceration in primiparous. But, the perineal body length did not correlate with perineal laceration incidence and degree in primiparous. Perineal warm compresses during the second stage may decrease perineal laceration degree in primiparous with perineal body length  $<3.3\text{cm}$ .

### Keywords

Perineal warm compresses, Perineal body length, Perineal laceration, Primiparous.

### Introduction

Every year approximately 600,000 women died due to pregnancy and childbirth related complications. The majority of them occur in developing country. Antenatal, natal, and postnatal care are fundamental services for protection and improvement of the health of mother and born baby. Prevention of perineal trauma is one of the best options in delivery for minimizing perineal trauma

and reducing mother morbidity. Birth canal trauma is most likely to be present in vaginal birth and more common in primiparous women. Perineal laceration is one of complications and remaining the commonest form of vaginal birth injury, from low degree such as mucosal laceration until severe laceration which involving perineal muscle and rectum.

Perineal laceration associated with some complications, including bleeding, perineal pain, dyspareunia, rectovaginal fistula, perineal abscess and incontinence. Some complications have also negative effect to physical, psychological, social aspect, and quality of life.

Several risk factors of perineal laceration have been reported, including elderly, primiparous, vaginal operative procedure, macrosomia, epidural anesthesia, dystocia, oxytocin use, and episiotomy [1].

Perineal body is pyramidal fibromuscular structure lying between the distal of posterior vaginal wall and anus. The size is about 2 cm to 5 cm [2-5]. In 2014, Deering et al. from Bethesda studied about perineal body length and perineal laceration in delivery. They measured perineal body length of 133 women from fourchette to middle part of anus, and the mean length was 3.9 cm. There was no significant difference between perineal body length in nullipara and multipara. Perineal body length less than or equal to 2.5 cm have significantly higher incidence of severe perineal laceration, with the incidence was tenfold higher than perineal body length more than 2.5 cm [6,7]. However, study conducted in Al Azhar Hospital, which involving 100 pregnant women, reported that incidence of perineal laceration was higher in women with perineal body length  $\leq 3$  cm than women with perineal body length  $> 3$  cm [8].

Perineal warm compresses during the second stage of labour is the only proposed technique to reduce the incidence of perineal laceration. Perineal warm compresses during the second stage of labour cause vasodilation of vessel which increase blood flow, reduce pain, relax the muscle, muscle become more elastic, and give comfort to mother.

Meta-analysis involving 1,525 women with random sampling, about the use of warm compresses during the second stage of labour compared with no warm compresses, showed a significant result in reduction on the incidence of third and fourth degree perineal laceration in the group with perineal warm compresses. Although no decrease in intact perineum incidence during labour. Perineal warm compresses are also acceptable to women during the second stage of labour, easy to perform, no need high cost, and able to perform at all level of health care facilities, thus this technique may be an option for management during the second stage of labour to reduce the risk of perineal laceration [9].

Study comparing perineal warm compresses during the second stage of labour in primiparous and perineal body length with the risk of laceration, has never been studied in Hasanuddin University, Makassar. Therefore, we conducted this study to evaluate whether the perineal warm compresses during the second stage of labour can be used in management during the second stage to reduce the risk of perineal laceration, particularly in primiparous women with different perineal body length.

## Materials and Methods

### Settings

This study was conducted at the teaching hospital of Department of Obstetrics & Gynecology, Hasanuddin University, including Siti Fatimah Mother and Child District Hospital, Pertiwi Mother and Child District Hospital, and Siti Khadijah I Mother and Child Hospital. Study was held after obtaining written informed consent from primiparous women in labour to participate in study which

was conducted from January 2018 to May 2018.

### Design and Variables

This study was nonrandomized controlled trial, which researcher performed perineal warm compress during the second stage of labour to respondents with particular perineal body length, then compared the incidence and degree of perineal laceration with control group.

### Population and Sample

The study population were primigravida who underwent delivery at several satellite teaching hospitals including: Siti Fatimah Mother and Child District Hospital, Pertiwi Mother and Child District Hospital, and Siti Khadijah I Mother and Child Hospital. Samples were primigravida who underwent normal delivery at these hospitals.

### Data Collection Methods

All primigravida who fulfill the inclusion criteria were given the information, and after obtaining informed consent to participate in this study, we performed measurement of perineal body length and divided into two groups, perineal warm compresses group (willing to have warm compresses on the perineum for 20 minutes cumulative time during the second stage) and control group (without perineal warm compresses). Respondents in perineal warm compresses group were given warm compresses during the second stage using washcloth soaked in warm water with temperature of 38-44 Celsius degrees, duration of 20 minutes cumulative time on each contraction. When achieving the second period of labour, women with episiotomy intervention or assisted delivery were excluded, whereas women without episiotomy intervention were observed for the degree of perineal laceration.

### Data Analysis

Data were analyzed using computerized data analysis program, then descriptive analysis and hypothesis testing were performed. Statistical analysis was performed using Chi Square test as appropriate, with the significance level  $\alpha = 5\%$ .

## Results

In the beginning of this study, there were 67 women recruited in warm compresses group and 109 women in control group who fulfilled the inclusion criteria. During observation period, there were 5 women in warm compresses group and 47 women in control group excluded, thus total samples that could be analyzed were 124 samples, consist of 62 samples in warm compresses group and 62 samples in control group. Samples which met exclusion criteria due to several conditions including caesarean section due to obstetrics indication (11 women in warm compresses group), episiotomy (5 women in warm compresses group and 36 women in control group). From total samples, there were 53 samples with short perineal body length ( $< 3.3$  cm) and 71 samples with long perineal body length ( $\geq 3.3$  cm).

### Characteristics of samples

Characteristics of study samples are presented in Table 1.

Samples Characteristics	Warm compresses (n = 62)	Without warm compresses (n = 62)	P*
	Mean ± SD	Mean ± SD	
Age (year)	25.73 ± 3.68	25.02 ± 3.79	0.292
Birth weight (gram)	2957.19 ± 305.22	2920 ± 320.95	0.513
Gestational age (week)	38.48 ± 0.65	38.40 ± 0.66	0.495

**Table 1:** Distribution of Samples Characteristics.

\* independent sample t-test, Significant:  $p < 0.05$ .

Distribution of groups based on respondent characteristics showed that after using independent sample t-test, all variables had P value  $> 0.05$  indicated that there was no significant difference in both groups and overall samples were homogeneous and normally distributed.

### Bivariate Analysis

Chi-square test were used to determine significant correlation between categorical independent variable and dependent variable in this study.

Variables		Perineum		P OR	Laceration degree		P OR
		Intact	Laceration		Low	High /severe	
Intervention	Compresses	10 (16.1%)	52 (83.9%)	0.030 5.769	51 (98.1%)	1 (1.9%)	0.004 14.106
	None	2 (3.2%)	60 (96.8%)		47 (78.3%)	13 (21.7%)	
Perineal body length	< 3.3 cm	4 (9.4%)	48 (90.6%)	1.000 0.952	39 (81.3%)	9 (18.7%)	0.149 0.367
	≥ 3.3 cm	7 (9.9%)	64 (90.1%)		59 (92.2%)	5 (7.8%)	

**Table 2:** Comparative analysis of incidence and degree of laceration between perineal warm compresses group and without perineal warm compresses group, and between perineal body length < 3.3 cm group and perineal body length ≥ 3.3 cm group.

\* Chi-Square test, Significant:  $p < 0.05$  and OR: Odds Ratio.

Table 2 shows correlations between perineal warm compresses intervention with incidence and degree of laceration. There were 10 respondents with intact perineum and 1 respondent with severe laceration in perineal warm compresses group. Compared with

Perineal body length	Group	Laceration incidence				P value OR	Laceration degree				P value OR
		Intact		Laceration			Low		Severe		
		n	%	N	%		n	%	N	%	
< 3.3	Warm compresses	4	16.7	20	83.3	0.164 5.600	20	100.0	0	0.0	0.006 -
	None	1	3.4	28	96.6		19	67.9	9	32.1	
≥ 3.3	Warm compresses	6	15.8	32	84.2	0.113 6.000	31	96.9	1	3.1	0.355 4.429
	None	1	3.0	32	97.0		28	87.5	4	12.5	

**Table 3:** Comparative analysis of laceration incidence and degree between perineal warm compresses group and without perineal warm compresses group according to perineal body length.

\* Chi-Square test, Significant:  $p < 0.05$  and OR: Odds Ratio.

control group without warm compresses intervention, there were 2 respondents with intact perineum and 13 respondents with severe laceration. Statistical analysis showed p value = 0.030 for laceration incidence and p value = 0.004 for laceration degree, both of them were statistically significant ( $< 0.05$ ), indicated that there were correlations between perineal warm compresses intervention with incidence and degree of laceration.

Table 2 also shows correlations between perineal body length with incidence and degree of laceration. Among women with perineal body length < 3.3 cm, there were 4 respondents with intact perineum and 9 respondents with severe laceration. Whereas among women with perineal body length ≥ 3.3 cm, there were 7 respondents with intact perineum and 5 respondents with severe laceration. Statistical analysis showed p value = 1.000 for laceration incidence and p value = 0.149 for laceration degree, both of them were not statistically significant ( $> 0.05$ ), indicated that there were no correlations between perineal body length with incidence and degree of laceration.

Table 3 shows correlation between perineal warm compresses intervention with incidence and degree of laceration according to perineal body length. Among women with perineal body length < 3.3 cm, there were 4 respondents with intact perineum, 20 respondents with low laceration and none with severe laceration in perineal warm compresses group. While in group without perineal warm compresses, there were 1 respondent with intact perineum and 28 respondents with laceration (9 with severe laceration). Statistical analysis showed significant correlation in perineal body length < 3.3 cm group with warm compresses intervention and laceration degree, with p value = 0.006 ( $p < 0.05$ ).

Among women with perineal body length ≥ 3.3 cm, there were 6 respondents with intact perineum, 32 respondents with laceration (1 with severe laceration) in perineal warm compresses group. While in group without perineal warm compresses, there were 1 respondent with intact perineum and 32 respondents with laceration (4 with severe laceration). Statistical analysis in both groups showed no significant correlation with p value  $> 0.05$  for group with and without warm compresses in perineal body length < 3.3 cm, indicated that there were no correlations between perineal warm compresses with incidence and degree of laceration in perineal body length < 3.3 cm group.

## Discussion

Characteristics of samples in this study showed mean age of case and control group were similar. According to the Result of Indonesian Population Census 2010, fertility rate of Indonesian women was highest in age group of 25-29 years. Similar with this study, our samples were in productive age because sample that we recruited were primiparous. Other study conducted by Dahlen et al. in Australia also reported the mean sample age was 27.0 years in warm compresses group and 27.2 years in control group. Similar with Essa et al., their study in Egypt obtained samples with highest percentage in age group of 20-30 years, 50% in case group and 42% in control group [1,10].

Characteristics of mean birth weight in this study were also similar between case and control group. Samples with birth weight of baby > 3500 gr were only found in 2 babies in case group and 3 babies in control group. These are because many birth attendants were doubtful and discourage not to perform mediolateral episiotomy when estimated fetal weight is higher than 3500 gr, to prevent severe perineal laceration. Thus, many of samples were excluded due to episiotomy intervention.

Warm compress is one of thermotherapy related with peaceful and relaxation. Heat effects to the cell are increasing metabolic activity thus increasing O<sub>2</sub> requirement, increasing nutrition and producing much metabolic products. Previous study has found that temperature above 40-45°Celsius causes expansion of collagen tissue. This is only happened when tissues are simultaneously stretched within therapeutic temperature limit. Tissue heating with therapeutic temperature (40-45°Celsius) decrease muscle spasm. Thermotherapy or the use of heat is likely to decrease excitability of muscle spindles and increase activity of Golgi tendon organs and result in decreased muscle spasm. Sedation of sensory nerve endings with heat effect within therapeutic temperature limit may also promote pain relief at the spinal cord level and may raise the pain threshold level [11,12].

Cochrane Review by Aasheim et al. studied about perineal trauma management literature related with warm compresses on perineum during the second stage of labour. Four randomized controlled trials by Albers et al. in Mexico, Dahlen et al. in Australia, Sohrabi et al. in Iran and Terre-Rull et al. in Barcelona showed that warm compresses during the second stage of labour may decrease perineal trauma and relieve pain in this stage. These four studies reported intact perineum in warm compresses group as outcome with RR 1.02, 95% CI 0.85 to 1.21, in 1799 women with P value=0.86 was not significant. Furthermore, these four studies also reported high degree perineal laceration including III and IV degree in group with perineal warm compresses compared with group without perineal warm compresses, had smaller probability to have severe laceration with RR=0.46, 95% CI 0.27-0.79, in 1799 women with P value=0.0048 was significant. This method can be used in every birth, non-invasive, inexpensive, no harm, and comfortable for clients [9,10,13].

Another randomized controlled trial conducted by Akbarzadeh et

al. in Iran with 150 samples, divided into intervention group and control group, reported that 27% samples with warm compresses intervention had intact perineum with P value < 0.001 was significant. Another study conducted by Essa M et al. in Egypt with 160 samples that measuring perineal tension before and after the application of perineal warm compresses showed severe perineal tension had decrease from 50% to 7.5% after intervention with significant result in warm compresses group with intact perineum, with P value=0.000. These findings showed that perineal warm compresses can enhance relaxation, reduce muscle spasm and reduce the incidence of perineal laceration.

In this study, number of respondents with intact perineum in warm compresses group were 10 women and in control group were 2 women. This finding suggested statistically significant correlation between perineal warm compresses with incidence of perineal laceration. It is in accordance with Akbarzadeh et al. and Essa M et al. trials. Number of respondents who had low degree laceration in warm compresses group and control group were 51 and 47 women respectively, while high degree were 1 and 13 women respectively. Thus, these can conclude that there was significant correlation between perineal warm compresses and the degree of perineal laceration in primiparous during second stage of labour.

These findings are in accordance with results from Cochrane Review by Aasheim et al. about four trials by Albers et al. in Mexico, Dahlen et al. in Australia, Sohrabi et al. in Iran and Terre-Rull et al. in Barcelona that reported perineal warm compresses during the second stage of labour reduced the degree of laceration, particularly in III and IV degree of laceration without warm compresses. In this study, although there was one sample in perineal warm compresses group had severe perineal laceration, but no more than IIIA degree with fetal weight was 3600 gr. While in group without perineal warm compresses, there were 13 women had severe perineal laceration, including 11 women with IIIA degree, 1 woman with IIIB degree, and 1 woman with total perineal laceration (IV degree of perineal laceration). These are in accordance with results from Cochrane Review by Aasheim et al. where in study conducted by Albers reported that in the warm compresses group there were still 3 samples with III degree of laceration and none of the samples with perineal warm compresses had IV degree of laceration in these four studies. While in study conducted by Albers, Dahlen and Terre-Rull reported that in group without perineal warm compresses there were still found III dan IV degree of perineal laceration. These indicated that perineal warm compresses in primiparous women during the second stage of labour may decrease the high degree of perineal laceration incidence, which are III and IV degree [9].

In this study, mean perineal body length was 3.4 cm, similar with study conducted by Luci Lisa published in 2013, about Comparison of POP-Q Component Measurement between Multiparous and Nulliparous Women, reported that perineal body length in nulliparous women particularly in Makassar was 3.27 cm with standard deviation was 0.22 [14]. Study conducted by Dua A et al. showed significant correlation between III degree of

perineal laceration incidence in women with short perineal body length, with mean perineal body length was  $3.7 \pm 0.9$  cm [15]. These results are in accordance with the result of Rizk and Thomas cit. [16] reported in their study that the perineal body length less than 4 cm correlated with increased risk of episiotomy, perineal laceration and assisted vaginal delivery. Deering et al. measured perineal body length of 133 women from fourchette to middle part of anus with the mean length was 3.9 cm. There was no significant difference between perineal body length in nullipara and multipara. Perineal body length less than or equal to 2.5 cm has significantly increased the incidence of severe perineal laceration, with the probability was tenfold higher than perineal body length more than 2.5 cm. Women with short perineal body length also increase the risk of assisted vaginal delivery [17]. Moreover, Samia reported statistically significant difference in incidence of perineal laceration between two groups which was higher in perineal body length  $\leq 3.5$  cm group compared with perineal body length  $\geq 3.5$  cm group [18].

This study found different result which was no statistically significant correlation between perineal body length with incidence and degree of perineal laceration in both groups with and without perineal warm compresses. This result is in accordance with Irawan A et al. trial in Makassar, reported that there were no significant correlations between perineal body length with incidence and degree of perineal laceration in samples with and without perineal massage [19].

However, another analysis from this study showed significant correlation with p value 0.006 ( $<0.005$ ) between perineal warm compresses intervention with the degree of perineal laceration in perineal body length  $<3.3$  cm group. Thus, perineal warm compresses performed in perineal body length  $<3.3$  cm group may reduce the high degree of perineal laceration incidence which are III and IV degree. Otherwise in perineal body length  $\geq 3.3$  cm group, there were no significant correlations between the incidence and degree of perineal laceration with or without perineal warm compresses intervention. From this analysis result, it can be concluded that perineal warm compresses are better performed in perineal body length  $<3.3$  cm group because they may reduce the risk of severe perineal laceration.

In perineal warm compresses, basically heat energy by conduction is absorbed on perineal tissue and surroundings, to achieve therapeutic targets including: increase collagen tissue elasticity, decrease joint stiffness, reduce pain, reduce muscle tension, reduce edema or swelling, and increase blood flow. Heat may increase collagen tissue elasticity by increasing the flow of matrix viscosity and collagen fibers. Heat may reduce pain with gate control mechanism where heat sensation that is transmitted through C fibers obscures the perception of pain transmitted by A fibers or by increasing endorphin secretion. Muscle stiffness due to ischemia can be cured with increases blood flow to inflammation area. Heat acts in several mechanisms including: increase temperature, increase metabolism, decrease pH level, increase capillary permeability, release histamine and bradykinin

resulting in vasodilation. Thermotherapy or the use of heat is likely to decrease excitability of muscle spindles and increase activity of Golgi tendon organs and result in decreased muscle spasm. Where relaxed muscle can contribute to decrease resistance to baby head when passes through perineum, which in turn can maintain the elasticity of perineum in labour process. Sedation of sensory nerve endings with heat effect within therapeutic temperature limit may also promote pain relief at the spinal cord level and may raise the pain threshold level [11,12,20].

Limitation of this study was different birth attendants in each labour process, both in perineal warm compresses group and control group, but all birth attendants in this study have been standardized with Management of Normal Delivery Course. Samples with baby birth weight  $>3500$  gr were only 2 samples in group with perineal warm compresses because many samples with estimated fetal weight  $>3500$ gr had episiotomy intervention, thus excluded from this study. Analysis of baby outcome in samples with high degree of laceration in warm compresses group and control group showed mean baby birth weight was 3000 gr. This finding can be used as basic consideration for further study regarding the methods that are believed to be effective for reducing the degree of perineal laceration, particularly in estimated fetal weight higher than 3000 gr.

## Conclusion and Suggestion

Based on the research, we can conclude that the perineal warm compresses during the second stage of labour, decrease incidence and degree of perineal laceration in primiparous. Especially in primiparous with a perineal body length less than 3.3 cm. However, the perineal body length is not related to the incidence and degree of perineal laceration in primiparous.

Subsequent studies need to use a randomized controlled trial (RCT) clinical trial, a sample of multiparous patients compared to primiparous, the effectiveness of perineal warm compresses during labor in latent phase, active phase and combination with other methods such as perineal massage, effects with different temperatures, compresses during contractions and not contractions, different compressing techniques for example with towels that are squeezed or not squeezed and use other media such as warm packs.

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