Perineum Laceration Treatment with *Coleus amboinicus* Lour Leaf Extract Solution in Postpartum Mothers

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Abstract

Perineum lacerations may increase the risk for morbidity and mortality in postpartum mothers. Therefore, perineum laceration treatment is critical for infection prevention and speedy healing. Coleus amboinicus Lour contains a composition that can be used as antimicrobial and antiseptic.

This research is a quantitative study with an experimental design. A research sample of postpartum mothers meeting inclusion criteria were divided into three groups, namely users of Coleus amboinicus Lour leaf extract solution, users of antiseptic solution, and users of high-level disinfectant. Wound healing observation used the REEDA scale, data analysis used WM score and ANOVA, and homogeneity testing used Levene's test.

Perineum laceration healing in Coleus amboinicus Lour leaf extract solution users took place on day 5, and in antiseptic solution users and high-level disinfectant users, it took place on day 6 and day 7, respectively. ANOVA results showed that F count > F table and sig. value 0.012 < 0.05, meaning that there was a significant difference in the three experiment groups. Meanwhile, post-hoc test (LSD) showed that the mean value of wound healing was higher and more significant in the Coleus amboinicus Lour leaf extract solution group.

Perineum laceration healing was more effective with the use of Coleus amboinicus Lour leaf extract solution than with the use of antiseptic solution and high-level disinfectant.

Experimental article (J Int Dent Med Res 2023; 16(1): 40-45)

Keywords: Colues amboinicus Lour Leaf, Effectiveness, Laceration, Postpartum.

Received date: 15 September 2022 **Accept date:** 16 November 2022

Introduction

The maternal mortality rate (MMR) is one of the success indicators of maternal and community health efforts owing to its sensitivity to health services improvement, in terms of both accessibility and quality. According to the results of the 2015 Intercensal Population Survey, the maternal mortality rate in Indonesia was 305 per 100,000 live births[1]. For the achievement of the Sustainable Development Goal (SDG) of reducing the MMR, more intensive efforts are required[2].

Most maternal deaths occur postpartum. Postpartum mothers are highly susceptible to uterine infections due to lochia. If left drying on the vulva and perineum, lochia will breed bacteria which may spread to the uterus[1]. Besides, infections may also be caused by improperly performed treatment of laceration wounds on the perineum. Malnutrition, low socioeconomic levels, and stress lead to infections after delivery[3]. Incorrect wound treatment on the perineum also promotes infections during this period. This is because the lochia-induced moist in the perineum area supports bacterial proliferation. Complication do to infections on the perineum may affect the bladder and internal reproductive organs, which may cause postpartum maternal death if mishandled.

Perineum laceration is also associated with short- and long-term morbidity in a significant way. Thirty percent of mothers reported discomfort from perineum laceration that spans 2 weeks after delivery, and 7% reported pain until 3 months after delivery. Other than pain, maternal morbidity associated with perineum laceration also includes dyspareunia and incontinence, which may cause physical, psychological, and social problems affecting the way postpartum women carry out their role as mothers in caring for their babies[4].

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Over 85% women having vaginal delivery experienced perineum trauma, and 60%–70% received stitching (hecting). Risk factors include bigger babies, delivery methods (forceps trauma), foetal malpresentation and malposition, mother's position during delivery, and long labor. Other factors that may increase the level and degree of trauma are ethnicity, ages over 25, abnormal collagen synthesis, poor nutritional status, and higher socioeconomic status. Doctor practice or preference with regard to childbirth interventions may also influence the level of severity and the level of trauma in the perineum (e.g., use of forceps and extractive vacuum)[5].

The incidence of perineum laceration in mothers all over the world, according to WHO in 2015, was 2.7 million cases, and the number is projected to rise to 6.3 by 2050. In Asia alone, 50% of laboring mothers experience perineum laceration. In the case of Asia, perineum laceration is a common problem in society; 50% of the world's perineum laceration incidence take place in Asia. The prevalence of laboring mothers experiencing perineum laceration in Indonesia within the age ranges 25–30 years and 32–39 years was 24% and 62%, respectively. Perineum laceration is one of the causes of bleeding in postpartum mothers in Indonesia. The risk for infection in perineum laceration can be handled in various ways, including by performing perineum laceration wound treatment as early as possible, 2 hours after normal delivery. The main care for perineum wound thus far is antibiotic application as it is considered a potent way to reduce infections. However, over the last few decades, its effectiveness at combating infections has been decreasing, causing severe intoxication and bacterial resistance. According to the World Health Organization, 70%–80% people in developing countries use alternative medicines or supplement their medication with traditional medicinal herbs[6].

Coleus amboinicus Lour leaves can be used to maintain hygiene in the perineum area, speed up wound healing by acting as an anti-bacterial, and keep the perineum area moist to promote wound healing. *Coleus amboinicus* Lour is part of Indonesia's ethnobotany which is used by Tapanuli Utara people in their daily vegetable menu from generation to generation, especially for mothers who have just given birth. *Coleus amboinicus* Lour leaves have such contents as glycosides, carbohydrates, amino acids, proteins, flavonoids, tanins, phenolic compounds, and terpenoids[5].They show efficacy as antioxidants, antitumors, and antimutagens and can be used to treat bronchitis, astma, diarrhoea, epilepsy, fever, cough, headache, dyspepsia, kidney stones, dysentery[5], malaria, intestinal worm infestation(3), wounds, and sprue prevent cancer and vertigo, and increase total breastmilk volume[7,8]. It is for this reason that these leaves are still widely studied, in particular to figure out and prove their benefits[9].

From a field survey in Tapanuli Utara Regency, it was found that, of 103 deliveries in the period from January to February 2020, 97% were with perineum laceration. It thus became an interest to the researchers to find out the benefits of *Coleus amboinicus* Lour leaf extract solution for wound healing in perineum laceration among postpartum mothers in Tapanuli Utara Regency.

Materials and methods

Research Design and Location

This research is of the quantitative type with an experimental design. It was conducted in Tapanuli Utara Regency.

Population and Sample

Target population: all women having a vaginal delivery with a perineum laceration wound in Tapanuli Utara Regency within the period March to October 2020, numbering 1,470. Reached population: all women having a vaginal delivery with a second-degree perineum laceration wound in Tapanuli Utara Regency in the period March to October 2020, numbering 258.The research sample was 90 postpartum mothers with second-degree perineum laceration, divided into three treatment groups, namely *Coleus amboinicus* Lour leaf extract, antiseptic solution, and high-level disinfectant groups, each with 30 members.

Data Collection Methods

The data used were of the primary type. Wound healing observation was performed with the REEDA scale. Respondents were selected by consecutive sampling according to the following inclusion criteria:

1) Perineum laceration wounds up to grade 2 due to delivery;
2) Being in a healthy condition, with no history of diseaseas that could influence wound healing;

3) Willing to become research subjects and providing signed informed consent.

The respondents were assigned to three different treatment groups by deployment time. The first 30 respondents were assigned to group 1 (to use *Coleus amboinicus* Lour leaf extract solution), the second 30 respondents were assigned to group 2 (to use providone-iodine antiseptic solution), and the third 30 respondents were assigned to group 3 (to use high-level disinfectant). All the respondents in this research received the same antibiotic (Amoxicillin tab 500 mg at a dose of 3 x 1), and they were instructed to take it regularly. With regard to geographical, ethnic, and cultural characteristics and especially to postpartum care, all the respondents were homogenous.

Data Analysis

Data analysis involved univariate analysis, weighted mean analysis, and multivariate analysis using ANOVA for regression. Homogeneity testing used Levene's test at sig. level ρ = 0.05. If the variance data of each group were homogenous, then ANOVA was performed to see the difference between the three research groups.

Results

Respondents' Characteristics

The data collected were then analyzed as follows:

Overview of the respondents' characteristics

Variable	Number	
	n	%
Age		
1. Below 20 years;	11	12.2
2. 20–35 years;	54	68.1
3. Above 35 years	25	27.7
Parity		
1. Primipara;	28	31.1
2. Multipara	62	68.9
Laceration cause		
1. Spontaneous cause	53	58.9
2. Episiotomy	37	41.1
Birth weight		
1. < 2,500 grams	13	14.4
2. > 2,500 grams	77	85.6

Table 1. Characteristics distribution of Postpartum Mothers with Spontaneous Perineum Laceration.

Based on Table 1, the majority of the respondents in each group were within the age range 20–35 years (n = 54, 68.1%). Eleven (12.2%) respondents were aged below 20, and 25 (27.7%) respondents were aged above 35. With respect to parity, most of the respondents were within the multipara category (n = 62, 68.9%), and the rest were in the primipara category (n = 28, 31.1%). In terms of perineum laceration cause, more respondents mentioned spontaneous cause (n = 53, 58.9%) than episiotomy (n = 37, 41.1%) as their cause of perineum laceration. The birth weight in each group mostly was within the > 2,500 grams category (85.6%).

Wound Healing Measurement

Measurement of average perineum laceration wound healing rate in each group was conducted using the REEDA scale, the results of which are presented in Table 2.

Category	*Coleus amboinicus* Lour Leaf Extract Solution		Antiseptic Solution		High-Level Disinfectant	
	WMean	Interpretation	WMean	Interpretation	WMean	Interpretation
Day 1	7.89	Moderate	7.98	Moderate	8.01	Moderate
Day 2	6.69	Moderate	7.73	Moderate	7.92	Moderate
Day 3	5.70	Mild	6.53	Moderate	6.72	Moderate
Day 4	4.95	Mild	5.89	Mild	6.01	Moderate
Day 5	2.90	Good	4.91	Mild	5.14	Mild
Day 6	2.30	Good	2.95	Good	4.63	Mild
Day 7	1.04	Good	2.43	Good	2.89	Good
Day 8			1.62	Good	2.09	Good

Table 2. Varying Average Levels of Perineum Laceration Wound Healing Rate among Respondents.

From the results of the observation performed over the wound healing process, it was figured out that the healing rate of the *Coleus amboinicus* Lour leaf extract solution group was higher than the healing rates of the antiseptic solution and high-level disinfectant groups. The post-treatment perineum laceration wound healing rate, based on the REEDA scale results, of the *Coleus amboinicus* Lour leaf extract solution group entered the good category on day 5, while the antiseptic solution group and the high-level disinfectant group did on day 6 and day 7, respectively.

Analysis of Variance (ANOVA)

Prior to ANOVA, homogeneity test was first conducted using Levene's test, and ρ = 0.839 > 0.05 was obtained, meaning that the data used in this research were homogeneous. From ANOVA, the wound healing rates of the experiment groups were found to be as presented in Table 3.

Group	Mean	Sum of square	F	df	p-value
Coleus amboinicus Lour leaf extract solution	5.79				
Antiseptic solution	6.50	15.123	4.692	2	.012
High-level disinfectant	6.77				

Table 3. Varying Wound Healing Rates between Group.

Based on ANOVA results, F count = 4.692 and F table at df 2 = 3.10 were found. Since F count > F table, and sig. value 0.012 < 0.05, H0 was rejected and H1 was accepted, meaning that there was a significant difference between the three experiment groups. Then, post-hoc test using least square difference (LSD) statistics was carried out to see the difference of each experiment group, and the results showed that the statistic average of wound healing rate of the *Coleus amboinicus* Lour leaf extract solution group was significantly higher than those of the antiseptic group and the high-level disinfectant group.

Discussion

Normal delivery is influenced by five factors, namely contracting power, passenger (foetus), passage, psychology, and assistance provider. The five factors must be adequate for normal delivery to occur. Perineum as part of the passage through which the foetus issues to the external world from the uterus must be elastic, while the right pushing technique will reduce the risk for perineum rupture.

Perineum laceration is a wound on the perineum caused by either spontaneous cause or intervention (episiotomy)[10]. In this research, the majority of the respondents experienced spontaneous laceration (n = 53, 58.9%), and the rest experienced laceration due to episiotomy (n = 37, 41.1%). Similar to this research, a study on laboring women at Puskesmas Godean in 2017 reported a spontaneous laceration rate of 58.2%(10). Laceration due to episiotomy is performed based on these indications: stiff perineum, foetal emergencies, and preconditions for other interventions such as extractive vacuum/forceps use to expand the passage as a prevention for late extraction of the head of the foetus, easing the delivery process[11–13]. Lacerations were more of the mediolateral type, which is in accordance with the clinically evidenced recommendations of various guides[14]. However, recovery from perineum laceration takes longer in the case of spontaneous tears than episiotomy-induced lacerations[15]. Thus, episiotomy is not recommended on a routine basis for each delivery, but on a selective one following indications[16,17].

The univariate analysis results indicated that the respondents participating in this research were mostly aged between 20 and 35 years (n = 54, 68.1%). This might be attributable to 20–35 years of age being the average age range in which Indonesian women start marriage and reproduction. Law No. 16 of 2019 on Marriage in Indonesia stipulates a minimum marrying age of 19 years for women. Below the age of 20, women usually are still pursuing education or attending schools. Pregnancies under 20 years of age or above 35 may lead to increased risks for pregnant women. Under-20 pregnant women are at risk of premature delivery, bleeding, and a psychological condition in which they are not ready to accept a pregnancy, which may influence their pregnancy and foetus. Perineum laceration occurs in nearly all first deliveries and not rarely in subsequent deliveries. Pregnancies that occur over 35 years of age put women at risk of complications such as prolonged labor, postpartum haemorrhage, preeclampsia, early amniotic sac rupture, low birth weight, and congenital defects[3,18].

Age is one of the internal factors that affect wound healing. Wounds can be healed faster in younger than older age because skin elasticity and collage quality are different between both age groups. Therefore, the skin of younger people is better able to tolerate cellular trauma or infections than the skin of older people. Age affects every phase of wound healing: increased thrombocyte aggregation, increased inflammatory mediator secretion, delayed macrophage and lymphocyte infiltration, interference with the macrophage function, decreased growth factor secretion, delayed re-epithelialization, delayed angiogenesis and collagen deposition, decreased collagen turnover and remodeling, and decreased wound strength[19,20].

Spontaneous rupture or laceration may happen because of the wrong way of pushing, high birth weight, stiff perineum, and parity. One of the risk factors for perineum laceration is baby's weight; the heavier the baby born, the more stretched the perineum will be, causing a rupture or laceration on the passage. In this research, laceration occurred more often in deliveries with birth weights > 2,500 grams (85.6%). Only 14.4% of the mothers gave birth to infants with birth weights < 2,500 grams. This is in line with a study which stated that the incidence of perineum laceration is influenced by, among other things, birth weight[16,21]. Perineum

laceration is affected by, among other factors, mother's position during delivery, pushing technique, and birth attendants[22].

Perineum laceration care is provided based on the depth and length of the tear. This research was limited to respondents with first- and second-degree lacerations. First-degree lacerations involve perineum skin tissue and vaginal mucosa, and it does not require stitching (hecting). Meanwhile, second-degree lacerations involve perineum skin tissue, mucosa, and perineum muscle fascia with no damage to anal sphincter, and it needs stitching (hecting). This is relevant with perineum laceration management, that is by stitching tears and by medication or non-medication methods such as administration of antibiotic, pain reliever, and laxative. Patients can also be given education on position, movement, pelvic floor exercise, and wound care[23]. Generally speaking, degree of laceration and wound stitching also determine the level of pain and interference with sexual function until 6 months postpartum[24]. Perineum pain is associated with slow wound healing process, prolonged active phase in the second delivery stage, excessive neonatal weight, and prolonged seating position of the mother. Laceration wound pain may also stem from incorrect wound care.

Perineum laceration treatment is important for accelerated wound healing and for infection prevention, given that perineum laceration occurs in anatomic proximity with the rectum area, raising the risk for bacterial growth and increased infections in the wound. Various plants in Indonesia have widely been identified and used as medicines and natural sources of nutrition, demonstrating potentials as antioxidant, antibacterial, anti-inflammatory, anticancer, anti-microbial, and other agents. Plants rich with benefits are readily available in the neighborhood, whether they be intentionally planted or growing on their own in nature. One of such plants is *Coleus amboinicus* Lour/CAL. Batak people have long been using this plant to increase breastmilk supply and to clean "dirty blood" in postpartum mothers[25].

Among the various potentials exhibited by *Coleus amboinicus* are the antibacterial and antioxidant properties. Other than nutrition, this plant also contains pharmaceuticals like neophytadine, which can be used as antibacterial and antimicrobial[26]. Carvacrol and thymol are its main components that give taste in food, while chlorogenic acid and rosmarinic acid are phenolic components. Therefore, this plant has seen numerous therapeutic, in addition to medicinal and dietary, applications[27].

Analysis of *Coleus amboinicus* Lour leaf extract solution effectiveness in relation to perineum laceration wound healing length with ANOVA indicated that there was a significant difference between the three experiment groups (F count = 4.692; sig. value = 0.012). Essential oils from *Coleus amboinicus* Lour leaves are rich with thymol, eugenol, carvacrol, ethyl silicate, and chavicol. Findings by[27] showed that *Coleus aromaticum* planted in India contains 74.41 mg% volatile ether in 24% water solution, with 2.23% petroleum ether extraction and 8.5% alcohol solution. Eugenol, contained in the leaves, not only exhibits antimicrobial effect, but also has analgesic property[7].

On average, perineum laceration healing using *Coleus amboiticus* Lour leaf extract occurred on day 5, while using povidone-iodine solution, it took place on day 7, showing that *Coleus amboiticus* extract solution was more effective at wound healing than antiseptic solution and high-level disinfectant. This result is supported by some findings[28] showing that *Coleus amboiticus* extract was effective at killing *Streptococcus aureus*, *Eschericia coli*, and *Candida albicans*.

Coleus amboiticus has a wealth of contents such as propyl propanoate, alkaloid, terpenoid, eugenol, carvacrol, and thymol that function as antimicrobials. Carvacrol displays effectiveness as a microbial against *Stapylococcus aureus*, *Eschericia coli*, *Salmonella typhi*, and *B. subtilis*. It works by inhibiting flagellar movements and preventing flagella synthesis. Other than as an antimicrobial, the phenolic compound in carvacrol is capable of inhibiting fungal growth (*Candida albacans*). *E. coli* in the perineum area can be from urination and defecation through the rectum. The presence of *Staphylococcus aureus*, *Eschericia coli*, and *Candida albicans* may lengthen the wound healing period[29].

Speedy wound healing can be derived from correct treatment using appropriate techniques and medicines. Based on this research, perineum laceration care using povidone-iodine solution yielded slower laceration healing than the use of *Coleus amboiticus* Lour leaf extract solution. Although povidone-iodine is useful for killing germs, using it for perineum laceration

wound healing will yield imperfect outcome and lower elasticity and skin collagen quality that is important for the wound healing process.

Conclusions

Proper and correct perineum laceration care has a pivotal role in pain reduction and wound healing acceleration. Perineum laceration care using *Coleus amboinicum* Lour leaf extract solution was more effective at wound healing than perineum laceration care using antiseptic solution and high-level disinfectant. The results of this resarch suggest the use of herbs, in this case *Coleus amboinicum* Lour, for perineum laceration wound treatment in postpartum midwifery care and suggest that attention be paid to nutrition care during the recovery period.

Declaration of Interest

The authors report no conflict of interest.

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