MEDIA PENELITIAN DAN
PENGEMBANGAN KESEHATAN
Vol 35 No 4, Desember 2025

e-ISSN: 2338-3445
p-ISSN: 0853-9987

EFFECTIVENESS OF USING ALOE VERA AND BETEL LEAF OINTMENT (*Piper betle L.*) ON THE HEALING OF PERINEAL WOUNDS

Efektivitas Penggunaan Salep Lisih Lidah Buaya (Aloe Vera) dan Daun Sirih (Piper betle L.) terhadap Penyembuhan Luka Perineum)

Halimatus Saidah[1*], Putri Wahyu Wigati[1], Nur Fahma Laili[2]
[1]Program Studi Kebidanan DIII, Fakultas Ilmu Kesehatan, Universitas Kadiri, Kediri, Indonesia
[2]Program Studi Apoteker, Fakultas Ilmu Kesehatan Universitas Kadiri, Kediri, Indonesia
*Email: halimatus.saidah@unik-kediri.ac.id

ABSTRAK

Luka perinuem adalah robekan pada jaringan perineum baik robek spontan maupun episiotomi, terjadi pada 75,70% ibu bersalin, 11-25% ibu dengan luka perineum mengalami gangguan penyembuhan karena proses inflamasi berlangsung berkepanjangan seperti nyeri persisten, oedem dan kemerahan, 0,1-5% berujung infeksi. Kombinasi lidah buaya (Aloe vera) dan daun sirih (Piper betle L.) dapat digunakan sebagai alternatif mempercepat penyembuhan luka perineum karena salep lidah buaya dan daun sirih memiliki efek antiinflamasi, antibakteri dan regeneratif, kombinasi dua senyawa akan lebih efektif dibandingkan dengan efek tunggal masing masing ekstrak. Tujuan penelitian ini adalah untuk mengetahui efektivitas penggunaan salep lidah buaya dan daun sirih terhadap penyembuhan luka perineum. Desain penelitian yang digunakan adalah penelitian quasi eksperimen, dengan populasi ibu nifas hari ke-1 (luka perineum derajat dua), sampel 32 orang (16 kelompok kontrol, 16 kelompok intervensi), teknik pengambilan sampel menggunakan purposive sampling. Instrumen penelitian menggunakan lembar observasi skala REEDA, dengan uji menggunakan Man-Whitney. Hasil uji perbedaan yang siginifikan antara 2 kelompok terlihat hari ke 5 (nilai p= 0,013), hari ke 6 (nilai p=0,001), hari ke 7 (nilai p=0,035). Salep Lisih dapat digunakan sebagai alternatif dalam mempercepat penyembuhan luka perineum dengan menggunakan bahan alam.

***Kata kunci**: daun sirih, lidah buaya, luka perineum, penyembuhan, salep*

ABSTRACT

Perineal wounds are tears in the perineal tissue, either spontaneous tears or episiotomy, occurring in 75.70% of mothers giving birth. 11-25% of mothers with perineal wounds experience healing disorders due to prolonged inflammatory processes, such as persistent pain, edema, and redness, 0.1-5% end up with infection. The combination of aloe vera (Aloe vera) and betel leaf (Piper betle L..) can be used as an alternative to accelerate the healing of perineal wounds because aloe vera and betel leaf ointments have anti-inflammatory, antibacterial, and regenerative effects; the combination of two compounds will be more effective than the single effect of each extract. The purpose of this study was to determine the effectiveness of using aloe vera and betel leaf ointment on healing perineal wounds. The research design used was a quasi-experimental study, with a population of postpartum mothers on day 1 (second-degree perineal wounds), a sample of 32 people (16 control groups, 16 intervention groups), and the sampling technique used was purposive sampling. The research instrument used a REEDA scale observation sheet, with a test using the Mann-Whitney. Significant differences between the two groups were observed on day 5 (p-value = 0.013), day 6 (p-value = 0.001), and day 7 (p-value = 0.035). Lisih ointment can be used as an alternative to accelerate the healing of perineal wounds using natural ingredients.

Keywords: aloe vera, betel leaf, healing, ointment, perineal wounds

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

INTRODUCTION

A perineal tear is a wound to the perineum, vulva, and vagina that occurs during childbirth. This tear can occur spontaneously or as a result of an episiotomy. Data on the incidence of perineal tears is not available globally, but several studies have reported the incidence of perineal tears during childbirth. The incidence of perineal tears in Thailand is 2.9% (1.7% wound infection and 1.2% wound dehiscence). The incidence of perineal tears in Iran is 84.3%, with 50% of women being primiparous. The incidence of perineal tears in Indonesia is 75.70%. 11-25% of mothers with perineal wounds experience impaired healing due to prolonged inflammation such as persistent pain, edema, and redness. This is mostly found in mothers under 20 years of age, primigravida, premature pregnancies, macrosomia, and vacuum-assisted deliveries. This perineal tear not only causes pain, but can also cause slow wound healing, increase the risk of infection with an infection rate of 0.1 to 5%), disrupt daily activities, the breastfeeding process, and even reduce the mother's quality of life during the postpartum period [1][2].

Based on a preliminary study conducted at the Ngasem Community Health Center, Kediri Regency, East Java, data for two months (January to February 2025) showed that 147 postpartum mothers experienced perineal injuries, including episiotomies and spontaneous tears. Of the 10 postpartum mothers who experienced perineal tears, 6 (60%) healed within 7 days, with inflammation, redness, and pain. 4 (40%) healed more quickly, in less than 7 days. Perineal wounds can be a source of initial infection in postpartum mothers. This is caused by open tissue, which allows germs and bacteria to easily enter. The incidence of infection is 0.1-23.6% in postpartum mothers, which is the second cause of maternal death after postpartum hemorrhage. Infection of perineal wounds occurs because healing takes a long time. The healing time for perineal wounds generally lasts 7-10 days and no more than 14 days. If healing takes a long time, there is a risk of infection. Delays in healing perineal wounds are caused by several factors such as economic factors, the mother's knowledge about healing perineal wounds, cultural factors, and factors within the mother herself (malnutrition, smoking, lack of sleep, stress, medical conditions and therapy, suboptimal wound cleaning, unclean environment, and infection) which result in a long inflammatory process so that wound healing is hampered[3][4].

Perineal tears cannot be considered a minor matter because if left untreated, they can lead to serious risks such as bleeding, severe pain causing discomfort to the mother, infection, and even deformity of the birth canal. The increased risk of perineal wound infection is also due to the length of healing time. The longer the healing process, the greater the risk of wound exposure to microorganisms. Infection is a leading cause of direct death, along with hemorrhage and eclampsia. The frequency of postpartum infections is approximately 45%, with infections of the perineal wound/birth canal accounting for approximately 25% to 55% [5][6][7].

Signs of perineal wound infection include perineal pain, a ruptured perineal wound, and purulent vaginal discharge. Postpartum mothers are often afraid to clean their perineal wounds due to discomfort caused by stitches in the birth canal. Common management practices for perineal wound care include dry cleaning by washing the perineal wound and scrubbing it with soap, and the use of pain-relieving medications. Examination results obtained from mothers with perineal wound infections revealed 100% Escherichia coli, 33.3% Staphylococcus bacteria, and 33.3% Acinetobacter sp. Escherichia coli bacteria are often found in the perineal wounds of postpartum mothers with delayed healing. E. coli bacteria act as pathogens in perineal wounds and can cause wound infections [8][9].

Until now, perineal wound care has largely relied on the use of local antiseptics or antibiotics, such as Betadine, due to its broad spectrum against bacteria, viruses, and

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

fungi. However, it has the disadvantage of causing dryness and irritation with repeated use. Boiled betel leaves are also sometimes used for sitz baths or washing, but this has the disadvantage of inconsistent concentrations of active ingredients. The content of natural antiseptic compounds (phenol, kavicol, eugenol) depends heavily on the type of leaf, its age, the boiling method, and the duration of the boiling. This makes the healing effect inconsistent and can vary between individuals[10][11].

Indonesia is rich in traditional medicinal plants with great potential as alternative treatments for perineal wounds, such as aloe vera and betel leaf (Piper betel L.). Aloe vera contains aloin, saponins, and glucomannan, which function as anti-inflammatory, antibacterial, and tissue regeneration stimulants. Meanwhile, betel leaf contains phenol, flavonoids, and kavicol, which have antimicrobial, anti-inflammatory, and hemostatic properties.

Aloe vera extract can inhibit the growth of Staphylococcus aureus bacteria because aloe vera leaves contain various bioactive compounds that function as antibacterial agents, including anthraquinones (aloin, emodin), saponins, flavonoids, tannins, alkaloids, and polyphenols. These compounds are bactericidal and can inhibit gram-positive bacteria such as Enterococcus bovis and Staphylococcus aureus, as well as gram-negative bacteria such as Escherichia coli, Pseudomonas aeruginosa, Morganella morganii, Proteus mirabilis, and Proteus vulgaris. Betel leaves (Piper betle L..) can also inhibit the growth of Staphylococcus aureus. Its bioactive contents include essential oils (kavikol, eugenol, chavibetol), flavonoids, saponins, tannins, alkaloids, and phenols that function as antibacterials. The chemical compounds and antibacterial activity of betel leaves have been proven to be able to inhibit gram-positive bacteria (Staphylococcus aureus, Bacillus subtilis, and Listeria monocytogenes) and gram-negative bacteria (Salmonella typhimurium, Escherichia coli, and Pseudomonas pseudomallei)[2][8].

Betel leaf (Piper Betle L..) is one of the native plants of Indonesia, which has an antibacterial effect due to the content of essential oils from betel leaves, namely phenol components and several derivatives, namely eugenol and kavikol. The antibacterial properties of betel leaves have been tested in vitro on the antibacterial activity of betel leaves, showing that, with a mixture of 96% ethanol, it can inhibit the growth of Escherichia coli bacteria. This is in line with Saraswati's research (2011) on the effect of betel leaf extract concentration on the inhibitory power of Escherichia coli, and the minimum concentration of extract that can inhibit Escherichia coli bacteria was obtained [12].

A single extract of aloe vera and a single extract of betel leaf have lower inhibitory activity against bacteria compared to the combination of the two extracts. When two antimicrobial compounds, namely aloe vera and betel leaf, work together on a homogeneous microbial population, the effect can be synergistic, meaning the combined effect is significantly greater than the single effect of each extract. The concentration of aloe vera and betel leaf extracts from various treatments results in variations in the diameter of inhibitory activity. The interaction between the concentration of aloe vera and betel leaf extracts on the diameter (inhibition zone) of inhibitory activity against Staphylococcus aureus has been studied, so in this study, aloe vera and green betel leaf extracts were combined into one. There is no treatment for perineal wounds that combines two natural ingredients, most of which use a single intervention, namely the use of aloe vera ointment or green betel leaf for wound healing, especially to accelerate the healing of perineal wounds [8].

Ointments are an alternative to accelerate the healing of perineal wounds because they are considered more practical and easy to use by postpartum mothers. Perineal wound care to prevent bacterial growth can be done traditionally, based on local wisdom, which is proven safe and can accelerate the healing of perineal wounds. These plants are also easily available locally, namely aloe vera and green betel leaves. Aloe vera

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

extract contains anthraquinones as anti-inflammatory, antibacterial, polysaccharides accelerate fibroblast regeneration, stimulate collagen synthesis, vitamins (A, C, E, B12, folic acid): antioxidants, ward off free radicals, minerals (calcium, magnesium, zinc): support the tissue healing process. While green betel leaf extract (Piper betle L.) contains Kavikol & kavibetol: strong antibacterial, especially against E. coli and Staphylococcus aureus, Flavonoids & tannins: antioxidants, accelerate wound epithelialization, saponins: stimulate collagen formation & angiogenesis, eugenol: antiseptic & analgesic effects so that aloe vera plays a role in accelerating regeneration and reducing inflammation while green betel leaf (Piper Betle L..) plays a role in preventing infection and accelerating wound closure, so the combination of both is very appropriate for perineal wound healing ointment[8].

The intervention of administering aloe vera ointment with betel leaves was given for 7 days on days 1-7 because the wound healing process is divided into the inflammatory phase (days 1-3), proliferation phase (days 4-7), and maturation phase (after day 7), day 7 was chosen because it is still in the proliferation phase, which is the most important phase for the formation of granulation tissue and epithelialization, after 7 days, usually mild-moderate episiotomy/perineal tears have closed, so that topical intervention is no longer very effective and is given twice a day because the half-life of the topical effect usually only lasts a few hours so that application twice a day maintains the concentration of the active ingredient in the wound area[13]. This study aimed to determine the effectiveness of using lisih ointment (aloe vera and betel leaves) on healing perineal wounds.

METHODS

This study used a two-pretest posttest with control group design to determine the effect of aloe vera and betel leaf (Piper betle L..) ointment on perineal wound healing. The population was all postpartum mothers on the first day who experienced second-degree perineal wounds in the Ngasem Community Health Center, Kediri Regency. The sample was taken using the infinite formula, resulting in a total of 32 people divided into 16 respondents for the intervention group and 16 respondents for the control group, A sample of 32 postpartum mothers was selected based on the inclusion criteria. Allocation into the intervention and control groups was performed using a simple randomization method. All respondents were assigned sequential numbers 1–32, then randomization was performed using the RAND() function in Microsoft Excel. The randomization results first determined the order of the respondents, then the first 16 respondents were allocated to the intervention group and the next 16 respondents to the control group. The sampling technique used purposive sampling, namely taking samples that meet the criteria set by the researcher, namely the inclusion criteria (All postpartum mothers who experience second-degree perineal wounds, are willing to be respondents, mothers do not use other drugs/other procedures for wound healing purposes, do not have diabetes mellitus, are not anemic, mothers have a daily protein intake according to the minimum postpartum needs, namely ≥ 1.2 g/kgBW/day or equivalent to ±70 grams of protein per day based on a 24-hour food recall assessment), exclusion criteria are (mothers who experience postpartum complications such as bleeding, mothers do not follow research procedures, mothers who are over 40 years old), the research instrument used an observation sheet for perineal wound healing using the REEDA Score, the study was conducted in July-August 2025.

The research procedure began with processing research permits, preparing research materials (making ointments), conducting ointment product tests, managing research ethics, selecting research subjects who experienced second-degree perineal wounds, the selected samples were asked for consent (informed consent), research subjects 1-16 were selected as the control group and subjects 17-32 were selected as the research intervention group. The intervention group in this study was given treatment with Lisih

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

ointment (aloe vera and green betel leaf (Piper betle L..) by cleaning the perineum area with clean water and drying it gently, applying a thin layer of ointment to the wound area, using it regularly 2 times a day. The intervention was given for 7 days (day 1 to day 7) given ointment 2X1 at 07.00 WIB and 19.00 WIB; While the control group was given perineal wound care by washing the perineum with soap and running water, carried out every morning for 7 days of observation. Each intervention was observed using the REEDA Score, an instrument introduced by Davidson (1974), one of the observation methods used to assess perineal wound healing, REEDA, namely R = Redness / (Redness), E = Edema (Swelling), E = Ecchymosis (Bruising), D = Discharge (Fluid/mucus/pus from the wound), A = Approximation (Wound edge alignment), with a REEDA score of 0-15.

Table 1. REEDA Score Numbering

Component	Score 0	Score 1	Score 2	Score 3
Redness	No redness	Redness within <0.25 cm of the wound	Redness 0.25–0.5 cm from the wound	Redness >0.5 cm from the wound
Edema	No swelling	Swelling within <1 cm from the wound	Swelling 1–2 cm from the wound	Swelling >2 cm from the wound
Ecchymosis	No bruising	Bruising within <1 cm from the wound	Bruising 1–2 cm from the wound	Bruising >2 cm from the wound
Discharge	No discharge	Serous discharge (clear fluid)	Serosanguinous discharge (mixed with blood)	Purulent discharge (pus)
Approximation	Edges well approximated (closed)	Slight separation of wound edges	Clear separation of wound edges	Complete dehiscence (edges widely separated)

Description:
Healing items are scored 0-3 depending on the condition of the wound.
The scores for the total number of healing items are:
0 = good wound healing
1-5 = poor wound healing
>5 = poor wound healing
The day the wound heals is the REEDA score= 0

The ointment is made using the fusion method. First, all ingredients are weighed according to the formulation: 1 g of aloe vera ethanol extract, 1 g of green betel leaf ethanol extract, 3 g of adeps lanae, 1 g of liquid paraffin, 1 g of cetyl alcohol, 0.002 g of alpha-tocopherol, and vaseline flavum, reaching a total weight of 20 g. The ointment base ingredients, vaseline flavum, adeps lanae, liquid paraffin, and cetyl alcohol, are melted at a temperature not exceeding 70°C until homogeneous. The mixture is then allowed to cool slightly to around 40–45°C. Then, the aloe vera ethanol extract and the betel leaf ethanol extract are slowly added, stirring continuously until thoroughly combined. Next, alpha-tocopherol is added to the mixture as an antioxidant to prevent oxidation of the extracts. The stirring process continues until a homogeneous, semi-solid ointment mass is obtained that does not experience phase separation. The homogenized ointment is then put into a clean and sterile ointment container, tightly closed, and stored at room temperature, protected from direct sunlight and excessive heat to maintain its stability. Data analysis using the Mann-Whitney test to determine the effectiveness of using aloe vera ointment from betel leaves on healing perineal wounds. This research has undergone ethical testing with ethical feasibility number 064/18/VII/KEP/UNIK/2025.

RESULT

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

Table 2. Characteristics of Respondents in the Intervention and Control Groups

Variables	Group Treatment		Control Group	
	n	%	n	%
Age				
<20 Years	2	13	4	25
21-35 Years	11	69	8	50
>35 Years	3	19	4	25
Amount	16	100	16	100
Job				
Housewife	6	38	9	56
Self-employed	8	50	2	13
Private	2	13	3	19
Civil Servant	0	0	2	13
Amount	16	100	16	100
Education				
Elementary School	1	6	0	0
Junior High School	3	19	4	25
Senior High School	8	50	9	56
College	4	25	3	19
Amount	16	100	16	100
Parity				
Primipara	6	38	5	31
Multipara	10	63	11	69
Amount	16	100	16	100
Food Taboos				
Food Taboos	0	0	0	0
No Food Abstinence	16	100	16	100
Amount	16	100	16	100

Based on Table 2, the respondent characteristics in both intervention and control groups were generally similar. In the intervention group, most participants (69%) were aged 21–35 years, half (50%) were self-employed and had a high school education, 63% were multiparous, and all (100%) had no dietary restrictions. Likewise, in the control group, half (50%) were aged 21–35 years and self-employed, 69% had a high school education, 65% were multiparous, and all (100%) had no dietary restrictions. Overall, there were no notable differences in respondent characteristics between the two groups.

Table 3. Distribution of Perineal Wound Healing From Day 1 to Day 7 in The Intervention and Control Groups

Wound Healing	Group Intervention (n=16)						Group Control (n=16)					
Day to-	Good (Reeda Scale Number 0)		Not good (Reeda Scale Number 1-5)		Bad (Reeda Scale Number >5)		Good (Reeda Scale Number 0)		Not good (Reeda Scale Number 1-5)		Bad (Reeda Scale Number >5)	
	n	%	n	%	n	%	n	%	n	%	n	%
1	0	0	0	0	16	100	0	0	0	0	16	100
2	0	0	0	0	16	100	0	0	0	0	16	100
3	0	0	16	100	0	0	0	0	13	81.25	3	18.75
4	0	0	16	100	0	0	0	0	16	100	0	0
5	13	81.25	3	18.75	0	0	6	37.5	10	62.5	0	0
6	16	100	0	0	0	0	8	50	8	50	0	0
7	16	100	0	0	0	0	12	75	4	25	0	0

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

Based on table 3 regarding the Distribution of Healing from Day 1 to Day 7 in the Intervention Group and the Control Group, it is known that the difference in perineal wound healing in the intervention group and the control group was seen on day 5. On day 5 in the intervention group, almost all (81.25%) of the wounds healed well (score 0 using the REEDA scale assessment), while in the control group, more than half (62.5%) of the wounds healed poorly (score 1-5 using the REEDA scale).

Data Normality Test in the Intervention Group and Control Group

The homogeneity test is an assumption test that aims to determine whether the samples studied have the same abilities. The normality test uses the Kolmogorov-Smirnov test using Statistical Product and Service Solutions (SPSS) software. The results of the data normality test are shown in Table 3 below.

Table 4 Normality Test

Day To.	Inter Group	Control Group
	p-value	p-value
1	0,000	0,000
2	0,000	0,000
3	0,000	0,000
4	0,000	0,000
5	0,000	0,000
6	0,000	0,000
7	0,000	0,000

Based on table 4, the results of the normality test using the Kolmogorov-Smirnov test obtained ρ-value <α 0.05, so it can be concluded that the data is not normally distributed. From the normality test (Kolmogorov-Smirnov), if p-value< 0.05 is obtained, it means the data is not normal, so the test used is non-parametric, namely the Mann-Whitney U test.

Table 5. Effect of Lisih Ointment (Aloe Vera) and Betel Leaf (*Piper betle L..)* on Perineal Wound Healing

Day To	Mean Rank Control	Mean Rank Intervensi	Mann-Whitney U	Z	p-value (Asymp. Sig. 2-tailed)
1	16,50	16,50	128,000	0,000	1,000
2	16,50	16,50	128,000	0,000	1,000
3	18,00	15,00	104,000	-1,791	0,073
4	16,50	16,50	128,000	0,000	1,000
5	20,00	13,00	72,000	-2,480	0,013
6	20,50	12,50	64,000	-3,215	0,001
7	18,50	14,50	96,000	-2,104	0,035

Based on table 5, analysis using the Mann-Whitney test showed that on days 1, 2, and 4, there was no difference in REEDA scores between the intervention and control groups (p-value = 1.000). On day 3, although the intervention group had a lower mean rank than the control group (15.00 vs. 18.00), the difference was not statistically significant (p-value= 0.073).

From day 5 to day 7, there was a significant difference between the two groups. On day 5, the intervention group's REEDA score was lower than the control group's, with a p-value = 0.013. On day 6, the difference became more significant (p-value= 0.001), and on day 7, it remained significant (p-value= 0.035). It can be concluded that the healing of perineal wounds in the intervention group (administration of aloe vera and betel leaf ointment) took place faster and better than in the control group, which means that

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

administering aloe vera and betel leaf ointment (lisih) is effective in accelerating the healing of perineal wounds.

DISCUSSION

1. Distribution Of Perineal Wound Healing From Day 1 To Day 7 In The Intervention And Control Groups

Based on Table 3 regarding the Distribution of Healing from Day 1 to Day 7 in the Intervention Group and the Control Group, it is known that the difference in perineal wound healing in the intervention group and the control group was seen on day 5. On day 5 in the intervention group, almost all (81.25%) of the wounds healed well (score 0 using the REEDA scale assessment), while in the control group, more than half (62.5%) of the wounds healed poorly (score 1-5 using the REEDA scale)

The results showed that differences in perineal wound healing between the intervention and control groups were only visible starting on day 5. On day 5, the majority of respondents in the intervention group (81.25%) showed good wound healing (REEDA score = 0), while in the control group, more than half (62.5%) still experienced poor healing (REEDA score 1–5).

This difference can be explained by the mechanism of action of the combination of aloe vera and betel leaf extracts used in the ointment form in the intervention group. Aloe vera is known to contain bioactive compounds such as anthraquinones, saponins, flavonoids, and tannins, which act as antibacterials and anti-inflammatory agents, while also accelerating tissue epithelialization. Meanwhile, betel leaves contain essential oils (especially eugenol and kavicol), flavonoids, and polyphenols, which have strong antibacterial effects against both Gram-positive and Gram-negative bacteria, thus preventing wound infection [14]. Efektivitas *Aloe vera* pada luka perineum postpartum juga melaporkan bahwa kelompok intervensi dengan *Aloe vera* memiliki skor penyembuhan luka lebih baik dibandingkan kelompok kontrol, dan perbedaan menjadi signifikan [15].

Physiologically, perineal wound healing enters the proliferative phase on days 4 to 7. This phase is characterized by the formation of granulation tissue, fibroblasts, and collagen, which close the wound. Interventions such as applying aloe vera and betel leaf ointment accelerate the proliferation phase by inhibiting bacterial growth, reducing inflammation, and stimulating new tissue growth. This is consistent with previous research showing that aloe vera can accelerate the epithelialization process, while betel leaf extract has been shown to effectively inhibit the growth of Staphylococcus aureus and Escherichia coli, the dominant bacteria that cause perineal wound infections.

2. Effect of Lisih Ointment (Aloe Vera) and Betel Leaf (Piper betle L.) on Perineal Wound Healing

Analysis using the Mann-Whitney test showed that on days 1, 2, and 4, there was no difference in REEDA scores between the intervention and control groups (p-value= 1.000). On day 3, although the intervention group had a lower mean rank than the control group (15.00 vs. 18.00), the difference was not statistically significant (p-value= 0.073).

From day 5 to day 7, there was a significant difference between the two groups. On day 5, the intervention group's REEDA score was lower than the control group's with a p-value= 0.013. On day 6, the difference became more significant (p-value= 0.001), and on day 7, it remained significant (p-value= 0.035). It can be concluded that the healing of perineal wounds in the intervention group (administration of aloe vera and betel leaf ointment) took place faster and better than the control group, which means that administering aloe vera and betel leaf ointment (lisih) is effective in accelerating the healing of perineal wounds.

The perineal wound healing process generally proceeds through three phases: the inflammatory phase (0–3 days), characterized by edema, redness, and pain; the proliferation phase (days 4–21), characterized by the formation of granulation tissue,

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

fibroblasts, and collagen; and the maturation/remodeling phase (>21 days), where wound closure becomes more complete [16].The results of this study align with this theory, stating that from days 1 to 4, perineal wounds are still in the inflammatory phase, so no significant differences are visible. Differences begin to appear on day 6 because Lisih ointment (aloe vera from betel leaf) accelerates the proliferation phase through its bioactive compounds[2].The proliferation phase typically lasts from days 4 to 21 after wounding. This phase involves granulation tissue formation, fibroblast proliferation, collagen synthesis, angiogenesis, and epithelialization, accelerating wound healing. Therefore, interventions that increase fibroblast activity, collagen, and angiogenesis will accelerate wound healing.

Aloe vera is known to contain polysaccharides (acemannan), vitamins C, E, and antioxidant compounds that play a role in accelerating wound epithelialization, stimulating fibroblasts, and increasing collagen synthesis [17]. Furthermore, aloe vera has anti-inflammatory effects that reduce excessive leukocyte infiltration, thus optimizing the healing process. Bioactive compounds such as acemannan (a polysaccharide) have been shown to stimulate fibroblast proliferation and type III collagen synthesis, thus accelerating the formation of granulation tissue[18]. Through this mechanism, aloe vera accelerates the proliferation phase of perineal wound healing. Betel leaves contain phenols, flavonoids, eugenol, and chavicol, which have antimicrobial, antiseptic, and antioxidant properties. Betel leaf (Piper betle L.) is a member of the Piperaceae family and is widely cultivated throughout much of South and Southeast Asia, including Vietnam [17]. The plant has been used medicinally. Betel leaves contain numerous chemical components, such as betal-phenol, kavicol, and other phenolic compounds. These components contribute to its potent antifungal and antibacterial properties. Betel leaves have also been reported to show potential in wound healing and other ailments. Betel leaves contain flavonoids, phenols, eugenol, chavicol, and tannins, which have antimicrobial, antiseptic, antioxidant, and astringent properties. Flavonoids aid tissue regeneration, while chavicol and eugenol function as antiseptics, preventing bacterial colonization in wounds. Tannins act as astringents, accelerating wound contraction. Thus, betel leaves keep wounds sterile and facilitate the granulation and epithelialization phases[17][18].

Aloe vera is effective in killing gram-positive (75%) and gram-negative (100%) bacteria. The protease enzyme, along with glucomannan, found in aloe vera, can stimulate fibroblasts for wound healing. These elements in aloe vera, when combined, can stimulate macrophages, which control the immune system. Furthermore, aloe vera mucus contains vitamins E and C, as well as several amino acids not found in other plants commonly used for wound healing, such as binahong, which is beneficial as a powerful antioxidant in wound healing. Aloe vera is particularly well combined with betel leaves because they both have antimicrobial properties[19][20].

The use of aloe vera as a medicinal plant for wound healing has been proven to be effective in post-operative wounds such as episiotomy, cesarean section, skin biopsy, hemorrhoidectomy, gynecological laparotomy, and grafts.[21] Research by Hekmatpou et al. in 2019 showed that aloe vera concentrations of 1-100 mg/kg body weight can improve wound healing [21].

Previously, an in vitro test was conducted on the interaction of aloe vera and betel leaves on the inhibitory effect of Staphylococcus aureus. The results showed an interaction between the concentration and type of aloe vera and betel leaf extracts on the inhibitory effect of Staphylococcus aureus [6][16]. One effort to simplify the use of this ingredient is to create an ointment preparation. Ointments are semi-solid preparations intended for topical application to the skin and mucous membranes. Topical ointments are chosen because they are easy to use and best suited for therapeutic purposes [22].

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

The combination of aloe vera and betel leaf in Lisih ointment provides a synergistic effect. Aloe vera accelerates tissue regeneration, while betel leaf prevents bacterial colonization in wounds. Perineal wound healing was assessed using the REEDA scale (Redness, Edema, Ecchymosis, Discharge, Approximation) observation sheet developed by Davidson. Redness was reduced due to the anti-inflammatory effects of aloe vera, edema (swelling) was reduced due to the anti-inflammatory and astringent effects of betel leaves (ecchymosis (bruising) disappeared more quickly due to improved microcirculation, discharge (secretions/exudates) was reduced because betel leaves prevented bacterial growth, and approximation (wound edge meeting) was achieved more quickly due to increased collagenization by acemannan in aloe vera, the novelty of this study is that previous researchers used single interventions, for example aloe vera ointment, traditional herbal medicine, or synthetic drugs (povidone iodine, topical antibiotics), not many have combined two natural ingredients with complementary mechanisms, aloe vera functions to accelerate the process of tissue proliferation & regeneration and green betel leaves prevent bacterial infections (eg E. coli, S. aureus) in perineal wounds[2][23].

Therefore, the combination of aloe vera and betel leaves (Lisih ointment) significantly accelerated the reduction in REEDA scores starting from the proliferation phase[23]. Betel leaf extract is well-documented as an antiseptic that lowers infection risk in perineal wounds. Furthermore, studies in the *Journal of Obstetrics & Gynecology Research* and the *International Journal of Wound Care* have shown that herbal agents with anti-inflammatory and antimicrobial activities markedly accelerate postpartum wound healing[24]. The results of this study are consistent with previous findings that the use of natural ingredients such as aloe vera and betel leaf can accelerate wound healing. A significant time difference (day 5) indicates that the inflammatory phase proceeded normally in both groups, but the proliferative phase was faster in the intervention group with Lisih ointment Aloe Vera and Betel Leaf), which proves that the use of Aloe Vera and betel leaf ointment can accelerate perineal wound healing compared to the group that was not given the ointment.

The advantage of this research is that aloe vera and betel leaf ointment can accelerate the healing of perineal wounds because both have antibacterial, anti-inflammatory properties, and accelerate the wound healing process so that the results of this research are directly useful in improving the quality of obstetric services, the use of aloe vera and betel leaf in the form of ointment is also an innovation in the use of natural ingredients because the ointment formulated from aloe vera (Aloe vera) and betel leaf (Piper betle) offers a safer alternative complementary therapy compared to chemical treatment, this research also adds scientific data related to herbal-based non-pharmacological therapy using natural ingredients that are easily found in the community [12][16].

The limitations of this study are the relatively small number of respondents due to the relatively small incidence of perineal tears in a society where most deliveries are by CS, nutritional factors, general health status, wound care techniques carried out by respondents, and respondent compliance may not be fully controlled, the use of clinical scales such as REEDA (Redness, Edema, Ecchymosis, Discharge, Approximation) although valid, still has the potential for subjectivity bias between assessors and the study focuses more on clinical evaluation, without specific examination of the antibacterial activity of ointments on perineal flora [23].

The results of this study can be used as an alternative intervention for perineal wound care in health care facilities, because the ointment made from natural ingredients, namely a combination of aloe vera leaves and green betel leaves, has minimal side effects because it is made from natural ingredients, is practical, easy to use and affordable, the ointment/topical form is easy to apply by mothers themselves at home, with faster wound healing and reduced pain, mothers can be more comfortable in their

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

activities and focus on caring for their babies and the breastfeeding process. This study strengthens the theory that the combination of herbal ingredients with anti-inflammatory and antibacterial properties can accelerate tissue proliferation in perineal wounds.

CONCLUSION

Lisih ointment (aloe vera and betel leaf) has an effect on perineal wound healing. The difference in perineal wound healing between the intervention group given Lisih ointment (aloe vera and betel leaf) and the control group (mothers washed the perineal wound with running water) showed a difference in the perineal wound healing process on day 6, while no difference was observed between days 1 and 5.

Lisih ointment can be an alternative complementary therapy using relatively safe and inexpensive local ingredients to accelerate perineal wound healing. This effectiveness is likely due to the combined anti-inflammatory, antioxidant, and antimicrobial effects of the ointment and aloe vera.

ACKNOWLEDGMENT

Thank you to the respondents, the research team, the research location, the Ngasem Community Health Center, Kediri Regency, LP3M University, and also to the Ministry of Education and Culture who provided research costs.

REFERENCES

[1] H. Cakwira *et al.*, "The Clinical Characteristics Of Perineal Tears: A Study Carried Out On 14 Pregnant Women In A Tertiary Center: Case Series," *Ann. Med. Surg.*, vol. 82, no. June, p. 104432, 2022, doi: 10.1016/j.amsu.2022.104432.

[2] S. Dona, S. Afriyanti, and D. Rahmawati, "Identifikasi Penyembuhan Luka Perineum Menggunakan Skala Reeda Pada Ibu Yang Diberikan Teh Kalakai," *Din. Kesehat. J. Kebidanan Dan Keperawatan*, vol. 14, no. 2, pp. 310–319, 2024, doi: 10.33859/dksm.v15i1.936.

[3] S. Damarini, "The Effectiveness of Red Betel in Healing Perineal Wound in Independent," *Kesehat. Masy. Nas.*, vol. 8, no. 03, pp. 39–44, 2013.

[4] A. Rohmin, B. Octariani, and M. Jania, "Faktor Risiko yang Mempengaruhi Lama Penyembuhan Luka Perineum pada Ibu Post Partum (Risk Factor Affecting the Period of Perineal Wound Healing in Postpartum Mothers)," *J. Kesehat.*, vol. 8, no. 3, pp. 449–454, 2017.

[5] R. Harini, "Upaya Percepatan Penyembuhan Luka Perineum Pada Ibu Post Partum Dengan Antiseptik Daun Sirih Di Puskesmas Wagir Kabupaten Malang," *J. Kesehat. Mesencephalon*, vol. 5, no. 2, 2019, doi: 10.36053/mesencephalon.v5i2.182.

[6] P. Astuti, S. R. Agfiany, and K. R. Abidin, "Aktivitas Ekstrak gel Aloe vera sebagai Antiinflamasi Untuk Mempercepat Proses Penyembuhan Luka Pada Tikus Sprague dawley," *J. Ilm. Umum Dan Kesehat. Aisyiyah*, vol. 5, no. 1, pp. 50–55, 2020.

[7] KEMENKES RI, *Profil Kesehatan Indonesia 2020*. 2021. [Online]. Available: https://pusdatin.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-Tahun-2020.pdf

[8] S. Az-Zahra *et al.*, "Potential Compound Extract From Potential Compound Extract From Carica pubescens On Gingiva Incision Wound Healing: Through Proliferation, Differentiation and Immunoresponse Mechanisms," *Med. Heal. J.*, vol. 1, no. 1, p. 11, 2021, doi: 10.20884/1.mhj.2021.1.1.4683.

[9] S. Inayatullah, "Efek Ekstrak Daun Sirih HIJAU (Piper betle L..) Terhadap Pertumbuhan Bakteri Staphylococcus aureus," *Skripsi Progr. Stud. Pendidik. Kedokt. UIN Syarif Hidayatullah Jakarta*, p. 50, 2012.

[10] N. Nurhidayati, R. Afdila, and N. Rahmadani, "Perbandingan Pemberian Teh Daun Binahong Dan Povidone Iodine Terhadap Lamanya Penyembuhan Luka Perineum Derajat 1 Dan 2 Pada Ibu Nifas," *Prepotif J. Kesehat. Masy.*, vol. 8, no. 3, pp. 6479–6485, 2024, doi: 10.31004/prepotif.v8i3.35243.

https://doi.org/10.34011/jmp2k.v35i4.3855

e-ISSN: 2338-3445
p-ISSN: 0853-9987

[11] Herman, N. F. Jumatrin, R. Ananda, and M. Uksin, "Studi Penerapan Terapi Sitz Bath Post Partum Terhadap Nyeri Dan Penyembuhan Luka Perineum Di Wilayah Puskesmas Motaha," *J. Keperawatan*, vol. Volume 7, pp. 1–6, 2023, [Online]. Available: https://jurnal.karyakesehatan.ac.id/JK/article/view/1180/469

[12] N. J. Pinatik, W. B. S. Joshep, and R. H. Akili, "Efektivitas Daun Sirih Hijau (Piper Betle L.inn.) Dalam Menghambat Pertumbuhan Bakteri Escherichia Coli," *E-Journal Univ. Sam Ratulangi*, vol. 6, pp. 1–9, 2017.

[13] S. Lestari, E. Mayasari, and J. Parmin, "Asuhan Kebidanan Pada Ibu Nifas Dengan Luka Laserasi Perineum Di PMB Dewi Sartika Wilayah Kerja Puskesmas Kuok Midwifery Care for Postpartum Women with Perineal Lacerations at PMB Dewi Sartika, Kuok Health Center Work Area," vol. 3, no. 4, 2024, [Online]. Available: https://journal.universitaspahlawan.ac.id/

[14] A. Budiman, R. Khoerunnisa, and A. Tazyinul Qoriah, "Wound-healing test of piper betle L.eaf extract and aloe vera in gel preparation," *Int. J. Appl. Pharm.*, vol. 10, no. 3, pp. 86–91, 2018, doi: 10.22159/ijap.2018v10i3.24408.

[15] D. Maternity, "Efektivitas Penggunaan Lidah Buaya (Aloevera) Terhadap Penyembuhan Luka Perineum Pada Ibu Nifas Diwilayah Kerja Puskemas Karang Anyar Lampung Selatan Tahun 2021," *J. Ilm. Bidan*, vol. 6, no. 2, pp. 25–32, 2022, doi: 10.61720/jib.v6i2.340.

[16] Rahmawati, "Interaksi Ekstrak Daun Lidah Buaya (Aloe vera L.) dan Daun Sirih (Piper betle L..) terhadap Daya Hambat Stapylococcus aureus Secara In Vitro.," *J. EduBio Trop.*, vol. 2, no. 1, pp. 121–186, 2014.

[17] A. E. Manuntungi, I. Irmayanti, and R. Ratna, "Faktor-Faktor yang Mempengaruhi Lamanya Penyembuhan Luka Perineum pada Ibu Nifas di Ruang Perawatan Rumah Sakit Mitra Manakarra Mamuju," *Nurs. Insid. Community*, vol. 1, no. 3, pp. 96–103, 2019, doi: 10.35892/nic.v1i3.231.

[18] L. T. Lien, N. T. Tho, D. M. Ha, P. L. Hang, P. T. Nghia, and N. D. Thang, "Influence of phytochemicals in piper betle L.inn leaf extract on wound healing," *Burn. Trauma*, vol. 3, no. 1, pp. 1–8, 2015, doi: 10.1186/s41038-015-0023-7.

[19] F. Mubayyina, "the Effectiveness of Red Betel Leaf and Aloe Vera in the Treatment of Perineal Wounds: Literature Review," *Int. J. Nurs. Midwifery Sci.*, vol. 7, no. 2, pp. 208–215, 2023, doi: 10.29082/ijnms/2023/vol7/iss2/478.

[20] Halimatus Saidah, Dewi Kartika Sari, Cristina Sri Healthyni, and Mira Zoraya, "The Effectiveness of Infusa Leaf of Binahong (Anredera Codifolia) in Healing Perineal Wound," *J. Qual. Public Heal.*, vol. 5, no. 2, pp. 537–544, 2022, doi: 10.30994/jqph.v5i2.353.

[21] F. Mubayyina, G. Alam, A. N. Usman, M. Ahmad, S. As'ad, and I. Raya, "Piper crocatum and Aloe vera Difference Effectiveness in Complementary Treatment of Perineal Wounds," *Biota*, vol. 15, no. 1, pp. 31–39, 2022, doi: 10.20414/jb.v15i1.409.

[22] D. Larasati, F. Istiqomah, and B. Hernowo, "Evaluasi Sifat Fisik Salep Kunyit (Curcuma domestica) dengan Variasi Konsentrasi Vaselin Album," *J. Kesehat. Madani Med.*, vol. 13, no. 01, pp. 93–99, 2022.

[23] M. B. Alvarenga, A. A. Francisco, S. M. J. V. De Oliveira, F. M. B. Da Silva, G. T. Shimoda, and L. P. Damiani, "Episiotomy healing assessment: Redness, oedema, ecchymosis, discharge, approximation (REEDA) scale reliability," *Rev. Lat. Am. Enfermagem*, vol. 23, no. 1, pp. 162–168, 2015, doi: 10.1590/0104-1169.3633.2538.

[24] N. M. D. M. W. Nayaka *et al.*, "Piper betle (L): Recent review of antibacterial and antifungal properties, safety profiles, and commercial applications," *Molecules*, vol. 26, no. 8, pp. 1–21, 2021, doi: 10.3390/molecules26082321.

https://doi.org/10.34011/jmp2k.v35i4.3855