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Research Article

Piper crocatum and *Aloe vera* Difference Effectiveness in Complementary Treatment of Perineal Wounds

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Abstract

Indonesia, with a maternal mortality rate (MMR) of 305 per 100,000 live births, is directly caused by post-partum hemorrhage (30.3%) and hypertension (27.1%). At the same time, post-partum infection ranks second as a contributor to maternal death after bleeding. Data from the Indonesian Demographic Health Survey (IDHS) showed that the incidence of perineal laceration or rupture was experienced by women who gave birth vaginally (75%). The prevalence of women who experience perineal tears is in the 25-30 years (24%) and women aged 32-39 years (62%). This study aimed to examine the differences in the effectiveness of Piper crocatum and Aloe vera in the complementary treatment of perineal wound healing in post-partum mothers. This study was a quasi-experimental pretest-posttest control group design with a total sampling method with a ratio of 1:1:1 for as many as 30 post-partum mothers with grade I and II injuries according to inclusion criteria with Intervention group red betel stew, aloe vera, and the Control group with perineal injuries at Gunung Sari Health Center and Sesela Health Center. The data observed were the degree of perineal wound healing using the REEDA scale (Redness, Edema, Ecchymosis, Discharge, and Approximation). The results showed differences in the effectiveness of Piper crocatum and aloe vera on perineal wound healing. The average results of the Mann-Whitney statistical test were on the 5th and 7th days (p-value< 0.005). This study shows that Piper crocatum can accelerate the healing of perineal wounds and become an alternative, complementary therapy in perineal wound healing.

Keywords : *Piper crocatum*, *Aloe vera*, Complementary Treatment, Perineal Wounds

1. Introduction

Perineal injury, tearing of the perineum due to spontaneous delivery or the procedure is divided into degrees I, II, III, and IV with heacthing as handling. The incidence of perineal rupture in maternity mothers in the world in 2020 was 2.7 million cases, estimated to reach 6.3 million in 2050. In Asia, 50% of women giving birth experience perineal rupture (Astuti, 2021).

The screening results on chemical components show that red betel leaf contains a group of compounds, including the flavonoid quercetin (Fitriyani et al., 2011). essential oil (Suri et al., 2021). Alcooids and polyphenols (Gong et al., 2021). While the compound content of aloe vera is anthraquinone anthrones, sterols, phenolic acid, terpenoids, chromone, alkaloids, flavonoids, carbohydrates, amino acids, lipids, and minerals (Nalimu et al., 2021) (Cock, 2015) (Nalimu et al., 2021) (Kumar et al., 2019). Some of these

ingredients have anti-inflammatory, antioxidant, and antibacterial properties that can help wound healing.

The perineum with conditions exposed to lochia in a humid state will trigger the proliferation of bacteria, which can lead to infection in the perineum and does not rule out the possibility of spreading to the urinary tract or infection in the birth canal. Perineal wound healing time lasts 7-10 days and no more than 14 days with perineal wound care to prevent infection that can be done through pharmacological and non-pharmacological therapy. Pharmacological therapy is by giving antibiotics and antiseptic drugs (povidone-iodine), while non-pharmacologically, it can be done with therapy using various plants, one of which is *Piper crocatum* and *Aloe vera* (Riyanti imron & Risneni, 2018).

Piper crocatum or *Piper crocatum* is a family of *Piperaceae*, which has been shown to have various pharmacological activities, including anticancer activity, antioxidant activity, antibacterial activity, antihyperglycemic activity, and anti-allergic inflammatory activity (Gong et al., 2021). Research by Karimah et al. (2019), who performed perineal wound care using boiled water from *Piper crocatum* leaves with a concentration of 25%, was used to wash the genitals after urinating and the last rinse at 07.00 and 15.00 on 1-3 post-partum days. Observations were made every morning to assess the recovery of the perineal wound from the second post-partum day until it was fully recovered using the REEDA score. Another plant that can be used in the treatment of perineal wounds is *Aloe vera* (Eghdampour et al., 2013).

The application of *Aloe vera* as a medicinal plant for wound healing has been proven to be used in postoperative wounds such as episiotomy, caesarean section, skin biopsy, hemorrhoidectomy, gynaecological laparotomy surgery, and grafts. The research of Hekmatpou et al. (2019) showed that concentrations of *Aloe vera* 1-100 mg/kg BW were able to improve wound healing(Hekmatpou et al., 2019). Another study by Vfizquez et al., (1996) showed that 96% ethanol extract Aloe vera gel can potentially reduce edema. This research is to determine the difference in the effectiveness of giving *Piper crocatum* and *Aloe vera* in the complementary treatment of perineal wounds in post-partum mothers.

2. Materials and Methods

2.1 Materials

2.1.1 Production of *Piper crocatum*

Fresh *Piper crocatum* leaves are cleaned by washing them leaves in running water. Then the leaves are drained, boiled as much as 25 grams of leaves into 100 ml of water until boiling and left for 15 minutes. After the cooking water becomes warm, and it is then filtered using a flannel cloth. Sufficient volume of betel leaf boiled water to 100 ml (Karimah et al., 2019)

2.1.2. Production *Aloe vera*

Aloe vera meat was obtained by peeling the leaves and taking the *Aloe vera* flesh with a weight calculation of 100 mg/kg of the respondent's body weight. The *Aloe vera* meat was homogenized to resemble a gel (mucus) and then stored in the refrigerator in the container of each respondent. At the time of use, the gel preparation is taken using sterile gauze (Hekmatpou et al., 2019)

2.2 Methods

This research is quasi-experimental with a Pretest-Posttest Control Group design carried out at Gunung Sari Health Center and Sesela Health Center in February-March 2022. The study population was all post-partum mothers with perineal injuries either spontaneously or episiotomy grade I and II, with sample 30 divided into three groups consisting of 1 intervention group given *Piper crocatum* decoction and one intervention group was given *Aloe vera*. In contrast, the control group was assigned povidone-iodine in a ratio of 1:1:1.

a. Inclusion criteria include:
   1. Mother with spontaneous perineal rupture and degrees I and II. episiotomy
   2. Willing to be a research respondent

b. Exclusion criteria include:
   1. Respondents who do not take antibiotics
   2. Respondents who use other herbs
   3. Respondents with a history of comorbid disease

   The instrument in this study used the REEDA scale, and the analysis used was Kruskal-Wallis and Post Hoc Man-Whitney.

On the 1st day of the intervention group with *Piper crocatum* decoction, the mother cleaned the genital area at the last rinse given once for 3 post-partum days in the morning. In the *Aloe vera* intervention group, post-partum mothers will be intervened by giving a compress of *Aloe vera* flesh wrapped in sterile gauze and compressed on the perineal wound area for 3 minutes at 6 hours post-partum repeated at the same hour. While in the control group, the mother received povidone-iodine therapy just once on the first day. The assessment was carried out on the 5th and 7th day post-partum.

3. Results and Discussion

3.1. Results

This study provided intervention to post-partum mothers who experienced grades 1 and 2 perineal injuries caused by spontaneous delivery or episiotomy. The intervention given was the *Piper crocatum* stew used for washing and compressing *Aloe vera* on the wound. This research provided intervention to post-partum mothers who experienced grades 1 and 2 perineal injuries caused by spontaneous delivery or episiotomy. The intervention given was the *Piper crocatum* stew used for washing and compressing *Aloe vera* on the wound.

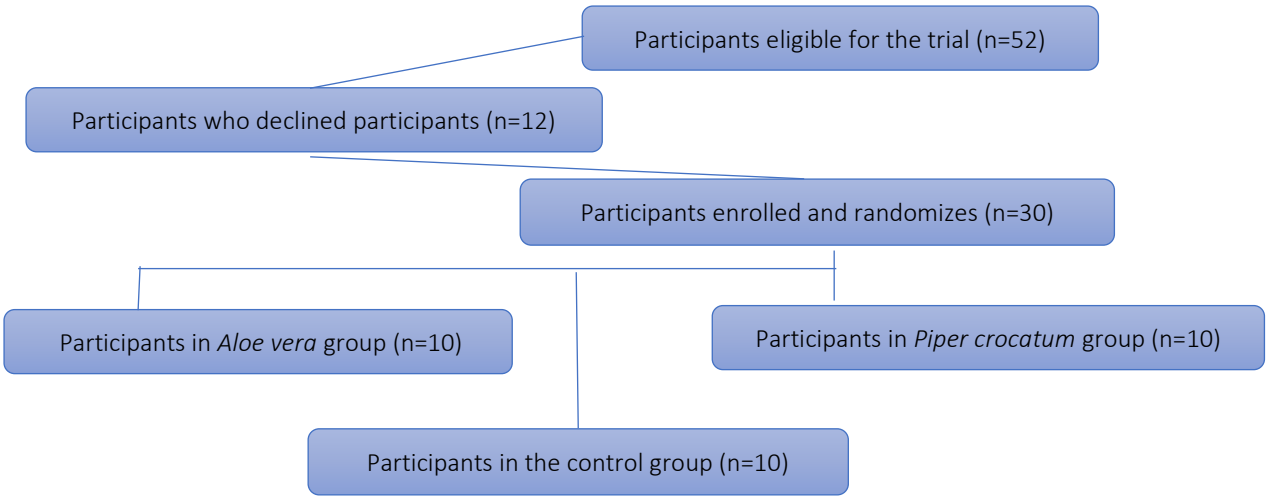

Figure 1. Flowchart of Group Participants

Table 1. REEDA Scale Average

Variabel	Group	Day 1 Postpartum Mean (SD)	Day 5 Postpartum Mean (SD)	Day 7 Postpartum Mean (SD)
Redness	*Piper crocatum*	1,60 (0,516)	0,00 (0,000)	0,00 (0,000)
	Aloe vera	1,90 (0,568)	0,70 (0,823)	0,40 (0,516)
	Control	2,00 (0,471)	0,50 (0,527)	0,30 (0,483)
	p-value	0,214	0,028	0,096
Edeme	*Piper crocatum*	0,90 (0,568)	0,00 (0,000)	0,00 (0,000)
	Aloe vera	1,00 (0,667)	0,60 (0,843)	0,00 (0,000)
	Control	1,40 (0,516)	0,00 (0,000)	0,00 (0,000)
	p-value	0,152	0,012	1,000
Ecchymosis	*Piper crocatum*	1,30 (0,483)	0,00 (0,000)	0,00 (0,000)
	Aloe vera	1,30 (0,483)	0,70 (0,675)	0,10 (0,316)
	Control	1, 40 (0,516)	0,00 (0,000)	0,00 (0,000)
	p-value	0,865	0,001	0,368
Discharge	*Piper crocatum*	2,00 (0,943)	0,50 (0,527)	0,00 (0,000)
	Aloe vera	2,70 (0,483)	0,80 (0,632)	0,20 (0,422)
	control	2,50 (0,527)	1,20 (0,422)	0,40 (0,516)
	p-value	0,162	0,028	0,089
Approximation	*Piper crocatum*	1,30 (0,483)	0,10 (0,316)	0,00 (0,000)
	Aloe vera	1,30 (0,483)	0,50 (0,527)	0,40 (0,516)
	Control	1,00 (0,000)	0,20 (0,422)	0,10 (0,316)
	p-value	0,163	0,056	0,089

*Tested by Kruskal Wallis

It was seen that the *Piper crocatum* group had the fastest change in score compared to other groups, with significant changes on the 5th and 7th day of redness and discharge, $p < 0.05$.

Table 2. The Average Rating of the REEDA Scale saw the significance of the three interventions on Days 1, 5 and 7

Intervention	Mean±SD		
	Day 1	Day 5	Day 7
Piper crocatum	7.10±0.994	0.60±0.516	0.00±0,000
Aloe vera	8.20±1.229	3.30±2.548	1.10±0,876
Control	8.30±0.823	1.80±0.422	0.90±0,568
p-value	0,032	0,003	0,001

Based on table 2 with the Kruskal Wallis test, it can be seen that the significance of the average REEDA assessment on the 5th and 7th days shows a p-value (<0.05) which means there is a significant difference between the three control groups on the level of perineal wound healing using an assessment REEEDA. To determine the inter-group variables that most influence perineal wound healing, the Mann-Whitney test between treatment groups was continued in Table 3.

Table 3. REEDA Rating Day 5

Intervention	*Mann Whitney*	*Z score*	*P-value*
Control and *Piper crocatum*	0,000[b]	-3,574	0,000
control and *Aloe vera*	0,353[b]	-1,057	0,291
Piper crocatum and *Aloe vera*	0,019[b]	-2,439	0,015

Based on table 3, there are several differences between the three intervention groups where the control group and *Piper crocatum* decoction and *Piper crocatum* and *Aloe vera* have significant differences (p-value <0.05).

3.2. Discussion

The *Piper crocatum* plant has been proven and trusted by the public for decades. apart from being easy to get, cheap in price, easy to process and included in a series of herbal treatments that are very popular with Indonesia (Rostika et al., 2020). The use of herbal plants, such as *Piper crocatum* leaves is also a natural treatment because the side effects it causes can be minimized, unlike chemical products (Karimah et al., 2019).

Some secondary metabolites contained in *Piper crocatum* such as flavonoids (Atik Fitriyani, Lina Winarti, 2011), alkaloids, tannins, saponins, triterpenoid steroids, quinones, polyphenols, and essential oil groups (Wulandari et al., 2018). In a study conducted by (Parfati & Windono, 2017) *Piper crocatum* contains eugenol and hydroxychavicol, phenolic compounds that have anti-inflammatory activity in the research of Atik Fitriyani, Lina Winarti (2011) and Maslikah et al., (2019), antibacterial (Rachmawaty et al., 2018) antifungal (Candrasari et al., 2012), and antioxidant (Parfati & Windono, 2017). This is in line with research conducted by Anggraini (2021) where the

fastest wound healing time in respondents who used *Aloe vera* was the 3rd day, the longest was the 6th day while the most wound healing was the 5th day. Perineum of respondents who used *Aloe vera* was 4.59 or recovered on the 5th day.

Aloe vera flesh contains more than 200 different compounds and nutrients naturally which together have medicinal properties. The presence of sterol compounds, anthraquinones, and other natural substances, including polysaccharides in *Aloe vera* work synergistically to cause anti-inflammation (Kumar et al., 2019). Nowadays people prefer to do treatment in overcoming various diseases by re-utilizing nature. Supported by various kinds of diversity and richness of natural materials from the State of Indonesia, especially those that have great potential to be developed, they are also utilized optimally (Mutia et al., 2021). One of the plants commonly used by the people of Indonesia is *Piper crocatum* leaf and *Aloe vera*.

Complementary therapies have been applied in various health care settings, one of which is assisting the delivery process, alternatives in reducing pain, and wound care, reflecting the quality of midwifery services (Complementary). Complementary therapy is also known as traditional medicine or folk medicine, based on knowledge developed from generation to generation in various societies before the era of modern medicine, one of which is the use of traditional medications including herbs, one of which is *Piper crocatum* and *Aloe vera* (Nuraini et al., 2019)

Wound healing outcomes were measured using the REEDA Scale (Redness, Edema, Ecchymosis, Discharge, Approximation) to assess the severity of perineal trauma associated with episiotomy or labour lacerations (Mutia et al., 2021). In this study, the assessment using the REEDA scale was carried out within 1-7 days post-partum (Pebolo et al., 2020). For each item assessed, scores ranging from 0 to 3 were scored by the midwife and enumerator (1-15) scores indicating a greater degree of tissue trauma and indication (poor healing) and score 0 indicating total perineal trauma healing (good healing). Wound assessment criteria are good if the wound is dry, the perineum is closed, and there are no signs of infection such as redness, swelling, heat, pain, or functional oleosa, moderate if the wound is wet, the perineum is closed. There are no signs of infection, poor if the wound is wet, the perineum is open or closed, and signs of infection (Mutia et al., 2021).

Observations were made on the first day using the REEDA scale, with the results that there were no significant changes to the respondents from wet wounds, perineal closure and pain, adjusted to the initial state when the tissue was injured, vasoconstriction of blood vessels occurred to control bleeding with the formation of platelet plugs. And fibrin fibres, blood elements such as antibodies, plasma proteins, electrolytes, complement and water penetrate the vascular space for 2-3 days, causing normal inflammatory criteria, including the possibility of swelling, feeling warm, redness and pain (Indrayani et al., 2021).

Table 2 showed the significance of the average REEDA assessment between the three groups on the 5th and 7th day with a p-value <0.05. On the first day, the p-value = 0.120 means no difference between the control group, *Piper crocatum* decoction and *Aloe vera*. , on the fifth day the p value = 0.027 means there is a difference between the control group, *Piper crocatum* decoction and *Aloe vera*. On the seventh day, the p-value = 0.008 means there is a difference between the control group, *Piper crocatum* decoction and *Aloe vera*. To determine the inter-group variables that most influence the healing of perineal wounds, proceed with the Mann-Whitney test with the results that there are significant

comparisons in each control and intervention group on wound healing. Comparison of wound healing between the control group and *Piper crocatum* with p value = 0.022 and *Piper crocatum* and *Aloe vera* group with p value = 0.020 shows a significant difference in perineal wound healing (Table 3).

This study is in line with research conducted by Sulistianingsih & Wijayanti (2019), who observed wounds at 7-10 days post-partum using the REEDA scale. It was found that on day 7, most of the respondents (60%) in perineal wound healing were in the good category. . This shows that replacing and restoring damaged network functions is going well. Assessment using the REEDA scale is used to objectively measure the progress of wound healing in this case perineal (Pebolo et al., 2020).

In this study, it appears that the boiled water of *Piper crocatum* leaves in perineal wound healing is caused by several things, one of which is the content of specific compounds in *Piper crocatum* leaves where *Piper crocatum* leaves contain alkaloids 543.75 mg/g, polyphenols 210.11 mg/g, and flavonoids 6,09 mg/g. Alkaloids are antibacterial by interfering with the peptidoglycan component of bacterial cells. In addition, polyphenols are antioxidants that are 100 times more effective than vitamin C and 25 times more effective than vitamin E. Flavonoids have the ability of antibiotics to interfere with metabolic functions, causing the death of microorganisms. All of these abilities prevent infection. Thus, they accelerate the late stages of the inflammatory phase during recovery and the rapid proliferative phase (Karimah et al., 2019).

Inflammation is an inflammatory process characterized by symptoms such as redness (rubor) and swelling (tumour). Assessment using the REEDA score indicates wound healing using the terms redness (rubor) and edema (swelling). This is what causes the *Piper crocatum* group to have a better average score of redness and edema than the *Aloe vera* group (Karimah et al., 2019).

4. Conclusion

The use of *Piper crocatum* in the treatment of perineal wounds in post partum mothers has proven to be more effective than *Aloe vera* and povidone-iodine. The limitation of this study was that the control group only received povidone-iodine therapy on day 1 post partum and it was not repeated the next day. And it is hoped that it can be used as a reference for implementing midwives, especially in carrying out perineal wound care to accelerate the healing process with complementary medicine using the herbal *Piper crocatum*.

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