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The Effect of Red Binahong Extract (*Androdera cordifolia* (Ten.) Steenis) on Healing of Cesarean Section Surgical Wounds

Tien Tirta Nurulita¹✉, Jehani Fajar Pangestu¹, Dianna¹

¹ Department of Midwifery, Politeknik Kesehatan Kementerian Kesehatan Pontianak, Pontianak, West Kalimantan, Indonesia

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Abstract

Cesarean section is an artificial delivery procedure involving an incision in the abdominal wall and uterus, which can cause pain at the suture site for up to six months. Binahong leaves are known to have properties that accelerate wound healing, both externally and internally. This study aims to determine the effect of binahong leaf extract on wound healing after cesarean section at the Sambas Regional General Hospital, Sambas Regency. This study used a quantitative method with a quasi-experimental design and a posttest nonequivalent control group design. Sampling was conducted using non-probability sampling with purposive sampling techniques, involving 34 respondents. The Shapiro-Wilk normality test showed that the data were not normally distributed ($p < 0.05$), so the analysis was continued with the Mann Whitney non-parametric test. The test results showed a p-value of 0.000, which means that there was a significant difference between the intervention and control groups. Thus, the administration of binahong leaf extract had an effect on accelerating the healing of cesarean section wounds. The conclusion of this study is that binahong leaf extract significantly accelerates the average healing of post-cesarean section wounds at Sambas Regional General Hospital, making it a potential adjunct therapy in post-surgical care.

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Corresponding Author:

✉ Tien Tirta Nurulita

Department of of Midwifery, Politeknik Kesehatan Kementerian Kesehatan Pontianak, Pontianak, West Kalimantan, Indonesia

Email: tientirta1@gmail.com

1. INTRODUCTION

Cesarean section (CS) is a complex obstetric procedure performed to save the lives of mothers and babies using various delivery methods such as vaginal delivery, instrument-assisted delivery, and operative delivery through CS (Koc et al., 2011; Wondie et al., 2019; Lim et al., 2018; Nurhikmah, Widowati, and Kurniati, 2020). The indications for CS arise from maternal and fetal factors, including cephalopelvic disproportion, uterine dysfunction, dystocia, placenta previa, macrosomia, fetal distress, and transverse lie (Silaen, Gulo, and Suarti, 2020). Cesarean section is defined as an artificial delivery involving an incision in the abdominal and uterine walls (Nugraheni and Kurniarum 2016). National data showed that the most common complications leading to CS include fetal malposition (3.1%), bleeding (2.4%), premature rupture of membranes (5.6%), prolonged labor (4.3%), and others (Badan Penelitian dan Pengembangan Kesehatan, 2019). With CS rates continuing to rise, the postoperative wound healing process becomes a critical concern, particularly because delayed healing or infection may worsen maternal outcomes.

Wound healing itself can be classified as acute or chronic, with acute wounds generally healing without complications, whereas chronic wounds experience delayed healing (Wijaya, 2018). After a cesarean section, initial wound healing typically requires one week, while complete uterine recovery may take up to three months. Postoperative pain can persist for months, and full fascial recovery may take more than a year (Riandari 2020). Several factors including age, anemia, vascular disease, diet, and obesity can influence healing (Eviyanti, 2020). Wound healing progresses through inflammatory, proliferative, and maturation phases, but disruption in any phase can lead to infection (Fatah, Nuraini, and Hubaedah, 2023). Surgical wound infections are commonly caused by bacteria entering through the incision site (Sari and Soebyakto 2023), and healing is further influenced by oxygenation, hematoma, surgical technique, age, diet, steroids, infection, sepsis, and medications (Dharmayanti, 2019). Despite these known risks, there is growing public interest in non-pharmacological or herbal approaches to support postoperative healing.

Indonesia has rich natural resources suitable for developing herbal therapies; however, the use of plant-based alternatives in surgical wound care remains underdeveloped. Non-pharmacological therapies offer advantages such as accessibility, affordability, and fewer side effects. Several herbal materials such as betel leaf, snakehead fish, and binahong leaf—have been traditionally used for wound healing (Samirana et al., 2016). Red binahong (*Anredera Cordifolia (Ten.) Steenis*) is widely known for its medicinal properties, including its use in treating external wounds, post-surgical conditions, postpartum recovery, immunity enhancement, ulcers, hemorrhoids, bruises, itching, and rheumatism (Sudiono et al., 2014; Samirana et al., 2016). Binahong contains high-molecular-weight proteins capable of stimulating antibody formation (Nugraheni and Kurniarum, 2016). Previous studies reported its effectiveness in healing perineal wounds in postpartum mothers (Indrayani, Solehah, and Widowati 2020) and reducing wound size (Hanum and Liesmayani 2020). Ethanol extract of binahong leaves has also demonstrated wound healing activity in animal models, though full recovery was not achieved (Samirana et al. 2016).

Despite existing evidence, most previous studies have focused on perineal wounds or animal models, and there is limited research specifically examining the use of binahong for cesarean section wound healing in humans, particularly in clinical settings with high

CS rates. Preliminary data from Sambas Regional General Hospital show increasing numbers of post-CS mothers 357 cases (45.1%) in 2022 and 508 cases (45%) from January–October 2023. These trends highlight the importance of monitoring wound healing outcomes among post-CS patients. Interviews with hospital midwives revealed that although patients receive antibiotic therapy and dietary recommendations, some still experience delayed healing. Notably, many mothers admitted consuming herbal remedies commercial or homemade despite being advised against it prior to discharge. This practice suggests a gap between patient behavior and clinical recommendations, indicating the need to better understand the use of herbal remedies, particularly binahong, in CS wound care.

Given these conditions, a clear gap emerges: although binahong has shown wound-healing potential, its effectiveness in cesarean section postoperative wounds remains understudied, and there is a lack of clinical evidence supporting or discouraging its use among post-CS mothers. The novelty of this research lies in exploring binahong use specifically in the context of cesarean section wound healing an area not previously addressed despite high patient interest and rising CS rates. Therefore, the purpose of this study is to analyze the role, perceived effectiveness, and potential impact of binahong consumption on wound healing outcomes among post-cesarean mothers at Sambas Regional General Hospital.

2. METHOD

This study employed a quantitative quasi-experimental design using a posttest nonequivalent control group approach. The design consisted of two groups: an intervention group that received binahong leaf extract and a control group that did not receive any intervention. Observations of wound healing were conducted in both groups after the respective treatments or conditions were applied.

The population in this study consisted of post-cesarean section mothers, estimated at over five hundred individuals from January to October 2023. The research subjects were post-cesarean section mothers treated at Sambas Regional General Hospital during the study period. A total of thirty-four respondents were included, with seventeen assigned to the intervention group that received binahong leaf extract and seventeen assigned to the control group that received standard care without the intervention.

The sampling technique used was non-probability sampling with a purposive sampling method, in which participants were selected based on specific criteria relevant to the study. The data collected consisted of both primary and secondary data. Primary data were obtained through direct observation of post-cesarean section wound healing from the fourth to the tenth day after the procedure. Secondary data were collected indirectly from institutional records, including information on cesarean deliveries at Sambas Regional General Hospital.

Data analysis began with univariate analysis to describe wound healing progress over the observation period. A normality test using the Shapiro–Wilk method was then conducted, as the sample size was fewer than fifty respondents. The data were found to be not normally distributed; therefore, the Mann–Whitney test was applied to compare differences between the intervention and control groups regarding wound healing outcomes.

This study obtained ethical approval from the Ethics Committee of the Pontianak Ministry of Health Polytechnic under ethical clearance number 28/KEPK-PK.PKP/II/2024.

3. RESULTS AND DISCUSSION

Table 1. Frequency Distribution of Cesarean Section Wound Healing Time.

Healing Time (Days)	Intervention Group		Control Group	
	Frequency (n)	%	Frequency (n)	%
6	2	11.8	0	0
7	13	76.5	0	0
8	2	11.8	8	47.1
9	0	0	5	29.4
10	0	0	3	17.6
11	0	0	1	5.9
Total	17	100	17	100

Based on Table 1 above, which shows the healing time of SC wounds in the intervention group given binahong leaf extract and the control group not given binahong leaf extract, the fastest time was 6 days and the longest was 11 days. In the intervention group given binahong leaf extract, the fastest healing time was 6 days for 2 people (11.8%), followed by a healing time of 7 days for 13 people (76.5%) and a healing time of 8 days for 2 people (11.8%). In the control group, which did not receive binahong leaf extract, the fastest healing time was 8 days for 8 people (47.1%), followed by a healing time of 9 days for 5 people (29.4%), a healing time of 10 days for 3 people (17.6%), and a healing time of 11 days for 1 person (5.9%).

Table 2. Frequency Distribution Based on Respondent Characteristics.

Characteristics	Category	Frequency (n)	Percentage (%)
Age	< 20 Years	2	5.9
	20–35 years	21	61.8
	> 35 Years	11	32.4
Parity	Primipara	14	21.2
	Multipara	20	58.8
Education	Basic	16	47.1
	Secondary	14	41.2
	Higher	4	11.8
Employment	Not working	28	82.4
	Working	6	17.6
Total		34	100

Table 2 shows that the results show that most respondents in both the intervention and control groups were aged 20-35 years, totaling 21 people (61.8%), while a small number of respondents were aged < 20 years, totaling only 2 people (5.9%), and almost half of the respondents were aged > 35 years, totaling 11 people (32.4%). The parity of the respondents showed that a small portion of the respondents were primiparous, totaling 14 people (20.2%), while the majority of the respondents were multiparous, totaling 20 people (58.8%). As for the level of education, almost half of the respondents, 16 people (47.1%), had a basic education (elementary and junior high school), a small number of respondents had a secondary education (high school), totaling 14 respondents (21.2%), and a small number of respondents had a higher education (D3-S1), only 4 people (11.8%). Based on the table above, it also shows that almost all respondents were unemployed, totaling 28 people (82.4%), and a small portion of respondents were employed, totaling 6 people (17.6%).

Table 3. Effect of *cesarean section* wound healing in the intervention group and control group.

Group	N	Posttest					p-value
		Mean	±sd	Median	Min	Max	
Intervention	17	1.00	0.00	7.0	6	8	0.00
Control	17	2.0	0.00	9.0	8	11	

Based on the table 3, differences in the degree of healing can be seen in the group given binahong leaf extract using *Mann Whitney* (data not normally distributed). From the statistical calculation comparing *the posttest* in the intervention group and the control group, a *p-value* of 0.000 was obtained, which means that the value is smaller than the significance value of 0.05, thus indicating that the administration of red binahong leaf extract (*Anredera cordifolia* (Ten.) Steenis) has an effect on the healing of *cesarean section* wounds at Sambas District General Hospital, Sambas Regency.

DISCUSSION

The bivariate analysis in this study was carried out to examine the effect of binahong leaf extract on the healing of cesarean section wounds at Sambas Regional General Hospital. After conducting a normality test using the Shapiro–Wilk method, the data were found to be non-normally distributed, which justified the use of a non-parametric statistical approach. Consequently, the Mann–Whitney test was employed to compare wound-healing outcomes between the intervention and control groups. The results demonstrated a statistically significant difference, indicating that binahong leaf extract contributed positively to the healing of post-cesarean surgical wounds.

These findings align with the research of Liesmayani et al. (2021), which reported that postpartum women consuming binahong leaf decoction experienced faster perineal wound healing compared to those who did not. This supports the premise that binahong contains bioactive compounds capable of accelerating tissue repair. Similarly, the study by Zeranika et al., (2022) found that postpartum women who received binahong leaf decoction showed a more rapid reduction in wound severity scores than those in the control group, further strengthening the evidence for the extract’s wound-healing efficacy.

Additional experimental evidence was reported by Samirana et al., (2016), who examined the wound-healing activity of ethanol extracts of binahong leaves in male Wistar rats. Their findings indicated that the extract possessed significant wound-healing properties, likely attributed to its flavonoid and triterpenoid content. Although these compounds are believed to contribute to tissue regeneration, the specific component most responsible for the healing effect remains unidentified. The study also noted that complete healing to baseline tissue conditions had not yet been achieved within the observed period, suggesting that the extract may promote healing but requires further optimization.

Further supportive evidence is provided by Yuliana et al., (2020), who compared the effectiveness of binahong leaf extract with 10% povidone-iodine solution for perineal wound care. Their research demonstrated that binahong leaf extract was more effective in promoting wound healing, leading to recommendations for developing herbal-based pharmaceutical preparations such as creams or ointments using binahong as the main active ingredient. Collectively, these studies reinforce the present findings that binahong leaf extract has substantial potential as an alternative or complementary therapy for postoperative wound healing.

Despite these promising results, this study has several limitations. First, the sample size was relatively small, which may limit the generalizability of the findings. Second, the

use of a non-randomized sampling method may introduce selection bias, affecting the comparability of the intervention and control groups. Third, wound healing was assessed only through observational scoring without additional clinical or laboratory confirmation, which may affect the accuracy of the measurements. Lastly, the study period covered only the early phase of wound healing, leaving long-term outcomes unexamined. Future research with larger randomized samples, longer follow-up periods, and more comprehensive assessment tools is recommended to validate and expand upon these findings.

4. CONCLUSION

It is concluded that the healing of cesarean section wounds in postpartum women who underwent cesarean section and were given red binahong leaf extract took a minimum of 6 days and a maximum of 8 days. There is an effect of red binahong leaf extract (*Anredera cordifolia* (Ten.) Steenis) on the average healing time of cesarean section wounds at Sambas District General Hospital, Sambas Regency.

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