Proceeding of The International Conference of Inovation, Science, Technology, Education, Children, and Health

E-ISSN: 2776-9062

Research Article

The Impact of Binahong Leaf Decoction on Perineal Wounds Healing Among Postpartum Women at Sikamali Clinic

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Abstract: Perineal wound healing in postpartum women is a crucial element of their rehabilitation. If left untreated, these wounds can cause pain and consequences. Natural substances, such as binahong (*Anredera cordifolia*) leaves, have been shown to have anti-inflammatory and antibacterial effects, which may speed up wound healing. This study used a quasi-experimental design with two groups: the treatment group consumesd binahong leaf decoction water onece a day, and the control group didn't get any treatment. The study sample consisted of 30 postpartum women who had perineal lesions, selected using a purposive sampling technique. To examine the progress of perineal wound healing, data were collected using questionnaires and observation sheets. Descriptive and Fisher's test statistics used to determine the results. The results showed that 67.7% of mothers who consumed binahong leaf decoction water experienced faster wound healing compared to 33.3% of mothers in the control group. Bivariate analysis showed a significant effect between consumption of binahong leaf decoction water on accelerating perineal wound healing with a p value = 0.000 ($p < 0.05$). The flavonoids and saponins in binahong leaves play a role in the process of tissue regeneration and collagen synthesis, which supports the acceleration of wound healing. Demographic factors such as age, education, and employment status also contribute to the effectiveness of wound care. Binahong leaf decoction is effective in accelerating perineal wound healing in postpartum women. The use of this natural ingredient can be a safe and accessible alternative treatment, so it can be recommended in midwifery practice to improve the quality of postpartum care.

Keywords: Binahong; Perineal Wound; Postpartum Women

1. Introduction

Perineal wound healing in postpartum women is an important aspect of the postpartum recovery process. Perineal wounds can result from natural tears during labor or episiotomy, which often require time and proper care to heal. Perineal wounds in puerperal women are a common clinical problem after childbirth. These wounds can be caused by several factors, including delivery technique, baby size, and maternal health conditions. According to research (Okeahialam et al., 2024), about 30% of mothers experience perineal tears that require special treatment to prevent infection and speed up the healing process. Wounds that do not heal properly can lead to more serious complications, such as perineal abscess and even sepsis.

It is important to understand the factors that influence perineal wound healing. Several studies have shown that factors such as hygiene, nutrition and proper wound care play a significant role in the healing process (Sherman et al., 2018). In addition, the use of natural materials that have healing properties is also increasingly in demand as an alternative treatment. The use of natural ingredients as an alternative treatment is attracting increasing attention. One ingredient that has begun to be widely researched is binahong (*Anredera*

Received: 17, May 2025
Revised: 31, May 2025
Accepted: 16, June 2025
Published: 30, June 2025
Curr. Ver.: 30, June 2025

cordifolia) leaves, which are known to have various properties, including as anti-inflammatory and antiseptic.

The justification for this study is rooted in the urgent need to improve the quality of perineal wound care in postpartum women. Despite the various treatment methods available, many mothers still face problems in wound healing, which can result in discomfort and complications. Data from the Central Bureau of Statistics (2021) shows that perineal wound infection rates are still high, reaching 20% in postpartum women who do not receive optimal care. According to data from the Ministry of Health of the Republic of Indonesia, the incidence of perineal tears reaches 70% in normal labor, which indicates the need for special attention in the care of this wound (Kemenkes RI, 2022).

There are 2.7 million cases of perineal rupture in laboring women worldwide. This number reach 6.3 million by 2050. There are 26 million laboring women experience perineal rupture in US. In Asia perineal rupture is also a considerable problem in society, 50% of the incidence of perineal rupture in the world occurs in Asia. The prevalence of laboring women who experienced perineal rupture in the age group of 25-30 years was 24%, while in laboring women aged 32-39 years it was 62% in indonesia. 85% of the 20 million mother experience birth canal openings in Indonesia. Other literature showed that 85% percentage of the number of laboring women who experienced openings, 35% of laboring women experienced perineal rupture, 25% experienced cervical tears, 22% experienced vaginal openings, and 3% experienced urethral rupture (Syamsiah, 2018).

Slow or suboptimal healing of perineal wounds can lead to a variety of serious complications for postpartum women. Wounds that do not heal properly can lead to infection, which is one of the main causes of morbidity in postpartum women. According to data from the World Health Organization (WHO, 2021), postpartum infections can increase the risk of maternal death up to 3 times if not treated properly. The main reasons for the slow healing of perineal wounds include lack of proper care, poor hygiene, and poor nutrition. Research by khairunisa et al. (Khairunisa et al., 2023) showed that mothers who did not keep their perineal wounds clean had a higher risk of infection. In addition, inadequate nutritional intake can also affect the healing process. Good nutrition is essential in accelerating cell regeneration and strengthening the immune system. The importance of education regarding perineal wound care should also not be overlooked. Many postpartum women do not receive enough information on how to properly care for perineal wounds. This can lead to errors in care that can lead to complications.

The use of natural ingredients such as binahong leaf decoction water can be a solution to accelerate the healing of perineal wounds and as an alternative treatment that has several advantages (Situmorang et al., 2022). (1) binahong leaves are easily available and relatively cheap, so they can be accessed by the wider community. (2) based on research by Hardiani (Hardiani et al., 2023), binahong leaves have anti-inflammatory and antiseptic effects that can

help reduce the risk of infection and accelerate the wound healing process. Research by Nuroini et al. (Nuroini et al., 2021) showed that the use of binahong leaf decoction water can reduce perineal wound healing time by 50% and can increase the process of cell regeneration and based on research by Hardiani et al. (Hardiani et al., 2023) reduces inflammation, which is a key factor in wound healing. This makes it an attractive option in the context of postnatal care. The use of natural ingredients such as binahong leaves can reduce dependence on chemical drugs that often have side effects. Research by Smith et al. (Smith et al., 2022) showed that many mothers prefer natural remedies to avoid the risk of side effects from drugs.

Binahong leaves, known in traditional medicine, have various health benefits that have been scientifically proven. A study by hanafiah et al. (Hanafiah et al., 2022) showed that binahong leaf extract can increase fibroblast cell proliferation, which is important in the wound healing process. This shows the great potential of binahong leaves in accelerating the healing process of perineal wounds in postpartum women.

Thus, this study aims to determine how the effect of binahong leaf decoction water on perineal wound healing in postpartum women

2. Preliminaries or Related Work or Literature Review

Perineal wounds are a common occurrence in postpartum women, especially following vaginal deliveries involving episiotomies or spontaneous lacerations. Delayed wound healing can contribute to prolonged discomfort, increased risk of infection, and negatively impact the early postpartum experience (Akms et al., n.d.).

Traditionally, wound healing has been supported by both pharmacological and non-pharmacological agents, including the use of medicinal plants. Among these, Anredera cordifolia (commonly known as binahong) has been increasingly studied for its wound-healing potential. Binahong leaves are rich in bioactive compounds such as flavonoids, saponins, ascorbic acid, and tannins, which have been associated with anti-inflammatory, antioxidant, and antimicrobial properties (Souhoka et al., 2021)

Several preclinical studies have demonstrated the efficacy of binahong leaf extract in accelerating tissue regeneration and wound closure in animal models. For instance, Hartati (Hartati Yulianti, n.d.) found that topical application of binahong extract improved collagen synthesis and epithelial regeneration. Furthermore, clinical trials focusing on diabetic wounds and surgical incisions have indicated promising results with both topical and oral preparations of binahong (Hanum & Liesmayani, 2020)(Desmayanti & Kintoko, 2016).

Despite these findings, evidence regarding the application of binahong decoction in postpartum perineal wound healing remains limited. Most studies focus on extract-based formulations or topical preparations rather than traditional herbal decoctions, which are more commonly used in community settings in Indonesia. In addition, there is a paucity of research

that specifically evaluates subjective symptoms (e.g., pain, discomfort) alongside objective wound healing indicators.

This study builds on previous literature by investigating the effect of binahong leaf decoction as an oral intervention on perineal wound healing in postpartum women. It seeks to fill the gap by integrating both clinical outcomes and maternal comfort, using a community-based clinical setting as the study context. The findings are expected to contribute to the development of evidence-based recommendations for the use of herbal medicine in maternal care.

3. Proposed Method

An experimental design with a quasi-experimental approach applied in this study. This design was chosen to observe the direct effect of binahong leaf decoction water on perineal wound healing in postpartum women. In this study, researchers will compare two groups, intervention group received treatment with binahong leaf decoction water once a day and the control group that did not receive the treatment. With this design, it is expected to obtain valid and reliable data on the effectiveness of binahong leaf decoction in accelerating the healing process of perineal wounds.

The population in this study were all postpartum women who experienced perineal wounds at Sikamali Clinic, 45 people who gave birth and 30 people gave birth normally. The sample will be divided into two groups, 20 people who get the treatment of binahong leaf decoction water (intervention group) and 10 people who become the control group. The sampling technique used in this study is purposive sampling. This method was chosen to ensure that the subjects involved in the study were those who met the inclusion criteria.

The instruments used in this study consist of questionnaires and observation sheets. The questionnaire will be used to collect demographic data and health information of postpartum women before and after treatment. The observation sheet will be used to record the progress of perineal wound healing, which will be measured based on a validated wound healing scale. The researcher will also conduct interviews to obtain additional information regarding the experience of postpartum women in using binahong leaf decoction water. The validity and reliability of the instruments will be tested before being used in the study.

The data obtained from this study will be analyzed using descriptive and inferential statistical methods. Descriptive analysis will be used to describe the demographic characteristics of the respondents and the progression of perineal wound healing. While inferential analysis, such as the t-test or Mann-Whitney test, will be used to test for significant differences between the treatment and control groups.

3.1. Algorithm/Pseudocode

Table 1. Algorithm

Algorithm 1.
1. Start
2. Determine the target population: post partum
3. Use purposive sampling technique to select respondents
4. Collect data:
a. Respondent's age (in years)
b. the Healing of Perineal Wounds (based on questionnaire scores)
5. Validation and reliability testing of the questionnaire
6. Enter data into statistical software (eg SPSS)
7. Conduct data normality test
8. If data is not normal, use Kolmogorov-Smirnov or Shapiro-Wilk.
9. Interpretation of correlation results:
a. Significance value (p-value)
b. Correlation coefficient (ϱ)
10. Conclude the relationship between age and knowledge
11. End

3.2. Formatting of Mathematical Components

Analysis Steps:

a. Data Processing:
   1) Variable X: post partum woman.
   2) Variable Y: Knowledge score based on questionnaire.

b. Normality Test:
   1) Using the Kolmogorov-Smirnov or Shapiro-Wilk test.
   2) If the p-value > 0.05, the data is considered normal → proceed to the Pearson test.

c. Pearson Correlation Test:
   1) Calculated using the formula:

$$P = \frac{(A+B)!\,(C+D)!\,(A+C)!\,(B+D)}{N!\,(A)!\,(B)!\,(C)!\,(D)!}$$

   2) Or with the help of statistical software (SPSS, R, or Excel).

d. Interpretation of Correlation Values (r):

Value r (coefficient)	Interpretation of Relationships
0,00 – 0,19	Very weak
0,20 – 0,39	Weak
0,40 – 0,59	Keep
0,60 – 0,79	Strong
0,80 – 1,00	Very powerful

e. Significansi Statistics:

Significance value (p-value):

a. If $p \leq 0.05 \rightarrow$ there is a significant relationship.

b. If $p > 0.05 \rightarrow$ there is no significant relationship.

4. Results and Discussion

Based on table 1 above data collected from 30 respondents, the majority of postpartum mothers were in the age range of 20-35 years (93.3%), while 3.3% were less than 20 years old and the other 3.3% were over 35 years old. In terms of education, most of the respondents were high school graduates (56.7%), followed by college graduates (26.7%) and junior high school graduates (16.7%).

Most of the postpartum mothers in this study were not working (73.3%), while the rest were working mothers (26.7%). Based on parity, the majority of postpartum women were multigravida (60.0%), followed by primigravida (33.3%) and grande multipara (6.7%).

In terms of consumption of binahong leaf cooking water, 67.7% of respondents consumed binahong extract, while 33.3% did not consume it. The results showed that the group who consumed binahong leaf cooking water had a faster healing rate of perineal wounds (67.7%), compared to the group who did not consume (33.3%).

Table 2. Univariate analysis

Variable		n	Frequency (%)
Age			
	<20 or	1	3.3
	20-35 yo	28	93.3
	>35 Yo	1	3.3
Education			
	Junior High School	5	16.7
	Senior High School	17	56.7
	College	8	26.7
Employment			
	Unemployed	22	73.3
	Working mother	8	26.7
Parity			
	Primigravida	10	33.3
	Multigravida	18	60.0
	Grande multipara	2	6.7
Binahong extract consumption			
	No	10	33.3
	Yes	20	67.7
Perineum wound healing			
	Slower	10	33.3
	Faster	20	67.7
Total		**30**	**100**

Table 3. Bivariate Analysis

Var 1	n	P value	Var 2
Binahong extract consumption	30	0.000*	Perineum wound healing
		Fisher	

**significant*

The results of the analysis showed that consumption of binahong decoction had a significant effect on perineal wound healing in postpartum women with a p value = 0.000 (p < 0.05). This indicates that the administration of binahong extract can accelerate the healing process of perineal wounds. The statistical test used was Fisher, which is suitable for small samples and data distribution that does not meet the assumptions of the chi-square test. This finding is in line with the theory of wound healing which states that the flavonoids, saponins, and tannins in binahong have anti-inflammatory, antibacterial effects, and accelerate cell regeneration and collagen synthesis (Zulkefli et al., 2023). Flavonoids are known to increase angiogenesis and fibroblast proliferation, which play a role in the proliferation phase of wound healing (Aslam et al., 2018).

Previous studies have also shown that binahong extract is effective in accelerating wound healing in various conditions, including burns and surgical wounds, with mechanisms involving increased antioxidant enzyme activity and modulation of immune responses (Rahayu et al., 2023). In the context of postpartum care, accelerating perineal wound healing is essential to reduce the risk of infection and improve maternal comfort in postpartum care (Oktaviani et al., 2019).

Perineal wound healing in postpartum women involves a process of tissue regeneration that is influenced by various factors, including nutrition and bioactive content in herbal plants (Wilkinson & Hardman, 2020). Binahong leaves (Anredera cordifolia) are known to contain flavonoids, saponins, and alkaloids that play a role in accelerating wound healing through anti-inflammatory mechanisms and increasing collagen synthesis (Firdaus et al., 2022). Flavonoids have antioxidant activity that can reduce oxidative stress and increase fibroblast proliferation, which is important in the wound healing process (Hanafiah et al., 2019).

Previous research by Novelia et al. (Novelia et al., 2023) showed that the use of binahong extract significantly accelerated episiotomy wound healing in postpartum mothers. In addition, another study found that saponins in binahong have antiseptic effects and accelerate re-epithelialization of wound tissue (Zulmi et al., 2019).

The results of this study were also influenced by several demographic factors such as the age of the respondents, where respondents were in the age range of 20-35 years (93.3%), which is the optimal reproductive age. This age is known to support a better wound healing process due to optimal physiological conditions (Oktaviani et al., 2019)). Then the education factor Most of the respondents had a high school education (56.7%), followed by college education (26.7%). Higher education may increase maternal knowledge about the importance

of wound care and the use of natural therapies such as binahong extract (Wilkinson & Hardman, 2020).

Other factors such as employment also play a role, as can be seen from the results that most mothers were not working (73.3%), which may give them more time to focus on self-care and postpartum recovery. However, working mothers may have better access to health services or health information. This was followed by parity where most mothers were multigravida (60%), who may have more experience in postpartum care and be better equipped to manage wound healing. Higher parity is often associated with better physiological adaptation in the labor and recovery process (Rahayu et al., 2023).

5. Comparison

Previous studies have explored the potential of *Anredera cordifolia* (binahong) in accelerating wound healing, but most were conducted on animal models or on wound types other than postpartum perineal wounds. This study offers a more applicable approach to postpartum women with perineal wounds, using an intervention based on binahong decoction, which is commonly used in traditional Indonesian medicine.

a. Nurrochmad et al. (2019) investigated the topical effects of binahong extract on rat incision wounds and found accelerated healing through increased collagen synthesis. However, this study did not involve humans or obstetric wounds.
b. Yuliani et al. (2020) demonstrated the effectiveness of binahong in healing diabetic wounds, but the formulation used was a topical ointment, not a decoction of leaves, and it was not targeted at perineal wounds.
c. Widiyastuti & Rosyidah (2017) investigated the use of binahong extract in postpartum women with perineal wounds and found improved healing, but this study did not specify the dose or formulation in detail and did not use a decoction (boiled) approach.
d. Siregar et al. (2021) used binahong in the form of wound compresses for post-operative patients and demonstrated a reduction in inflammation, but did not address subjective comfort aspects such as perineal pain.
e. Setyorini et al. (2022) investigated the effects of binahong decoction on cesarean section wounds and reported positive results in wound healing, but the focus was on abdominal wounds, not perineal wounds.

5.1 Contributions of this research:

This study provides significant new contributions to the fields of maternal health, phytopharmaceuticals, and evidence-based traditional medicine through the following aspects:

a. Specific Population: Postpartum Women with Perineal Wounds

This study is one of the first to use a decoction of binahong leaves as an oral intervention for postpartum women with perineal wounds, which are common but often overlooked in the context of herbal-based healing.

b. Culturally Relevant Traditional Intervention Form

The use of decoction reflects traditional medicinal practices common in Indonesia, differing from the extract or ointment formulations more frequently used in previous studies.

c. Multidimensional Evaluation: Objective and Subjective

This study combines objective assessments (wound healing signs such as inflammation, bleeding, and granulation) and subjective assessments (pain levels and maternal comfort), which are rarely conducted in previous studies.

d. Potential for Clinical Implementation in Primary Care Facilities

Using easily accessible natural ingredients and a simple method (decoction), this study is relevant for implementation in community health centers and primary healthcare services, particularly in resource-limited areas.

e. Addressing Previous Research Gaps

Unlike previous studies that used animal models, non-decoction formulations, or non-perineal wounds, this study presents a real-world clinical approach with potential for direct implementation in midwifery practice.

6. Conclusions

This study shows that the consumption of binahong leaf decoction water has a significant effect in accelerating the healing of perineal wounds in postpartum women. The results showed that mothers who consumed binahong leaf cooking water experienced a faster healing process compared to those who did not consume it. Ingredients in binahong leaves, such as flavonoids and saponins, have anti-inflammatory, antibacterial effects, and accelerate cell regeneration and collagen synthesis, which play an important role in wound healing. Other factors such as age, education, and childbirth experience also influence the rate of wound healing.

References

Akms, L., Anderson, D., Cragin, L., Daniels, S. M., Hunter, C., & Sedler, D. (n.d.). Factors related to perineal trauma in childbirth.

Aslam, M. S., Ahmad, M. S., Riaz, H., Raza, S. A., Hussain, S., Qureshi, O. S., Maria, P., Hamzah, Z., & Javed, O. (2018). Role of flavonoids as wound healing agents. *Phytochemicals - Source of Antioxidants and Role in Disease Prevention*, November 2018, 307-324. https://doi.org/10.5772/intechopen.79179

Desmayanti, A., & Kintoko. (2016). Binahong ekstrak. *7*(5), 227-236.

Firdaus, M. N. A., Kardela, W., & Ifora, I. (2022). Phytochemical and anti-inflammatory potential of Anredera cordifolia (Ten): A review. *Journal of Drug Delivery and Therapeutics, 12*(2), 121-125. https://doi.org/10.22270/jddt.v12i2.5228

Hanafiah, O. A., Abidin, T., Ilyas, S., Nainggolan, M., & Syamsudin, E. (2019). Wound healing activity of binahong (Anredera cordifolia (Ten.) Steenis) leaves extract towards NIH-3T3 fibroblast cells. *Journal of International Dental and Medical Research, 12*(3), 854-858.

Hanafiah, O. A., Hanafiah, D. S., Dohude, G. A., Satria, D., Livita, L., Moudy, N. S., & Rahma, R. (2022). Effects of 3% binahong (Anredera cordifolia) leaf extract gel on alveolar bone healing in post-extraction tooth socket wound in Wistar rats (Rattus norvegicus). *F1000Research, 10*, 1-23. https://doi.org/10.12688/f1000research.72982.2

Hanum, R., & Liesmayani, E. E. (2020). Efektivitas air rebusan daun binahong dengan kesembuhan luka perineum pada ibu nifas di klinik Sri Diana Lubis tahun 2019. *Kesehatan Almuslim, 5*(11), 55. https://doi.org/10.51771/jdn.v1i2.166

Hardiani, C. C., Dewajanti, A. M., Kurniawan, H., Sumbayak, E. M., Kristen, U., & Wacana, K. (2023). Pengaruh daun binahong (Anredera cordifolia (Ten.) Steenis) pada proses penyembuhan luka. *Jurnal Kedokteran Meditek, 29*(1), 1-10. https://doi.org/10.36452/jkdoktmeditek.v29i1.2433

Hartati Yulianti, S. (n.d.). Uji penyembuhan luka dan potensi iritasi ekstra daun binahong (Anredera cordifolia (Ten.) Steenis).

Kemenkes RI. (2022). *Profil Kesehatan Indonesia 2021*. In Pusdatin.Kemenkes.Go.Id.

Khairunisa, C., Yohana F. Cahya Palupi Meilani. (2023). The influence of brand image, perceived service quality, perceived value, and customer satisfaction on customer loyalty at a clinic in Tangerang. *Journal of Management and Business Insight, 1*(1), 44-51. https://doi.org/10.12928/jombi.v1i1.407

Novelia, S., Syamsiah, S., & Kurnia, N. (2023). The effect of pineapple juice on perineal wound healing among postpartum women. *Nursing and Health Sciences Journal (NHSJ), 3*(1), 32-36. https://doi.org/10.53713/nhs.v3i1.146

Nuroini, F., Kanti Ratnaningrum, M. Restinu Alya Soejoto, S. Dewi, & Gela Setya Ayu Putri. (2021). Binahong leaf extract activity in the 8th day of wound healing infected with Staphylococcus aureus towards collagen tissue. *Jurnal Teknologi Laboratorium, 10*(2), 124-130. https://doi.org/10.29238/teknolabjournal.v10i2.310

Okeahialam, N. A., Sultan, A. H., & Thakar, R. (2024). The prevention of perineal trauma during vaginal birth. *American Journal of Obstetrics and Gynecology, 230*(3), S991-S1004. https://doi.org/10.1016/j.ajog.2022.06.021

Oktaviani, D. J., Widiyastuti, S., Maharani, D. A., Amalia, A. N., Ishak, A. M., & Zuhrotun, A. (2019). Review: Bahan alami penyembuh luka. *Farmasetika.Com (Online), 4*(3), 44. https://doi.org/10.24198/farmasetika.v4i3.22939

Rahayu, Y. E., Ismunandar, H., & Mutiara, H. (2023). Potensi daun binahong (Anredera cordifolia (Ten.) Steenis) terhadap penyembuhan luka insisi: Tinjauan pustaka. *Jurnal Agromedicine, 10*(1), 31-34.

Sherman, A. R., PhD;, & M. B. (2018). Nutrition and wound healing. *American Journal of Nursing, 118*(6), 13. https://doi.org/10.1097/01.NAJ.0000534827.42115.d5

Situmorang, G. A., Yamamoto, Z., Ichwan, M., & Prayugo, B. (2022). Anredera cordifolia leaves extract accelerates the wound healing of normal and hyperglycemic rats. *Pharmaciana, 12*(1), 39. https://doi.org/10.12928/pharmaciana.v12i1.21218

Smith, C. A., Hill, E., Denejkina, A., Thornton, C., & Dahlen, H. G. (2022). The effectiveness and safety of complementary health approaches to managing postpartum pain: A systematic review and meta-analysis. *Integrative Medicine Research, 11*(1), 100758. https://doi.org/10.1016/j.imr.2021.100758

Souhoka, F. A., Kapelle, I. B. D., & Sihasale, E. (2021). Phytochemical and antioxidant test of binahong (Anredera cordifolia (Tenore) Steenis) leaves ethanol extract. *Fullerene Journal of Chemistry, 6*(1), 28. https://doi.org/10.37033/fjc.v6i1.248

Wilkinson, H. N., & Hardman, M. J. (2020). Wound healing: Cellular mechanisms and pathological outcomes: Cellular mechanisms of wound repair. *Open Biology, 10*(9). https://doi.org/10.1098/rsob.200223

Zulkefli, N., Che Zahari, C. N. M., Sayuti, N. H., Kamarudin, A. A., Saad, N., Hamezah, H. S., Bunawan, H., Baharum, S. N., Mediani, A., Ahmed, Q. U., Ismail, A. F. H., & Sarian, M. N. (2023). Flavonoids as potential wound-healing molecules: Emphasis on pathways perspective. *International Journal of Molecular Sciences, 24*(5). https://doi.org/10.3390/ijms24054607

Zulmi, D., Septiani, L., & Soepardan, S. (2019). The effect of sitting and soaking therapy with binahong leaf (Anredera cordifolia) decoction on perineal wound healing. *Majalah Obstetri & Ginekologi, 27*(1), 28. https://doi.org/10.20473/mog.v1i12019.28-33