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# The Period of Perineal Wound Healing in Postpartum Mothers Between The Decoction Water Treatments of Bihanong Leaves with Red Betel Leaves

Nahdiyah Karimah<sup>\*</sup>, Nur Khafidhoh, Triana Sri Hardjanti, Riska Ismawati Hakim

Postgraduate Applied Science Program in Midwifery, Poltekkes Kemenkes Semarang, Indonesia

**\*Corresponding author's email:** [nahdiyahkarimah@gmail.com](mailto:nahdiyahkarimah@gmail.com)

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## ABSTRACT

**Background:** The global prevalence of the second degree of the perineal wound of postpartum mothers is 73.4%. Pharmacological treatments have a cytotoxic effect. Other treatments is non-pharmacological treatments are such as using decoction waters of binahong leaves and red betel leaves. Both have compounds that accelerate epithelialization of wounds. This study aims to analyze the differences of the perineal wound recovery period of postpartum mothers between the decoction water treatments of binahong leaves compared to red betel leaves.

**Methods:** This study is a quasi-experiment post-test only without control group design. There are 32 respondents meeting the inclusion criteria who are taken by accidental sampling. The sample is divided equally into two groups, namely binahong group and the red betel group. Binahong or red betel leaf decoction waters are used for genital washing after urinating at the last rinse at 7 am and 3 pm on 1-3 postpartum days. Perineal wound recovery is assessed by using the REEDA score from the second postpartum day until the wound fully recovered. Statistic analysis with chi-square, time series analysis, Mann Whitney and Kruskal Wallis test.

**Results:** The average of perineal wound recovery period of binahong group is 6 days, while the red betel group is 4.69 days. There are significant differences of perineal wound recovery period between the binahong group and the red betel group with a p-value of  $0.0001 < \alpha (0.05)$ . Respondents' characteristics are age, BMI, frequency of changing pads, and educational background between binahong and red betel groups have no significant differences.

**Conclusion:** Red betel leaf decoction water is recommended for postpartum mothers suffering perineal wounds. Further research is needed with a larger number of respondents and true experiments are needed to analyze the effect of red betel leaves on perineal pain, platelets, and leukocyte level.

**Keywords:** binahong leaves, red betel leaves, perineal wound's treatment

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## 1. Introduction

Puerperium is period needed for anatomy and physiology to return into normal condition before pregnancy, started after birth of placenta until 6 weeks after the labor (O'Reilly et al., 2012). There are various problems during puerperium, one of them is the perineal wound. Perineal wound may occur spontaneously or intentionally through episiotomy (Lindsay et al., 2018). There are four degrees of perineal wounds. The first degree includes vaginal mucosa, posterior fourchette and perineal skin.

The second degree involves perineal muscle. The third degree involves external anal sphincter muscle. The fourth degree involves anterior rectal wall (Lindsay et al., 2018).

About 80% of primiparous women in the world have perineal wounds (WHO, 2015). Considering from the degree of perineal wound, the most prevalence is second degree (73.4%), then first degree (17.7%), third degree (8.4%) and fourth degree (0.5%) (Smith et al., 2013). Factors associated to perineal wound recovery are internal and external factors. Internal factors are age, Body Mass Index (BMI), hemoglobin, and disease. Meanwhile, external factors are abstaining from certain food, educational background, early mobilization, frequency of changing pads, and treatment. Treatment is dominant factor associated to perineal wound recovery (Rohmin et al., 2017; Said et al., 2016; Gunanti, 2010; Greenhalgh, 2003; Hartiningtiyaswati, 2010; Sari, 2019).

Perineal wound that are not treated properly may lead to complications such as persistent pain, severe wound damage, dyspareunia, urinary retention, fecal incontinence, infection and disrupt the bond between mother and baby during the postpartum period (Lindsay et al., 2018). Thus, treatment for perineal wound is important to prevent morbidity in postpartum mothers. Pharmacological treatment is such as by using povidone iodine. Povidone iodine inhibits tissue granulation, damages endothelial cells, leukocytes, fibroblasts, keratinocytes, deactivates phagocytes, and separated wound edge. Therefore, wound recovery is delayed (Koca Kutlu et al., 2013). Meanwhile, non-pharmacological treatments are such as by using binahong and red betel leaf decoction waters.

Binahong leaf contains antimicrobial substances namely alkaloids (Marwoko, 2013). Binahong leaf also contain ascorbic acid to form collagen (Ariani et al., 2014). The collagen formation is stage of proliferation and maturation of wound recovery (Suriadi, 2004). Polyphenols, flavonoids, and saponins in binahong leaf can accelerate epithelialization of wounds. The first degree of perineal wound in postpartum mothers treated by using binahong leaf extract is recovered for 6 days (Aditia et al., 2017).

Red betel leaf contains alkaloids, carvacrol, eugenol, and essential oils functioning as antimicrobials and antibiotics. Red betel leaf has double antiseptic power than green betel leaf. Red betel leaf also contains Polyphenols, saponins, flavonoids, and tannin which accelerate epithelialization of wounds (Suhermanto et al., 2013; Fithriyah et al., 2016). Average of perineal wound recovery for 5 days by using red betel leaf decoction water (R, 2017). Previous research about binahong or red betel leaf decoction waters did not assess the process of perineal wounds recovery day by day until fully recovered. Daily assessment is important to compare redness, edema, ecchymosis, discharge, and approximation of perineal wound. There is no previous research comparing binahong and red betel leaf decoction waters to find out effectiveness of perineal wounds recovery treatment. The number of postpartum mothers suffering second degree of perineal wound at Gubug I community health center in 2017 was 136 of 226 spontaneous labor. Meanwhile, Gubug II community health center was 161 of 269 spontaneous labor. Postpartum mothers in Gubug I and II community health center experienced perineal wound recovery for 7 days (80%) and 10 days (15%). About 5% experiencing perineal wound infection. This problem insists midwives to be aware of proper perineal wound treatment. This study aims to analyze the differences of perineal wound recovery period of postpartum mothers treated by using binahong compared to red betel leaf decoction waters.

## 2. Method

This quasi experiment research uses two post test groups without control group design. There are 32 respondents as sample selected by using accidental sampling. They are divided equally into binahong and red betel groups. Respondents in the working area of Gubug I community health center are grouped in binahong group and respondents in the working area of Gubug II community health center are grouped in red betel group. Selection of samples is based on inclusion and exclusion criteria.

The inclusion criteria of this study are postpartum mothers suffering second degree perineal wounds due to spontaneous tearing or episiotomy, mobilizing based stages, taking oral medication (amoxicillin 125 mg 3 times a day, methylergometrine 0.125 mg twice a day, paracetamol 500 mg 3

times a day, vitamin A 200000 IU every 24 hours for 2 days and samcobion once a day) as program of Gubug I and II community health center for postpartum mothers. Meanwhile, the exclusion criteria are postpartum mothers who are not willing to be respondents, suffering diseases such as diabetes mellitus, malignant disease and tuberculosis, smoker, abstaining from certain food, suffering from anemia (Hb <11 g/dL), and having BMI <18.4 kg/m<sup>2</sup>.

The procedures of making decoction water of binahong leaves are 50 grams of fresh binahong leaves put into 800 ml of boiling water. It is boiled for 15 minutes on medium heat by using clay pan to prevent damaging the content of binahong leaf substances and closed during the manufacturing process. The decoction water is let to cool, then it is filtered and only the water is left (Wijayanti and Rahayu, 2017). Meanwhile, the procedures of making decoction water of red betel leaves was 25 grams of fresh red betel leaves put into 100 ml of boiling water on clay pan and closed until it is cool. Then it is filtered and only the water is left (R, 2017).

Binahong or red betel leaf decoction waters are used for genital washing after urinating at last rinse at 7am and 3pm on 1-3 postpartum days. It was observed every morning to assess perineal wound recovery from the second postpartum day until fully recovered by using REEDA score.

REEDA score is an assessment tool of perineal wound recovery that was primarily developed by Davidson. REEDA score includes redness, edema, ecchymosis, discharge, and approximation with the highest score of each aspect is 3 and the lowest score is 0. A higher score indicates a greater level of tissue trauma and perineal wounds recovered when REEDA score is 0 (Davidson, 1974).

This research receives ethical approval by the Health Research Ethics Commission (KEPK) of Poltekkes Kemenkes Semarang number 036/KEPK/Poltekkes-Smg/EC/2018. Primary data collection has gained respondents' approval through informed consent. Anonymity and confidentiality are guaranteed in this study and respondents have the right to stop participate in the research process. using chi square, time series analysis, mann whitney and kruskal wallis test.

**Table 1.** REEDA Score (Hill, 1990)

Points	Redness	Oedema	Ecchymosis	Discharge	Approximation
0	None	None	None	None	None
1	Within 0.25 cm of the incision bilaterally	Perineral, < 1 cm from incision	Within 0.25 cm bilaterally or 0.5 cm unilaterally	Serum	Skin separation 3 mm or less
2	Within 0.5 cm of the incision bilaterally	Perineal and or between 1-2 cm from the incision	Between 0.25-1 cm bilaterally or between 0.5-2 cm unilaterally	Serosanguinous	Skin and subcutaneous fat separation
3	Beyond 0.5 cm of the incision bilaterally	Perineal and or vulvar > 2 cm from incision	> 1 cm bilaterally or > 2 cm unilaterally	Bloody, purulent	Skin, subcutaneous fat and fascial layer separation

### 3. Results

#### 3.1 Respondents' characteristics

Respondents' characteristics in this study are based on age, Body Mass Index (BMI), frequency of changing pads, and educational background. Table 2 shows that most of respondents are on reproductive ages (93.8%), have normal BMI (81.25%), change of pads frequency more than 3 times a day

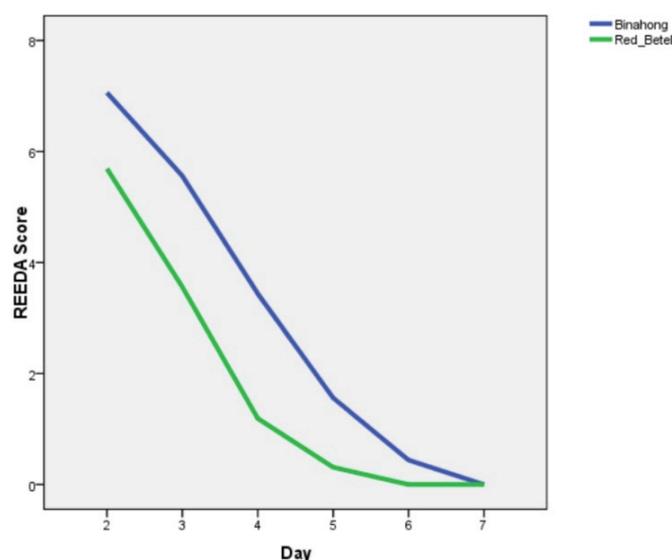
(59.4%), and have basic education level (59.4%). Respondents in binahong and red betel groups have no significant differences with  $p$  value  $> \alpha$  (0.05).

**Table 2.** Respondents' characteristics

No	Respondents' characteristics	Binahong group (n=16)		Red betel group (n=16)		Total (n=32)		P value
		F	%	F	%	F	%	
1	Age							1
	< 20 years old	1	6.2	1	6.2	2	6.2	
	20-35 years old	15	93.8	15	93.8	30	93.8	
2	BMI							0.654
	Normal (18.5 - 24.9 kg/m <sup>2</sup> )	12	75	14	87.5	26	81.25	
	Fat ( $\geq$ 25 kg/m <sup>2</sup> )	4	25	2	12.5	6	18.75	
3	Frequency of changing pads							1
	$\leq$ 3 times a day	6	37.5	7	43.8	13	40.6	
	$>$ 3 times a day	10	62.5	9	56.2	19	59.4	
4	Educational background							0.473
	Basic (elementary and junior high school)	11	68.8	8	50	19	59.4	
	Secondary (senior high school)	5	31.2	8	50	3	40.6	

### 3.2 The average of REEDA score

Assessment of perineal wound recovery by using REEDA score. A higher score indicates a greater level of tissue trauma. The average of REEDA score between binahong and red betel groups was assessed from the second postpartum day until fully recovered.



**Figure 1.** Analysis of the average of REEDA score by using time series analysis

Figure 1 shows that average REEDA score on 2-7 postpartum days of binahong and red betel groups decreased every day. The red betel group has an average REEDA score on 2-7 postpartum days lower than the binahong group. Therefore, the perineal wound recovery period of red betel

group is better than in binahong group. On day 6, perineal wound of red betel group is fully recovered. Meanwhile, on day 7, perineal wound of binahong group is fully recovered.

### 3.3 Perineal wound recovery period

Perineal wounds recovered when REEDA score is 0. Perineal wound recovery period between binahong and red betel groups was assessed in this study.

**Table 3.** Perineal wound recovery period

Dependent Variable	Binahong group (n=16)		Red betel group (n=16)	
	Mean ± SD	Min-Max	Mean ± SD	Min-Max
Perineal wound recovery period	6 ± 0.73	5-7	4.69 ± 0.79	4-6

Table 3 shows that perineal wound recovery averagely 6 days in binahong group. The fastest recovery period is 5 days and the longest one is 7 days. Meanwhile, perineal wound recovery averagely 4.69 days in red betel group. The fastest recovery period is 4 days and the longest one is 6 days.

### 3.4 Normality test of dependent variables

Normality test is related to statistic analysis. Normality test of this study is on dependent variables (REEDA score and perineal wound recovery period of binahong and red betel groups).

**Table 4.** Normality test of dependent variables

No	Dependent variables	P value	
		Binahong group	Red betel group
1	REEDA 2	0.008	0.278
2	REEDA 3	0.02	0.290
3	REEDA 4	0.007	0.002
4	REEDA 5	1	0.0001
5	REEDA 6	0.0001	0.0001
6	Perineal wound recovery period	0.005	0.001

Based on Table 4, REEDA score in binahong and red betel groups have not normal distribution with  $p$  value  $< \alpha$  (0.05). Thus, bivariate is done by using kruskal wallis test. Perineal wound recovery period in binahong and red betel groups is not normal distribution with  $p$  value  $< \alpha$  (0.05). Thus, bivariate is done by using mann whitney test.

### 3.5 Differences of REEDA score between binahong and red betel groups

**Table 5.** Differences of REEDA score between binahong and red betel groups

No	Dependent Variables	Binahong group (n=16)	Red betel group (n=16)	P value
		Mean ± SD	Mean ± SD	
1	REEDA 2	7.06±1.12	5.69±1.54	0.012
2	REEDA 3	5.56±1.15	3.56±1.55	0.001
3	REEDA 4	3.44±1.26	1.19±1.45	0.0001

4	REEDA 5	1.56±1.20	0.31±0.70	0.002
5	REEDA 6	0.44±0.81	0.00±0.00	0.036
6	REEDA 7	0.00±0.00	0.00±0.00	1

Table 5 shows that there is significant differences of REEDA score between binahong and red betel groups starting on the second postpartum day with  $p$  value  $< \alpha$  (0.05).

### 3.6 Differences of perineal wound recovery period between binahong and red betel groups

**Table 6.** Differences of perineal wound recovery period between binahong and red betel groups

Dependent Variable	Group		$P$ value
	Binahong group	Red betel group	
Perineal wound recovery period			0.0001

Based on Table 6, there is significant differences of the perineal wound recovery period between the binahong and red betel groups with  $p$  value  $0.0001 < \alpha$  (0.05).

## 4. Discussion

The majority of respondents are on reproductive ages. Postpartum mothers in reproductive ages have 6 times better perineal wounds recovery because speed of cellular recovery is normal (Rohmin et al., 2017). The respondents mostly have normal nutritional status based on BMI. Postpartum mothers who have good nutritional status have better perineal wound recovery because nutrients are needed for recovery process (Said et al., 2016). Most of respondents have change of pads frequency more than 3 times a day as a safe cleanliness of the genital area to prevent infections inhibiting perineal wound recovery (Sari, 2019).

Respondents' characteristics are age, BMI, frequency of changing pads, and educational background between binahong and red betel groups have no significant differences. Thus, respondents' characteristics do not affect perineal wound recovery in both groups. Internal and external factors associated to perineal wound recovery are BMI, hemoglobin, disease, abstaining from certain food, and mobilizing based stages (Rohmin et al., 2017; Said et al., 2016; Gunanti, 2010; Greenhalgh, 2003; Hartiningtiyaswati, 2010). All of these factors have been controlled in this study with inclusion and exclusion criteria. Thus, internal and external factors do not affect perineal wound recovery in binahong and red betel groups.

This study reveals that there is significant differences in the recovery period between binahong and red betel groups. In red betel group, the average day of perineal wound recovery is 4.69 days. This is faster than binahong group which requires 6 days. Thus, decoction water treatment of red betel leaves is effective for recover perineal wounds among postpartum mothers.

Binahong and red betel groups receives the same oral medication (amoxicillin 125 mg 3 times a day, methylergometrine 0.125 mg twice a day, paracetamol 500 mg 3 times a day, vitamin A 200000 IU every 24 hours for 2 days and samcobion once a day) as program of Gubug I and II community health center for postpartum mothers. Thus, oral medication do not affect perineal wound recovery in both groups and the perineal wound is recovered by the binahong or red betel leaf decoction waters.

Amoxicillin is an antibiotic to prevent infection. Based on Fouelifack et al. (2017), the perineal wound of postpartum mothers treated by using povidone iodine compared to combination of amoxicillin 1000 mg and clavulanic acid 125 mg twice a day, could recover perineal wound on day 9 of both groups. Thus, amoxicillin does not affect the process of perineal wound recovery.

Methylergometrin is an ergot alkaloid used to prevent postpartum haemorrhage by stimulating uterine contractions (Borgelt et al., 2010). Paracetamol was able to reduce 62% perineal wound pain

(Akil et al., 2014). Vitamin A 200000 IU eases postpartum mothers recovery better (WHO, 2003). Samcobion is an iron tablet to prevent anemia. Based on the research of Dewi et al. (2016), iron consumption of postpartum mothers did not affect the second degree perineal wound recovery.

This study indicate that perineal wound treated using binahong leaf decoction water, wound recovery averagely 6 days and longest recovery is 7 days. It is different from Wijayanti and Rahayu (2017). Their study shows postpartum mothers who used binahong leaf decoction water for perineal wound, recovery averagely 7 days and longest recovery is more than 7 days.

It is different because the respondents in Wijayanti and Rahayu (2017) were postpartum mothers suffering 1-3 degree perineal wounds. Meanwhile, the respondents of this study are postpartum mothers suffering second degree perineal wound. Third degree of perineal wound have deeper and wider wounds than first and second degree of perineal wound. Thus, third degree of perineal wound experience prolonged proliferation and the edges of the wound will fuse longer. Therefore, the recovery period is longer than first and second degree of perineal wound (Suriadi, 2004). Binahong leaf decoction water in Wijayanti and Rahayu (2017) was initially given on the third postpartum day. About 9.1% of respondents experienced perineal wound recovered longer than 7 day. Meanwhile, decoction water of binahong leaves in this study is initially given on the first postpartum day and perineal wound is recovered no later than 7 days. Thus, decoction water treatments of binahong leaves given on the first postpartum day quickly recovers perineal wound than given on the third postpartum day.

In terms of maintenance of red betel leaf decoction water, the results of this study are in accordance with research of R (2017). The average perineal wound recovery for 5 days by using decoction water of red betel leaves and perineal wound healed proves to be fastest within 4 days.

The wound recovery process started from coagulation, inflammatory, proliferation, and maturation. In the coagulation phase, released thrombocyte occurrence causes vasoconstriction and coagulation to prevent wider bleeding. Then, the inflammatory phase triggers an inflammatory reaction to fight infection. When there is no infection, the granulation process and epithelialization occur in the proliferation stage. Then during phase of maturation, collagen fibers are bound together and fused to recover the tissue (Middleton, 2011).

The REEDA score of the binahong and red betel groups show significant differences starting on the second day of postpartum. The daily average REEDA score in the red betel group is lower than the binahong group. It means that daily perineal wound recovery of red betel group is better than the binahong group. Thus, decoction water of red betel leaves is effective for perineal wound recovery of postpartum mothers.

The effectiveness of red betel leaf decoction water in perineal wound recovery is caused by some specific compounds of red betel leaves rather than binahong leaves. Some of these compounds are red betel leaves contain alkaloid 543.75 mg/g, polyphenols 210.11 mg/g, and flavonoids 6.09 mg/g (Suhermanto et al., 2013; Fithriyah et al., 2016; R, 2017; Wijayanti and Rahayu, 2017; Davidson, 1974; Hill, 1990; Fouelifack et al., 2017; Borgelt et al., 2010; Akil et al., 2014; WHO, 2003; Dewi et al., 2016; Middleton, 2011; Kusumowati et al., 2012). Whereas binahong leaves only contain alkaloids 0.86 mg/g, polyphenols 70,25 mg/g, and flavonoids 0.11 mg/g (Marwoko, 2013; Sulistyaningsih et al., 2015; Selawa et al., 2013).

Alkaloid is antibacterial by interfering constituent components of bacterial cell peptidoglycan (Juliantina et al., 2008). Polyphenols are antioxidants that are 100 times more effective than vitamin C and 25 times more effective than vitamin E (Sulistyaningsih et al., 2015). Flavonoids have antibiotic ability to disrupt microorganism functions, causing death of microorganisms (Suhermanto et al., 2013). All of them abilities prevent infection. Thus, they accelerate the ending stage of the inflammatory phase during the recovery and rapid proliferation phase (Selawa et al., 2013). Inflammation is an inflammatory process characterized by several symptoms such as redness (rubor) and swelling (tumor). Assessment by using REEDA score shows the wound recovery uses terms redness (rubor) and edema (swelling) (Davidson, 1974). This is the reason why red betel group has better average score of redness and edema than the binahong group.

Flavonoids may also accelerate period of epithelialization of wounds in the proliferation phase. Polyphenols and saponins are able to stimulate collagen formation in the proliferation phase (Suriadi, 2004). The content of flavonoids and polyphenols in red betel leaves is more than the content in binahong leaves. This is why the red betel group has better average score of ecchymosis and approximation than binahong group.

Some of the compounds are contained in red betel leaf but not in binahong leaves are tannin 3.97 mg/g as antibacterial and new tissue regeneration, carvacrol as antibiotic, and eugenol 2.2 mg/g as antiseptic, antimicrobial, and analgesic which stimulating formation of new epithelial cells, and supporting process of re-epithelialization (Nisa et al., 2014).

Meanwhile, some compounds contained in binahong leaves but are not found in red betel leaves are protein and ascorbic acid. Protein function in fostering tissue formation and accelerating epithelialization period of wounds. Ascorbic acid plays a role in the formation of collagen, so that collagen fibers formed will be more robust (Mercandetti and Cohen, 2012).

## 5. Conclusion

This study suggests that decoction water treatment of red betel leaves is effective for perineal wound recovery of postpartum mothers. Then, red betel leaf decoction water is recommended as an alternative treatment for postpartum mothers suffering perineal wounds. However, further research with a larger number of respondents and true experimental research design is needed to analyze effect of red betel leaves on perineal pain, platelets level, and leukocyte level.

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## Conflict of Interest

There is no conflict of interest.

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