

## Comparison of The Effectiveness of *Piper crocatum* and Sour Turmeric Acid for Healing Time

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### Abstract

Maternal mortality (MMR) is still 359 per 100,000 live births, and the expected target is still far from what was proclaimed in 2030, the number of 70 per 100,000 live births. Data from WHO (World Health Organization) shows that in 2015, deaths were around 2.7 million cases caused by perineal injuries. According to IDHS data (Indonesian Demographic and Health Survey), in 2017, the maternal mortality rate (MMR) was 305 per 100,000 live births caused by an infection in the perineal wound. The total maternal mortality rate (MMR) in various provinces in Indonesia has decreased from 4,226 to 4,221. In 2019 the maternal mortality rate (MMR) was most contributed by bleeding (30.3%) and postpartum infection (5%). This study aimed to determine the differences in the effectiveness of red betel and turmeric acid in complementary wound healing treatment in postpartum women. This study was a quasi-experimental pretest-posttest control group design with a total sampling method by giving three intervention and control groups, as many as 30 postpartum women with perineal wounds grades I and II according to the inclusion criteria with the group given red betel, tamarind, and turmeric. Control group at Anutapura General Hospital Palu. Perineal wound care using the REEDA scale (Redness, Edema, Ecchymosis, Discharge, and Approximation). The results showed a difference in the effectiveness of red betel and turmeric acid on perineal healing. The average Mann-Whitney statistical test results were on the 5th and 7th days (P-Value < 0.005). This study shows that *Piper crocatum* can accelerate perineal wound healing and become an alternative for complementary therapy and perineal wound healing.

**Keywords:** *Piper crocatum*, Turmeric acid, Perineal wounds, Complementary medicine

### 1. Introduction

Perineal wound healing replaces damaged tissue fungus due to skin tissue damage or disintegration. A breakdown or catabolic and anabolic formation processes characterize the wound healing process. The perineal wound healing process will heal within 6-7 days (Nurrahmaton and Sartika 2018). In wound healing, there are 4 stages: the hemostatic phase, the inflammatory phase, the proliferation phase and the maturation phase (Şanlıer 2012). Perineal wound care properly and correctly avoids infection in the perineal wound. A preliminary study carried out at the Anutapura Regional General Hospital Palu with the number of postpartum mothers with perineal injuries in January-September 2021 was 170 cases.

Wound healing is not good; with a percentage of wound healing more than 14 days, there are 50 cases in postpartum mothers, causing discomfort to the mother and the wound healing process takes longer, so it becomes easy for mothers to get postpartum infections. With this preliminary study, researchers are interested in conducting research related to the use of red betel and turmeric acid in perineal wound healing. This research has never been done, so it is expected to be a reference for providing complementary therapies that can be used by postpartum mothers in particular and can also be used by the community in general. Medical treatment that has been carried out, in this case, is to provide medical therapy drugs for the perineal wound healing process, in this study using red betel stew and tamarind turmeric to accelerate the perineal wound healing process. The results found from this study showed that tamarind turmeric is more effective in healing perineal wounds.

*Piper crocatum* is a traditional medicine that is very popular and widely available in Indonesia. Red Betel (*Piper crocatum*) is easy to obtain and has been used as an empirical herbal medicine for generations in Asian countries to treat wounds (Sharma, 2013). This plant contains saponins, flavonoids, tannins and essential oils; these ingredients can help the wound healing process and are very functional for antioxidants and antimicrobials so that they affect the wound healing process and accelerate epitalization (Lister et al. 2019). Piper Crocatum) contains *catechaldehyde* compounds that function as an anti-inflammatory (Gong 2021).

Research that has been carried out (Karimah et al. 2019) perineal wounds can be treated using 25 gram of fresh red betel leaf, put into 100 ml of water, then boiled for 15 minutes, and wait until cool and filtered so that the remaining water. A decoction of red betel is washed on the genitals twice a day and applied 1-3 days postpartum. Perineal wound assessment was carried out every morning using the REEDA score. The results of this study showed that red betel decoction was able to accelerate the healing of perineal wounds, with an average wound healing of 4.69.

Besides the red betel leaf decoction, sour turmeric decoction is another plant commonly used for perineal wound healing. The active ingredient curcumin can be trusted for medical treatment (Gupta et al. 2013). The content of curcumin is known to have extensive biological activity and has the potential to heal wounds (Sjahrudin, 2015). Research conducted (Susanti, 2017) healing perineal wounds with tamarind turmeric drink using a dose of turmeric 165mg/Kg BW, with tamarind 1:3 by weight of turmeric, then boiled and filtered until the water remains, taken every morning after breakfast. The results of an assessment of wound healing using the REEDA scale showed that turmeric acid only took 5 days to heal wounds on the perineum. In this case, the researchers stated that the benefits of complementary therapy in helping the healing process could accelerate the healing of perineal wounds and avoid perineal infections.

## 2. Material and Method

### 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 then filtered using a flannel cloth. Sufficient volume of betel leaf boiled water to 100 ml (Karimah et al. 2019).

#### 2.1.2 Sour turmeric acid production

Turmeric acid is a mixture of turmeric rhizome and tamarind fruit. It made sour turmeric using turmeric rhizome as much as 165 mg/kg adjusted to the patient's weight. Turmeric acid is given in a 1:3 ratio, namely 1 part turmeric with 3 parts acid. For example, for a patient of 50/kg, it takes 6.6 grams of turmeric rhizome and 19.8 grams of tamarind, both of which are mixed; first, the turmeric rhizome is grated and added with tamarind and 120ml of water, then boiled until boiling and left for 15 minutes. After it is warm, it is filtered using a flannel cloth, and the volume is up to 120 ml. For food and drinks, you can add palm sugar to taste according to taste. This sour turmeric must always be made fresh daily (Susanti 2017). *Piper crocatum* is given by washing on the vulva once a day after urinating, and sour turmeric is provided by drinking it in the morning after breakfast. Both preparations are continually made new if you will use these preparations.

### 2.2 Methods

This study is a quasi-experimental study with a Pretest-Posttest Control Group design carried out at the Anutapura Regional General Hospital Palu in March-April 2022. The study population was all postpartum mothers with perineal injuries, both spontaneous and with episiotomy degrees I and II, with a sample of 30 divided into 3 groups consisting of 1 intervention group given red betel stew and 1 intervention group given tamarind turmeric. In contrast, the control group was given vulvar hygiene treatment.

a. Inclusion criteria include:

1. Mothers with perineal rupture degrees I and II
2. Willing to be a research respondent

b. Exclusion criteria include:

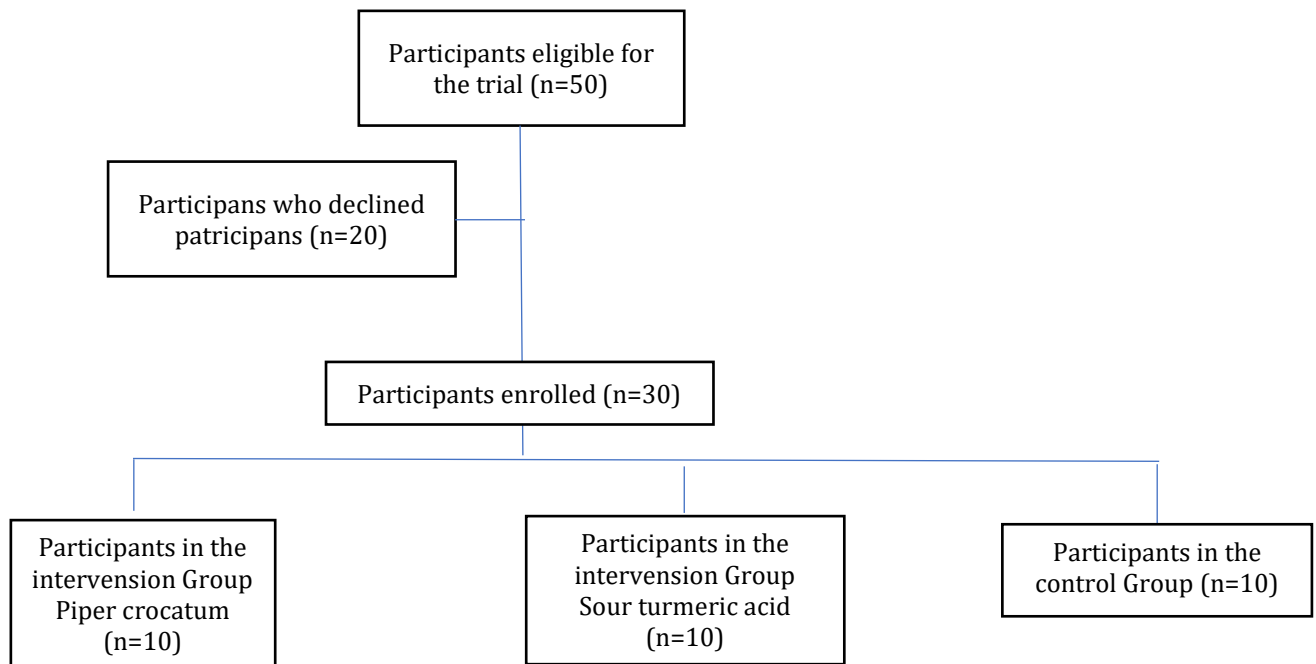
1. Respondents who experience communication disorders
2. Respondents who do not take antibiotics
3. Respondents who use other herbs
4. Respondents who have comorbid diseases

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

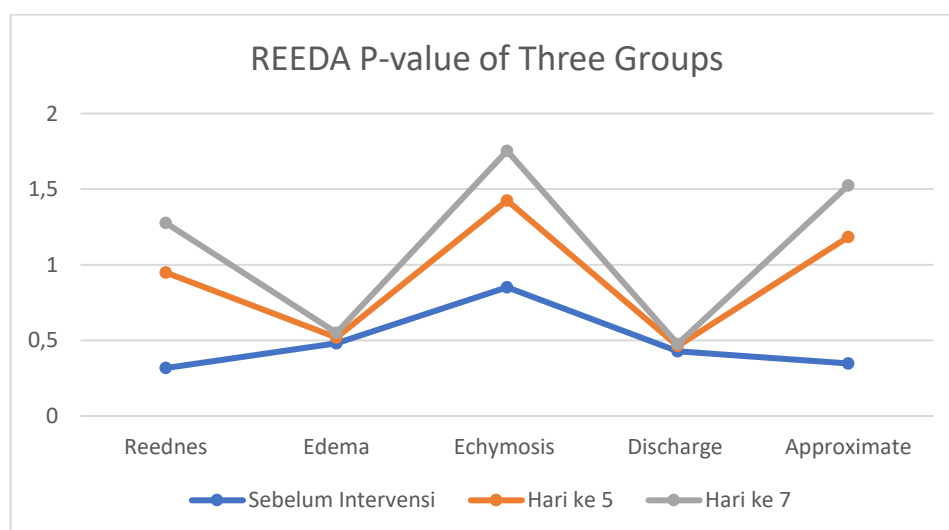
### 3. Results and Discussion

#### 3.1 Results

This research was conducted by providing intervention to postpartum mothers who suffered grades I and II perineal injuries either directly or by episiotomy. The intervention was to use red betel stew by washing it on the wound area and drinking sour turmeric.



**Figure 1.** Group of Participants enrolled the study



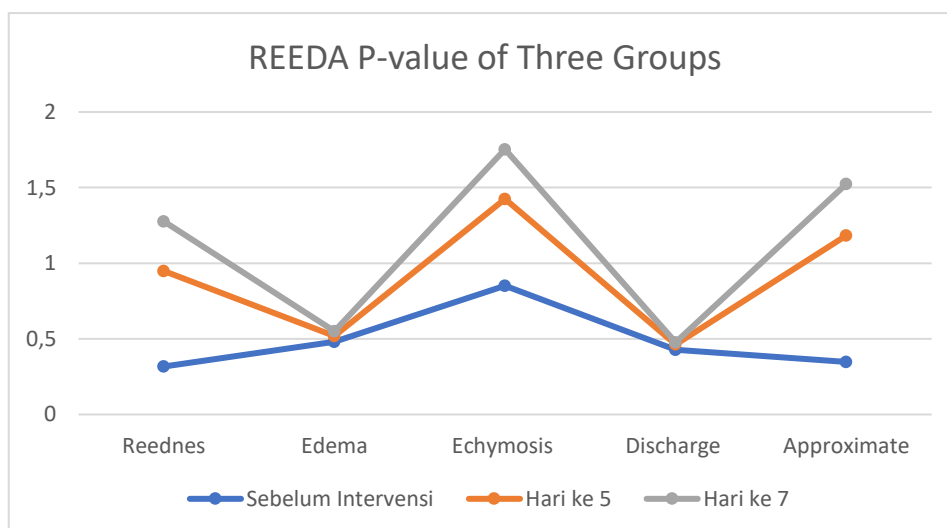
**Figure 1.** Average REEDA Scale in the Three Groups Days 1.5 and 7

**Table 1.** Average REEDA Scale in the Three Groups Days 1.5 and 7

Variable	Group	Before intervention	Day-5 Postpartum	Day-7 Postpartum
		Mean (SD)	Mean (SD)	Mean (SD)
Reedness	Control	1,90 (0,738)	0,30 (0,483)	0,20 (0,422)
	Piper	2,40 (0,699)	0,40 (0,516)	0,20 (0,422)
	Crocatum	2,20 (0,789)	0,20 (0,422)	0,00 (0,000)
	Sour	2,20 (0,789)	0,20 (0,422)	0,00 (0,000)
	Turmeric	2,20 (0,789)	0,20 (0,422)	0,00 (0,000)
	<i>P value</i>	0,317	0,631	0,328
Edema	Control	2,10 (0,738)	0,40 (0,516)	0,20 (0,422)
	Piper	1,90 (0,738)	0,60 (0,516)	0,20 (0,422)
	Crocatum	1,90 (0,738)	0,60 (0,516)	0,20 (0,422)
	Sour	1,70 (0,823)	0,30 (0,483)	0,00 (0,000)
	Turmeric	1,70 (0,823)	0,30 (0,483)	0,00 (0,000)
	<i>P value</i>	0,480	0,039	0,032
Echymosis	Control	1,90 (0,738)	0,30 (0,483)	0,20 (0,422)
	Piper	2,10 (0,876)	0,30 (0,483)	0,20 (0,422)
	Crocatum	2,10 (0,876)	0,30 (0,483)	0,20 (0,422)
	Sour	2,00 (8,16)	0,50 (0,527)	0,00 (0,000)
	Turmeric	2,00 (8,16)	0,50 (0,527)	0,00 (0,000)
	<i>P value</i>	0,851	0,574	0,328
Discharge	Control	1,50 (0,527)	0,50 (0,527)	0,30 (0,438)
	Piper	1,60 (0,843)	0,30 (0,483)	0,10 (0,316)
	Crocatum	1,60 (0,843)	0,30 (0,483)	0,10 (0,316)
	Sour	1,90 (0,738)	0,20 (0,422)	0,00 (0,000)
	Turmeric	1,90 (0,738)	0,20 (0,422)	0,00 (0,000)
	<i>P value</i>	0,427	0,036	0,014
Approximate	Control	1,10 (0,316)	0,30 (0,483)	0,20 (0,422)
	Piper	1,20 (0,632)	0,20 (0,422)	0,10 (0,316)
	Crocatum	1,20 (0,632)	0,20 (0,422)	0,10 (0,316)
	Sour	1,50 (0,850)	0,20 (0,422)	0,00 (0,000)
	Turmeric	1,50 (0,850)	0,20 (0,422)	0,00 (0,000)
	<i>P value</i>	0,348	0,835	0,342

\* *Uji Kruskal-Wallis Test*

Table 1 shows that on the 1st postpartum day, there was no significant difference in the average REEDA scale in the three groups. It can be seen from the  $p$ -value  $> 0.05$ . On the 5th and 7th-day postpartum, there was a significant difference in the swelling and discharge aspects with a value ( $p < 0.05$ ), while the other REEDA parameters were not significantly different. Significant changes in this aspect of the turmeric acid group.



**Figure 2.** Total REEDA Score of Perineal Wound Days 1, 5 and 7 Postpartum Healing Rate

**Table 2.** Total REEDA Score of Perineal Wound Days 1, 5 and 7 Postpartum Healing Rate

Total Skor <i>REEDA</i>			Piper Crocatum		Sour Turmeric		<i>P-Value</i>
	Control						
Hari Ke-1	n	%	N	%	n	%	
0	0	0	0	0	0	0	Konstan (-)
1-5	0	0	0	0	0	0	
>5	10	100	10	100	10	100	
Total	10	100%	10	100%	10	100%	
Day -5							
0	0	0	0	0	1	10	0,355
1-5	10	100	10	100	9	90	
>5	0	0	0	0	0	0	
Total							

	10	100%	10	100%	10	100%	
Day -7							
0	0	0	0	0	6	60	0,001
1-5	10	100	10	100	4	40	
>5	0	0	0	0	0	0	
Total	10	100%	10	100%	10	100%	

*\*Uji Chi-Square Test (Day 1 konstan)*

It was based on table 2, using the Chi-Square Test to see the healing rate. Based on the total score using the REEDA scale, there was no difference in the rate of wound healing on the first and fifth days. Still, on the 7th day there was a difference in the healing rate with a P-Value of 0.001 ( $< 0.05$ ) which was significant between groups. Almost all groups were still in the poor category based on the REEDA scale. Still, 6 people (60%) had good categories, namely in the group with turmeric acid administration.

### 3.2 Discussion

In Indonesia, herbal medicine is a complementary therapy accepted by the wider community (Eghdampour et al., 2013). Complementary therapy is also called traditional or folk medicine (Nuraini, 2013). Wound healing was measured using the REEDA scale (Redness, Edema, Ecchymosis, Discharge, Approximation) to assess the severity of perineal trauma during episiotomy and labor lacerations. Wound criteria with good assessment if the wound is dry, the perineum is closed, and there are no signs of infection such as redness, swelling, heat, or pain (Siagian et al., 2021). Turmeric plants can maintain health naturally; turmeric is used as a traditional medicine that plays an active role as a wound medicine (Cobra et al., 2019).

This study shows that turmeric acid can accelerate the healing process of perineal wounds, with an average healing time of 5 days. Research conducted by (Mohanty and Sahoo 2017) said that the healing time of perineal wounds using curcumin averaged 5 days and showed rapid re-epithelialization. This research is in line with study conducted by (Putri Andanawarih 2021) showed that the healing time of the perineal wound with the administration of turmeric acid on average healed within 3-7 days with the wound condition improving. In addition, this research conducted by (Susanti 2017) showed the perineal wound healed within 5 days, which compared the treatment of perineal wounds using red betel and oral antibiotics.

Several research results show that curcumin contained in turmeric has physiological and molecular properties in the inflammatory phase and also provides an antioxidant effect by restoring the imbalance in the production of reactive oxygen species (ROS) free radicals. The proliferation phase of curcumin can result in collagen synthesis, fibroblast migration, epithelialization, and vascular density (Barchitta et al., 2019). Curcumin has also been shown to have pro-angiogenic properties on wound healing by inducing fibroblast growth factor (TGF $\beta$ ), extracellular matrix accumulation, and angiogenesis, which continues into the wound healing phase (Mahmudi et al., 2015).

The working process of curcumin is an antibacterial. It can inhibit the metabolic process of bacteria by damaging the cytoplasmic membrane and denaturing the cells, causing nutrient leakage from dead cells and bacteria so that their growth is inhibited. The role of essential oils in curcumin has five components, namely *oxygenated monoterpenes*, *oxygenated sesquiterpenes*, *monoterpene hydrocarbons*, *sesquiterpene hydrocarbons* and *esters*. Essential oils contain *sesquiterpenes* which have strong antibacterial activity compounds that cause the wound healing process to occur (Sasidharan, 2013).

Research conducted by (Rostika, Choirunissa, and Rifiana 2020) showed Perineal wound healing time with the administration of red betel, on average, healed in 5.80 days. The results of this study are slower than the research conducted by (Damarini 2013) showed that the average perineal wound healing using boiled red betel healed in 2-3 days. Research conducted by (Samura and Mela Azrianti 2021) showed that the healing time of perineal wounds with mothers who used red betel healed within the 8th day, and the average perineal wound healing was healed within 5-6 days. Turmeric has also been shown to have significant wound-healing properties, and it acts at various stages to accelerate wound healing (Martinello et al. 2006). Turmeric has been proven an anti-inflammatory, antioxidant, anticarcinogenic, anti-infective, and anticoagulant, so tamarind turmeric is efficacious in helping heal the perineal wound (Akbik et al. 2014).

*Piper crocatum* is a plant belonging to the Piperaceae family which has active ingredients, including *phenols*, *flavonoids*, *tannins*, and polysaccharides, which are helpful for wound healing, anti-fungal, and antioxidant. Red betel contains volatile oil compounds, *alkaloids*, *flavonoid*, *tannins*, and *saponins*. The properties are empirically able to kill candida albicans fungus and prevent infection. Saponins in red betel can stimulate collagen formation, a structural protein that plays a role in the wound healing process, essential oils containing chavibetol and chavicol, compounds with antiseptic properties. The benefits of antiseptic are closely related to the inhibition of bacterial growth (Nurul aini siagin, 2020).

This study provided red betel stew by boiling for 15 minutes with 100 ml of water, and tamarind turmeric boiled for 15 minutes with 120 ml of water, given 1:3 turmeric acid and grams of palm sugar to taste according to taste. B vitamins: thiamine, riboflavin, pyridoxine, folic acid, pantothenic acid, and cobalamin are essential cofactors in enzyme reactions involved in leukocyte formation and the anabolic process of wound



healing. Thiamine, riboflavin, pyridoxine, and cobalamin are also required for collagen synthesis (Russell, 2001). Therefore, vitamin B deficiency indirectly affects wound healing by interfering with antibody production and white blood cell function, increasing the risk of infectious complications. Vitamin C is implicated in wound healing with several roles in cell migration and transformation, collagen synthesis, antioxidant response, and angiogenesis (Sasidharan, 2010).

Malnutrition and lack of minerals several minerals are involved in the wound healing process because of their role as structural factors for enzymes, metalloenzymes, and antioxidants. Among these, zinc is essential for DNA replication in cells with a high rate of cell division, such as inflammatory and epithelial cells and fibroblasts. In the inflammatory phase, zinc enhances the immune response and fights susceptibility to infectious complications by activating lymphocytes and producing antibodies. The proliferative and remodeling phases are essential for collagen production, fibroblast proliferation, and epithelialization by stimulating enzyme activity (Todorovic, 2002).

## Conclusion

Perineal wound healing by giving red betel stew and tamarind turmeric had a significant difference in the duration of wound healing with a P-Value <0.05, which means that there was a difference in the duration of perineal wound healing. It is suggested that turmeric acid is more effective in healing perineal wounds given by consuming it 1 time a day.

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