



The Effectiveness of Kersen Leaves (*Muntingia Calabura L*) Gel on Perineal Wound Healing in Rabbit (*Oryctolagus Cuniculus*)

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Abstract

Background: Perineal rupture, which causes pain and discomfort in normal delivery mothers, necessitates a rapid perineal wound healing process. Kersen leaves include flavonoids, saponins, and tannins, which can help perineal sores heal faster. The purpose of this study is to see how successful kersen leaf gel is at healing perineal wounds in rabbits.

Materials and Methods: This research employs an experimental research design that includes a randomized post-test research design with a control group. The rabbits in this study were separated into two groups of six rabbits each for the control group, which received dry wound care, and the intervention group, which received kersen leaf gel. The REEDA Scale is used to measure wounds. Man Whitney was used to analyze the data.

Result: The effects of kersen leaf gel and dry wound care on perineal wound healing were not statistically significant, however the intervention group experienced a higher decrease than the control group. p value ($= 0.340$) > 0.05 was used to represent the outcomes of the study of the two groups.

Conclusion: Kersen leaf gel applied topically promotes wound healing in the perineum

Keywords: Perineal wound, kersen leaf gel, cherry leaf gel, REEDA scale

Introduction

When the wound in the birth canal is next to the anus as a place to dispose of excrement (dirt), it can become a fertile environment for bacteria to proliferate and develop in the perineum. The wound healing process is slowed as a result of this.^{1,2}

In 2009, there were 2.7 million cases of perineal rupture in pregnant women around the world. Perineal rupture will affect 6.3 million people in 2020, according to estimates.³ Perineal tears are a widespread concern in Asia, with Asia accounting for half of all perineal tears worldwide. In Indonesia, maternal rupture of the perineum affects 24 percent

of women aged 25 to 30, and 62 percent of women aged 32 to 39. 5 Perineal rupture is still a common occurrence: 57 percent of women had perineal rupture, 28 percent had an episiotomy, and 29 percent had a tear out of 1951 spontaneous vaginal deliveries. Infection of the perineal rupture is one of the complications of perineal rupture.⁴

Perineal wound care satisfies the demand to nourish the genitalia positioned between the thighs and bordered by the vulva and anus in the mother who is between the birth of the placenta and the restoration of the genital organs to their pre-pregnancy state.

Maintaining the genitals by washing them with soap, then drying the vulva area to the anus before applying sanitary napkins, and washing your hands with soap before and after cleaning the genital area are all suggested perineal wound care practices. Replace the pads in running water at least three times a day. However, it turns out that this treatment is insufficient to prevent the perineal area from infection, which might cause the lesion to heal more slowly. A moist wound that is shielded from germs is a favorable and ideal condition in the wound healing process.^{5,6}

Non-pharmacological treatment, such as kersen leaves, can be used to destroy germs and treat illnesses. According to Muhammad's study, kersen leaf can minimize erythema in wound healing without the need of antibiotics.⁷

Antibacterials made from natural substances minimize the occurrence of bacterial resistance in the body while causing no adverse effects. Antibiotic resistance should be avoided at all costs.

Kersen leaf provides the highest antibacterial inhibition of 75 percent against *Streptococcus viridans*, according to Sulaiman's research. Infection, which is one of the obstacles to perineal wound healing, can be prevented by antibacterial qualities. Kersen leaves have antibacterial, antimicrobial, anti-inflammatory, and antioxidant effects in addition to being antibacterial.^{8,9,10} Flavonoids, saponins, and tannins are all found in kersen leaves.¹¹

Antibacterial properties are influenced by flavonoid content. The antibacterial activity of kersen leaves is proportional to their flavonoid concentration.¹² These diverse ingredients can help perineal sores heal faster. Aside from the content of kersen leaves, the usage of kersen leaves was chosen because they are easy to get and inexpensive.

Making kersen leaves into a gel preparation makes it easier to utilize them for perineal wound healing. Gel preparations offer various benefits, including the fact that they are non-sticky, simple to apply, wash, and do not leave an oily coating on the skin, decreasing the risk of future irritation caused by oil collection in the pores.¹³

Antimicrobial, antibacterial, pain-relieving, and anti-inflammatory qualities are all present in kersen leaf gel. So that it can help with perineal wound healing,

pain relief, and infection prevention. Kersen leaf gel can be used instead of topically applied anti-inflammatory medications. As a result, the authors are considering the term "The efficacy of kersen leaf gel (*Muntingia calabura*) on perineal wound healing in rabbits (*Oryctolagus cuniculus*)."

Material and methods.

This is an analytical study that employs an experimental research design and a post design with a control group. The ethics commission of the Poltekkes, the Ministry of Health in Semarang, has given authorization for this study.

The study used a group of 12 female rabbits (*Oryctolagus cuniculus*) to see how successful kersen leaf gel was in healing perineal wounds in rabbits. The research lasted seven days. The research begins with the selection of 12 rabbits that fit the criteria and the selection of female sex aged 2-3 months with a body weight of 1-1.5 kg, followed by a 7-day adaption period. During the adaption period, all rabbits were maintained and treated the same way. The rabbits were fed 1 ounce/day/head pellets and water from a bottle during the 7-day adaption.

Manufacturing kersen leaf simplicia is the first step in making kersen leaf gel. Selected old kersen leaves, in order of number 5 from the tip of the stalk, were collected in the afternoon for up to 3 kg, then washed and aerated for 3 days to create 2,630 g of semi-dried kersen leaves. Then bake for 6 hours at 50 degrees Celsius. There were 1,150 g of dried kersen leaves produced. Then, in a blender, verify the amount of water. A simplicia pollinator was also used to pollinate kersen leaves.

How to Make Kersen Leaf Gel

Then 500 g of simplicia powder was split into two portions and placed in 250 g glass jars, with 2500 ml of 96 percent ethanol poured to each jar. Then I stirred for 5 minutes in the morning and evening for 3 days. Maceration is the outcome of stirring for 3 days, every morning and evening for 5 minutes. The maceration was then filtered, yielding a liquid extract of 410 mL. The kersen leaf extract was then thickened in a rotary evaporator at 50°C and 50 rpm to obtain thick kersen leaf extract.

Starting with 225 ml of hot aquadest, add carbomer to the mortar, stirring well, then add adequate TEA

and 73 ml of ordinary distilled water without heating, then add 75 g of thick kersen leaf extract and 60 g of methyl paraben. mg while stirring well. The flavonoids, saponins, and tannins were then tested.

Results

The rabbits in the intervention and control groups were maintained in separate cages during the wound healing procedure. None of the bunnies perished during the recovery procedure. There are no dead bunnies in the healing process.

The antioxidant test of 100 ml of kersen leaf gel revealed flavonoids of 0.216 mgEq, tannin content of 92.63 mgTE, and saponin content of 0.216 mgEq. When the kersen leaf gel is agitated, it produces foam.

Perineal Wounds Healing

Figure 1: Total REEDA Scale on Perineal Wound Healing in Rabbits

Table 1: Total REEDA Scale on Perineal Wound Healing in Rabbits

Figure 1 and Table 1 show the information.

The REEDA scale healing in the kersen leaf gel group occurred on day 7, as shown by a mean value of 0.00 in the leaf gel group. On day 7, the dry wound care group had the lowest mean REEDA scale, averaging 1.00.

The Effects of Kersen Leaf Gel

Table 2: Analysis of the differences in mean REEDA scale between the kersen leaf gel and dry wound care.

Table 2 contains the information.

The Man Whitney test, which compared the intervention and control groups on perineal wound healing in rabbits, yielded a p-value of 0.340 (p-value > 0.05), indicating that there was no significant impact in both groups.

Discussion

The findings of a research comparing the use of kersen leaf gel versus dry wound care on perineal wound healing found no significant differences, while the intervention group saw a higher drop than the control group.

The intervention group's average REEDA score decreased by 39.99 points, whereas the control group's score decreased by 45.01 points, indicating that the value of the decline was larger in perineal wound healing on the REEDA scale.

The findings of this investigation support Ninan Jisha's findings that kersen leaf extract has anti-inflammatory properties. According to the hypothesis, the wound healing process begins on day 1 of the inflammatory phase and ends on day 7 of the proliferative phase of wound healing. The proliferative and inflammatory phases are intertwined. The objective of this phase of healing is to restore skin integrity and fill the wound with new tissue. The benchmark for initiating this phase is the establishment of a new network. Angiogenesis (new blood growth), collagen synthesis, extracellular matrix (ECM) creation, and wound contraction that occurs at the wound borders are all part of the proliferative phase.^{14, 15}

Kersen leaf gel includes free radical scavenging components that can speed wound healing and protect tissues from oxidative damage when applied topically. Flavonoids are a powerful antioxidant with antibacterial capabilities that can minimize lipid peroxidation, speed up epithelialization, and reduce lipid peroxidation. By enhancing the strength of the collagen fiber webbing, decreased lipid peroxide will avoid necrosis, enhance vascularity, and increase the viability of collagen fibers.¹⁶

Tannins speed wound healing by cleaning reactive oxygen and free radicals, increasing wound closure by increasing the number of fibroblasts and blood capillaries, and being anti-microbial by increasing epithelialization, while saponins increase the ability of TGF-B receptors to bind with fibroblasts. TGF-B is a growth factor required by fibroblasts in the production of collagen, and it is assumed that flavonoids, saponins, and tannins are important for wound contraction during the proliferative phase.

According to research, kersen leaf extract shows antimicrobial action against *Escherichia coli*, *Pneumonia aeruginosa*, *staphylococcus aureus*, and *B. subtilis* bacteria, and raising the concentration of the extract has a significant inhibitory power.¹⁷

According to Siti Rohimah's research, the gel preparation product of a combination of soursop leaf

extract and kersen kersen as an antibacterial in rabbits showed that after three days of use, neither the single gel preparation nor the combination of soursop leaf extract and kersen leaf extract caused irritation to the skin of experimental animals.¹⁸

According to Retno's research, nine out of ten postpartum moms who were administered kersen leaf extract had faster wound healing and one had sluggish wound healing.¹⁶

Conclusion

Based on the findings of study into the efficiency of kersen leaf gel as a perineal wound healer in rabbits, it can be concluded that kersen leaf gel can be used as a perineal wound healer.

References

1. Varney H et al. Buku Ajar Asuhan Kebidanan. EGC, editor. Jakarta; 2010.
2. Bick D, Beake S. Post-Natal Care for the Recently Delivered Obese Women [Internet]. First Edit. Obesity: A ticking time bomb for reproductive health. Elsevier Inc.; 2013. 397–420 p.
3. Hilmi & Bascom. Obstetri Williams Volume I. Jakarta: EGC; 2010.
4. Susanti D. Pengaruh Konsumsi Minuman Kunyit Asam terhadap Lama Penyembuhan Luka Perineum Ibu Nifas. Poltekkes Kemenkes Semarang; 2017.
5. Arisanty A. Konsep dasar manajemen perawatan. EGC, editor. Jakarta; 2013.
6. Fitri E. Faktor-faktor yang mempengaruhi Lamanya Penyembuhan Luka Perineum pada Ibu Nifas di Rumah Sakit Umum dr. Zainoel Abidin Banda Aceh tahun 2013. Kebidanan Banda Aceh; 2013.
7. Damarini S, Eliana E, Mariati M, Al E. Efektivitas Sirih Merah dalam Perawatan Luka Perineum di Bidan Praktik Mandiri. Kesmas Natl Public Heal J. 2013;8(1):39.
8. `Ibad M, Nasution T, Andarini S, Al E. Pengaruh Ekstrak Daun Kersen (Muntingia Calabura) Terhadap Derajat Eritema Pada Proses Inflamasi Marmut (Cavia Porcellus) Dengan Luka Bakar Derajat Ii Dangkal. J Ilmu Keperawatan. 2013;1(2):pp.157-161.
9. Sulaiman AY, Astuti P, Dewi A, Shita P. Uji Antibakteri Ekstrak Daun Kersen (Muntingia Calabura L .) Terhadap Koloni Streptococcus viridians. 2017;01(02):1–7.
10. Patrick. Asian Paci fi c Journal of Tropical Biomedicine. Asian Pac J Trop Biomed [Internet]. 2016;6(8):682–5.
11. Patrick W, Buhian C, Rubio RO, Martin-puzon JJ. Chromatographic fingerprinting and free-radical scavenging activity of ethanol extracts of Muntingia calabura L. leaves and stems. Asian Pac J Trop Biomed [Internet]. 2016
12. Manik DF, Hertiani T. Analisis Korelasi Antara Kadar Flavonoid Dengan Aktivitas Antibakteri Ekstrak Etanol Dan Fraksi-Fraksi Daun Kersen (Muntingia Calabura L.) Terhadap Staphylococcus Aureus. 2014;1–11.
13. Lieberman AH, Rieger MM, BankerS.G. D. Pharmaceutical DosageForms: Disperse System, 2nd Ed.,Revised and Expanded. 1998;3(265-267,272-273).
14. Fedorko L, Bowen JM, Jones W, Oreopoulos G, Goeree R, Hopkins RB, et al. Hyperbaric oxygen therapy does not reduce indications for amputation in patients with diabetes with nonhealing ulcers of the lower limb: A prospective, double-blind, randomized controlled clinical trial. Diabetes Care. 2016;39(3):392–9.
15. Jisha N, Vysakh A, Vijeesh V, Latha MS. Anti-inflammatory efficacy of methanolic extract of Muntingia calabura L. leaves in Carrageenan induced paw edema model. Pathophysiology [Internet]. 2019.
16. Wahyuni R, Istiadi H, Utami AW. Pengaruh Ekstrak Daun Kersen (Muntingia Calabura L) Terhadap Integritas Mukosa Esofagus Tikus Wistar. J Kedokt Diponegoro [Internet]. 2017;6(2):1156–65.
17. Dan I, Daya UJI, Ekstrak A, Kersen D. ISOLASI DAN UJI DAYA ANTIMIKROBA EKSTRAK DAUN KERSEN (Muntingia calabura). J MIPA Unnes. 2013;35(2):115048.
18. Rohimah S, Kurniasih ELI. Jurnal Kesehatan Bakti Tunas Husada Volume 13 Nomor 1 Februari 2015. 2015; 13:213–27

FIGURE

Figure 1: Total REEDA Scale on Perineal Wound Healing in Rabbits

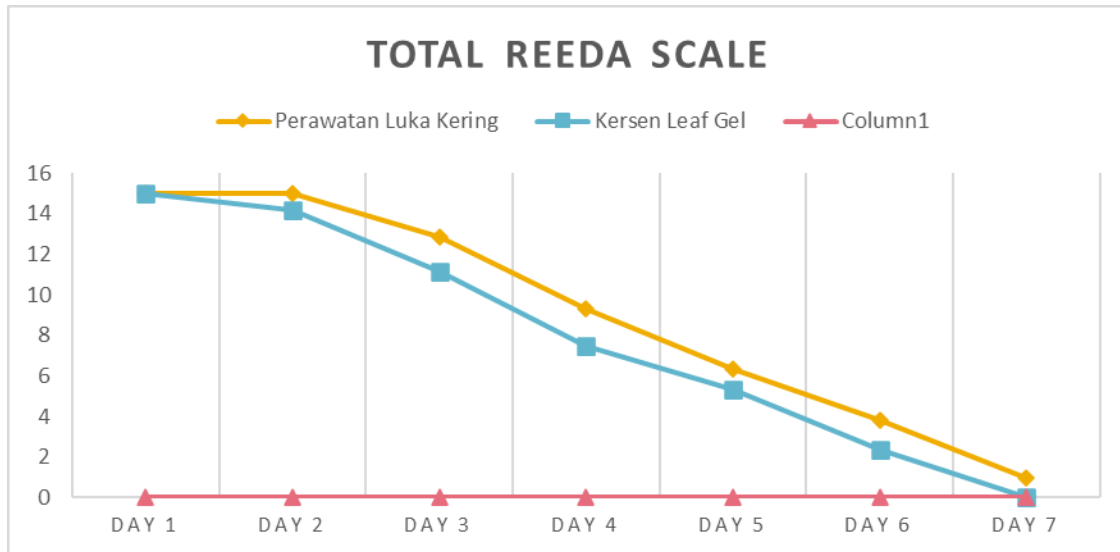


Table 1: Total REEDA Scale on Perineal Wound Healing in Rabbits

REEDA (Day)	Kersen Leaf Gel		Dry Wound Care		p value
	Mean	± SD	Mean	± SD	
Day 1	15.00	0.000	15.00	0.000	1.000
Day 2	14.16	1.329	15.00	0.000	0.140
Day 3	11,16	1.169	12.83	1.471	0.061
Day 4	7.50	1.760	9.33	2.732	0.215
Day 5	5.33	1.366	6.33	1.505	0.249
Day 6	2.33	1.032	3.83	1.940	0.134
Day 7	0.00	0.000	1.00	1.264	0.059

Table 1: Analysis of the differences in mean REEDA scale between the kersen leaf gel and dry wound care

Skala REEDA	Mean	± SD	p value
Kersen Leaf Gel	39,99	5.518	0,340
Dry Wound Care	45,01	5.396	