

The Benefits of Red Betel Leaf Extract for Perineal Wound Healing in BPM Rini District Kediri

Mitayakuna Stianto¹, Yuly Peristiowati², Siti Farida²

¹ Magister of Health Study
Program of STIKes Surya Mitra
Husada Kediri

² Lectures of STIKes Surya
Mitra Husada Kediri
mitayaku@gmail.com

ABSTRACT

Red Betel Leaf contains substances which are effective to treat the wounds. Therefore, it is important to conduct a research to ascertain the difference of healing duration, infection marks, perineum wound pain using red betel leaf 2x/day, red betel leaf extract 1x/day compared with using povidone iodine 10%. This research design is in a true experiment with factorial design. The samples are 18 postpartum mother, divided into 3 groups and each is 6 postpartum mother, and are chosen with simple random sampling method. The variables that are measured in this research are the healing duration, infection marks, perineum wound pain. This research is also conducted using statistic test one way anova with post hoc as the post test. The result shows that the alpha score is 0.002 which means there is a significant difference of injury care using red betel leaf 2x/day, red betel leaf extract 1x/day with povidone iodine 10% to the duration of healing. The alpha score results at 0.003 shows the significant difference difference of injury care using red betel leaf 2x/day, red betel leaf extract 1x/day with povidone iodine 10% to the infection marks. The alpha score results at 0.021 shows the significant difference difference of injury care using red betel leaf 2x/day, red betel leaf extract 1x/day with povidone iodine 10% to the wound pain. The perineum injury care of postpartum mother using red betel leaf extract 2x/day is more efficient and neither does infection marks nor wound pain is found.

Keyword : Healing wound, Perinium care, Red Bettel.

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INTRODUCTION

Postpartum infection is the second leading cause of maternal death after bleeding if not promptly handled. Postpartum infections occur in the genital tract after birth resulting in bacteria. This increases the risk of postpartum infections, one of which is caused by an episiotomy injury that can cause septic shock (Cunningham, 2005).

Antiseptic/betadine fluid in wound care management has been around for hundreds of years. However, according to literature studies conducted by Angel et al (2012) in the Journal of Wound Practice and Research, states that the use of betadine is still a debate between doctors to date, this is because betadine has proven to be the most effective antiseptic, yet the use of betadine in wound care management remains controversial, there is research evidence suggesting that wound healing can be delayed by using excessive amounts of betadine as it may inhibit the granulation process of the wound, besides betadine is also irritating and more toxic when entering the blood vessels.

Red betel leaf contains Saponin, flavonoid, tannins and essential oils. The content of saponins, flavonoids and tannins can help the wound healing process because it serves as an antioxidant and microbes that affect the wound grafting also accelerate epithelialization (Shentil P, 2012). The content of saponins and tannins play a role in tissue regeneration in the wound healing process (Reddy BK, et al, 2012). Saponin content has the ability as a cleanser or antiseptic. Saponins can trigger vascular endothelial growth factor (VEGF) and increase the amount of macrophages migrate to the wound area thus increasing the production of cytokines that will activate fibroblasts in the wound tissue (Kimura Y, et al, 2013). The flavonoid content functions as an antioxidant, antimicrobial and also anti-inflammatory in perineum wounds (Harborne, 2000). The onset of cellular necrosis is reduced by flavonoids by reducing lipid peroxidation. Lipid peroxidation inhibitors can increase the viability of collagen fibers, blood circulation, prevent cell damage and increase DNA synthesis. The content of tannins has the ability of astringent, antioxidant and antibacterial (Naifu et al, 2011). Tannin content accelerates wound healing with several cellular mechanisms, ie cleansing of free radicals and reactive oxygen, improves wound surgery and promotes capillary blood vessel formation as well as fibroblasts (Sheikh AA et al., 2011).

Other chemicals found in red betel leaf are essential oils, hydroxycavicol, kavicol, kavibetol, allylprocatolol, carvacrol, eugenol, p-cymene, cineole, caryofelen, estragol, terpenene and phenyl propada. Essential oil acts as an antibacterial by disrupting the process of membrane formation or cell wall so it is not formed or formed imperfect (Simanjuntak M, 2008). Kavicol is disinfectant, antifungal, so it can be used for antiseptic drugs on bad breath and whiteness. Eugenol can be used to reduce pain (Sumarwoto et al, 2008).

Based on preliminary Study At BPM Ny. Rini Kabupaten Kediri on 21-23 August 2017, there are 12 postpartum women who gave birth with perineal wound. Then divided into 3 groups there are 4 puerperal women, group A in the extract of betel leaves 2x/day, group B 1x/day and group C in povidone iodine 10%. Daily observation and wound care. With the results of group A there are 3 postpartum women based on the duration of healing within 3 days and there is no sign of infection or pain and there are 1 postpartum women recovered his wound within 4 days, no signs of infection or pain. Results of group B were 2 postpartum women based on the duration of healing within 5 days and no signs of infection or pain, and 2 postpartum women recovered within 6 days and no signs of infection or pain. Lastly for group C all postpartum there are 4 people perineum wound healed within 8 days and there is no sign of infection or pain. The purpose of this study was to determine the difference of duration of healing, signs of infection and pain of perineum wound on postpartum between wound care with red betel leaf extract and povidone iodine 10%. In BPM Ny. Rini Kabupaten Kediri.

METHOD

The design of this research is true experiment with factorial design. This study was conducted on November 18, 2017 s.d January 20, 2018. Variables measured in this study were the length of wound healing, signs of infection and pain in the treatment of wound care using red betel leaf extract 2x/day, 1x/day and povidone iodine 10%. The sample consisted of 18 postpartum mothers in the 3 treatment groups each of 6 puerper mothers who were selected with simple random sampling. Instruments for long wound healing, signs of infection and pain levels using observation sheets. For additional signs of infection using laboratory tests of blood leukocyte levels. The data were analyzed using one way anova test with post hoc advanced test.

The method of betel leaf extract is 30 sheets of red betel leaf washed and drebus with 300 ml water to live about 50 ml, then filtered and inserted into glass bottles.

Dose of betel leaf extract smeared on perinium wound using gauze 2x/day or 1x/day, as much as 2 drops.

RESULTS

Characteristics of the subject

Table 1. Characteristics of respondents in this study include age, hemoglobin level, parity, nutritional status, duration of wound healing, leukocyte level and level of pain.

No	characteristics	Red betel 2x/day	Red betel 1x/day	Povidone Iodine 19%
1	Age (year)			
	<20-25	2	3	4
	26-30	2	3	2
	>30	2	0	0
2	Hemoglobin level			
	<8 – 10g/dl	0	0	1
	11-12g/dl	6	6	5
3	Parity			
	1	3	2	3
	2	1	3	2
	3	2	1	1
4	Nutritional status			
	<90%	0	3	0
	90-110%	5	1	3
	110-120%	1	2	3
5	duration of wound healing (day)			
		6	8	10
6	leukocyte level (µL)			
		5766,6	6366,6	6850
7	Level of pain			
		level 1	level 2	level 2

STATISTICAL TEST RESULTS

The research data was then analyzed by One-way ANOVA SPSS version 11 for Windows (Sumarto et al, 2013). Anova analysis results on the duration of wound healing obtained p value 0.000. This means that there is a difference between the length of wound healing between povidone iodine 10%, red betel leaf extract 2x/hari and red betel leaf extract 1x/day, which means Ho is rejected and menyika Ha. Analisa Anova on the infection obtained p value of 0.000 indicating the influence of differences between the use of povidone iodine 10%, red betel leaf extract 2x/hari and red betel leaf extract 1x/ hari. Anova analysis on pain

obtained p value of 0.002 which means there is influence of the use of povidone iodine 10%, red betel leaf extract to perineal pain. In conclusion there are significant differences from the provision of red betel leaf 2x/day, red betel leaf extract 1x/day, and povidone iodine 10% against long wound healing perinium.

Results of Advanced Test Analysis (Post Hoc Test) is a Multiple Comparison Test or Multiple Comparisons with LSD. From LSD with a 95% confidence interval that produces LSD (Least Significance Different) or BNt test (the smallest real difference) as a further test shows that Post SD analysis of LSD gets sig 0.002 which means there is a significant difference between povidone iodine 10%, red betel 2x/day and betel leaf extract 1x/day to the page perineum wound healing. In the infection, the value of sig 0.003 indicated that there was a difference of leukocyte count (infection) in the use of povidone iodine 10%, red betel 2x/day and red betel 1x/day. In the pain obtained value of sig 0.021 which indicates a difference of pain in the use of povidone iodine, red betel leaf extract 2x/day and betel leaf extract 1x/day. In conclusion, there is a significant difference in duration of wound healing perineum, signs of infection and pain between wound care using red betel leaf extract 2x/day, red betel leaf extract 1x/day and with povidone iodine 10% in perineal wound care on postpartum.

DISCUSSION

Influence of duration of perinium wound healing on postpartum mother to red betel leaf extract 2x/day, red betel leaf extract 1x/day and povidone iodine 10%

From the analysis of Anova test that the significance value 0.000 which means there is the effect of red betel leaf extract 2x/day to the duration of perinium wound healing. The data shows red betel leaf extract 2x/day able to heal the wound most quickly compared with red betel leaf extract 1x/day and Povidone iodine 10%. The results of One-way ANOVA analysis showed significant difference between treatment group and 2x/day red betel leaf extract, betel leaf extract 1x/day, and povidone iodine 10%.

The results of the data analysis above show that red betel leaf extract proven to accelerate wound healing, especially in the inflamasi. Angiogenesis phase is a process in the inflammatory phase in which new blood vessels begin to grow in wounds after injury and is very important role in the proliferation phase. Fibroblasts and endothelial cells alter molecular oxygen and dissolve with superoxide which is an important compound in resistance to infection as well as providing oxidative signaling in stimulating further growth factors. In the inflamatory process is a resistance to infection and as a bridge between injury tissue and for the growth of new cells, (Suriadi, 2016).

In this inflammatory phase more oxygen is required. Azadirachtin is a chemical mixture containing limonoids, a secondary metabolite produced by the neem tree, with the molecular formula C₃₅H₄₄O₁₆. Azadirachtin is a highly oxidised tetranortriterpenoid that has the ability to obtain more oxygen, containing an ether, acetal, hemiacetal, and tetra-substituted oxirane as well as various carboxylic esters. Classified as a secondary plant metabolites and has a complex melekuler structure. So with the existing content that mempunyai ability to get the amount of oxygen more then it is very influential in the process of wound healing, especially in the inflammatory phase that requires a lot of oxygen (Steven Ley, 2017).

Red betel leaf extract also affects the proliferation phase. The proliferative phase is characterized by the formation of granulation tissue in the wound, in this phase macrophages and lymphocytes still play a role, predominant cell types undergo proliferation and migration including epithelial cells, fibroblasts, and endothelial cells (Suriadi, 2016).

According to the researchers, the treatment of red betel leaf extract 2x/day faster healing time. Based on the content of betel leaf extract and wound care done exactly then in tunjang from the general aspects of the respondents.

Influence of long healing of perineal wound on postpartum to wound care using red betel leaf extract 1x/days

From the results of research in getting the duration of perineal wound healing using red betel leaf extract 1x/day is 8 days. Longer compared to the group using red betel leaf extract 1x/day. From the results of Anova test results obtained sig value 0.000 which means there is the effect of red betel leaf extract 1x/day on the duration of wound healing perineum mother puerperal.

From the results of research at the age of 26-30 years there are 3 people (50.1%) duration of healing 8 days. Age shows the ability to learn and the form of teaching behaviors needed. Users can affect a person's physical, psychic and cognitive. A person's maturity can develop by learning from oneself or from the experiences of others.

The effect of prolonged wound healing of the perineal wound on the puerperal mother on wound care using Povidone iodine 10%

In the treatment group with Povidone iodine 10% showed an average duration of healing in a matter of days ie 10 days. Longer compared to the wound care group using 2x / day red betel leaves and with the group using red betel leaf extract 1x / day. From the results of Anova test results obtained for the duration of healing 0.000 significance value which means there is a 10% povidone iodine effect on the duration of perineal wound healing.

Wound healing can be delayed by using 10% povidone iodine in excessive levels because it can inhibit the granulation process of the wound, besides povidone iodine 10% is also irritating and more toxic when entering blood vessels (Angel, 2015).

The effect of perineal wound infection marks on wound care using red betel leaf extract 2x/day, betel leaf extract 1x/day and povidone iodine 10%

From result of analysis of test data of Anovanilai sig. 0.002 which means there is the effect of red betel leaf extract 2x/day to the sign of infection.

From the result of research there are 2 postpartum mother (33,3%) at age ≥ 30 years have leukocyte level of 6100 μL . Age also affects a person's behavior. According to Harijati (2014) a result of improper perineal wound care can lead to perineum conditions affected lockhea and moisture can cause perineal infections (Harijati, 2014).

From the results of research there are 3 postpartum (33.3%) with hemoglobin levels of 11-12g / dl have leucocytes 5800 g / dl. Hemoglobin levels of protein rich in iron. Having affinity (oxygen) to oxygen with oxygen it will form oxyhemoglobin in red blood cells. By performing this function oxygen is carried from the lungs to the tissues (Pearce, 2014). According to Morison (2014), whatever the cause in anemia there is a decrease in blood capacity that carries oxygen (hemoglobin). In particular, it is very important when associated with infection.

According to the researchers, the content of red betel leaf extract is anterior khodol, antifungal, so it can to antiseptic and prevent the occurrence of infection. Treatment is done for 2x/day is helpful in preventing the occurrence of infection in the wound perineum.

Influence of signs of perinium wound infection in postpartum to wound care using red betel leaf extract 1x / day

From the results of research in getting the duration of perineal wound healing using red betel leaf extract 1x/day is 8 days. Longer compared to the group using red betel leaf extract 1x/day. Dari Anova test results obtained sig value of 0.000 which means there is the effect of red betel leaf extract 1x/day on the duration of wound healing perineum nifas mother.

From the results of research at the age of 26-30 years there are 3 people (50.1%) duration of healing 8 days. Age shows the ability to learn and the form of teaching behaviors

needed. Users can affect a person's physical, psychic and cognitive. A person's maturity can develop by learning from oneself or from the experiences of others.

From the results of postpartum study based on LILA nutritional status of 90-110% there are 3 postpartum (66,7%) old wound healing 7 days. According to Jonson and Taylor (2014) for wound healing requires adequate nutrition intake. Proteins supply amino acids, which are needed for tissue repair and generation. Vitamin A and zinc are required for epithelialization, vitamin C for iron capillary integration to deliver oxygen.

According to researchers, red betel leaf contains saponins and tannins play a role in tissue regeneration in the wound healing process. When done 1x/day, the content of saponins and tannins less or less active role in the formation of new networks.

Influence of infection marks on perineal wound on wound care using 10% povidone iodine

The result value for the signification of the signification value of 0.001 meaning that there is a 10% povidone iodine effect on the perineal wound infection marks. The result value for the signature sign value is 0,000, which means that there is a 10% povidone iodine effect on the perineal wound infection mark.

Treatment by using 10% Povidone iodine is to keep the wound surface moist so as to enhance the development and migration of epithelial tissue (Potter, 2017).

From the results of the study in obtaining signs of perineal wound infections based on levels of leukocytes in the blood of puerperal women using Povidone iodine 10% to reach the number 6850 μ L. Which means higher levels of leukocytes in comparison with the wound care group using 2x/day red betel leaf and wound treatment group using red betel leaf extract 1x/day.

From the research results leukocytosis level 6500 μ L at the age of 26-30 years there are 2 postpartum (33,3%) mean leukocytes normal. Umur / age, old age where body metabolism decrease, influence to collagen formation, decrease elasticity and surface tension of skin, this is reinforced by studies showing that the average surgical wound infection in older people increases with age (Primadona, 2015).

Effect of perineal wound pain on wound care using red betel leaf extract 2x/day, betel leaf extract 1x/day and povidone iodine 10%

Influence of perineal wound pain on postpartum to wound care using red betel leaf extract 2x/day

From the results of the research, the treatment group of red betel leaf 2x/day in get the pain on the scale of 1 which means there is still little pain. The small figure compared with the treatment group of red betel leaf 1x/day and with povidone iodine 10%. From the results of Anova test analysis in obtaining the value of sig 0.000 which means there is the effect ekstrak red betel leaf 2x/day against perineal wound pain.

From the results of the study there are 5 postpartum (83.3%) have a level of pain 1 which means mild pain. Hemoglobin levels that can inhibit less healing and the presence of infection. In the event of hypoxia due to anemia, the automatic leukocyte function can be reduced in wound healing may be inhibited, hypoxia affects oxidative phosphorylation and therefore, also has an impact on ATP synthesis. Inadequate oxygenation and lack of nutrients make the system easy to infect (Morison, 2014).

According to the researchers, the sign of pain is reduced for giving of betel leaf extract 2x/day in because there is content of euganol in red betel leaf extract to reduce pain in the perineal wound. So the mother feels comfortable and the scale of pain on a normal scale.

The effect of perinium wound pain on postpartum to wound care using red betel leaf extract 1x/day

From result of research of pain group of treatment of red betel leaf 1x/day in get pain on scale 2. Small number compare with treatment group povidone iodone 10%. From result of statistical test of Anova got result of sig value. 0.013 which means there is the effect of red betel leaf extract 1x/day to nipple maternal wound perineum pain.

From the results of the study. at the age of 26-30 years there are 3 postpartum (50.1%) level of pain 2 which means mild pain There is a correlation with the pain response of a result of the pain in a mild scale. In the postpartum age of the average young adult already know how overcome pain (Sarwono, 2013)

The content of red betel leaves contains ethanol and euganol which serves to reduce pain in the wound perineum.

Influence of perineal wound pain on postpartum to wound care using povidone iodone 10%

From the research results of pain group treatment of povidone iodone 10% in get pain on scale 2,3. A large number compared with the treatment of red betel leaf extract 2x/day and with red betel leaf extract 1x/day. Dari statistical test results obtained Anova sig value. 0.000, which means there is a 10% povidone iodone effect on wound pain perineum nifas mother.

In the control group of povidone iodone 10% iodine content that is almost the same as red betel leaf extract, the content of red betel leaf extract there kavikol that is disinfectant, so that when used for wound care results obtained (long wound healing) is also almost the same.

Hemoglobin concentrations of 11-12 g / dl were no puerperal mothers (4) (66.8%) had a level of pain 2 which means mild pain Hemoglobin level affects the pain, healing of the wound is greatly influenced by the supply of oxygen and nutrients to the tissues (Kartinah, 2016). Oxygen binding to the hemoglobin protein molecule is circulated to tissues and body cells 2 via the circulatory system. This oxygen functions in addition to the biological oxidation as well as tissue oxygenation Clinically the lesion has shown no signs of erythema, warmth to the skin, edema and pain (inflammatory phase) after day 3 or 4 (Jong, 2017). So in the normal care of postpartum mothers will be safer to go home after the fourth or fifth day. However, in theory the wound should be observed up to 7 days after surgery, where the wound healing phase of collagen formation begins with a marked union of skin tissue affecting the pain sign. The higher parity of the puerperal mother will lower the level of stress so that the level of pain on a mild scale because there is a period of time childbirth and past childbirth (Boyle, 2015).

From the result of research of nutritional status of 90-25% of postpartum women, there are 4 postpartum mothers (66,7%) have pain level 2. Nutritional status of food of puerperal mother consumed must have quality, nutritious and enough calorie. Preferably foods containing protein, lots of fluids, vegetables, fruits. Good food can accelerate wound healing, the four healthy five perfect description needs to be noticed. This is in accordance with the needs of postpartum according to Ambarwati and Wulandari (2015) postpartum women should eat food containing energy sources, source builders, and protectors.

Thus, this research can be used as a scientific basis for the use of red betel leaf extract as an alternative material for wound care in addition to povidone iodone 10% which is recommended for irrigation and wound cleaning.

CONCLUSION

That perinium treatment of wounded red leaf extract 2x/day is more effective in long wound healing, reducing the sign of infection and reducing pain.

SUGGESTION

It is recommended that postpartum perineal wound care using red betel leaf extract 2x/day more efficient, faster recovery, no infection or pain.

REFERENCE

Angel, dkk. (2013). The Effectiveness Of Using Betadine In Wound Care. *Journal of Wound Practice and Research*.

Ari, & Nizam. (2015). Efektivitas Air Rebusan Daun Sirih Dalam Mempercepat Penyembuhan Luka Perinium. *Jurnal Kesehatan Terpadu*, 4(2). Nov. 2015 hal 82-196.

Bahiyatun. (2014). *Buku Ajar Kebidanan Asuhan Nifas Normal*. Jakarta : EGC.

Cunningham, F.G. (2015). *Obstetri Williams*. Jakarta. EGC. Edisi 21.

Damarini, dkk. (2013). Efektivitas sirih Merah dalam Perawatan Luka Perinium Di Bidan Praktek Swasta. *Jurnal Kesehatan Masyarakat Nasional*, 8 (1). Agustus 2013.

Depkes RI. (2013). *Riset Kesehatan Dasar*. Jakarta. Badan Penelitian dan Pengembangan Kementerian Kesehatan Republik Indonesia.

Esti, H., Mundarti, & Siti, R. (2015). Faktor Yang Mempengaruhi Penyembuhan Luka Perinium Pada Ibu Post Partum. *Poltekes Semarang*. ISSN 1829-5754.

Gilmore, (2016). A Study of The Effect of Povidone-Iodine On Wound Healing. *Post Graduate Medical Jurnal*, PMC2496482, 122-125.

Gosain, A., & Di Pietro, L.A. (2013). Aging and Wound Healing *Word J. Surg.* 28:321-326. PUBMED.

Harborne, J.B. *Metode Fitokimia Penuntun Cara Modern Menganalisis Tumbuhan diterjemahkan dari Bahasa Inggris oleh Kosasih Padmawinata dan Iwang Soediro*. ITB. Bandung.

Kementerian Kesehatan RI. (2013), *Profil Kesehatan Indonesia*. Jakarta. Kementerian Kesehatan Republik Indonesia.

Khaidir, M. (2009). *Asuhan Keperawatan Dengan Infeksi Nifas*. Jakarta : EGC.

Kimura, Y., Sumiyoshi, M., Kawahira, K., & Sakana, M. (2013). Effects Of Ginseng Saponins Isolated From Red Ginseng Roots On Burn Wound Healing in Mice. *British Journal Of Pharmacology*, 148 :860-870.

Kurniarum, & Ari. (2013). Keefektifitasan Penyembuhan Luka Perinium Pada Ibu Nifas Menggunakan Daun sirih. *Skripsi. Prodi Kebidanan Kementrian Kesehatan Politeknik Kesehatan Surabaya*.

Kusumaningsih dkk. (2016). Betel Leaf Decoction As An Antiseptic For Perinatal Wound Healing, *ASIAN Academic Society International Conference Proceeding*, Nakhon Pathom, 12-13 May 2016.

Morison, M.J. (2013). *manajemen Luka*. Jakarta : EGC.

- Naidu, K.A. (2014). Vitamin C In Human Health And Disease Is Still a Mystery. *An Overview Nutrition J:2*.
- Nursalam. (2013). Konsep Penerapan Metode Penelitian Ilmu Keperawatan. Jakarta : Salemba Medika.
- Prawirohardjo, S. (2013). *Ilmu Kebidanan*. Jakarta : PT. Bina Pustaka.
- Primadona, P., & Susilowati, D. (2015). Penyembuhan Luka Perinium Fase Proliferasi Pada Ibu Nifas. Jakarta.
- Pusdiknakes. (2017). Asuhan Masa Nifas. Jakarta : Pusdiknakes.
- Reddy, B.K., Balaji, P.U., Reddy, G., Sailaja, K., Vaidyanath & Narashima, G. 2013. Antifeedant and antimicrobial activity of *Tylophora Indica*. *African Journal of Biochemistry Research*, 3(12), 393-397.
- Rukiyah & Ai Yeyeh, dkk. (2014). Asuhan Kebidanan IV. Jakarta : Trans Info Media.
- Saifuddin, & Bani, A. (2013). Ilmu Kebidanan Sarwono Prawirohardjo. Jakarta. PT. Bina Pustaka. Edisi Ke-4 Cetakan ke-4.
- SDKI. (2013). Survei Demografi dan Kesehatan Indonesia 2012. Jakarta : SDKI.
- Sheikh, A.A., Sayyed, Z., Siddiqui, A.R., Praptopwar, A.S., & Sheakh, S.S. 2012. Wound Healing Agent Of *Sebanica Grandiflora* Linn Flower Ethanolic Exstract Using Excision And Incision Wound Model In Wistar Rats. *Internasional Journal Of Pharm Tech Research* 895-898.
- Shentil, P. (2014). Design And Development Of Hydrogel Nanoparticles For Mercaptopurine. *Journal Of Advanced Pharmaceutical Technology and Rearch*, 1:334-337.
- Simanjuntak, M. (2013). Ekstraksi Fraksinasi Komponen Ekstrak Daun Tumbuhan Senduduk Serta Pengujian Efek Sediaan Krim Terhadap penyembuhan Luka bakar. Medan. Fakultas farmasi Universitas Sumatera Utara. Diakses pada 10 September 2017. <http://Repository.usu.ac.id/bitstream/123456789/144729/09E01171.Pdf>.
- Smeltzer, Suzanne, C., & Brenda. (2013). Buku Ajar Keperawatan Medikal Bedah Brunner dan Sudarth (Ed.8 Vol. 1,2) di terjemahkan oleh Agung Waluyo, dkk. EGC. Jakarta.
- Sudewo, B. (2013). Basmi Penyakit Dengan Sirih Merah : Sirih Pembasmi Aneka Penyakit. Jakarta : Agromedia Pustaka.
- Suherni dkk. (2014). Perawatan Masa Nifas. Jogjakarta : Fitramaya.
- Sumarwoto, Susilowati, & Yanning A. (2014). Uji Sirih Merah Pada Berbagai Intensitas Sinar Matahari Dan Media Tanam. *Jurnal Pertanian Mapeta* Vol.. N0. 1-8.
- Tamsuri. (2013). Konsep Dan Penatalaksanaan Nyeri. Jakarta : EGC.
- Utami, Sri. (2015). Perbedaan Tingkat Nyeri Pada Ibu Post Partum Yang Mengalami Episiotomi Dengan Ruptur Spontan Di RSUD Panembahan Senopati Bantul. Skripsi. D4 Bidan Pendidik. STIKes Aisyiyah Yogya.