

Effect of Red Betel Infusion Perineal Care on Healing Time of Perineal Grade I Wounds Postpartum

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Abstract

Most women who give birth sustain perineal injuries, which can lead to postpartum infections. Red betel infusion is recognized as one of the simple, inexpensive, and risk-free perineal wound care therapies; it also promotes perineal wound healing and possesses potent antimicrobial properties. This study seeks to determine the effect of perineal care infusion of red betel on postpartum perineal wound healing time at the Duren Sawit District Health Center in East Jakarta in 2022. The study employed the Quasi-Experiment methodology in conjunction with the Nonequivalent Pretest-Posttest Control Group Design research design. A sample of 38 samples was collected using a non-probability sampling technique and an accidental sampling approach. Based on the results of the Mann Whitney test, the p-value was 0.001, indicating that there was a difference in perineal care administration of red betel infusion on the healing time of the postpartum perineal wound between the red betel infusion group and the control group. Other researchers are anticipated to use red betel infusion media by adding variables relating to pain, redness, symptoms of inflammation, and wound healing processes, as well as respondents.

Keywords: *Perineal Wounds, Healing, Red Betel.*



A. INTRODUCTION

In Indonesia, postpartum infection is the fourth leading cause of maternal mortality, behind hemorrhage, hypertension in pregnancy (HDK), and circulatory disorders. According to data from the Indonesia Health Profile for 2020, the Maternal Mortality Rate (MMR) in Indonesia will increase by 9.6% compared to 2019 to 4,221 fatalities. In Indonesia, 216 cases of maternal mortality are attributable to postpartum infection out of a total of 4,616 maternal fatalities. DKI Jakarta recorded 5 maternal deaths due to postpartum infections out of 216 cases (Moh, 2021).

Postpartum infection is an infection that occurs in and through the genital tract after delivery. One of the symptoms of postpartum infection is *puerperal morbidity*. When a woman's fever rises to 38 degrees Celsius or higher for two consecutive days within the first 10 days after giving birth (excluding the first day), doctors call this *puerperal morbidity* (Saridewi et al., 2018). There are various factors that cause postpartum infection including metritis, parametritis, septicemia and piema, as well as infection of the perineal wound (Eriyawati, 2016).

Perineal or birth canal injuries are a breeding ground for germs that can increase the risk of infection in suture wounds that can extend to the urinary tract or birth canal. Postpartum perineal lesions can be caused by an episiotomy or occur naturally during childbirth (Ramadhani, 2019). Approximately 60% to 85% of women

who sustain vaginal delivery will require suturing for perineal wounds. (Sulistianingsih & Wijayanti, 2019). In 2015, there were 2.7 million cases of perineal injuries in women who gave birth; this number is projected to rise to 6.3 million cases by 2050 (Sigalingging & Sikumbang, 2018).

Perineal injuries are also quite an issue in society in Asia; over half of all perineal injuries that occur around the world happen in Asia. WHO reported that the incidence of perineal injuries in ASEAN nations in 2013 was 64.4% of 1000 deliveries without perineal injuries in Thailand, 57.2% of 1000 deliveries without perineal injuries in Malaysia, and 40.8% of 1000 deliveries without perineal injuries in Singapore. These figures refer to Thailand, Malaysia, and Singapore, respectively. The rate of perineal injuries in Indonesia increased to 67.2% per 1000 deliveries in 2014 from the previous year's rate of 60% per 1000 deliveries in 2013 (Widia, 2017). This represents an increase over the previous year's rate of 60% per 1000 deliveries.

The process of wound healing, also known as the wound healing process, is a set of events that occur within the body in response to damage to the structural integrity of the skin. These events take place in a succession of distinct stages that overlap with one another. The process of wound healing may be broken down into several stages, the first of which is the inflammatory phase, followed by the proliferation or epithelialization phase, and then lastly the maturation or remodeling phase. Following the completion of these three stages, the healing process will begin, at which point the damaged tissue in the wound will return to its normal state. Quick or sluggish? According to Saputra (2011), the amount of time it takes for a postpartum mother's wounds to heal might vary greatly depending on the other factors that play a role in the process.

Age, parity, education, type of wound, nutritional status, knowledge, early mobilization, and wound care are variables that affect wound healing time (Astuti & Hartinah, 2021). How to care for perineal wounds is the most influential factor in the healing process of perineal sutures in order to reduce pain, discomfort, maintain hygiene, prevent infection, and speed up the healing process (Rohmin et al., 2017). Inadequate perineal wound care, in which the perineum affected by lochia becomes more moist, promotes the proliferation of bacteria that can cause infection in the perineum (Rohmin et al, 2017). Preventing contamination with the rectum, handling the wound tissue delicately, and cleaning the blood, which is a source of infection and odor, are essential.

Treatment of perineal wounds can be done with 3 therapeutic techniques, namely therapy using antiseptics (pharmacological), without antiseptics and traditional (non-pharmacological/complementary) methods (Kurniarum & Kurniawati, 2015) . Based on data from WHO cited by Setyaningsih, D et al (2020) as many as 80% of health practitioners in developing countries prefer complementary medicine to chemical medicine, including midwives in providing midwifery services. In Indonesia, supplemental midwifery services are provided not only by the private/independent sector, but also by the government (Puskesmas and Hospitals).

Several investigations have revealed that red betel leaf extract contains chemical components with antiseptic and antibacterial properties. According to Rachmawaty et al. (2018), red betel leaf extract is superior to green betel leaf extract. Flavonoids, alkaloids, saponins, tannins, and essential oils in the red betel plant have antiseptic, anti-oxidizing, and fungicide, antifungal properties.

Damarini (2013) did research on the use of red betel leaf as an antiseptic for perineal wounds, stating that using a 25% concentration of red betel leaf infusion in the perineal wound area can speed wound healing, with an average healing time of 4-5 days. Sholiha's (2019) study of 31 responders who used red betel infusion at the same concentration as Damarini et al. (2013) in treating their perineal lesions verified this. On day 6, 21 patients (67.7%) had good perineal wound healing with an average healing rate.

Based on these findings, researchers were curious about the differences in the healing of perineal wounds using perineal care infusion of red betel, so they published a study titled "The Effect of Perineal Care of Red Betel Infusion on the Healing Time of Grade II Postpartum Perineal Wounds at the Duren Sawit District Health Center".

B. LITERATURE REVIEWS

1. Perineal Wounds

Between the vulva and the anus is a portion of the pelvic floor muscle known as the perineum. The perineum is made up of the urogenital muscles, fascia, and pelvic diaphragm. Perineal rupture is a wound that occurs during childbirth, either spontaneously or as a result of episiotomy. Perineal rupture or birth canal injury is one of the sources of germs that can increase the risk of infection in suture wounds and extend to the bladder or birth canal. (Irawati, 2017). Perineal tears or lacerations occur in nearly all first births and can recur in subsequent deliveries. Spontaneous perineal rupture can occur in the cervix, vagina, external genitalia, perineal muscles to the anus. The tear usually starts in the middle and widens if the baby's head is born too fast (Irawati, 2017).

According to Prawirohardjo (2008) in Saputra (2011), the classification of perineal wounds is divided into 2, namely:

- a. Spontaneous perineal rupture, namely injuries to the perineum that occur for certain reasons without tearing or intentional action. These injuries occur at the time of delivery and are usually irregular.
- b. Intentional perineal wound (episiotomy), namely perineal wound that occurs due to cutting or tearing of the perineum.

Perineal care or perineal care is an endeavor to promote comfort fulfillment by nourishing the area that is limited between the anal canal and the external genitalia in women who have given birth to avoid infection. This area is located between the two thighs and is limited between the anal canal and the external genitalia. (Kumalasari, 2015).

2. Red Betel

The red betel plant originated in Peru but has since been introduced to other parts of the world, including Indonesia. Red betel is a bushy plant with tendril-like, segmented stems and a node spacing of 5-10 cm; roots develop at each node. Leaves on a stem that are elliptical in shape, with a flat border, are glossy or hairless, and have an acuminate, or sub-acute, tapered apex. Its length is 9-12 cm, and its width is 4-5 cm. Veins in the bottom half of the pinna, bullulatus-lacunosa veins 4-5 x 2. 10 mm long petiole, with a 90-110 mm long, 5 mm wide spike. Dark green on top, with silvery highlights in the veins; purple or reddish purple on the undersides. The leaves are slimy, the flavor is unpleasant, and the aroma is vague (Parfati & Windono, 2016).

Traditionally, red betel has been used to treat a wide variety of medical conditions, including high blood pressure, inflammation of the liver or prostate, inflammation of the eyes, vaginal discharge, ulcers, breast cancer, joint pain, lowering and controlling blood sugar levels, cosmetics, medicine for heart problems, bone tuberculosis, acute leucorrhoea, breast tumors, and antiseptics to eliminate microorganisms on the skin or wounds. Expectorant cough treatment can help keep your teeth and gums healthy by acting as a mouthwash (Parfati & Windono, 2016).

Red betel leaves have twice the antibacterial power of green betel leaves (Karimah et al, 2019). This is because the ethanol extract of betel leaves with red leaves is more effective as an antibacterial against *S. aerus bacteria* than green leaves. Therefore, to keep the red betel leaves from losing their red color, the red betel plant (*P. crocatum*) is planted in a shady, cool air and exposed to the morning sun. If red betel leaves grow in hot areas or are exposed to continuous direct sunlight, the stems will dry out quickly. In addition, the red color on red betel leaves will fade quickly. Even though the efficacy of red betel leaves lies in the chemical compounds contained in the red color of the leaves (Rachmawaty et al., 2018).

3. Red Betel Leaf Infusion

Infusion is a liquid preparation obtained by extracting (diluting) vegetable simplicia with water at 90 °C for fifteen minutes. The preparation entails combining simplicia with sufficient water fineness, heating on a water bath for 15 minutes beginning when the temperature reaches 90°C while agitating intermittently. Strain while heated through a flannel cloth, and pour sufficient hot water through the dregs to achieve the desired volume of infusion (Eliyanor, 2017).

The infusion or infusion method can dissolve the flavonoids, alkaloids, tannins, and essential oils contained in red betel leaves. Flavonoids and tannins are water soluble substances. Alkaloids can exist in the form of salts so that alkaloids may be soluble in water and essential oils can also dissolve in polar solvents. The infusion method was chosen because it is more applicable and economical in society compared to other extracts and is more effective than the boiled form (Eliyanor, 2017).

4. Wound healing

The process of wound healing, also known as the wound healing process, is a set of events that occur within the body in response to damage to the structural integrity of the skin. These events take place in a succession of distinct stages that overlap with one another. The phase of wound healing can be broken down into three stages: the inflammatory phase, the proliferation or epithelialization phase, and lastly the maturation or remodeling phase. Each stage is named after a different aspect of the healing process. Following the completion of these three stages, the healing process will begin, and the injured tissue will eventually recover to its previous state. (Saputra, 2011).

Wound healing is a complex kinetic and metabolic process involving various cells and tissues in an attempt to seal off the body from the external environment by restoring tissue integrity. In every wound, both clean and infected, the body will try to heal the wound (Saputra, 2011). The healing time for wounds in the birth canal normally not accompanied by infection will last 7 to 10 days and no more than 14 days. Perineal wounds are said to be healed if there is no redness, swelling, and good wound union (Kurniarum & Kurniawati, 2015).

C. METHODS

This study used a research method with a Quasy Experiment research design. The population taken in this study were all postpartum mothers who experienced perineal injuries at the Duren Sawit District Health Center and Cakung District Health Center with inclusion criteria. The sample was selected by *accidental sampling technique*, namely sampling by taking respondents or cases that happened to exist. In this study the samples were grouped based on the condition of being given red betel perineal care and not given red betel perineal care. Based on calculations using the 2 mean difference test formula, the results obtained were 17 respondents, but taking into account the presence of respondents who dropped out, the research respondents added 10% of the minimum yield sample, namely 19 samples in each group. In this investigation, the minimum sample size for both the intervention and control groups was 38 samples. This research makes use of both primary and secondary data. Using observation diaries, data obtained directly from the sample as research subjects. In the meantime, secondary data consisted of the medical records of postpartum mothers who delivered in the Work Areas of the Duren Sawit District Health Center and the Cakung District Health Center. After data collection is carried out, data processing is carried out by means of editing, coding, data entry and data cleaning. The data that has been processed is then analyzed using univariate analysis and bivariate analysis.

D. RESULTS AND DISCUSSION

1. Univariate analysis

Univariate analysis is used to present an overview of each research variable, where the results are described in the tables below:

a. Characteristics of Respondents

Table 1 Frequency Distribution of Respondent Characteristics

Variable	Intervention Group (N=16)		Control Group (N= 17)	
	Frequency	%	Frequency	%
Age				
Low Risk (20-35)	12	75.0	10	58.8
High risk (<20 years >35)	4	25.0	7	41.2
Education				
Higher Education (> High School)	13	81.3	13	76.5
Low Education (<Junior High School)	3	18.7	4	23.5
Parity				
Primipara	6	32.5	6	35.3
Multipara	10	67.5	11	64.7
Work				
Work	3	18.8	4	23.5
Doesn't work	13	81.3	13	76.5

According to table 1, the majority of respondents in the intervention group and the control group were in the low risk age category (20-35 years), with 12 respondents (70.6%) in the intervention group and 10 respondents (58.8%) in the control group falling into this category. Regarding the characteristics of the level of education, the majority of respondents in the intervention group and the control group had a higher level of education (High School), with 13 respondents in the intervention group and 13 respondents in the control group having a higher level of education. The majority of respondents in the intervention and control groups were multiparous, with 10 respondents (62.5% of the intervention group) and 11 respondents (64.7% of the control group) being multiparous, respectively. In terms of job characteristics, the majority of respondents in the intervention and control groups were unemployed: 13 (81.3% of intervention group respondents) and 13 (76.5% of control group respondents)..

b. Distribution of Postpartum *Grade II* Perineal Wound Healing Time with Red Betel Infusion Perineal Care in Both Groups

Table 2 Frequency Distribution of Postpartum *Grade II* Perineal Wound Healing Time

Healing TimePerineal Wounds	N	Means	Median	Std. Deviation	Min-Max
Group Intervention	16	5.50	5.00	1.033	4-8
Control Group	17	6.82	7.00	0.951	5-8

According to table 2, the average amount of time it takes for perineal wounds to heal in the intervention group was 5.50 days, with a minimum value of 4 days and a maximum value of 8 days, and a standard deviation of 1.033. In the control group, the perineal wound healing time was found to have an average of 6.82 days, with a minimum value of 5 days and a maximum value of 8 days, and a standard deviation of 0.951 days.

2. Bivariate Analysis

Bivariate analysis was used to investigate the influence of the independent variable (perineal care infusion of red betel) on the dependent variable (perineal wound healing process) and to compare perineal wound healing times between the intervention and control groups.

a. Normality test

A test for normalcy needs to be carried out first in order to prepare for choosing the appropriate statistical method. It is possible to establish whether or not the data follow a normal distribution by applying the normality test. Whether the distribution of a data set is normal or not has an effect on the kind of analysis that should be performed; in this instance, it decides whether the kind of analysis that should be performed is parametric or non-parametric. Both the pre-test and post-test variables were included in the analysis of each group's data. Because there are fewer than 100 samples, the Shapiro-Wilk test is the one that is employed to test for normality. If the value of Sig. is more than 0.05, then the data are considered to be normal. In this investigation, the findings of the normality test revealed that the Sig. 0.05 indicated that the data did not follow a normal distribution. Therefore, the non-parametric statistical test known as the Mann Whitney U test was chosen to conduct the analysis of the data for this investigation.

b. The Effect of Red Betel Infusion Perineal Care on Perineal Wound Healing Time between the Intervention Group and the Control Group

Table 3 Effect of Perineal Care *Care Betel Red* Infusion on Perineal Wound Healing Time between the Intervention Group and the Control Group

Time Wound healingPerineum	N	Means	Median	Min-Max	SD	P Value
Group Intervention	16	5.50	5.00	4-8	1.033	0.001*
Group Control	17	6,82	7.00	5-8	0.951	

Note: (*) Significant with Mann Whitney Test

Based on table 3 of the results of the Mann Whitney test statistic on the variable of wound healing time, the statistical test results revealed a significant difference in wound healing time between the intervention group and the control group, with a p value of $0.001 < 0.05$. This indicates that red betel infusion perineal care has an effect on the healing time of perineal lesions.

The analysis presented in table 3 yielded a significant value with a p value of $0.001 < 0.05$ and a median difference of 2 days. This indicates that there is a difference in the healing time of grade II perineal lesions between respondents who were administered perineal care infusion of red betel and those who were not. Therefore, it can be concluded that perineal care infusion of red betel has an effect on the recovery time of postpartum perineal wounds.

The process of wound healing is the replacement and restoration of damaged tissue function. Due to tissue damage or disintegration, the time required for a wound

to recover is known as the wound healing period. Wounds in the birth canal that are not infected will recover within 7 to 10 days (Afrilia & Sari, 2018).

Red betel (*Piper crocatum* Ruiz & Pav.) is a plant that is popular as a potential medicinal plant that can treat various types of diseases and can heal wounds. As a wound medicine, red betel contains several phytochemicals, including *flavonoids*, *alkaloids*, *tannins*, essential oils, *carvacrol*, *eugenol*, *saponins*, and *polyphenols*. *Flavonoids* and *alkaloids* can interfere with the function of microorganisms resulting in damage or cell death of microorganisms. In addition, *flavonoids* and *alkaloids* also have the ability to accelerate wound healing. *Tannins* and essential oils have a function as an antibacterial. In addition, *tannins* can improve wound closure, as well as increase the formation of capillary blood and fibroblasts. *Carvacrol* can be a disinfectant and antifungal so it functions as an antibiotic drug. *Eugenol* acts as an antiseptic, antimicrobial, and supports the re-epithelialization process which will affect the acceleration of wound healing. *Eugenol* also produces analgesic or pain reliever activity. And *Polyphenols* are antioxidant compounds that help produce collagen formation in the skin (Karimah et al., 2019)

It was found in a previous study by Damarini et al. (2013) that red betel leaf was more effective than iodine in treating perineal wounds in the postpartum period. The average perineal wound healing time using red betel infusion is 3-4 days, whereas the average perineal wound healing time using the antiseptic drug group is 5-6 days. The researchers used a concentration of 25% in their red betel infusion.

Researchers found that providing postpartum mothers with an infusion of red betel for perineal care sped up the average time it took for perineal wounds to heal by two days. This was the case in the group of women who received perineal treatment that included the use of red betel infusions. This demonstrates that the process of healing perineal wounds is inextricably linked to the presence of active compounds found in red betel leaves. These active compounds include flavonoids, alkaloids, tannins, carvacrol, eugenol, saponins, and essential oils. These compounds have been shown to accelerate the healing of perineal wounds in postpartum mothers (Karimah et al., 2019).

E. CONCLUSION

Based on the research and discussion described in the previous chapter, it is known that red betel infusion has an effect on the healing time of perineal lesions. Red betel infusion has a considerable impact on the healing time of postpartum perineal wounds when compared to the use of conventional medications. Red betel infusion has a considerable impact on the healing time of postpartum perineal wounds when compared to the use of conventional medications. It is hoped that other researchers will be able to conduct additional research on perineal care media for red betel infusion by increasing the number of respondents, expanding other variables, establishing a connection between the use of red betel infusion and pain, redness, and signs of inflammation of the postpartum perineal wound, and comparing the wound

healing process. It is hoped that other researchers will change the infusion media into a form that is easier for respondents to use.

REFERENCES

1. Afrilia, E. M., & Sari, H. (2018). Hubungan Pengetahuan Ibu Nifas Tentang Perawatan Luka Perineum Dengan Proses Penyembuhan Luka Ruptur Perineum di Puskesmas Pakuhaji Kabupaten Tangerang. *IMJ (Indonesian Midwifery Journal)*, 1(2).
2. Astuti, D., & Hartinah, D. (2021, May). Mobilisasi Dini Dengan Tingkat Kesembuhan Luka Post Episiotomi Pada Ibu Post Partum. In *Prosiding University Research Colloquium* (pp. 9-13).
3. Damarini, S. (2013). The Effectiveness of Red Betel in Healing Perineal Wound in Independent. *Kesehatan Masyarakat Nasional*, 8(03), 39-44.
4. Eliyanor, B. B. (2017). *Fitokimia: Bahan Ajar Farmasi*. Jakarta: Ministry of Health.
5. Eriyawati, A. M. (2016). *Gambaran Perilaku Perawatan Luka Perineum Pada Ibu Postpartum di RSUD Sleman Yogyakarta* (Doctoral Dissertation, Universitas Alma Ata Yogyakarta).
6. Irawati, D. (2017). Faktor yang berhubungan dengan ruptur perineum di Puskesmas Puri Kabupaten Mojokerto. *Faktor yang Berhubungan dengan Ruptur Perineum di Puskesmas Puri Kabupaten Mojokerto. Sekolah Tinggi Ilmu Kesehatan Majapahit*, 227-73.
7. Karimah, N., Khafidhoh, N., Hardjanti, T. S., & Hakim, R. I. (2019). The period of perineal wound healing in postpartum mothers between the decoction water treatments of bihanong leaves with red betel leaves. *GHMJ (Global Health Management Journal)*, 3(3), 107-116.
8. Kumalasari, I. (2015). Panduan Praktik Laboratorium dan Klinik Perawatan Antenatal, Intranatal, Postnatal, Bayi Baru Lahir dan Kontrasepsi. *Jakarta: Salemba Medika*.
9. Kurniarum, A., & Kurniawati, A. (2015). Keefektifan Penyembuhan Luka Perineum Pada Ibu Nifas Menggunakan Daun Sirih. *Interest: Jurnal Ilmu Kesehatan*, 4(2).
10. Kurniarum, A., & Kurniawati, A. (2015). Keefektifan Penyembuhan Luka Perineum Pada Ibu Nifas Menggunakan Daun Sirih. *Interest: Jurnal Ilmu Kesehatan*, 4(2).
11. Ministry of Health. (2021). *Profil Kesehatan Indonesia Tahun 2020*. Jakarta: Ministry of Health.
12. Parfati, N., & Windono, T. (2016). Sirih merah (*Piper crocatum* Ruiz & Pav.) kajian pustaka aspek botani, kandungan kimia, dan aktivitas farmakologi. *Media Pharinaceutica Indonesiana*, 1(2), 106-115.
13. Rachmawaty, F. J., Akhmad, M. M., Pranacipta, S. H., Nabila, Z., & Muhammad, A. (2018). Optimasi ekstrak etanol daun sirih merah (*Piper crocatum*) sebagai antibakteri terhadap bakteri *Staphylococcus aureus*. *Jurnal Kedokteran dan kesehatan*, 18(1), 13-16.

14. Rachmawaty, F. J., Akhmad, M. M., Pranacipta, S. H., Nabila, Z., & Muhammad, A. (2018). Optimasi ekstrak etanol daun sirih merah (*Piper crocatum*) sebagai antibakteri terhadap bakteri *Staphylococcus aureus*. *Jurnal Kedokteran dan kesehatan*, 18(1), 13-16.
15. Ramadhani, D. N. (2019). Pemberian Rebusan Daun Sirih Hijau Untuk Pencegahan Resiko Infeksi Episiotomi Pada Asuhan Keperawatan Ibu Post Partum. *DIII Keperawatan*.
16. Rohmin, A., Octariani, B., & Jania, M. (2017). Faktor risiko yang mempengaruhi lama penyembuhan luka perineum pada ibu post-partum. *Jurnal Kesehatan*, 8(3), 449-454.
17. Saputra, H. A. (2011). *Perbandingan Kesembuhan Luka Episiotomi dengan Luka Ruptur Perineum Tingkat 1–2 pada Primigravida di RSUP H. Adam Malik Medan* (Doctoral dissertation, Universitas Sumatera Utara).
18. Saridewi, W., Marlina, D., & Meilani, S. P. (2018). Piper Crocatum Dalam Percepatan Penyembuhan Luka Perineum Di Pmb Nia Rosmawati A. Md. Keb Kota Cimahi. *Prosiding Pertemuan Ilmiah Nasional Penelitian Dan Pengabdian Masyarakat I (Pinlitamas 1)*, 1(1), 473-479.
19. Setyaningsih, D., Novika, A. G., & Safety, H. (2020). Pemanfaatan Terapi Komplementer pada Asuhan Antenatal: Studi Kualitatif. In *Prosiding Seminar Nasional Multidisiplin Ilmu* (Vol. 2, No. 1, pp. 172-179).
20. Sholiha, U. J. (2019). Hubungan Karakteristik Ibu Nifas Dengan Lamanya Penyembuhan Luka Perineum Menggunakan Infusa Sirih Merah di Puskesmas Kecamatan Koja Jakarta Utara Tahun 2019. Thesis.
21. Sigalingging, M., & Sikumbang, S. R. (2018). Faktor yang Berhubungan dengan Terjadinya Rupture Perineum pada Ibu Bersalin di RSUD Imelda Pekerja Indonesia Medan. *Jurnal Bidan Komunitas*, 1(3), 161-171.
22. Sulistianingsih, A., & Wijayanti, Y. (2019). Faktor yang Berpengaruh terhadap Penyembuhan Luka Perineum pada Ibu Postpartum. *Journal for Quality in Women's Health*, 2(1), 11-18.
23. Widia, L. (2017). Hubungan Antara Mobilisasi Dini Dengan Proses Penyembuhan Luka Rupture Perineum Pada Fase Proliferasi Ibu Post Partum. *Dinamika Kesehatan: Jurnal Kebidanan Dan Keperawatan*, 8(1), 25-32.