Jurnal Info Kesehatan
Vol. 23, No. 1, March 2025, pp. 162-172
P-ISSN 0216-504X, E-ISSN 2620-536X
DOI: *10.31965/infokes.Vol23.Iss1.1645*
Journal homepage: *https://jurnal.poltekkeskupang.ac.id/index.php/infokes*

RESEARCH **Open Access**

Analysis of Consistency The REEDA Scale in Healing Second-Degree Perineal Lacerations

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Received: 2 July 2024 Revised: 27 December 2024 Accepted: 28 January 2025

Abstract
Many studies of perineal wounds use the redness, edema, ecchymosis, discharge, and approximation (REEDA) scale as a healing assessment tool. Still, this tool has not become part of the standard of care in postpartum women with perineal lacerations due to the lack of evidence of its validity. This study aimed to analyze the consistency of the REEDA scale in healing perineal wounds of postpartum women. The method uses an observational study using the interrater reliability test for the REEDA tool on perineal wound healing in postpartum women with second-degree perineal lacerations, 11 women were recruited using consecutive sampling. Lacerations were observed by researchers, and midwives were trained on days 1, 3, and 7 postpartum. Cohen's kappa coefficient test was used to test the consistency of the REEDA scale. The results shows that the fair and excellent agreement on the redness item with kappa (0.57-1.00), agreement on the edema item showed good and excellent results (0.61-0.84), fair and good agreement on the ecchymosis item (0.51- 0.73), good and excellent agreement on discharge items (0.79 -1.00). On the approximation item (0.62–1.00), agreement improved to excellent at the final assessment. In the third evaluation, the scoring of all items showed good or excellent agreement between the raters. The conclusion is the overall assessment shows that the application of the REEDA scale is reliable because it shows consistency; namely, there are no more values with low agreement on the seventh day of the postpartum period.

Keywords: Consistency, Healing, Perineal Laceration, Postpartum Women, REEDA Scale.

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1. INTRODUCTION

Perineal lacerations that occur during vaginal delivery will require suturing. After suturing, the perineal wound must be examined to assess the suture results, which might cause problems postpartum (RCOG, 2015). This problem, namely signs of inflammation such as edema, ecchymosis, redness, and pain, occurs from the first hours after giving birth and may remain after the hospitalization period (Alvarenga et al., 2015). More than 85% of women who give birth vaginally experience perineal injuries. Estimated to occur in one-third of women's spontaneous perineal lacerations requiring suturing in the U.K. and the U.S. (Frohlich & Kettle, 2015). Complications due to perineal wounds, such as wound dehiscence with an incidence ranging from 0.21-24.6% and generally associated with infection, occur in 0.1-23.6% of women (Jones et al., 2019). The reported tear frequency varies between 20% and 41%; grade II perineal lacerations can cause problems similar to those caused by lacerations involving the anal sphincter. Delays in healing perineal laceration wounds that are sutured due to infection can cause long-term physical and psychological problems that affect the daily activities of women after giving birth (Åhlund, 2019).

So far, postpartum women have been taught about hygiene in wound management, namely washing the perineal area from front to back after urinating or defecating, changing sanitary napkins regularly, and not having sexual intercourse during the postpartum period (Faraji et al., 2021). However, the results of descriptive studies in Indonesia show data on postpartum women who experience delayed healing and infection in perineal suture wounds, including a 2021 study of 31.7% of 60 postpartum women in Palangka Raya City with suture wounds. Second-degree perineum is categorized as not yet healed using the REEDA Scale on the seventh day (Yuniarti et al., 2021). The treatment used depends on the severity of the perineal laceration and is often influenced by local customs and the training and experience of the professional recommending treatment. Appropriately, assessing and managing wounds is essential to optimize the healing results of perineal suture wounds in postpartum women (Webb, Sherburn, & Ismail, 2014).

REEDA (redness, edema, ecchymosis, discharge, and approximation) is a tool for assessing perineal wound healing with the Scale system introduced by Davidson in 1974. Many researchers and health practitioners have used this tool because it covers five critical aspects in healing perineal wounds, including a study of effectiveness of black cumin ointment in the process of healing perineal rupture wounds (Yuniarti, 2018), three perineal skin closure techniques in the repair of second-degree perineal lacerations (Swenson, et al., 2019), the healing effect of Quercus Persica and Lawsonia Inermis ointment on primiparous episiotomy wounds (Zibanejad et al., 2020), clinical trial of the impact of ginger extract ointment (zingiber officinale) on pain and healing of episiotomy wounds in nulliparas (Cheshfar et al., 2023), Randomized controlled trial of running and interrupted suturing techniques for repair of episiotomy wounds or second-degree perineal tears (Faal Siahkal et al., 2023), conservative management versus systematic suturing of first-degree vaginal or perineal tears after delivery (Lallemant et al., 2023), and many other studies. However, due to a lack of evidence of tool consistency, the REEDA scale has not become the standard of care for postpartum women (Alvarenga et al., 2015).

Studies have shown that episiotomy leads to higher REEDA scores and increased pain compared to spontaneous perineal tears (Pebolo, Judith, & Dan, 2020). Proper perineal care using the REEDA scale can significantly reduce pain and improve wound healing. The scale evaluates both episiotomy and cesarean section incisions, with episiotomy wounds showing higher initial REEDA scores but faster overall healing (Limbachiya & Parmar, 2022). Failure to use the REEDA scale may result in inadequate assessment of wound healing progress and potential complications. Additionally, the scale can be used to evaluate the effectiveness of interventions, such as herbal ointments, in promoting episiotomy wound healing (Torkashvand

et al., 2021). Regularly using the REEDA scale is crucial for monitoring postpartum perineal wound healing and ensuring appropriate care.

Health workers use scales, questionnaires, and tests to identify signs and symptoms and assess the results of interventions. Repeated assessments are given according to condition but are often carried out by different health professionals. They must be sufficiently consensual to identify fundamental changes in an individual's condition. Method comparison studies are essential for developments in the medical and clinical fields. These studies often compare cheaper, faster, or less invasive measurement methods with widely used methods to see whether they are approved enough to be used interchangeably. The measuring device and the rater influence response measurements in many clinical and medical assessments. Some inconsistencies are generally found among assessors due to different characteristics such as training and experience. This is because agreement between assessors and patients is required to be evaluated repeatedly to determine practical actions (Wang et al., 2020). This study is part of a randomized controlled trial (RCT) examining the effectiveness of black cumin (*Nigella Sativa*) ointment in healing perineal wounds in postpartum women. Our goal is to analyze the consistency of the REEDA scale as a clinical tool for assessing the healing of perineal lacerations.

2. RESEARCH METHOD

This research, uses an observational study with interrater reliability methods. The study was conducted at the Community Health Center in Palangka Raya City, Central Kalimantan, a facility that provides care for women giving birth 24 hours a day. Data was collected on the first, third, and seventh days at the Community Health Center and the patient's home over a period of June-July 2023.

The population was 15 postpartum women with grade II perineal lacerations who gave birth at the Public Health Center during the time of this study. The sample size was calculated with power at 80%, K1 0.0 and K2 0.6, alpha of 0.05, and anticipation dropout at 20% (Bujang & Baharum, 2017). The sample was taken using consecutive sampling; it was found that 11 postpartum women were willing to become participants who met the inclusion criteria. These, namely women had a standard vaginal delivery, a second-degree perineal laceration was sutured, there were no postpartum complications, the baby was born alive, and the research team could reach their home address.

The healing of perineal lacerations in maternal participants was assessed using the REEDA scale at three different times in the postpartum period. The first assessment is at 6-24 hours postpartum, the second assessment is on the third day postpartum, and the third assessment is on the seventh day postpartum. The REEDA scale is a tool for assessing perineal healing primarily developed by Davidson (1974), has been subject to psychometric evaluation (Hill, 1990). The REEDA scale has been widely used in recent studies to assess the healing of perineal wounds (Alvarenga et al., 2015) and cesarean wounds in postpartum women (Saghafi et al., 2023), and has been adopted into various languages, one of which is Indonesian (Astri et al., 2023) while maintaining the psychometric of the source. This tool assesses redness, edema, ecchymosis (purplish spots of blood flow), discharge, and approximation (closeness of the skin edges) in each individual who experiences perineal trauma after giving birth. Each item uses a value range of 0-3; perineal wounds are given a value for each item according to the description and then added up to get a total score with a value range of 0-15. Higher numbers indicate greater tissue damage in the wound; a maximum value of 15 means the worst perineal healing outcome (Davidson, 1974) shown in Table 1. Based on the REEDA scale, healing is graded as follows: completely healed 0, mostly healed 1-5, slightly healed 6-10, not healed 11-15 (Pebolo, Judith, & Dan, 2020).

Table 1. Redness, Edema, Ecchymosis, Discharge, and Approximation (Closeness of Skin Edge) Scale.

Points	Redness	Edema	Ecchymosis	Discharge	Approximation
0	None	None	None	None	Close
1	Within 0.25 cm of the incision bilaterally	Perineal, less than 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 to 2 cm from the incision	Between 0.25 cm to 1 cm bilaterally or between 0.5 to 2 cm unilaterally	Serosanguinus	Skin and subcutaneous fat separation
3	Beyond 0.5 cm of the incision bilaterally	Perineal and or vulvar, greater than 2 cm from the incision	Greater than 1 cm bilaterally or 2 cm unilaterally	Bloody, purulent	Skin, subcutaneous fat, and fascial layer separation

Data collection the REEDA assessment for collecting data on perineal wounds was conducted with the patient in a dorsal recumbent position, lying on her back with her knees bent. A ruler was positioned perpendicular to the line of the perineal wound to measure its length in centimeters accurately. REEDA measurements used 11 transparent PVC rulers. A nine-centimeter-long ruler (so that the assessor does not have difficulty holding the ruler) with a length of 1 mm represents each line. It's reused after washing it with soap and water, then disinfection with 70% alcohol. The REEDA scale was assessed by two assessors: the midwife as a primary researcher and the midwife trained as an enumerator in this study. Criteria for the midwives who collected the data were worked for > 5 years in the delivery room where this study was conducted. The assessors assessed healing perineal wounds on the first day of postpartum at the health community center and on the third and seventh days at the patient's home.

Statistical analysis for the REEDA scale data to be valid, there must be an agreement in perception between the assessors, namely the midwife as a primary researcher and the midwife trained as an enumerator in this study. Agreement (strength of agreement) was analyzed using IBM SPSS Statistics 26 software, including an interrater reliability test with Cohen's kappa coefficient ranging from 0 to 1. Kappa value ≥ 0.81 is considered a solid agreement (excellent), kappa value ≥ 0, 61 showed strong agreement (good), kappa value ≥ 0.41 was regarded as moderate agreement, ≥ 0.21 as fair agreement, and < 20 as low agreement.

The ethical principles in this research follow WHO standards, 2011, and CIOMS guidelines, 2016. Postpartum women became participants in this research after signing informed consent. This study received ethical approval from the Health Research Ethics Commission, Faculty of Medicine, University of Diponegoro, on March 24, 2023, number 85/EC/KEPK/FK-UNDIP/ III/2023. The confidentiality principle was explained to the respondent and two witnesses who signed the informed consent. This research is committed to maintaining the confidentiality of our respondents. We do not include the names of postpartum mothers on the data collection sheet, using codes instead to protect their identities. The identities of postpartum mothers who are respondents are never shared without their explicit permission. The examination results data, including numbers, categories, and photos, which are the focus of this research, are published as part of our research activities.

3. RESULTS AND DISCUSSION

Of the 11 participants, 10 participants were examined for laceration wounds on the first day postpartum, and 1 participant did not take part in the assessment because he had already gone home. On the second assessment (third day postpartum), a home visit was carried out by researchers and enumerators to examine and collect data on the healing of perineal wounds in 10 women. One woman dropped out because she changed her address. On the third assessment (7th day postpartum), researchers and enumerators conducted home visits on 9 participants; 2 participants dropped out because they changed addresses. Demographic data includes ages between 20 and 39 years, with a mean age of 28.4 years (SD=6.2). The majority of women were multiparous (55.5%), with the majority having intermediate education (72.7%). As many as 63.6% of women were housewives, and the suture technique for postpartum women's perineal lacerations was mostly continuous (63.6%).

Figure 1. Second-degree perineal laceration on the first day

Figure 1 shows that on the first day, based on an examination of 10 postpartum women, the assessor found that redness appeared within 24 hours postpartum, as many as 100% of postpartum women experienced redness (primary researcher), and 90% of postpartum women experienced redness (enumerator). Edema was found in 100% (primary researcher and enumerator), ecchymosis was found in 30% by the primary researcher and 40% by the enumerator, and discharge and approximation were still in normal condition in the first 24 hours postpartum.

Figure 2. Second-degree perineal laceration on the third day.

Figure 2 shows that on the 3rd day, of 10 postpartum women, 60% of postpartum women experienced redness (primary researcher), and 80% experienced redness (enumerator). Edema

was found in 60% (primary researcher and enumerator), ecchymosis was found in 30% by the primary researcher, and 20% by the enumerator. Discharge results found that one patient was purulent, and gaps were still found in the laceration wounds of all postpartum women.

Figure 3. Second-degree perineal laceration on the seventh day

Figure 3 shows that on the 7th day, based on an examination of 9 postpartum women, as many as 55% of postpartum women experienced redness, and ecchymosis was found in 22%. Discharge was still found in 89% of postpartum women, with one patient (11%) having purulent perineal laceration wounds; dehiscence was found in 1 patient (11%).

Table 2. Comparison of the means and standard deviation (SD) of the REEDA scale items between the primary researcher and the evaluator at first (6-24 h), second evaluation (3 days), and third (7 days).

Items	Evaluation 1		Evaluation 2		Evaluation 3	
	Main researcher	Enumerator	Main researcher	Enumerator	Main researcher	Enumerator
	Mean (SD)	Mean (SD)	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
Redness	1.90(0.88)	1.80(1.03)	1.10(1.20)	1.20(1.03)	0.56(0.53)	0.56(0.53)
Edema	1.60(0.70)	1.50(0.71)	0.80(0.79)	0.70(0.68)	0.22(0.44)	0.11(0.33)
Ecchymosis	0.50(0.85)	0.50(0.71)	0.30(0.68)	0.30(0.48)	0.33(0.50)	0.22(0.44)
Discharge	1.90(0.32)	1.90(0.32)	1.80(0.63)	1.70(0.68)	1.22(0.83)	1.33(1.00)
Approximation	0.60(0.52)	0.80(0.63)	1.50(0.53)	1.60(0.52)	1.11(0.93)	1.11(0.93)
Total Score	6.60(2.01)	6.50(1.96)	5.50(2.22)	5.50(1.84)	3.44(2.46)	3.33(2.55)

Table 2 shows that the upon first assessment, the scores differed between the primary researcher and the enumerator on redness, edema, ecchymosis, and approximation. There are similarities in discharge scores between researchers and enumerators but differences in the total REEDA score. On the secondary assessment, there were differences in scores between the primary researcher and the enumerator on redness, edema, ecchymosis, discharge, approximation, and the total REEDA score. On the third assessment, the scores between the primary researcher and the enumerator on the redness and approximation items were similar. There were differences in the discharge, edema, and ecchymosis values between researchers and enumerators, and the total REEDA score also found differences in average values.

Table 3. Kappa coefficients for REEDA scale items, according to the evaluation periods.

Items	Evaluations		
	First	Second	Third
	Kappa	Kappa	Kappa
Redness	0.57	0.57	1.00
Edema	0.83	0.84	0.61
Ecchymosis	0.62	0.51	0.73
Discharge	1.00	0.83	0.79
Approximation	0.62	0.80	1.00
REEDA Scale	0.63	0.63	1.00

The results of the Kappa coefficient values in Table 3 show that the first assessment, between the primary researcher and the enumerator, produced good agreement on five items, namely edema, ecchymosis, approximation, discharge, and REEDA scale. For the redness item, there was moderate agreement between the raters. On the second assessment, there were four items with good agreement: edema, discharge, approximation, and REEDA scale. Regarding redness and ecchymosis, there was sufficient agreement between raters. In the third assessment, all items showed good or excellent agreement between researchers and enumerators.

DISCUSSION

The results of this study showed that on the first postpartum day, the assessors found edema and redness experienced by all postpartum women in the sample, serosanguineous being the most common type of discharge resulting from perineal lacerations. The physiological process of acute wound healing comprises four phases: Hemostasis, inflammation, proliferation, and remodeling (Wilkinson & Hardman, 2020). The wound healing process is an overlapping process. The presence of wounds due to trauma or surgery damages the tissue structure and bleeding; hemostasis begins immediately after the injury. This phase takes place on day one after a perineal laceration occurs. Serosanguineous is the discharge of wound fluid containing blood and blood serum. In small amounts, it is a natural healing component (Chhabra et al, 2017).

On the third postpartum day, researchers and enumerators found purulence in 1 postpartum woman (10%) with a maximum discharge item value of 3. The inflammatory phase occurred on days 1-4 after the injury occurred (Chhabra et al, 2017). Bacterial invasion of wounds can occur during trauma, during, or after the procedure. Symptoms of infection appear 3-7 days after the suturing procedure (Zabaglo & Sharman, 2022). Symptoms include pus, increased drainage, pain, redness and swelling around the wound, temperature, and white blood cells. Perineal lacerations can quickly become contaminated with feces because they are close to the anus. Infection can also be a reason why wounds do not heal soon, resulting in scar tissue (Boyle, 2006).

On the seventh day postpartum, most women still experience redness, and ecchymosis decreases. Discharge was still found in the majority of samples, as many astwo postpartum women with purulent perineal laceration wounds, and dehiscence was found in 1 postpartum woman. Dehiscence is the partial or total opening of the wound layer. Many factors, including obesity, malnutrition, multiple trauma, failure to fuse, excessive coughing, vomiting, and dehydration, increase the patient's risk of experiencing wound dehiscence. Infection or pressure on the perineal laceration suture due to bleeding carries the risk of the suture breaking, resulting in a gaping or open wound, which is called perineal wound dehiscence. It can occur 5 – 8 days after the wound is stitched (Rosen & Manna, 2022). Another study using the REEDA scale found that at the end of the 10th day of the study, there were still

respondents from the intervention group who showed poor healing results (Tomari et al., 2021).

Upon first assessment, differences in scores between the primary researcher and the enumerator were found in the items redness, edema, ecchymosis, and approximation. The lowest agreement was indicated by the redness item, with moderate results. In the redness (hyperemia) item, difficulties arise when applying the REEDA scale because this item is assessed bilaterally. Redness may be visible in patients on only one side of the perineal wound. Therefore, this item was measured and evaluated in this study, and even though it was only visible on one side, the evaluation did not fully comply with the instructions on the REEDA scale. Moderate agreement in the redness item shows differences in the application of the REEDA scale resulting from the accuracy of the assessors' judgments, where it is sometimes difficult to differentiate between redness and ecchymosis even though the assessors have undergone training on wounds (Alvarenga et al., 2015).

On the secondary assessment, there were differences in scores between the primary researcher and the enumerator on redness, edema, ecchymosis, discharge, approximation, and the total REEDA score. The lowest agreement between raters was on the redness and ecchymosis items, with moderate results. The appearance of symptoms of infection on the 3rd day after the suturing procedure is a challenge for researchers and enumerators when applying the REEDA scale assessment because the condition of the perineal wound of each postpartum woman is different (Zabaglo & Sharman, 2022). The measurement of the body's response in many clinical and medical assessments is influenced by the measuring device and the assessor. Some inconsistencies are often found between raters due to differences in characteristics such as rater training and experience (Wang et al., 2020). Difficulty distinguishing between redness and ecchymosis may occur among raters (Alvarenga et al., 2015).

On the third assessment, researchers and enumerators still had differences in the average values of edema, ecchymosis, discharge, and total REEDA score. But all items showed good and excellent agreement between raters. The results of this study indicate that application of the REEDA scale at the end of the visit resulted in better agreement between raters, with fewer items showing differences (edema, ecchymosis, and discharge). Signs of inflammation, which increase in the early phase of the healing process, show a decrease on the seventh day of the postpartum period due to changes in local reactions and absorption of suture material. The remodeling phase begins on the seventh day after the wound occurs, as seen by the redness decreasing and the wound closing (Townsend, 2021). The results of this study are supported by studies of almost perfect inter-rater agreement for patients' eating behavior before surgery (based on kappa). Interrater agreement with similar results was observed after surgery for episodes of binge eating and subjective overeating. Internal consistency of subscale and global scores varied between 0.41-0.97 (Ivezaj et al., 2022).

Limitations of this study, Researchers could not control the different locations of research activities on the third and seventh days; different lighting conditions and bed heights in postpartum women's homes were some of the factors that influenced the results of the REEDA scale assessment by the assessors. The results of this study could be a factor and reason for increasing the application of the REEDA scale in clinical practice, thereby improving the variability of the data and making it possible to verify the use of the REEDA scale as a clinical assessment tool in postpartum women healing of perineal suture wounds. Still, many midwives have not received training in assessing and diagnosing perineal repair, and health workers' knowledge of the expected results from perineal care is still inaccurate. Given the importance of these skills for women cared for by midwives, nurses, and doctors, these findings can provide input for the development of activities to improve the quality of health workers, including training and opportunities to gain experience and expertise related to perineal management (East, Lau, & Biro, 2015).

4. CONCLUSION

The results of the assessment of healing of second-degree perineal lacerations using the REEDA scale carried out by two assessors showed consistency with an increase in agreement on the redness and approximation items from the first day to the seventh day for the other three items, namely edema, ecchymosis, and discharge, there were still differences assessment on seventh day. However, the overall evaluation shows that applying the REEDA scale on the seventh day of the postpartum period is reliable because there are no more values with low agreement. The difference in scores shows differences in health professionals' perception of understanding the REEDA scale, so there is still a need to develop this tool, one of which is by implementing it in clinical practice through learning and training activities.

REFERENCES

Åhlund, S. (2019). *Pelvic Floor Complications After Vaginal Birth Short- And Long-Term Consequenses For Primiparous Women in Sweden. Dissertations*. Stockholm: Karolinska Institutet. Retrieved from: https://www.proquest.com/openview/048ed71fa7ddcdc40a249bb977cbad4d/1?cbl=18750&diss=y&pq-origsite=gscholar

Alvarenga, M. B., Francisco, A. A., de Oliveira, S. M., da Silva, F. M., Shimoda, G. T., & Damiani, L. P. (2015). Episiotomy healing assessment: Redness, Oedema, Ecchymosis, Discharge, Approximation (REEDA) scale reliability. *Rev Lat Am Enfermagem*, *23*(1), 162-168. https://doi.org/10.1590/0104-1169.3633.2538

Astri, H., Fratidhina, Y., Mulyati, S., & Tulandy, S. M. (2023). Salira Accelerates Perineal Wound Healing in Postpartum Mothers. *International Journal of Membrane Science and Technology*, *10*(2), 2882-2889. https://doi.org/10.15379/ijmst.v10i2.2980

Boyle, M. (2006). *Wound Healing in Midwifery*. London: Radcliffe Publishing Ltd.

Bujang, M. A., & Baharum, N. (2017). Guidelines of the minimum sample size requirements for Cohen's Kappa. *Epidemiology Biostatistics and Public Health, 14*, e12267-12261. https://doi.org/10.2427/12267

Cheshfar, F., Bani, S., Mirghafourvand, M., Hasanpour, S., & Javadzadeh, Y. (2023). The Effects of Ginger (Zingiber officinale) Extract Ointment on Pain and Episiotomy Wound Healing in Nulliparous Women: A Randomized Clinical Trial. *Journal of Caring Sciences*, *12*(3), 181-187. https://doi.org/10.34172/jcs.2023.31842

Chhabra, S., Chhabra, N., Kaur, A., & Gupta, N. (2017). Wound Healing Concepts in Clinical Practice of OMFS. *Journal of maxillofacial and oral surgery*, *16*(4), 403-423. https://doi.org/10.1007/s12663-016-0880-z

Davidson, N. (1974). REEDA: evaluating postpartum healing. *J Nurse Midwifery*, *19*(2), 6-8. https://doi.org/10.1111/j.1542-2011.1974.tb00384.x

East, C. E., Lau, R., & Biro, M. A. (2015). Midwives' and doctors' perceptions of their preparation for and practice in managing the perineum in the second stage of labour: a cross-sectional survey. *Midwifery*, *31*(1), 122-131. https://doi.org/10.1016/j.midw.2014.07.002

Faal Siahkal, S., Abedi, P., Iravani, M., Esfandiarinezhad, P., Dastoorpoor, M., Bakhtiari, S., ... & Mohaghegh, Z. (2023). Continuous non-locking vs. interrupted suturing techniques for the repair of episiotomy or second-degree perineal tears: A single-blind randomized controlled trial. *Frontiers in Surgery*, 10, 1114477. https://doi.org/10.3389/fsurg.2023.1114477

Faraji, A., Aghdaki, M., Hessami, K., Hosseinkhani, A., Roozmeh, S., Asadi, N., . . . Foroughinia, L. (2021). Episiotomy wound healing by Commiphora myrrha (Nees) Engl. and Boswellia carteri Birdw. in primiparous women: A randomized controlled trial. *J Ethnopharmacol*, *264*, 113396. https://doi.org/10.1016/j.jep.2020.113396

Frohlich, J., & Kettle, C. (2015). Perineal care. *BMJ clinical evidence*, 2015, 1401. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/25752310

Hill, P. D. (1990). Psychometric properties of the REEDA. *J Nurse Midwifery*, *35*(3), 162-165. https://doi.org/10.1016/0091-2182(90)90166-3

Ivezaj, V., Kalarchian, M. A., King, W. C., Devlin, M. J., Mitchell, J. E., & Crosby, R. D. (2022). Interrater reliability and internal consistency of the eating disorder examination in the longitudinal assessment of bariatric surgery study. *Surg Obes Relat Dis*, *18*(8), 1015-1022. https://doi.org/10.1016/j.soard.2022.04.015

Jones, K., Webb, S., Manresa, M., Hodgetts-Morton, V., & Morris, R. K. (2019). The incidence of wound infection and dehiscence following childbirth-related perineal trauma: A systematic review of the evidence. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *240*, 1-8. https://doi.org/10.1016/j.ejogrb.2019.05.038

Lallemant, M., D'Antona, A., Vidal, C., Bourtembourg, A., Toubin, C., Chehab, M., . . . Mottet, N. (2023). Conservative management versus systematic suture of isolated vaginal or first-degree perineal tears after delivery: A preliminary randomized efficacy trial. *Birth*, *50*(3), 513-524. https://doi.org/10.1111/birt.12671

Limbachiya, N., & Parmar, N. (2022). Evaluate the Effectiveness of Perineal Care on Episiotomy Pain and Wound Healing among Postpartum Women. *Journal of Pharmaceutical Negative Results*, *13*(6), 509-518. https://doi.org/10.47750/pnr.2022.13.S06.070

Pebolo, P. F., Judith, A., & Dan, K. K. (2020). Episiotomy related morbidities measured using redness, edema, ecchymosis, discharge and apposition scale and numerical pain scale among primiparous women in Mulago National Referral Hospital, Kampala, Uganda. *Pan Afr Med J*, *36*, 347. https://doi.org/10.11604/pamj.2020.36.347.25049

RCOG. (2015). *The management of third and fourth degree perineal tears. RCOG Green top Guidelines No 29*: Royal College of Obstetricians and Gynaecologists.

Rosen, R. D., & Manna, B. (2022). *Wound Dehiscence.* Treasure Island (FL): StatPearls Publishing

Saghafi, F., Ramezani, V., Jafari-Nedooshan, J., Zarekamali, J., Kargar, S., Tabatabaei, S. M., & Sahebnasagh, A. (2023). Efficacy of topical atorvastatin-loaded emulgel and nano-emulgel 1% on post-laparotomy pain and wound healing: A randomized double-blind placebo-controlled clinical trial. *International Wound Journal*, *20*, 4006 - 4014. https://doi.org/10.1111/iwj.14289

Swenson, C. W., Low, L. K., Kowalk, K. M., & Fenner, D. E. (2019). Randomized Trial of 3 Techniques of Perineal Skin Closure During Second-Degree Perineal Laceration Repair. *J Midwifery Womens Health*, 64(5), 567-577. https://doi.org/10.1111/jmwh.13020

Toomari, E., Hajian, S., Mojab, F., Omidkhah, T., & Nasiri, M. (2021). Evaluation the effect of Silybum marianum ointment on episiotomy wound healing and pain intensity in primiparous women: a randomized triple blind clinical trial. *BMC complementary medicine and therapies*, 21(1), 253-253. https://doi.org/10.1186/s12906-021-03413-z

Torkashvand, S., Jafarzadeh-Kenarsari, F., Donyaei-Mobarrez, Y., & Gholami Chaboki, B. (2021). Effectiveness of Olea Herbal Ointment on Episiotomy Wound Healing Among Primiparous Women: A Randomized Clinical Trial. *Jundishapur Journal of Natural Pharmaceutical Products*, 16(3), e104570. http://dx.doi.org/10.5812/jjnpp.104570

Townsend, C. M. (2021). *Sabiston Textbook of Surgery E-Book: The Biological Basis of Modern Surgical Practice* (21 ed.): Elsevier Health Sciences.

Wang, W., Lin, N., Oberhaus, J. D., & Avidan, M. S. (2020). Assessing method agreement for paired repeated binary measurements administered by multiple raters. *Stat Med*, *39*(3), 279-293. https://doi.org/10.1002/sim.8398

Webb, S., Sherburn, M., & Ismail, K. M. K. (2014). Managing perineal trauma after childbirth. *British Medical Journal*, *349*, g6829. https://doi.org/10.1136/bmj.g6829

Wilkinson, H. N., & Hardman, M. J. (2020). Wound healing: cellular mechanisms and pathological outcomes. *Open Biology*, *10*(9), 200223. https://doi.org/10.1098/rsob.200223

Yuniarti, Y. (2018). Efektivitas Salep Jintan Hitam (Nigella Sativa) Pada Proses Penyembuhan Luka Perineum Rupture Ibu Nifas. *Jurnal Kesehatan Manarang*, *4*(2), 64-68. https://doi.org/10.33490/jkm.v4i2.76

Yuniarti, Y., Asi, C., Aprilia, D., & Veronika, S. (2021). Determinan terhadap Penyembuhan Luka Perineum pada Ibu Nifas di Praktik Mandiri Bidan Kota Palangkaraya. *Jurnal Surya Medika*, *7*(1), 94-98. https://doi.org/10.33084/jsm.v7i1.2633

Zabaglo, M., & Sharman, T. (2022). *Postoperative Wound Infection*. Treasure Island (FL): StatPearls Publishing

Zibanejad, S., Miraj, S., & Kopaei, M. R. (2020). Healing effect of Quercus persica and Lawsonia inermis ointment on episiotomy wounds in primiparous women. *J Res Med Sci*, *25*, 11. https://doi.org/10.4103/jrms.JRMS_251_18