



A Literature Review on Postpartum Perineal Wound Care: Epidemiology, Impact, and Future Interventions

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Abstract

Edited by: Ksenija Bogoeva-Kostovska
Citation: Girsang BM, Elfira E. A Literature Review on Postpartum Perineal Wound Care: Epidemiology, Impact, and Future Interventions. Open Access Maced J Med Sci. 2023 Jan 02; 11(F):73-80.
<https://doi.org/10.3889/oamjms.2023.11073>
Keywords: Breeding; Perineum; Pain; Vaginal

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Received: 07-Oct-2022

Revised: 26-Oct-2022

Accepted: 27-Oct-2022

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Funding: This research did not receive any financial support

Competing Interests: The authors have declared that no competing interests exist

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BACKGROUND: Perineal injury is an injury to the urogenital diaphragm and levator ani muscle, which occurs during normal delivery, or vaginal delivery, can occur without injury to the perineal or vaginal skin. Perineal wounds become one of the breeding media for germs so that it becomes the cause of puerperal infection. Perineal infection can occur because the location of the perineum is moist so that it becomes a breeding ground for bacteria. Incidence of infection that occurs in the perineal wound can spread to the birth canal or urinary tract. Infectious conditions in the perineal wound will slow down the wound healing process, because it can increase the damage to the supporting tissues of the skin.

AIM: This systematic review aims to see how postnatal perineal wound care: Epidemiology, impact, and future interventions.

METHODS: Researchers searched for quantitative studies published between 2017 and 2021, using PubMed, Elsevier, and Google Scholar. Thirty studies in systematics review.

RESULTS: The studies that have been collected that there are nine studies discussing the effect of therapies given to the treatment of perineal wounds in studies that discuss therapy two studies including discussing infrared lamp therapy, one study discussing the effects of mastic oleoresin, one study discussing betel leaf decoction, one study discussing the effectiveness of *Aloe vera*, one study discussing the effects of cinnamon, one study discussed the application of negative pressure sores, one study discussed the effect of pineapple fruit juice, and one other study discussed the effects of carvacrol, tymol, and olive oil. Then, two studies discussed the prevalence of perineal wound events and three studies discussed the characteristics of perineum wounds.

CONCLUSION: This systematic review evaluates and synthesizes the effectiveness of intervention methods of perineal wound pain reduction and perineal wound healing (episiotomy) and improves comfort in consideration of the methodological evidence level of stud patients' comfort.

Introduction

Perineal infection can occur due to the humid location of the perineum so that it becomes a medium for the proliferation of bacteria. The incidence of infection that occurs in the wound of the perineum can spread to the area of the birth canal or urinary tract. The condition of infection in the perineal wound will slow down the wound healing process because it can add damage to the supporting tissue on the skin. This condition will aggravate the degree of perineal injury and its treatment. The period when after the mother gives birth to the placenta kala III, the mother will enter a recovery period called the post-Natal period [1].

In the puerperium, the mother will experience a recovery process both physically and psychically. In this puerperium, the mother will undergo a new role as a mother and will experience a process of uterine involution. Mothers experience some discomfort after childbirth, although it is considered a common discomfort during puerperium after childbirth pain,

perineal pain, fatigue, constipation, swelling of the breasts, lactation suppression, headaches, back pain, can cause physical, discomfort, psychological stress, and poor quality of life of the mother [2].

Maternity mothers generally have tears in the vagina and perineum that cause bleeding in varying and numerous amounts. The maternal mortality rate in Indonesia is still the highest among ASEAN countries. The direct cause of maternal death in Indonesia and other countries is almost the same, which is about (11%) caused by infection. Perineal laceration is a tear that occurs in the perineum during labor. Perineal lacerations can be classified according to the degree of laceration, which is degree I, degree II, degree III, and degree IV. A study conducted in the UK showed that 85% of women who give birth normally will experience perineal trauma. More than two-thirds of these women will need sewing. Perineal trauma will affect a woman's physical, psychological, and social well-being in the immediate and long-term postnatal period. Puerperal infection can be caused by a birth canal wound that does not undergo a proper healing process [3].

Perineal tearing occurs in almost all the first childbirth and not infrequently also in subsequent labor. Perineal tears generally occur in the midline and can become extensive if the fetal head is born too quickly, the pubic arch angle is smaller than usual, the fetal head passes through the upper door of the pelvis with a size larger than the suboxpitobregmatic circumference. A perineal wound is an injury to the urogenital diaphragm and levator ani muscle, which occurs at the time of normal labor, or childbirth with a tool, can occur without injury to the skin of the perineum or vagina so that it is not visible from the outside [4].

One of the leading causes of maternal death in developing countries is puerperal infections such as sepsis. Birth canal injury is one of the media for the proliferation of germs so that it can be the cause of puerperal infection. This is due to the lack of hygiene in the birth canal wound and the low resistance of the mother's body after childbirth. The delay in wound healing is caused by several problems including changes in vital signs due to bleeding, infections such as redness of the skin, fever, pain, and tearing of part or all of the stitches due to trauma and protrusion of internal organs to the outside due to the wound does not immediately blend well [2].

Methods

Systematic reviews are carried out in accordance with the preferred reporting items for systematic review and meta-analysis and the Joanna Briggs Institute Reviewer's Manual that this protocol is not listed in any database before [5]. The inclusion and exclusion criteria using the PICOS format (JBI, 2020) are shown in Table 1. This review includes all quantitative research papers on the treatment of perineal wounds. This approach allows for the totality of empirical evidence to be examined and can provide better insight into the extent to which the results of different study designs complement or contradict each other [5]. The search strategy uses a three-phase process, identifying relevant articles. At the first stage, the database of electronic journals (PubMed, Elsevier, and Google Scholar) is used to determine the exact keywords between the title and the abstract thus, the term controlled search index is used to identify relevant articles in this database. In the second phase, a specific search for each database is performed using these keywords and controlled index terms to identify potentially relevant articles among the databases. In the last phase, full-text filtering for literature is carried out through a manual search of all reference lists of studies to identify additional relevant articles. We are looking for articles published between 2017 and 2022. Screening and selection of studies using a literature search

11,800 studies were initially identified. After the span since 2018 so that, it became 3850 studies screened. Independently screened all identified research titles and abstracts for review, and 2235 studies were issued based on established exclusion criteria. Of these, 30 underwent full-text and detailed reviews. Screening and selection of studies are shown in Figure 1.

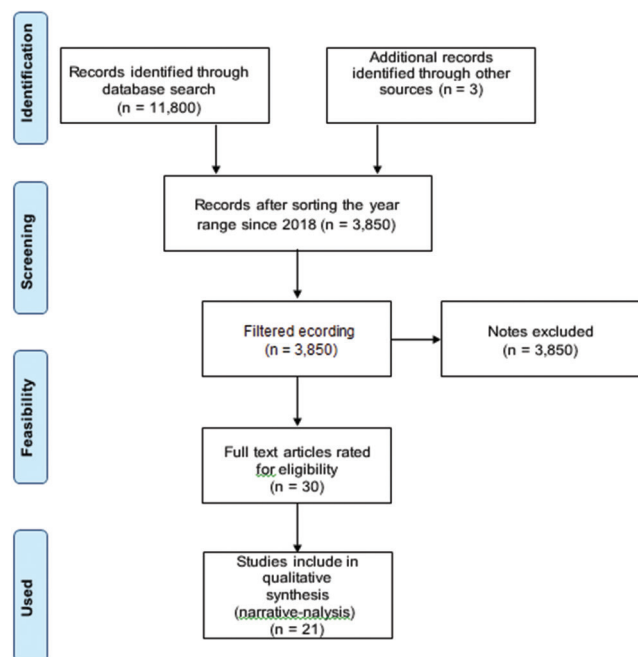


Figure 1: Preferred reporting items for systematic review and meta-analysis flow diagram

Results

The studies that have been collected that there are nine studies discussing the effect of therapies given to the treatment of perineal wounds in studies that discuss therapy two studies including discussing infrared lamp therapy, one study discussing the effects of mastic oleoresin, one study discussing betel leaf decoction, one study discussing the effectiveness of *Aloe vera*, one study discussing the effects of cinnamon, one study discussed the application of negative pressure sores, one study discussed the effect of pineapple fruit juice, and one other study discussed the effects of carvacol, tymol, and olive oil. Then, two studies discussed the prevalence of perineal wound events, three studies discussed the characteristics of perineum wounds. Studies were classified by intervention characteristics: infrared lamp material (n = 2) mastic (n = 1), betel leaves (n = 1), *A. vera* (n = 1), cinnamon (n=1), negative wound pressure (n = 1), pineapple juice (n = 1), and carvacol, tymol, and essential oils (EOs) (n = 1).

Table 1: Perineal wound treatment interventions in some studies (n = 9)

| Researchers | Components of nursing intervention | Pain levels | | | | The most important research results |
|--|--|---------------|---------------|---------------------|-------------|--|
| | | No pain (%) | Mild pain (%) | Moderately pain (%) | Severe pain | |
| Self-care Ari <i>et al.</i> (2019) | Hygiene Washing hands before and after perineal treatment Cleaning the perineum from front to back Does not touch the inside of the perineal pad Drain warm water from front to back Bathe as usual Applying pads from front to back Patting the dried perineum with a tissue without fragrance or a clean cloth Replacing pads at least 3–4 times a day Dry perineum | Day-7 7.25 | 68.75 | 6.25 | - | These findings reveal the following that the postpartum perineum is postpartum; severe pain, discharge of pus from the wound site, wound damage, excessive redness of the wound site, an unpleasant smell and pus are formed at the wound site |
| Media herbal Moudi <i>et al.</i> , (2018) | Mastic | Day-10 | 78% | | | No significant effect on the intensity of episiotomy pain on days 3, 7, and 10 postpartum (p = 0.61, p = 0.76, and p = 0.45, respectively). More research should be done to identify mastic effects |
| Darulis <i>et al.</i> (2021) | Betel leaf water decoction | - | - | - | - | There were differences in perineal wound healing between the experimental and control groups |
| Umamy <i>et al.</i> (2021) | Pineapple juice | - | - | - | - | The results of the research and theories that have been described above can be concluded that in the control group the healing process of perineal wounds is still relatively normal (7–10 days) and not a few take a long time (>10 days). This happens due to the lack of intake of vitamins and nutrients that the mother consumes during wound healing. So it is hoped that puerperal mothers will consume foods that have a balanced nutritional content, so that perineal wounds heal faster |
| Dewi <i>et al.</i> (2020) | <i>Aloe vera</i> Gel | - | 28.5 | 62.5 | 9 | The average decrease in the pain scale in the group with <i>Aloe vera</i> gel treatment was greater than in other groups with ice gel treatment, with an average difference of 2.46 and 1.61. The results of statistical analysis showed significant differences in pain relief between the two groups, p < 0.05 |
| Mohammadi <i>et al.</i> (2018) | Cinnamon effect | - | - | - | - | |
| Using the tool Girsang and Elvira | Infrared therapy | - | - | - | - | These results show that infrared therapy does not show significant changes if it is only carried out for 1 day |
| El-Lassy and Madian (2018) | Infrared therapy | - | - | - | - | This study concluded that infrared light therapy is the right way to treat episiotomy wounds in postpartum mothers. The study recommends that joining infrared therapy as a major part of postpartum instruction for women for an important role in improving quality of life during the postpartum period |
| Cahill <i>et al.</i> (2018) | Incision negative pressure wound therapy | - | - | - | - | This review shows that incisional negative pressure wound therapy lowers the complications of perineal wounds after abdominal resection |

Discussion

The benefits of each intervention to treat perineal wound pain and the wound healing are discussed below.

Infrared light

One of the main concerns of health workers during the puerperium is to provide comfort to the mother, help relieve pain and prevent infection. Therefore, improving episiotomy wound healing is one of the main concerns after normal delivery [1]. With regard to non-pharmacological methods, common practice is the use of ice packs, and the application of heat. Ice packs for the first 24 h postpartum are the traditional method used for immediate pain relief, because they soothe

the perineum, but this relief is generally short-lived, and there is no evidence of long-term benefit. After 24 h, heat is recommended as it increases circulation to the area [6]. The effect of perineal wound healing with infrared therapy on postpartum mothers is a unique treatment, where this therapy uses infrared light exposure on the perineal wound or on the affected part. This research is considered very important, because nurses can control the condition of perineal wound repair so that they can plan appropriate treatment actions for perineal wounds [6]. Infrared therapy is an appropriate surrogate intervention for those with episiotomy injuries and has biologic results in cutaneous vasodilation due to the release of chemical vasodilators, histamine, and parallel materials, along with potential direct consequences on blood vessels [7]. The use of infrared therapy has proven to be able to improve the condition of the wound. Infrared therapy is an appropriate surrogate intervention for those with episiotomy injuries and has

biologic results in cutaneous vasodilation due to the release of chemical vasodilators, histamine, and parallel materials, along with potential direct consequences on blood vessels [1].

Procedure technique: Infrared lamp was used for research subjects in the study group located at a distance of 45 cm from the perineum and heat emitted with 220 volts was used for 10–15 min; then, the level of pain was assessed directly. Due to the mixture of high penetration rate in the skin and absorbed, light is beneficial to promote wound healing, tissue repair, and skin rejuvenation [1]. In the results of the study, it was stated that infrared therapy is a treatment method on the perineum by utilizing the effect of 245 volt infrared rays, at a distance of 45–50 cm with a duration of 10–15 min will have an impact on providing comfort and reduce pain in perineal wounds [8]. According to research from [1] in this study, all in the pre-intervention phase the REEDA scores of the subjects studied were similar. Post-intervention comparisons showed significantly better wound healing in the study group compared to the control group. However, there was a very high percentage of mothers in the post-intervention phase with a “Good” category in the study group compared to the control group. This indicates that the improvement of wound restoration in the study group was due to the intervention performed on them. The similarity of these studies, the intervention study, was conducted by [9] to compare the effect of dry heat (Hairdryer) versus moist heat (Sitz Bath) on pain and restorative wounds at the episiotomy site among postnatal mothers admitted to Nehru Hospital, Chandigarh, where subjects in group one (dry heat) had lower pain intensity compared to group two (sitz bath) after the intervention. While the results of this study revealed that, the mean and standard deviation of the episiotomy pain scores of the control group participants were high on observations I and II on all 3 days compared to the study group, with a statistically significant difference. The present study described that the restoratives lasted within 4 days and they achieved good healing earlier and faster than the control group who used routine episiotomy care. Thus, infrared light is a better management of episiotomy wound restoration than any other procedure. These results are analogous to the research conducted in India by [4] and stated that after the intervention showed that a significant large percentage of postpartum mothers (92.64%) had healthier wound healing within 4 days compared to no control group.

Research results from [6] the two interventions applied in this study, namely, cold sitz bath hydrotherapy and infrared therapy did not show statistical differences in reducing perineal wound pain in spontaneous postpartum mothers. However, the results of the study proved that cold sitz bath hydrotherapy was better (1.80 ± 1.05) in reducing the scale of pain in puerperal wounds compared to infrared therapy (3.25 ± 1.41) for 3 consecutive days

with a significant level $p = 0.004$. This result is different from some of the effects of researchers who state that infrared rays are more effective in reducing pain in perineal wounds [1]. Therapy that uses the principle of hydrotherapy in a sitting position (sitz bath) has proven to be useful for recovery therapy. The main application of hydrotherapy is to stimulate circulation to the pelvic area. This hydrotherapy uses an alternative to cold water because it can overcome edema in perineal wounds compared to warm water [10].

Pain scale score analysis using two-way analysis of variance with replication showed that sitz baths with cold water were significantly more effective in relieving pain.

Cinammon

The postpartum period is a sensitive time when mothers must manage their own recovery while addressing the needs of their newborn. Effective pain relief is a key aspect of postpartum care that can positively impact a woman's life [11]. Only a few studies have been conducted on the treatment of this very common wound. Several studies have examined the effects of herbal remedies such as lavender [12] olive oil [13] about episiotomy pain and healing. However, the definitive effect of this method has not been verified through clinical trials, and more extensive studies are still needed in this area [14]. Cinnamon is a spice that is widely used throughout the world. It has been found to have many properties including anti-inflammatory, antioxidant, and antimicrobial. Analgesic and wound healing, its ethanol extract effect, has been demonstrated in laboratory rats. Furthermore, no significant side effects of cinnamon were found in human studies [14]. Considering the above-mentioned evidence on the possible efficacy and safety of cinnamon extract, plus the lack of human studies on its analgesic, and healing effects, this study was conducted to determine the effect of a 10-day application of 2% cinnamon extract ointment. In the episiotomy wound, the main outcomes involved reducing perineal pain and accelerating episiotomy wound healing; secondary outcomes measured consumption of other analgesics compared with the placebo group [14]. Research results from [14] showed that the application of cinnamon ointment to the episiotomy incision for 10 days reduced the intensity of perineal pain and increased incision healing without significant side effects. According to a literature review, this study is the first clinical trial on the anti-inflammatory and analgesic properties of cinnamon for wound healing in humans. The previous studies on laboratory rats also demonstrated the analgesic and healing properties of cinnamon extract. Some experts believe that cinnamon promotes epithelialization, reduces oxidative stress, and promotes wound healing with its antimicrobial and antioxidant properties. Based on review studies, cinnamon is recommended

for the treatment of many diseases such as diabetes, hypertension, and cardiovascular disease [15], [16]. The three main compounds in cinnamon include eugenol, cinnamaldehyde, and linalool, which make up about 80% of its composition. In this study [14], the decrease in redness in the cinnamon group and the presence of serosanguineous or purulent secretions on day 10 may be due to cinnamon's anti-inflammatory and antimicrobial properties.

Wound dehiscence in this study (one case in the cinnamon group and five cases in the placebo group) was slightly more common than would be expected based on international references, i.e., 0.1–2.1%. However, it was slightly less than what was found in a study conducted in Arak-Iran, where wound dehiscence was 3% in the group using lavender oil sitz baths and 8% in the group taking betadine. A possible reason for this slightly higher dehiscence might be related to the insufficient skills of the students who perform most of the episiotomy procedures in the hospital. In this study, the duration of repair was relatively long (35 min) which may be accompanied by more manipulation of the incision and could affect wound healing.

***A. vera* gel**

These non-pharmacological treatments include ice gel and *A. vera* gel compresses. Ice gel compress is one way to treat perineal pain. The mechanism of action is that the cold nature of the ice gel makes the blood vessels experience vasoconstriction in the wound and its surroundings to reduce blood flow to the wound area. As a result, the edema in them is minimal and also inhibits the inflammatory process so that the sensation of pain in the perineal area can be reduced. *A. vera* gel compress uses the flesh of the *A. vera* plant which clinically has more than 75 active compounds that function as antiseptic, anti-fungal, anti-inflammatory, and wound healing [17]. The mechanism of *A. vera* in reducing perineal pain is through anthraquinone compounds, allantoin, and other polysaccharides which will inhibit the synthesis of histamine and bradykinin. It inhibits the formation of prostaglandins and ultimately prevents the inflammatory process, reducing the sensation of pain. Studies on the use of *A. vera* gel compresses and gel ice have been carried out and have proven their effectiveness. However, the difference between the two gel effectiveness has not been discussed. This study examines the efficacy of *A. vera* gel and ice gel compresses in reducing the scale of perineal wound pain [18]. The process of reducing pain occurs due to the inhibition of the inflammatory process and the acceleration of the granulation process. In addition, *A. vera* gel contains amino acetic which can relieve pain; The analgesic effect of this plant works through a peripheral mechanism. Using an *A. vera* gel compress can speed up the healing process of postpartum wounds and reduce pain naturally [18].

A significant effect was also found on the ice gel compress on the decrease in the respondent's pain scale score. It comes from the cooling sensation that the ice gel gives. It can reduce pain in two ways: first, by reducing edema, muscle spasms associated with inflammatory reactions or trauma, second, it reduces pain by inducing short-term pain sensations in peripheral nerve fibers and reducing the inflammatory response. Cold therapy cools the skin, and underlying tissue, thereby activating alpha-receptors in the blood, stimulating the sympathetic nervous system to reduce blood flow to the injured area. It reduces pain, as proven in other studies [19]. Pain in the perineal wound can be reduced because *A. vera* gel, besides being able to relieve pain, also has active compounds to inhibit the inflammatory process and accelerate the wound healing process. The faster the wound healing process, the pain scale will indirectly decrease. *A. vera* contains more than 75 potentially active ingredients, including vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acid, and amino acids⁶. Due to its rich content of these benefits, *A. vera* is widely used for treatment and various pathological conditions, one of which is for wound healing. *A. vera* gel is clinically tested to accelerate the healing process of internal wounds 10, such as peptic ulcers and external, such as dermal or subdermal 19. It can also reduce pain due to magnesium lactate in *A. vera* gel, which is used as an anti-itch and analgesic by inhibiting histidine-decarboxylase, which controls the conversion of histidine to histamine in mast cells [20].

Pineapple juice

A perineal tear, either natural or episiotomy, can cause pelvic floor muscle function disorders so that it can reduce the quality of life of the mother after giving birth. Stretching and tearing of the perineum during labor can weaken the pelvic floor muscles [21]. Treatment is used to reduce discomfort, maintain cleanliness, prevent infection, and speed healing of perineal sutures. One solution for postpartum mothers to accelerate the healing of perineal wounds in addition to using medical drugs is traditional medicine obtained from natural herbs, namely, the application of pineapple juice to help accelerate the healing of perineal wounds [21]. Pineapple juice for postpartum mothers or postpartum mothers who experience perineal rupture, this is a natural and simple alternative to accelerate wound healing apart from using drugs. Pineapple contains the enzyme bromelain which acts as an anti-inflammatory. The bromelain in pineapple can reduce the average number of days to relieve post-operative pain and wounds that cause inflammation [21]. Research on women who underwent an episiotomy showed that the bromelain contained in pineapple was effective in reducing swelling, bruising, and pain, in women who underwent an episiotomy [21]. The results of research conducted by [21] that it was concluded

that giving pineapple juice to postpartum mothers with perineal injuries had a positive effect on perineal wound healing. This is because the content of pineapple is efficacious in accelerating the healing of perineal wounds. The results of the study between the group that was given pineapple juice and the control group who were not given pineapple juice had different results in the perineal wound healing process. The treatment group had faster wound healing compared to the control group. Good nutrition according to the needs of postpartum mothers also affects the perineal wound healing process. Bromelain enzymes have the ability to break down proteins into amino acids. Bromelain is efficacious to help digestion of food, anti-inflammatory, remove dead skin cells, and skin diseases such as itching, eczema, and scabies.

Pineapple juice contains pectin, Vitamin C, and bromelain enzymes which are efficacious to reduce pain and improve blood circulation and are efficacious for the wound healing process. This means that consuming pineapple juice can accelerate the healing of perineal wounds. Postpartum mothers should eat a lot of foods that contain protein, lots of fluids, vegetables and fruits, and fluids. Fruits contain various vitamins and minerals that play a role in facilitating the function of the body's organs. The ability of pineapple juice in accelerating the healing of perineal wounds is due to the content of the enzyme bromelain in pineapple juice. This enzyme plays a role in the inflammatory phase of the wound healing process. This phase lasts from the injury until the 5th day. Bromelain has potential as an anti-pain and anti-edema [21].

Mastic

Oleoresin from *Pistacia atlantica* sub sp. *cabulica* which is locally known as "Gvnjk", or "resin mastic" is widely used in Pakistan and Iran to treat conditions such as gastrointestinal disorders (*Helicobacter pylori* infection), jaundice, toothache, and anti-*Trichomoniasis vaginalis* activity [22]. Oleoresin mastic (MO) is mainly administered topically (as a wound dressing), orally, or through smoking [23]. Several studies have demonstrated the beneficial effects of MO on wound healing [24].

In addition, MO has been applied directly to the skin incision due to its adhesive qualities [25].

Betel leaf

Betel leaf is known to have a chemical content that plays a role in as an antiseptic and antibacterial drug, besides that betel leaf also contains chemicals as an anti-inflammatory which is good for use on mothers who experience wounds, especially in perineal wounds which can help accelerate wound healing and perineal wound healing process [26]. Betel leaf is a plant that

has a therapeutic effect. Betel leaf contains EOs, hydroxykavicol, clavicular, cavibetol, allylpyrocatechol, cineole, caryophyllene, cadinene, estragol, terpenene, sesquiterpene, phenylpropane, tennin, diastase, and arecoline. The content of betel leaf, such as kavicol and EO, is anti-fungal and anti-bacterial. Among these ingredients, betel also has anti-biotics, arecoline is useful for stimulating the central nervous system to increase peristalsis so that blood circulation in the wound becomes smooth, oxygen becomes more abundant, thus affecting wound healing faster. Based on these effects, betel can be used as a wound treatment [26].

Incision pressure wound

Flap closure has been proposed as a way to improve perineal wound healing, but its benefits are controversial. Several prospective studies demonstrated the protective effect of flap closure for APR and hip exenteration, while other studies found limited evidence for them [27]. Overall, the current literature suggests that flap reconstruction may be useful in certain patients and should be used selectively based on the size of the perineal defect. Similarly, the use of biological nets is controversial [28]. A survey of members of the Association of coloproctology in the UK2 in 2012 revealed that half (52.6%) of the survey respondents closed the perineal defect primarily, while the other half were divided between omentoplasty (21.4%), mesh repair (13.2%), and flap repair (12.8%).

Effects of carvacrol, thymol, and EOs

EOs consisting of low molecular weight volatile components, such as monoterpenes and sesquiterpenes, were included in the study. Monoterpenes account for about 90% of EO and are endowed with various biological and pharmacological properties [29]. Carvacrol and thymol are monoterpenes widely found in EOs of the genus *Origanum*. Somer this position has several antibacterial and antifungal activities as well as anti-inflammatory and analgesic effects. Thus, this systematic review aimed to examine and synthesize the healing potential of the monoterpenes thymol and carvacrol, and the essential oils containing them [30].

Conclusion

This systematic review evaluated and synthesized the effectiveness of intervention methods for reducing perineal wound pain and healing perineal wounds (episiotomy) and increasing convenience in consideration of the level of study methodological

evidence. As a result of the narrative synthesis, we found the following: one infrared therapy did not show any change if only done for 1 day.

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