

A Systemic Review on Impact of *Aloe Vera* gel in Episiotomy Pain and Wound Healing

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Abstract

Introduction: Child birth is the most memorable and marvelous period in women's life. Giving birth of a child is coinciding with physical, physiological, psychological and emotional process, such as perineal incision, delivery of fetus, delivery of placenta etc. The pleasure experience is mysterious and its call for celebration. Episiotomy is the most common surgical procedure in obstetrics to ease the birth. It may be associated with wound infection and delayed wound healing. Instead of pharmacological method of treating episiotomy pain and wound healing, the complementary method such as medicinal herbs as '*Aloe vera*' application as a natural treatment to reduce the pain level and enhance wound healing, which improves day to day activities as early as possible without any complications.

Objectives: This systemic review aimed to identify and discuss about various methods of episiotomy pain and wound healing process and specially to identify the impact on *aloe vera*.

Method: This systemic review was made by using the electronic database of MEDLINE and PUBMED, CINHALL, of articles published in between 2011 – 2021.

Result: The reviewed result shows complementary therapies are more effective on episiotomy pain and wound healing process. Among all, *aloe vera* has desirable effectiveness on reducing pain level and enhances wound healing process.

Conclusion: Effectiveness of cares achieved by application of natural herbs in complementary therapy and reduces the distressing symptoms and improves their health-related quality of life.

Keywords: *Aloe vera*, Episiotomy, Pain, Wound healing.

1. Introduction

The word 'mother' is equivalent to 'God'. God could not be present everywhere, so he created a mother. Mother is the one, who introduced us into the world, and made us to stand on our own feet. She is pouring love; affection and she is the idol of selfless love ever – ready. Mother works hard to grow her own child in equipped with skills, respect, abilities and knowledge. Mother taught from the beginning as soon as birth, showing bonding, feeding, talking, walking to living a fulfilling life.

Episiotomy is an incision through the perineal tissues, which is designed to enlarge the vulval outlet during birth. An episiotomy involves incision of the fourchette, the superficial muscles, skin of the perineum and the posterior vaginal wall. If the episiotomy is performed too early, it will fail to release the presenting part, and hemorrhage from cut vessels may ensure. If performed too late there will not be enough time to infiltrate with

local anesthetics. Episiotomy has wide benefits like reduced the incidence of uterine prolapsed in subsequent deliveries. Episiotomy allows safer and easier delivering the head of baby thereby preventing possible damage of new born brain, prevents laceration, and easy to repair.

Conception is a productive and creative period in a women's life and the fetus. Pregnancy is initiating and sustaining of a new life, a time of growth. In 1972 the obstetrician named Sir Fielding Ould introduced the procedure called episiotomy. Episiotomy injury not only deals with psychological causes, it also makes emotional stress, physical damage to vaginal tissues, extension of wound edges, and delay in wound healing. Complementary therapy like *aloe vera* stimulates and increasing the homeostatic action towards the injured and restoration of fibroblast cells for episiotomy pain and wound healing [1].

Episiotomy is performed in Tehran nearly 97.3% of primiparous mothers with normal vaginal delivery, comparing to other ethnic groups. Various complementary therapies were implemented on episiotomy wound such as sitz bath, ice pack application, postnatal exercise, hot application, water with betadine solution etc. All such measures take delayed in reducing pain and wound healing with wound dehiscence. Instead of all remedies, *aloe vera* gel plays major role and increases the blood flow to the strangulated tissues and enhances collagen deposition and stimulates speedy recovery from episiotomy pain and wound healing [2].

Perineal incision causes psychological, emotional, and physical discomfort, and damages to the perineal tissues, pain, anxiety, bleeding, delayed healing, dyspareunia, and discomfort on breast feeding, reduction in day to day activities. Suggesting *aloe vera* is an herbal medicine to accelerate early episiotomy wound healing and reducing pain with the presence of inflammatory properties. Perineal wound healing was assessed by REEDA scale and pain was determined by VAS. Study was started after 4 hours of postpartum period. *Aloe vera* and calendula combination ointment was given to postpartum mothers and instructed them to apply after cleansing episiotomy wound with water, for 5 days in 8 hours duration. Mothers are instructed to inform any hypersensitivity reactions noted. There were no complaints are noted from mothers about adverse side effects. Using *aloe vera* mixed calendula ointment noted attribute increases speedy episiotomy pain and wound healing [3]

Medicinal plant of *aloe vera* has rich in bioactive compound, employed in well-known position. Herbs are used in all domains as allopathic, homeopathic and ayurvedic. It treats episiotomy pain, and wound, genital herpes, seborrheic dermatitis, burn wound, minor cuts, etc. The leaves of *aloe vera* rich in natural sugars, amino acids, enzymes, vitamins, minerals, purgatives, emollient and healing properties. *Aloe vera* supported Kapha, Pitta, and Vatta in constituents of Ayurvedha. It regulates menstrual cycle and used for hemorrhoids. *Aloe vera* reduce E₂ prostaglandin production by inhibiting the cyclo oxygenase pathway, and increases the collagen cross – linking by speeding up the formation of scar tissue by wound constriction in episiotomy pain and wound healing [4].

The botanical name of *aloe vera* is *Aloe barbadensis* miller. *Aloe vera* found in all over the world. In India it is found in Tamil Nadu, Rajasthan, Andhra Pradesh, Gujarat, and Maharashtra.

The plant has triangular flashy leaves with serrated edges, yellow tubular flowers and fruits that contain numerous seeds. Each leaf composed of three layers. An inner clear gel that contains 99% water and rest is made of glucomannous, amino acids, lipids and sterols. The middle layer of latex is bitter yellow shape and contains anthroquinous and glycosides. Outer is thick layer of 15 – 20 cells called as rind which has protective function and synthesis carbohydrates and proteins.

Aloe vera has the actions of anti-inflammatory, anti-ulcer, effect on immune system, laxative effects, antiviral activity, anti- tumor activity, anti-bacterial and antiseptic effects, Moistening and anti-aging effect, healing properties, anti-diabetic effect, anti-oxidant effect, effect on skin exposure.

Pain is the most distressing symptoms of the individual. It is an unpleasant feeling such as prick, tingle, sting, burn, or ache. Pain makes somebody feel sad or upset. Episiotomy pain hurts the women and have difficulty in sitting, breast feeding, and impaired bonding between mother and infant, swelling over perineal area, infection,

painful defecation and takes on the mothers' having pain during sexual contact. It affects the women in her physical health and also mental health associated with deprivation in day to day life.

2. Materials and Methods

Information sources and search strategy

The systematic literature review was carried out by using the electronic database of Cinhal, Medline, Pub med, Scopus of articles published during 2011 – 2022, key words to search the articles for episiotomy pain, episiotomy wound, *aloe vera*, wound healing, medicinal plant. The data is not on direct observation of data; the data's are secondary data from previous researchers. The research based on written in English, intervention based on episiotomy pain, wound related symptoms and herbs medicinal plant of *aloe vera*.

Study eligibility and selection criteria

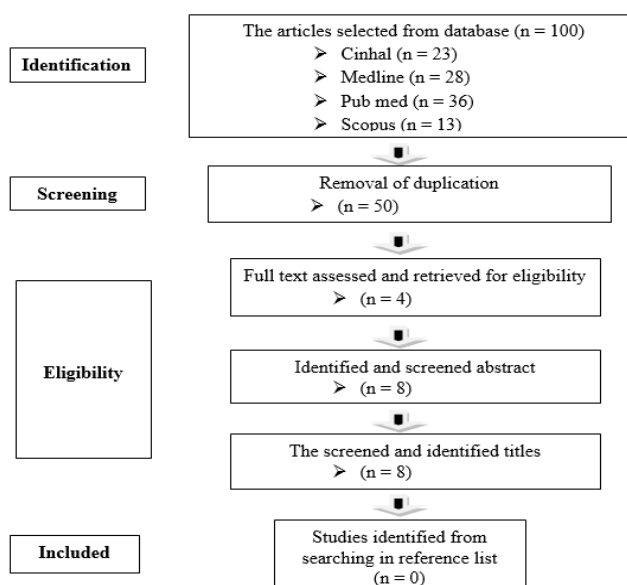
The reviewers selected articles or papers established according to the predetermined key words.

Table 1 selection criteria

Criteria	Inclusion	Exclusion
Population	Review, that focuses on medicinal herbs of <i>aloe vera</i> that has an impact on episiotomy pain and wound	Postnatal mother
Intervention	Intervention or application of <i>aloe vera</i>	Pharmacological treatment
Comparison	<i>Aloe vera</i> application	The group that was only observed, no any intervention
Outcome	Reviews explains the effect of natural and medicinal herbs of <i>aloe vera</i> and its effect on episiotomy pain and wound healing	The impact of pharmacological treatment was explored
Study design	Quasi experimental studies	Cross sectional study
Publication year	After 2011	Before 2022
Language	English	Other language

Articles were written based on the results. 100 literature been obtained from keywords with details in Cinhal (n = 23), Medline (n = 28), Pub med (n = 36), Scopus (n = 13) are reviewed for research result. Based on the title (n = 8), full text (n = 4) title, (n = 8) abstract were filtered and adjusted by the reviewer. The reviewer found only 20 articles for this review.

Figure 1. reporting eligible reviews for systematic review and Meta - analysis



3. Results

Respondent characteristics

Postnatal mothers with the age group of 18 – 45 years, who underwent episiotomy incision with normal vaginal delivery, forceps delivery and ventouse delivery. This review study included with primiparous and multiparas' mothers.

Study characteristics

This systematic review was made with 20 articles with all types of quantitative research design accordance to inclusion criteria and exclusion criteria been determined. This systematic review papers were considered from different countries, from India 3 articles, 7 articles from Iran, Indonesia 3, Egypt 2 articles, in addition to that from America 2 articles, from Brazil 1 review, Turkey 1 article and from Greece 1 paper.

Type of intervention

The systematic reviews study focusing the experiment carried out is found to be, the mothers who underwent episiotomy incision. The reviewer analyzed the articles that focusing the nature of *aloe vera* and its compound alone, articles interference analyzed was the effect of *aloe vera* on episiotomy pain wound, further articles overseen the intervention on cutaneous skin wound and its effective healing, review article was revealed that *aloe vera* gel was used in the treatment of CABG surgery and its effect, another article of *aloe vera* on burns treatment. Entirely all review shows, *aloe vera* was very much effective and successive in reducing pain and wound healing. Systematic review literature validated by evidence based.

Outcome of intervention

Medicinal plants are easily separated from nature. The contribution is recognized in tribal communities. *Aloe vera* has 75 biological active constituents and used for therapeutic purposes. Various analytical researches such as Cochrane library, Science direct, Scopus, Pub med, were used for literature review. *Aloe vera* also used for nutritional supplements and for cosmetic application. In episiotomy, it reduces the pain, swelling, redness, and heals the wound. *Aloe Veras* increase the filtration of leucocytes and promote prostaglandin synthesis and restore tissue integrity and keep on moistening the wound. It releases the maturation of collagen rapidly and increases epithelial migration which reduces pain as well as inflammation [5].

Aloe vera gel can be obtained from inner layers. The pH of *aloe vera* is 4.5, and the vagina has lactobacilli with pH of 3.5 to 4.5. This lactobacillus control infection and inflammation. *Aloe vera* promotes tissue regeneration; prevent infection in post – episiotomy and enhance wound healing [6].

In *aloe vera*, the juice has rich amount of a mannose, polysaccharide and gibberellins, a growth hormone. Those factors interact with growth factor receptors on the fibroblast, there by stimulating its activity on proliferation, which in turn significantly increases collagen synthesis after topical application. *Aloe vera* not only increased collagen content of the wound but also changed collagen composition and increased the degree of collagen cross lankiest. It accelerated wound contraction and increased the breaking strength of resulting scar tissue. It prevents infection, thereby reducing the pain and inflammation, the healing process accelerates the formation of new tissues and facilitates the debridement of the necrotic tissues [7].

Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. The name *aloe vera* derives from the Arabic word “Alloch” meaning shining better substance. In Latin means “true”, in Egyptian says, “The plant of immortality” *Aloe vera* is a wonder plant with healthy benefits so, myriad and astounding hat hardly any part of human body removes uninfluenced by its healing touch. *Aloe vera* is pea – green in color plant. Egyptian queen Cleopatra used of her regular beauty regimes, Christopher, Alexander the great used it to treat soldiers wound [8].

Direct or indirect thermal force causes physical trauma, that may superficial or deep tissue damage is called wound. Various factors may interfere with wound healing process like age, gender, general condition,

occupation, wound size, dietary pattern, wound depth and site etc. the stages of wound healing process as follows; formation of thrombus followed by inflammation, proliferation, and new tissue formation. The complementary medicine plays a major role in episiotomy pain and wound healing. *Aloe vera* has vitamin 'C' and vitamin 'E', Vitamin 'C' produces collagen whereas vitamin 'E' has antioxidant properties. All these properties make quickening and speedy recoveries of episiotomy wound and reduce the pain level [9].

The postnatal period is expected to be a joyous experience, yet it implies numerous dramatic physiological, psychological, and social changes as mothers adjust to a given birth by WHO. A comparative quasi experimental research design was used to apply *aloe vera* gel vs normal saline of 120 mothers, divided them into two groups. Pain was assessed with VAS, and wound by REEDA scale on 10th post-partum day, it shows the statistical analysis of $X^2 = 7.937$, $p = 0.005$. The group with *aloe vera* application achieved complete healing of episiotomy pain and wound healing compared to 80% of normal saline [10].

Management of perineal wound postnatally into two ways, non – pharmacological, pharmacological therapy. Non – pharmacology treatment deals with *aloe vera*, acupuncture, hypnotherapy, transdermal electrical stimulation and others. These treatments are safe, cheap and more effective than any other therapy. A study conducted with quasi experimental research design with grade – II perineal wound of 56 mothers. Mothers are, splited into two groups with *aloe vera* gel application and ice pack compression. The result shows were *aloe vera* gel is more effective in reducing pain and wound healing than ice pack. The mean variance of 1.61 and 2.46 and statistical analysis shows a representative difference in relief of pain among two groups ($p < 0.05$) [11].

Episiotomy is considered as the commonest and regular perineal incision during the second stage of delivery after cutting the umbilical cord. World Health Organization (WHO) insisted to reduce episiotomy to 10%. A paralleled randomizing of 73 primiparous women was selected for controlled clinical study during 2017-2018 at Iran, with inclusion of Iranian ethnic and excluded those who were not willing to participate. The mothers are divided into two groups respectively 34 and 39. The intervention started after 4 hours of episiotomy till 10th postnatal period on 8 hours duration. Experimental group advised to apply aloe ointment whereas control group with normal saline 0.9%. Independent t-test, Man-Whitney statistical analysis was performed; it shows the *aloe vera* is more effective in reducing episiotomy pain and wound healing ($p < 0.05$) than normal saline [12, 15].

Episiotomy is considered as the commonest and regular perineal incision during the second stage of labour. A randomized clinical trial study was conducted with 111 primiparous mothers, experimental ($n = 2$), control group ($n = 1$). Control group treated with routine hospital management, were as experimental groups was treated with *aloe vera* gel ($n = 1$), and calendula ointment ($n = 2$) on 8 hours basis for 5 days. Episiotomy pain and wound was assessed with VAS, and REEDA scale. The comparisons show statistically significant difference among three groups were ($p = 0.005$), *aloe vera* was most effective [13].

Pain is very common in all medical problems. There are different types of pain such as nociceptive pain, post-surgery pain, migraine, acute pain, neuropathic pain, chronic pain, musculoskeletal pain, and others. Several forms of *aloe vera* extort are made it available such as aloe gel, aloe tablet, aloe juice, aloe oil and so on. In vitro study revealed *aloe vera* has 92 enzymes, more than 200 active compounds, 75 nutrients, 12 vitamins, 18 amino acids, and 20 minerals. Almost all research papers reveal the treatment was given with *aloe vera*, is identified with rapid in reducing the intensity of pain and accelerate wound healing process [14].

The process of wound healing is dynamic, biological complex, and restoration of affected tissues. *Aloe vera* is the property of liliaceae family, and it is a cactus group of medicinal herbs. Since, *aloe vera* has 99% of water; it reduces the fragility and increases the flexibility of wound, thus stimulates and enhances the immune system. In vitro studies revealed *aloe vera* impade the IL8 and IL6 and activate IL10; this biochemical action reduces pain and increases wound healing effect [16].

Aloe vera gel is more effect on CABG wound than pharmacological therapy. A randomized interventional clinical study conducted with control and experimental group of 30 patients in each group. Wound healing is dependent variables, whereas aloe gel independent variables. This experiment was conducted followed by 2nd

day of post CABG surgery. In control group washed the wound with only betadine solution, experimental group with application of *aloe vera* gel. The nature of wound was assessed with intervals of 4, 7, and 14 days. The comparison revealed that the experimental group of *aloe vera* was very effective rather than control group. The significant difference of 'p' value is $p < 0.001$ [17].

Traditionally burn wound are treated with *aloe vera*. This herbal has wide perennial succulent with clump-forming, bristly leaves. *Aloe vera* gel is extracted from middle part of the leaves, which is high viscosity in nature. A comparative study of 20% nitrofurazone ointment and *aloe vera* gel application to superficial partial thickness of burn wound. *Aloe vera* act as bactericidal and bacteriostatic action towards wound and it prevent irritability and soreness of burnt wound. The comparison revealed that the *aloe vera* is more effective than nitrofurazone ointment [18].

In India the birth rate is increasing day by day and chances of episiotomy also increasing. Numerous alternatives and complement therapies are traditionally available to treat episiotomy pain and wound healing such as, *aloe vera*, ultra violet radiation, and relaxation technique are used to reduce pain and enhance wound healing. Among all alternate therapies, *aloe vera* increasing the oxygen capacity of blood to the episiotomy wound, reduce swelling; induce sleep, and promote blood circulation. A quasi experimental study revealed after 5-6 days evaluation of episiotomy pain by VAS thereby REEDA scale for episiotomy wound. The application of *aloe vera* gel has highest effect in reducing pain and enhances wound healing process [19].

At the time of second stage of labour, the perineal tissue been injured either episiotomy or by spontaneously. Any lag in wound healing, chance of infection and may leads to sepsis. A three-group double-blind randomized clinical trial was conducted with 120 of episiotomy mothers. They are divided into three groups, in each group with 40 mothers, group 1 advised to apply honey, other 40 instructed to apply curcumin, remaining 40 of mothers guided with placebo on two times a day basis. Episiotomy pain and wound healing were assessed with VAS and REEDA scale, followed by 5, 7, and 10th post-natal day [20]. The significant of variance were assessed with 't' test and ANOVA [21]. It shows no changes among the three groups. There was any improvement being noticed.

The systematic review articles shows, the *aloe vera* has an bioactive compound such as anti-septic, anti-inflammatory, anti-fungal, anti-bacterial, vitamins, minerals, amino acid compounds, and so on which makes the wound healing process was very earlier, speedy recovery, relief from pain, and improves their daily living activities as early as possible without any such complication, it also relay anxiety, free from mental distress and wound sepsis.

4. Discussion

Recently WHO recognized the need for a positive childbirth experience which corresponds to the new Global Strategy for Women's, Children's and Adolescent's Health (2016 – 2030), with an increase in emphasis on women – centered outcomes in clinical decision making, women's experience of episiotomy is highly relevant.

Aloe vera stimulates the macrophages and fibroblast activity. It increases collagen and protoglycogen synthesis, this will bind to growth factor receptor, (mannose – 6 phosphate) and it inhibits the thromboxan H₂. The inhibitory effect of *aloe vera* release a reactive oxygen species and reducing intracellular free calcium levels and quick episiotomy pain and wound healing. *Aloe vera* leaves furnish a gelatinous emollient extract used especially in cosmetics and skin cream.

Active components of *Aloe vera*

S.No	Active Components	Bioactions
1.	Sugar:	Mono saccharide, saccharides
2.	Enzymes	Amylase, Lipase, Carboxypeptidase, Catalase, Cellulose, Lipase, Peroxidase, Alkaline, Phosphate

S.No	Active Components	Bioactions
3.	Anthraquinones	It provides 12 anthra quinines which are known as laxatives
4.	Vitamins	A, C, E – antioxidant
5.	Fatty acid	It provides 4 plant steroids like as cholesterol
6.	Hormones	Auxins
7.	Minerals	Calcium, Copper, Chromium, Selenium, Magnesium, Zinc, Sodium

In episiotomy pain and wound healing, other complementary methods are reviewed, such as sitz bath, self-care, Epsom salt, exposing the stitches into fresh air, diet, application of turmeric, application of honey, application of lavender oil, olive oil, and *aloe vera*. Among all therapies, *aloe vera* is proven with the natural herbs with superior healing effect on reducing episiotomy pain and wound healing effect.

In international association pain is an unpleasant experience associated with actual or potential tissue damage to make somebody feels sad or upset. In episiotomy the women feel pain or soreness for 2 – 3 weeks after giving birth, particularly when walking and sitting. The stitches can irritate as healing takes place. Visual analogue pain scale used to assess the pain level, and REEDA scale used to assess the episiotomy wound.

Aloe vera is a bioactive compound and increases the amount of collagen in wounds and changes the composition of collagen, thereby promote episiotomy wound healing. *Aloe vera* can increase the flexibility and reduce the fragility of the perineal skin 99%. pH of *aloe vera* is 4.5.

Aloe vera is an effective treatment of burns, allergic reaction, rheumatic arthritis, rheumatic fever, indigestion, ulcers, disaster skin diseases, dysentery, diarrhea, piles, dental plague, lower blood sugar level, and inflammatory conditions.

5. Limitation

The systematic reviews are competent that this medicinal herbs of *aloe vera* application is most effective than any other treatment on episiotomy pain and wound healing without any side effects or complications. The review shows that *aloe vera* can be more effective in various types of wound like burns, cutaneous wound, CABG wound etc.

6. Conclusion

This systematic review furnishes the information on contribution of *aloe vera* in various wound especially on episiotomy pain and wound, is proven to be very effective and increasing the healing process rather than any other treatment without cost effective. Episiotomy pain and episiotomy wound are still a heavy burden and feared consequences of the women. Effective pain management and episiotomy wound healing, the healing will be achieved through natural medicinal plant, such as *aloe vera* gel along with women education, and application of such gel into episiotomy wound. The result shows thus *aloe vera* is an effective and excellent natural medicinal easily available without cost burden and has the quick healing rather than other properties.

Conflict of interest

The reviewer declares that there is no competent interest

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