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ORIGINAL ARTICLE

The effect of *Achillea millefolium* and *Hypericum perforatum* ointments on episiotomy wound healing in primiparous women

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ABSTRACT

Background: The purpose of this study was to assess the efficacy of *Achillea millefolium* and *Hypericum perforatum* ointments on episiotomy wound healing in primiparous women.

Materials and methods: This is a double-blind clinical trial study performed on 140 primiparous women. They were randomly divided into four groups, each group containing 35 women: 2control groups including nonintervention and placebo ointment; and 2 case groups including *Hypericum perforatum* ointment and *Achillea millefolium* ointment. Healing process was assessed by five specifications: redness, ecchymosis, edema, discharge and wound dehiscence on 7th, 10th, and 14th days after delivery; pain level was assessed by means of visual analog scale.

Results: There was significant difference between groups in perineal pain level at 7th, 10th and 14th days postpartum, redness and edema at 7th and 10th days postpartum and ecchymosis at 7th day postpartum; the pain level, redness, edema and ecchymosis in groups who consume *Hypericum perforatum* and *Achillea millefolium* ointments were less than the control groups ($p < 0.05$). But, discharge and dehiscence incidence showed no significant difference between groups ($p > 0.05$).

Conclusions: *Achillea millefolium* and *Hypericum perforatum* ointments reduce perineal pain level, redness, edema and ecchymosis of episiotomy wound, so it seems that consuming them was useful for episiotomy treatment.

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Achillea millefolium; *Hypericum perforatum*; episiotomy; primiparous

Introduction

Episiotomy was performed during vaginal deliveries in 1742 for the first time [1]. Although vaginal deliveries accompanied by episiotomy declined between 1992 and 2003, it is still performed during ~33% of vaginal deliveries. By late 1970s, episiotomy incision was commonly performed for almost all women having their first delivery [2]. There are no precise statistics for the rate of episiotomy in Iran but, considering high rate of births, it might have high frequency in Iran.

According to the documents available in Mashhad's Ommolbanin Women Hospital, the episiotomy rate in nulliparous women was 88.32% in 2005 [3]. In a study conducted by Khajavi-e-Shojaei (2008) on 510 nulliparous women referred to the teaching hospitals in Tehran, the incidence of episiotomy was observed in 97.3% such that 32.3% was median and 67.7% was mediolateral [4]. Based on a report by Rasouli, the overall rate of episiotomy was 41.5% in 978 cases of vaginal childbirth in Shahroud/Iran, which is much higher than the standards set by the World Health Organization (WHO). Further research is required to provide appropriate solutions to reduce episiotomy [5].

Wound dehiscence is a serious complication in episiotomy. It has been reported to occur in 0.1–2% of episiotomies depending on the degree of initial laceration; however, data on the prevalence of third degree rupture are much less than the fourth degree [6]. Although after delivery it takes three months or more for this wound to heal, faster wound healing (within two weeks after delivery) has become prevalent and seems to be successful [7]. Although episiotomy infection and dehiscence are rare, it is a postpartum important complication. The symptoms of episiotomy wound infection include fever, pain, and purulent discharge that usually occur within 6–8 days after delivery [8].

Many measures have been proposed to reduce perineal pain and accelerate wound healing that include:

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perineal hygiene and washing it regularly, keeping the wound dry, using salt and savlone in washing water, using dry heat by irradiation of infrared light, hot and cold shower, kegel exercises, using pads of plant extracts such as lavender, chamomile, *Hypericum perforatum*, marigold and so forth [9–16]. *Hypericum perforatum* accelerates wound healing that is probably due to the accelerated proliferative phase of wound healing, migration of fibroblasts and stimulation of collagen synthesis [17].

In general, the diet for 30 days after surgery is different for every individual. Some bodies suggest a high-fiber diet and others believe that osmotic laxatives such as milk of magnesia or lactulose have to be used for 10 days after delivery [18,19]. Using NSAID is recommended to relieve pain. Topical lidocaine ointment after episiotomy is not used routinely, since several studies have shown that using topical analgesics is less effective than placebo [20,21]. The routine use of antibiotic prophylaxis is not recommended after primary repair of the lacerations including 3rd and 4th degree lacerations or episiotomy [8].

In Iranian traditional medicine, *Hypericum Perforatum* has been used as anti-depressant, analgesic and diuretic, as well as anti-septic and wound healing [21]. From other uses of this plant, treatment of wounds, burns and insect bites can be listed [22]. The antibacterial and wound healing effects of *Hypericum perforatum* extract have been shown in many studies. For example, *in vitro* and *in vivo* studies showed that *Hypericum perforatum* extract has had more positive effects than sulfonylureas amide against *Staphylococcus aureus* infection [23]. A study in Germany found out that the ointment containing *Hypericum perforatum* extract not only has antiseptic effects, but can also treat burns in a short time [24]. Moreover, it has been reported that *Hypericum perforatum* contains hyperforin that has antibacterial effects on *Staphylococcus aureus* [25].

Achillea millefolium, owing to its diuretic properties, is effective in increasing the volume of urine and kidney stone treatment. This plant has anti-fever properties and its extract brewed in water or alcohol can heal the wounds and injuries of women's breast skin. The essence of *Achillea millefolium* is effective in neuralgia and rheumatic [26]. Anti-inflammatory effects of flavonoids in *Achillea millefolium* is because of its effects on the metabolism of arachidonic acid [27]. In a study, it was shown that turmeric cream accelerates episiotomy wound healing, that is, it accelerates or reduces the improvement of episiotomy incision from 14 days to 4 days; however, in terms of pain, it does not significantly reduce pain severity [28]. In another study, lavender oil significantly decreased the redness and inflammation of wound, but no significant difference was observed in terms of pain severity, infection level, wound dehiscence and the number of unabsorbed sutures between the two groups of this study [29].

In other studies, it was shown that pain severity did not decrease in the first 24 h of postpartum; however, on the 3rd, 5th and 10th days after surgery, pain severity decreased in the case group and, in terms of wound healing, a significant difference was observed on days 5 and 10 after the delivery [10]. Kafali et al. showed that putting a sponge soaked with bupivacaine in episiotomy wound bed reduces both postpartum pain level and need for analgesic [30]. The results from Abedian et al.'s study revealed that the use of cooling gel pad can significantly improve wound healing, pain reduction and satisfaction with the treatment [3]. Seckin et al. showed that *Hypericum perforatum* ointment, probably by reducing the amount of scar, can decrease the pain of cesarean in the 40th day after the surgery without any major side effect; however, it has had no effect on reducing the pain severity 10 days after the cesarean section [31]. As the episiotomy has physiologic, psychologic and social–economic consequences, not only the decision to do it but also the manner of performance and the quality of future cares are important. The purpose of this study was to assess the efficacy of *Achillea millefolium* and *Hypericum perforatum* ointments on episiotomy wound healing in primiparous women.

Materials and methods

This is a double-blind clinical trial study that was performed on 140 primiparous women, neither the subjects nor the researchers know which kind of drugs are administered. *Hypericum perforatum* and *Achillea millefolium* plants were purchased from medical plant sellers and after proving the identity by medical plants research Center of Shahrekord University of Medical Sciences, each plant was broken seperately, then extracted using 90% ethanol solution. The acquired hydroalcoholic extract was condensated to become dry and these condensated extracts were packed with strile vaseline as base (%5 weight ratio) in 30 g tubes.

The same vaseline tubes without extract was used as placebo. Then, unbeknown to researcher, the same drugs and placebo tubes were coded by chemist advisor master. After obtaining study refrence from the university vice chancellor for research, women qualified for research were randomly classified into four groups after they gave the consent letter.

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The study sample consisted of 140 nulliparous women with the gestational age of 37–42 weeks who were referred to Share-kord Health Center both before and after the delivery. They were randomly divided into four groups, each containing 35 women: two control groups including nonintervention group (group D) and placebo ointment group (group C); and two case groups including the group of *Hypericum perforatum* ointment (group A) and the group of *Achillea millefolium* ointment (group B). The total number of 140 women were enrolled; based on the exclusion criteria, 134 subjects were retained, among them 35 subjects were included in the nonintervention group, 34 in the placebo ointment group, 32 in the *Achillea millefolium* ointment group, and 33 in the *Hypericum perforatum* ointment group.

Inclusion criteria were: being nulliparous; gestational age of 37–42 weeks; having a single fetus; no use of particular medications (such as glucocorticoids, anticoagulants, chemotherapy, immunosuppressant, and radiotherapy); no history of the diseases that disrupt wound-healing process, such as chronic systemic diseases, heart, kidney and lung diseases, coagulation disorder, immune deficiency, connective tissue disorders and diabetes; not having anemia, mental illnesses, persistent constipation and hemorrhoids, hemophilia and malnutrition; no history of allergy to herbal medicines; body mass index of 19.8–26; having no active skin diseases such as allergic disorders, having no wound, skin allergy and symptomatic vaginitis; no use of antibiotics after episiotomy; no history of perineum reconstructive surgery; no history of genital warts.

Exclusion criteria were: mismatch between the fetus head and the mother's pelvis in pelvic examination; disorder in the labor progress; manual placenta removal; third and fourth degree perineal rupture; prolonged rupture of membranes (more than 18 h); abnormal postpartum hemorrhage or hematoma; irregular use of the cream as instructed (less than 7 days or 14 times); and the incidence of itching or skin irritation as the side effects of the ointments.

The procedure was as follows: the patients should first wash and dry perineal area; then, at second day after delivery the patients were asked to rub 1 cm of the ointment on the area of episiotomy (the sutures), so that ointment covers all surface of the episiotomy, then a sanitary napkin was used; this was continued twice a day for 10 days. The patient's demographic form was completed at this stage.

All patients were given mediolateral episiotomy and had second-degree rupture. In 2 days after delivery, pain level of patients was pursued by phone and characteristics of delivery were registered according to documents existing in the hospital and patents information. In case of any complications, for example allergy to the ointment, after the use, intervention were stopped.

Six criteria were assessed in the subjects: pain severity, redness, edema, ecchymosis, wound dehiscence and wound secretion. To assess pain severity, VAS tool was used; hereby, the patients were asked to express the level of episiotomy pain on days 2, 7, 10 and 14 after the labor by a number between 0 and 10. Number zero represented no pain, numbers 1–3 represented mild pain, 4–7 indicated moderate pain, and sever pain was indicated by numbers 8–10. Episiotomy wound healing was evaluated by 5 criteria of redness, edema, ecchymosis, wound dehiscence and wound secretion on days 7, 10 and 14 after the labor. The levels of redness, edema, and ecchymosis were measured by the researcher in terms of millimeters and were recorded in the control form of perineal repair. The collected data were entered into the SPSS software (Chicago, IL) and were analyzed using descriptive statistics and ANOVA, the Kruskal–Wallis test and Fisher's exact test. Following the Kruskal–Wallis test, DUNN test was used to compare the groups in pairs.

Results

No significant difference was observed in this study between the groups in terms of variables such as cases' age, gestational age, pre-pregnancy BMI, birth weight, and the length of the first and second stages of labor (Table 1).

Moreover, in terms of education, 11.2% of the subjects had secondary education, 27.6% high school education, 41% had diploma, and 20.1% of the subjects were university educated. There was no significant difference between the groups in terms of education ($p = 0.98$) (Table 1).

In the event of significant Kruskal–Wallis test, Dunn test was used to check two pairs of groups (Table 2).

In terms of pain severity, there has been no significant difference between the two groups 2 days after the labor ($p = 0.226$). However, on days 7, 10 and 14 after delivery, a significant difference was observed between the groups ($p < 0.05$): on day 7, group A was significantly different from groups C and D ($p < 0.001$), and group B from group D ($p < 0.05$); on day 10, group A was significantly different from groups B, C and D, and group B was different from groups C and D ($p < 0.05$ and $p < 0.01$, respectively); and finally, on day 14, groups A and B were significantly different

Table 1. Statistic characteristics of underlying variables in patients in subject groups.

		Groups				
	Statistic index	HP (A) Mean ± SD	AM (B) Mean ± SD	Placebo (C) Mean ± SD	No intervention (D) Mean ± SD	*p* values
Variables	Patient age	25.1 ± 4.3	25 ± 4	25.2 ± 4	24.8 ± 4	0.997
	Gestational age	39.2 ± 1.4	38.8 ± 1.3	38.9 ± 1.2	38.9 ± 1.3	0.651
	BMI	22.2 ± 1.3	22.7 ± 0.9	22.4 ± 1.2	22.6 ± 1	0.22
	Birth weight	3156.1 ± 252.7	3176.6 ± 251.8	3185.3 ± 231.8	3134.3 ± 254	0.833
	First level duration	7.9 ± 1.2	7.9 ± 1.3	7.8 ± 1.2	7.7 ± 1.1	0.883
	Second level duration	43.6 ± 10.7	41.9 ± 10.5	39.6 ± 9.9	42.6 ± 9.3	0.403

Table 2. Assessment of subject variables (pain, redness specifications, ecchymosis and wound edema) of patients in subject groups.

		Groups															
		HP (A)				AM (B)				Placebo (C)				No intervention (D)			
	Statistic index	Min	Max	Median	IQR	Min	Max	Median	IQR	Min	Max	Median	IQR	Min	Max	Median	IQR	*p* values
Variables	Pain level																	
	2th Day	3	10	9	2.5	6	10	9	2	3	10	9	2.5	6	10	9	2	0.226
	7th Day	0	7	4	2.5	3	8	6	2	1	9	6.5	3	4	9	7	1	<0.001
	10th Day	0	5	2	2.5	0	6	4	2	0	8	5.5	1.25	2	8	6	2	<0.001
	14th Day	0	3	0	1	0	5	0	2	0	7	3	4.25	0	7	4	3	<0.001
	Redness																	
	7th Day	0	8	3	5	0	15	5	6	0	15	7	3.5	5	15	8	4	<0.001
	10th Day	0	5	0	0	0	8	0	2.5	0	12	4	5	0	12	5	2	<0.001
	14th Day	0	0	0	0	0	5	0	0	0	10	0	0.5	0	10	0	4	<0.001
	Eccyhmosis																	
	7th Day	0	3	0	0	0	3	0	0	0	6	0	5	0	7	0	5	<0.001
	10th Day	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	<0.041
	Edema																	
	7th Day	0	5	0	4.5	0	10	0	5	0	15	5	5.5	0	15	5	3	<0.001
	10th Day	0	0	0	0	0	5	0	0	0	8	0	1	0	10	0	5	<0.001
	14th Day	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0	0	0.322

from groups C and D. At the mentioned day, A and B groups were not significantly different from each other ($p > 0.05$) (result not shown in tables).

A significant difference was observed between the groups ($p < 0.05$) in terms of redness at days 7, 10 and 14, and in terms of ecchymosis at days 7 and 10 after the labor: the level of redness at days 7 and 10 was significantly different between groups A and B compared with groups C and D; at day 14, this difference was significant between groups A and B compared with group D. Moreover, the level of ecchymosis at day 7 was significantly different between group A compared with groups C and D, and also between groups B and D. The other pair groups were not significantly different. In spite of significant difference between the groups in terms of ecchymosis at day 10, paired comparison of the groups did not show a significant difference between A and B, and C and D pair groups. In addition, at day 14, ecchymosis was not reported in any group of the study. In terms of redness at days 7, 10 and 14, and in terms of ecchymosis at days 7 and 10 after the labor, a significant difference was not observed between the groups A and B ($p > 0.05$) (result not shown in tables).

In terms of edema at days 7 and 10 after the labor, significant difference between the groups was as follows: on both days, group A was significantly different from groups C and D, and group B from group D ($p < 0.05$). Other pair groups were not significantly different from each other. At day 14, the level of edema was not significantly different between the groups. These show that *Achillea millefolium* and *Hypericum perforatum* ointments are not more effective in reducing the risk of wound dehiscence. This also shows that *Achillea millefolium* and *Hypericum perforatum* ointments cannot effectively decrease the risk of wound secretion. Wound dehiscence and wound secretion were not reported at day 14 in any group of the study (Table 2).

The wound dehiscence percent at 7th day postpartum was 31.3% in A and D groups and 18.8% in B and C groups. Also on 10th day postpartum, 50% in A and D groups and 0% in B and C groups reported that *Hypericum perforatum* and *Achillea millefolium*

Table 3. Frequency of wound dehiscence and wound discharge in patients in subject groups.

		Groups								
		HP (A)		AM (B)		Placebo (C)		No intervention (D)		
	Statistic index	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	*p* values
Variables	Dehiscence									
	7th Day	5	31.3	3	18.8	3	18.8	5	31.3	0.807
	10th Day	2	50	0	0	0	0	2	50	0.306
	Discharge									
	7th Day	3	14.3	5	23.8	6	28.6	7	33.3	0.655
	10th Day	1	20	0	0	2	40	2	40	0.755

ointments were not more efficient at reducing the probability of episiotomy wound dehiscence. The wound discharge at 7th and 10th days postpartum was reported to be 14.3 and 20% in A group, 23.8 and 0% in B group, 28.6 and 40% in C group, 33.3 and 40% in D group, which showes *Hypericum perforatum* and *Achillea millefolium* ointments are not more efficient in reducing the probability of episiotomy wound discharge. The difference between the groups were not significant by the Kruskal–Wallis test. Wound dehiscence and discharge at 14th day postpartum was not reported in any groups (Table 3).

Discussion and conclusions

Evaluating episiotomy pain was done based on the VAS scale and it was revealed that in terms of pain severity at day 2 after the labor, there was no significant difference between the groups. However, at days 7, 10 and 14, a significant difference was observed between the groups ($p < 0.05$), hence the ointments of *Achillea millefolium* and *Hypericum perforatum* were more effective than placebo ointment and nonintervention groups in reducing pain severity, the findings were in line with the following studies:

In a study, the effects of *Hypericum perforatum* ointment have been evaluated on the pain severity of cesarean wound. In this study, 125 women who had cesarean section were divided into three groups of nonintervention, placebo ointment and *Hypericum perforatum* ointment (for 16 days). Pain severity was examined by VAS scale at days 10 and 40 after the cesarean section, and it was revealed that *Hypericum perforatum* ointment can reduce the pain severity of cesarean wound at day 40 [31].

The results of a study, indicated that oral *Hypericum perforatum* extract in mice has an anti-inflammatory effect similar to indomethacin, and a central and peripheral analgesic effect similar to pentazocine, which was significantly more than the placebo [32].

In the current study, evaluating the indicators of episiotomy improvement including redness, edema, and ecchymosis showed that in terms of redness and edema level at days 7 and 10 after the labor and ecchymosis at day 7, all groups are significantly different ($p < 0.05$), also the levels of redness, edema, and ecchymosis in the case groups were less than the control group. These findings are consistent with the following studies on the effects of *Hypericum perforatum* and *Achillea millefolium* on wound healing:

A study conducted in Germany found out that the ointment containing *Hypericum perforatum* extract, in addition to antiseptic effects, can treat burns in a short time. According to this report, using this ointment can treat first-degree burns in 48 h, and second and third degree burns three times faster than the conventional methods [24].

According to a study conducted by Benedek et al., the aerial parts of *Achillea millefolium* plant are rich in flavonoids that have anti-inflammatory properties. The anti-inflammatory effect of this plant's flavonoids is due to its effect on the protease [27].

Evaluating the wounds in terms of dehiscence and secretion showed that no significant difference was observed between the groups ($p > 0.05$), and *Achillea millefolium* and *Hypericum perforatum* ointments have not been more effective than the control groups in reducing the likelihood of wound dehiscence and secretion. Phenolic acids such as caffeic acid and salicylic acid in *Achillea millefolium* also have anti-inflammatory and antimicrobial properties [33,34].

According to the study by Tajik et al., aqueous and alcoholic extracts of *Achillea millefolium* have antimicrobial effects on pathogenic microorganisms such as *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*. Among the studied microorganisms, *Staphylococcus aureus* has the greatest sensitivity to *Achillea millefolium* extract [34].

Aljancic et al. have reported that, in the laboratory level, *Achillea millefolium* has a significant inhibitory effect on *Candida albicans* and *Bacillus subtilis*. Moreover, according to these researchers, flavonoids of *Achillea millefolium* extract have an inhibitory effect on *Aspergillus niger* [35].

Finally, it can be said that perhaps one reason for non-effectiveness of *Achillea millefolium* extract on wound dehiscence and secretion has been the way and amount of prescribing this medicine. The antimicrobial effect of *Achillea millefolium* may also be dose-dependent that suggest the need for more research in this area.

Recommendations

Considering complementary medicine saves time, energy and expenses of patients. Extended studies in the future and administration of various types of *Hypericum perforatum* and *Achillea millefolium* herbs is recommended so that the possibility of using this drugs as episiotomy wound healing improver in primiparous women and more desirable used in order to guarantee health and hygiene of women should be presented.

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