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Original Article

Comparative Efficacy of Aloe Vera Gel Versus Normal Saline in Accelerating Episiotomy Wound Healing: A Randomized Controlled Trial

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ABSTRACT

Background: Episiotomy is a common obstetric procedure designed to aid vaginal delivery but often complicates postpartum recovery due to wound-related issues. Traditionally, these wounds are treated with normal saline. Recent studies suggest that aloe vera gel may enhance wound healing more effectively, yet comprehensive local data is lacking.

Objective: To compare the efficacy of aloe vera gel with normal saline in promoting episiotomy wound healing by the 10th postoperative day.

Methods: This randomized controlled trial included 60 gravid females undergoing normal vaginal delivery with episiotomy, randomly allocated into two groups: one treated with aloe vera gel and the other with normal saline. The primary outcome was wound healing, assessed on the 10th postpartum day using the REEDA score, categorized as complete (score <5), partial (score 5-9), or no healing (score 10-15). Written informed consent was obtained from all participants.

Results: Participants had an average age of 27.6 ± 5.2 years. The mean REEDA score on the 10th day postpartum was significantly lower in the aloe vera gel group (1.97 ± 1.22) compared to the normal saline group (3.57 ± 2.05; p = 0.001). The frequency of complete wound healing was 100% in the aloe vera group versus 76.7% in the saline group (p = 0.011).

Conclusion: Aloe vera gel significantly outperformed normal saline in healing episiotomy wounds by the 10th postoperative day, suggesting its advantageous use over traditional saline dressings in obstetric practice.

Keywords: Aloe Vera Gel, Episiotomy, Postpartum Care, Randomized Controlled Trial, REEDA Score, Wound Healing.

INTRODUCTION

Childbirth often results in considerable discomfort for women, primarily due to the pain associated with vaginal delivery, which frequently necessitates an episiotomy. This surgical incision, made during the second stage of labor, is linked to increased blood loss, risks of improper wound healing, and elevated pain during the early postpartum period (1-3). Aloe vera, a plant native to hot and arid regions and a member of the Liliaceae family, has been used since ancient Egyptian times for its therapeutic properties, particularly in wound healing and pain alleviation at the site of trauma (4-6).

The gel extracted from Aloe vera leaves contains numerous bioactive compounds, including amino acids, carbohydrates, fats, vitamins, and minerals, along with enzymes, hormones, and a variety of therapeutic agents such as antibiotics, antiseptics, and anti-inflammatory substances. These properties are believed to promote blood flow to the wound and stimulate fibroblasts, essential for effective wound healing (7, 8). Clinical studies have highlighted the potential benefits of Aloe vera in episiotomy recovery. For instance, Pooja et al. (2018) found a significant improvement in episiotomy wound healing scores using the Redness, Edema,

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Ecchymosis, Discharge, and Approximation (REEDA) scale in a group treated with Aloe vera gel compared to a control group receiving routine care. Similarly, Essa et al. (2020) reported faster complete wound healing in the Aloe vera group compared to those treated with normal saline on the fifth and tenth postpartum days(9, 10).

Despite its longstanding use and promising results in preliminary studies, there has been no comprehensive local research exploring the efficacy of Aloe vera gel for episiotomy wound healing. This study, therefore, aims to rigorously evaluate the effectiveness of Aloe vera gel compared to normal saline in the healing of episiotomy wounds by the tenth postoperative day. The hypothesis posited at the commencement of the study was that the degree of wound healing in women using Aloe vera gel would differ significantly from those using normal saline following an episiotomy during vaginal delivery(2, 11).

METHODS

The randomized controlled trial was conducted at the Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore, for a duration of six months, from August 2, 2022, to February 1, 2023, following the approval of the research synopsis. This study aimed to enroll 60 women, divided evenly into two groups, to assess the comparative efficacy of Aloe vera gel and normal saline in episiotomy wound healing. The sample size was determined based on a power of 80% and a significance level of 5%, predicting a complete healing rate of 100% in the Aloe vera group and 80% in the saline group by the tenth postpartum day (10). Participants were selected through non-probability, consecutive sampling(1, 12).

Inclusion criteria were pregnant women aged between 20 and 45 years with a parity of one or two, who underwent vaginal delivery requiring an episiotomy within three hours of labor. Women diagnosed with diabetes (either chronic or gestational), those with third or fourth-degree perineal tears, known allergies to Aloe vera, or anemia (Hemoglobin <10.5 g/dL) were excluded from the study(13, 14).

Upon ethical committee approval, 60 eligible women provided informed consent and were enrolled in the study. Baseline demographic data, including age, parity (either primipara or second para), education level, and family type, were collected. Random assignment to either Group A (Aloe vera) or Group B (normal saline) was facilitated using a lottery method with sealed opaque envelopes(6, 15).

For the intervention, Group A participants were initially administered 3cc of Aloe Vera gel to the episiotomy site, which was gently rubbed in using disposable gloves for 120 seconds. Participants were instructed to continue the application of the gel every 12 hours for ten days, using supplies provided in sterile, clean glass jars. Group B participants had their episiotomy wounds irrigated with 10 ml of 0.9% normal saline using a disposable syringe and were instructed to continue this treatment every 12 hours for the same duration, with supplies provided as needed. All participants were asked to return for a follow-up visit on the 10th postpartum day, where the episiotomy site was evaluated using the REEDA scale for redness, edema, ecchymosis, discharge, and approximation. The level of healing (complete, partial, or no healing) was documented using a specially designed proforma(16, 17).

Data were entered and analyzed using SPSS version 23.0. Numerical variables such as age and REEDA scores on the 10th postpartum day were presented as mean ± standard deviation, while categorical variables like parity, education level, family type, and degree of wound healing were displayed as frequencies and percentages. The primary comparison of wound healing between the two groups was performed using the Chi-square test or Fisher's exact test as appropriate, with a significance threshold set at $p \leq 0.05$. Additionally, data were stratified by age, parity, education level, and family type to control for potential effect modifiers, with post-stratification comparisons also employing the Chi-square or Fisher's exact test, maintaining the same level of significance(18, 19).

RESULTS

In this randomized controlled trial, the efficacy of Aloe Vera gel in episiotomy wound healing was compared with that of normal saline. The study included 60 participants, aged between 20 and 39 years, with a mean age of 27.6 ± 5.2 years. Demographically, the groups were well-matched with no significant differences in mean age, parity, family type, or educational status ($p > 0.05$ for all). The primary outcome measure was the degree of wound healing on the 10th postpartum day, assessed using the REEDA scale.

The results demonstrated a significant difference in wound healing outcomes between the two groups. The Aloe Vera gel group showed a higher frequency of complete wound healing (100.0%) compared to the normal saline group (76.7%), with a p-value of 0.011. The mean REEDA score on the 10th day postpartum was significantly lower in the Aloe Vera gel group (1.97 ± 1.22) than in the normal saline group (3.57 ± 2.05), indicating better wound healing ($p = 0.001$). Overall, complete wound healing was observed in 53 (88.3%) women, while 7 (11.7%) exhibited partial healing.

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Tables and Figures:

Table 1: Demographic characteristics of women undergoing episiotomy during normal vaginal delivery

Characteristics	Participants (n=60)
Age (years)	27.6±5.2
18-29 years	(61.7%)
30-39 years	23 (38.3%)
Parity	
Primipara	(45.0%)
Second Para	33 (55.0%)
Type of Family	
Nuclear	(31.7%)
Extended	41 (68.3%)
Educational Status	
Illiterate	(41.7%)
Under Matric	19 (31.7%)
Matric and above	16 (26.6%)
10th Day Mean REEDA Score	2.77±1.85

Table 2: Demographic characteristics of study groups

Characteristics	Aloe Vera Gel (n=30)	Normal Saline (n=30)	P-value
Age (years)	27.5±5.1	27.7±5.3	0.882
18-29 years	19 (63.3%)	18 (60.0%)	0.791
30-39 years	11 (36.7%)	12 (40.0%)	
Parity			
Primipara	14 (46.7%)	13 (43.3%)	0.795
Second Para	16 (53.3%)	17 (56.7%)	
Type of Family			
Nuclear	10 (33.3%)	9 (30.0%)	0.781
Extended	20 (66.7%)	21 (70.0%)	
Educational Status			
Illiterate	12 (40.0%)	13 (43.3%)	0.955
Under Matric	10 (33.3%)	9 (30.0%)	
Matric and above	8 (26.7%)	8 (26.7%)	
10th Day Mean REEDA Score	1.97±1.22	3.57±2.05	0.001*

n=60; Chi-square test and independent sample t-test, * observed difference was statistically significant

Table 3: Frequency of varying degrees of wound healing among women undergoing episiotomy during normal vaginal delivery

Wound Healing	Frequency (n)	Percent (%)
Complete Healing	53	88.3 %
Partial Healing	7	11.7 %
No Healing	0	0.0 %
Total	60	100.0 %

n=170

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Table 4: Comparison of varying degrees of wound healing with aloe vera gel versus normal saline among women undergoing episiotomy during normal vaginal delivery

Wound Healing	Aloe Vera Gel (n=30)	Normal Saline (n=30)	P-value
Complete Healing	30 (100.0 %)	23 (76.7 %)	
Partial Healing	0 (0.0 %)	7 (23.3 %)	0.011*
Total	30 (100.0 %)	30 (100.0 %)	

n=60; Fisher's Exact Test, * observed difference was statistically significant

Table 5: Comparison of varying degrees of wound healing with aloe vera gel versus normal saline among women undergoing episiotomy during normal vaginal delivery across age

Age	Wound Healing	Study Group		Total	P-value
		Aloe Vera Gel (n=30)	Normal Saline (n=30)		
20-29 years (n=37)	Complete Healing (n=33)	19	14	33	0.046*
		100.0%	77.8%	89.2%	
	Partial Healing (n=4)	0	4	4	
		.0%	22.2%	10.8%	
	Total	19	18	37	
		100.0%	100.0%	100.0%	
30-39 years (n=23)	Complete Healing (n=20)	11	9	20	0.217
		100.0%	75.0%	87.0%	
	Partial Healing (n=3)	0	3	3	
		.0%	25.0%	13.0%	
	Total	11	12	23	
		100.0%	100.0%	100.0%	

n=60; Fisher's Exact Test, * observed difference was statistically significant

Table 6: Comparison of varying degrees of wound healing with Aloe Vera Gel versus normal saline among women undergoing episiotomy during normal vaginal delivery across parity

Parity	Wound Healing	Study Group		Total	P-value
		Aloe Vera Gel (n=30)	Normal Saline (n=30)		
Primipara (n=27)	Complete Healing (n=24)	14	10	24	0.098
		100.0%	76.9%	88.9%	
	Partial Healing (n=3)	0	3	3	
		.0%	23.1%	11.1%	
	Total	14	13	27	
		100.0%	100.0%	100.0%	
Second Para (n=33)	Complete Healing (n=29)	16	13	29	0.103
		100.0%	76.5%	87.9%	
	Partial Healing (n=4)	0	4	4	
		.0%	23.5%	12.1%	
	Total	16	17	33	
		100.0%	100.0%	100.0%	

n=60; Fisher's Exact Test, observed difference was statistically insignificant

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Table 7: Comparison of varying degrees of wound healing with Aloe Vera Gel versus normal saline among women undergoing episiotomy during normal vaginal delivery across type of family.

Family Type	Wound Healing	Study Group		Total	P-value
		Aloe Vera Gel (n=30)	Normal Saline (n=30)		
Nuclear (n=19)	Complete Healing (n=17)	10	7	17	0.211
		100.0%	77.8%	89.5%	
	Partial Healing (n=2)	0	2	2	
		.0%	22.2%	10.5%	
	Total	10	9	19	
		100.0%	100.0%	100.0%	
Extended (n=41)	Complete Healing (n=36)	20	16	36	0.048*
		100.0%	76.2%	87.8%	
	Partial Healing (n=5)	0	5	5	
		.0%	23.8%	12.2%	
	Total	20	21	41	
		100.0%	100.0%	100.0%	

n=60; Fisher's Exact Test, * observed difference was statistically significant

Table 8: Comparison of varying degrees of wound healing with Aloe Vera Gel versus normal saline among women undergoing episiotomy during normal vaginal delivery across educational status.

Education	Wound Healing	Study Group		Total	P-value
		Aloe Vera Gel (n=30)	Normal Saline (n=30)		
Illiterate (n=25)	Complete Healing (n=22)	12	10	22	0.220
		100.0%	76.9%	88.0%	
	Partial Healing (n=3)	0	3	3	
		.0%	23.1%	12.0%	
	Total	12	13	25	
		100.0%	100.0%	100.0%	
Under Matric (n=19)	Complete Healing (n=17)	10	7	17	0.211
		100.0%	77.8%	89.5%	
	Partial Healing (n=2)	0	2	2	
		.0%	22.2%	10.5%	
	Total	10	9	19	
		100.0%	100.0%	100.0%	
Matric and Above (n=16)	Complete Healing (n=14)	8	6	14	0.467
		100.0%	75.0%	87.5%	
	Partial Healing (n=2)	0	2	2	
		.0%	25.0%	12.5%	
	Total	8	8	16	
		100.0%	100.0%	100.0%	

n=60; Fisher's Exact Test, observed difference was statistically insignificant

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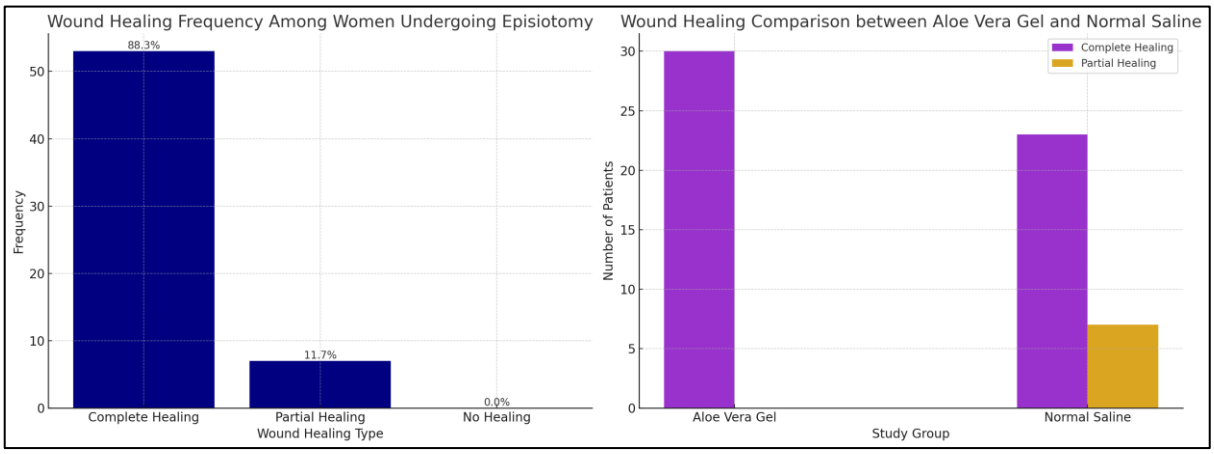

Figure 1: Frequency of varying degrees of wound healing among women undergoing episiotomy (left graph); comparison of the healing rates between Aloe Vera Gel and Normal Saline study groups (right graph).

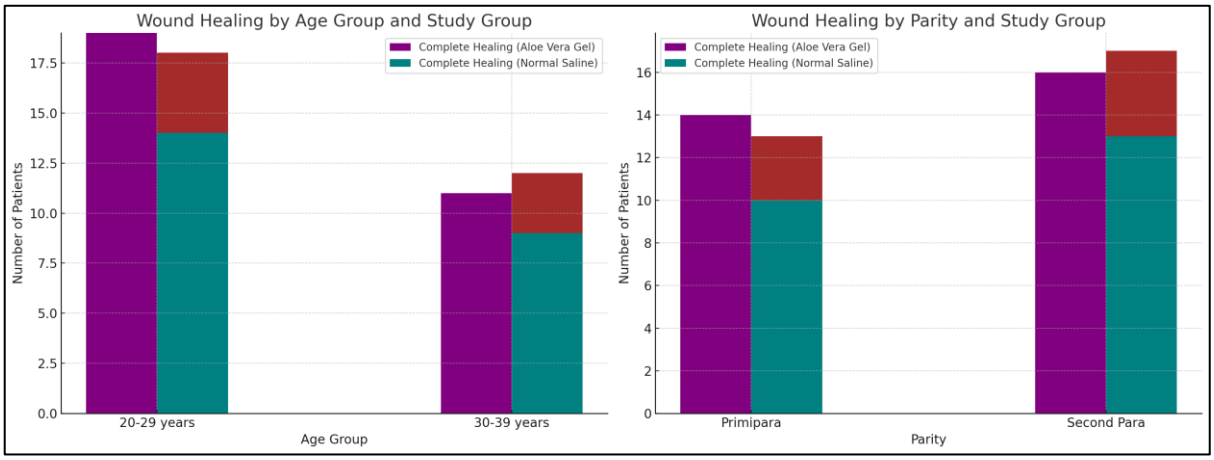

Figure 2: Wound healing by age group and study group (left bar graph); wound healing by parity and study group (right bar graph).

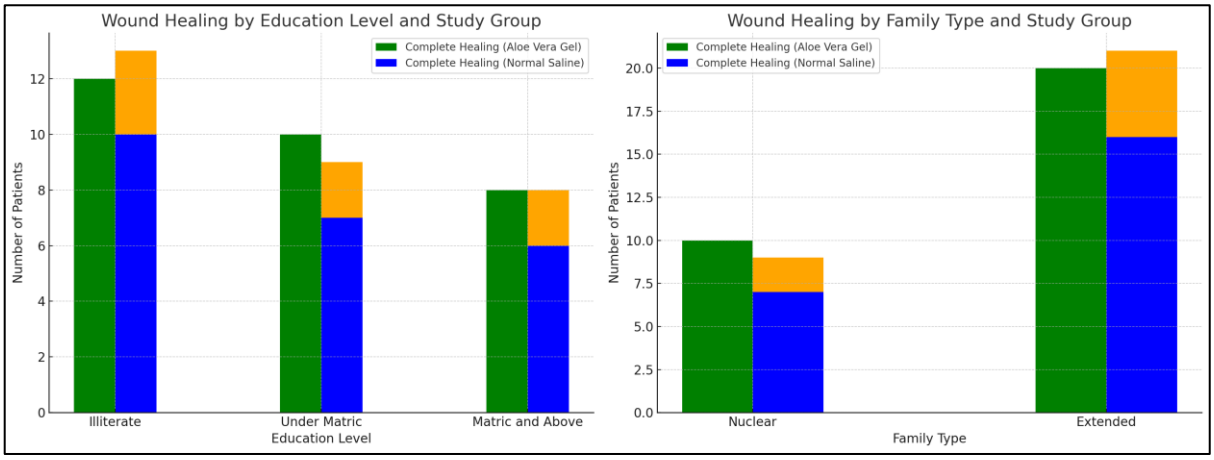

Figure 3: Wound healing outcomes based on education level and study groups (left bar graph), while representation of the data by family type (right bar graph).

DISCUSSION

The findings from this study underscore the superior efficacy of Aloe Vera gel in promoting episiotomy wound healing compared to

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normal saline. These results align with similar studies conducted in other regions. For instance, Jayashree et al. (2022) in India and Sabzaligol et al. (2014) in Iran also reported better wound healing outcomes with Aloe Vera gel, supporting its use as an effective alternative to normal saline in postpartum wound care(20, 21).

This study contributes to the limited but growing body of evidence favoring the use of Aloe Vera for episiotomy wound management. The use of a randomized design and the stratification of data by age, parity, family type, and educational status are strengths of this study, enhancing the reliability of the findings. Moreover, the study addresses a gap in local research, providing relevant data for obstetric practice in the region(19).

However, the study is not without limitations. One notable deficiency is the lack of assessment of perineal pain severity between the groups, which could provide additional insights into the benefits of Aloe Vera gel beyond wound healing. Future research should consider including pain assessment as an outcome measure to further elucidate the clinical benefits of Aloe Vera in postpartum care(22).

In conclusion, the evidence from this study strongly supports the preferential use of Aloe Vera gel over normal saline for the management of episiotomy wounds, given its superior healing outcomes. This aligns with historical usage and pharmacological studies, which suggest that the bioactive components of Aloe Vera not only facilitate wound healing but may also reduce pain and inflammation, contributing to faster recovery and improved postpartum care.

CONCLUSION

This randomized controlled trial demonstrated that Aloe Vera gel significantly enhances the healing of episiotomy wounds compared to normal saline. By the 10th postpartum day, those treated with Aloe Vera gel showed complete healing in 100% of cases, a substantial improvement over the 76.7% in the saline group. These findings were consistent across various demographic subgroups, highlighting the gel's effectiveness irrespective of age, parity, family type, or educational status. Given its natural, accessible, and cost-effective properties, Aloe Vera gel should be considered a preferred option for postpartum episiotomy care. Future studies should explore its potential for pain relief and long-term recovery benefits to fully establish its role in obstetric practice.

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