A True Experimental Study to Evaluate the Effectiveness of Alovera Gel Application on Superficial Thrombophlebitis Among Patients Receiving Intravenous Therapy Admitted at NMCH Jamuhar Rohtas

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Abstract- Background: Superficial thrombophlebitis is one of the most common complications of intravenous (IV) therapy, characterized by pain, redness, swelling, and palpable venous cords. Conventional management methods such as alcohol compress and magnesium sulphate applications have shown limited effectiveness. Aloe Vera gel, with its proven anti-inflammatory, antimicrobial, and wound-healing properties, is increasingly recognized as a safe, natural alternative for reducing thrombophlebitis.

Aim: To evaluate the effectiveness of Aloe Vera gel application on superficial thrombophlebitis among patients receiving intravenous therapy at NMCH, Jamuhar.

Method: A true experimental research design was adopted. Sixty patients with superficial thrombophlebitis undergoing IV therapy were selected through random sampling and equally divided into experimental (n=30) and control (n=30) groups. The experimental group received Aloe Vera gel application (10 ml applied with sterile gauze for 20 minutes, thrice daily for 3 consecutive days), while the control group received routine nursing care. The severity of thrombophlebitis was assessed using Jackson's Visual Infusion Phlebitis (VIP) Score in both pre-test and post-test phases. Data were analyzed using descriptive and inferential statistics, including paired and unpaired t-tests and chi-square tests.

Result: In the experimental group, the mean thrombophlebitis score reduced significantly from 3.10 ± 1.06 (pre-test) to 1.50 ± 0.97 (post-test), while in the control group, the reduction was less marked (4.13 ± 0.82 to 2.37 ± 0.99). Statistical analysis revealed a highly significant difference between groups (p = 0.001). Aloe Vera gel application was found to be effective in reducing pain, swelling, and erythema associated with thrombophlebitis. Associations were also observed between outcomes and socio-demographic factors such as sex, occupation, purpose of IV therapy, and hospital stay duration.

Conclusion: The study concludes that Aloe Vera gel application is a simple, cost-effective, and non-invasive nursing intervention that significantly reduces the severity of superficial thrombophlebitis among patients receiving IV therapy. Its use can enhance patient comfort, prevent complications, and support holistic nursing care practices.

Keywords: Aloe-Vera gel, Superficial Thrombophlebitis, Intravenous Therapy, Jackson's Visual Infusion Phlebitis (VIP) Score, Nursing Intervention.

I. INTRODUCTION

Intravenous (IV) therapy delivers fluids, medications, and nutrients directly into the bloodstream, providing the fastest way for systemic administration. Although vital in clinical care, placing an IV line can cause pain, infection, and inflammation, especially thrombophlebitis, which is one of the most frequent complications. Several studies have identified risk factors such as prolonged catheter dwell time, infusion of antibiotics, female gender, forearm insertion, use of Teflon catheters, and underlying infectious diseases that contribute to the development of phlebitis [1].

Vascular access devices are widely used for monitoring blood flow and for giving medications, fluids, nutritional solutions, and blood products. Despite their benefits, these devices can lead to both

local and systemic complications. Local problems include thrombosis, thrombophlebitis, infiltration, and extravasation. While systemic issues like pulmonary embolism and bloodstream infections happen less often, they can significantly impact patient outcomes [2].

Thrombophlebitis is inflammation of a vein and is characterized by pain, swelling, redness, warmth, and sometimes pus from the cannulation site. Phlebitis can be chemical, mechanical, or bacterial. Chemical phlebitis occurs due to irritating medications, high osmolarity, or rapid infusion rates. Mechanical phlebitis results from prolonged cannulation, poorly secured catheters, large-gauge catheters, or placement in flexion areas. Bacterial phlebitis often comes from inadequate hand hygiene, poor aseptic technique, or failing to recognize early symptoms [3]. Global data show that the incidence of thrombophlebitis is around 41.09%, making it a common adverse event linked to IV therapy. Complications include pain, inflammation, infiltration, hematoma formation, thrombosis, and embolism [4]. Although peripheral venous catheterization is routine, the incidence of superficial thrombophlebitis ranges from 3.7% to 67.24% across different settings. Symptoms include localized redness, heat, swelling, and a palpable cord [5].

Need of the study

Superficial thrombophlebitis is an inflammatory condition that affects the superficial veins. It most commonly involves the great saphenous vein (60%–80%) and the small saphenous vein (10%–20%). This condition can also occur in other locations (10%–20%) and, though less common, may present in both legs (5%–10%) [6]. While it is often seen as harmless, superficial venous thrombosis (SVT) can cause serious complications. These include the possibility of developing deep venous thrombosis (DVT) and pulmonary embolism (PE). Recent research seeks to create and test prognostic models to help primary care doctors predict prolonged symptoms, clot progression, and recurrence during set follow-up periods [7].

In the arms, superficial thrombophlebitis often follows the use of peripheral IV catheters, but there is no clear agreement on the best way to manage it. Current evidence from clinical trials is limited and of low quality, giving inadequate support for the use of topical agents, anticoagulation, or oral NSAIDs as standard treatments [8].

Clinical studies have identified several risk factors. These include being under 60 years old, being female, and receiving IV antibiotics. Larger catheters, like 18G, show higher rates of phlebitis compared to smaller ones, such as 20G [9].

The treatment for superficial thrombophlebitis in the legs is not well established. A review of 24 trials with 2,469 patients found that low molecular weight heparin (LMWH) and NSAIDs decreased the rate of recurrence and progression by around 70% compared with placebo. Topical therapies helped relieve local symptoms. Surgical treatment combined with compression seemed to reduce the risk of venous thromboembolism (VTE) more effectively than using compression alone [10].

Problem Statement: A True experimental study to evaluate the effectiveness of Alovera gel application on Superficial Thrombophlebitis among patients receiving Intravenous therapy admitted at NMCH Jamuhar Rohtas.

Objectives of the study

➢ To assess and compare the pre-test & post-test level of Superficial Thrombophlebitis among the patients receiving Intravenous therapy between the study group and control group.

➢ To determine the effectiveness of Alovera gel application on Superficial Thrombophlebitis among patients receiving Intravenous therapy in the study group.

➢ To associate the pre-test & post-test level of Superficial Thrombophlebitis among the patients receiving Intravenous therapy with their Sociodemographic variables in study and control group.

HYPOTHESIS:

H1: There will be a significant difference in the pre-test &post-test level of superficial thrombophlebitis among patients receiving intravenous therapy between the study and control group.

H2: There will be a significant difference in the pre-test level and post-test level of superficial thrombophlebitis among patients receiving intravenous therapy in the study group.

H3: There will be a significant association between the pretest and post-test level of superficial thrombophlebitis among patients receiving intravenous therapy with their sociodemographic variables in study and control group.

Operational Definitions

Evaluate: In this study, it refers to judge or determine the effectiveness of Alovera gel application on Superficial Thrombophlebitis among patients receiving Intravenous therapy.

Effectiveness: In this study, it refers to the reduction of Superficial Thrombophlebitis as determined by significant difference in pretest and post-test assessment score.

Alovera Gel application: In this study, it refers to the gel which is extracted from Alovera leaf naturally and is administered 10 ml using gauze on Superficial Thrombophlebitis for 20 minutes in the interval of 8 hours continuously for 3 days.

Superficial Thrombophlebitis: In this study, it refers to the inflammation of the superficial vein presenting as a painful induration with erythema which will be measured by Jackson's visual infusion thrombophlebitis score and categorized from grade (0 to 3).

Patients receiving Intravenous therapy: In this study, it refers to the client who are admitted in the Critical care unit and receiving intravenous therapy for the treatment.

ASSUMPTION

- Patient who are receiving IV therapy are prone to develop superficial thrombophlebitis
- Alovera gel application will help in reducing Superficial Thrombophlebitis.
- Alovera has anti-inflammatory, skin protection, antibacterial, antiviral, antiseptic wound healing properties.
- Alovera gel Improves shortening the time of elimination of red swelling symptoms, time of pain relief at the location of the infusion vein.
- Alovera gel application will help to prevent the complication of superficial thrombophlebitis.

DELIMITATION

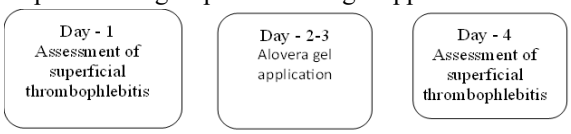
- Patients who are having Superficial Thrombophlebitis at the Intravenous site.
- The data were collected for 4 weeks at NMCH.
- Patients who are admitted in Critical care unit.
- Patient who are receiving any medical intervention will be included.

II. METHODOLOGY

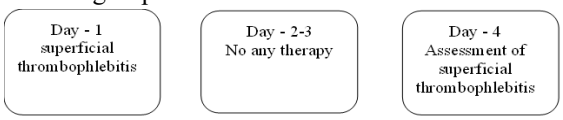
Research Design: A true experimental design was used.

Source of Data: Sixty patients with superficial thrombophlebitis were admitted in the CCU at NMCH.

Experimental group: Aloe vera gel application.



Control group: Routine care.



Variables:

Dependent: Superficial thrombophlebitis.

Independent: Aloe vera gel.

Demographic: Age, sex, education, marital status, occupation, purpose of IV therapy, cannula size, and hospital stay.

Setting: This was a pilot study at Sadar Hospital, Sasaram, followed by the main study at NMCH, Jamuhar. The sites were chosen based on available samples, feasibility, and administrative approval.

Population: Patients with superficial thrombophlebitis admitted at NMCH.

Sample and Technique: Sixty patients (30 in the experimental group, 30 in the control group) were selected through simple random sampling using the lottery method.

Inclusion Criteria: Patients with mild to moderate superficial thrombophlebitis receiving IV therapy and admitted in the CCU.

Exclusion Criteria: Patients with skin or muscle disorders, DVT, varicose veins, allergies to aloe vera, or severe thrombophlebitis.

Tools: Tool I: Demographic data.

Tool II: Jackson's visual infusion thrombophlebitis grading (0–5). Content validity was ensured by six experts and language validity was checked through translation.

Intervention Protocol: Aloe vera gel (10 ml) was applied with gauze for 20 minutes every 8 hours for 3 days.

Data Collection: This included introduction, consent, pretest, intervention for the experimental group, and posttest after 3 days.

Data Analysis: Data were analyzed using frequency, percentage, mean, and standard deviation. Paired and unpaired t-tests were used for pre-post differences. Chi-square tests were applied for associations.

Ethical Considerations: Approval was obtained from IEC, NNC, GNSU. Written consent was collected.

III. RESULT

The results of the study were organized into the following sections:

Section A: Description of the demographic variable. Most were aged 51–65 years (40% study, 33.3% control) and female (56.7%, 60%). Primary education was common (33.3%, 26.7%). Unmarried participants formed 50% and 43.3%. Many were housewives (53.3%, 26.7%). Blood transfusion was the main IV purpose (30%, 40%). Cannula use and hospital stay varied across groups.

Section B: Compare the pre-test & post-test level of Superficial Thrombophlebitis among the patients receiving Intravenous therapy between the study group and control group.

	group	N	Mean	Std. Deviation	P value	t	df	F
Pretest	Experimental	30	3.1	1.062	0.001	-4.22	58	2.3
	Control	30	4.13	0.819				

Table 4.2.2 Group Statistics

The pretest mean score of superficial thrombophlebitis was 3.10 ± 1.06 in the experimental group and 4.13 ± 0.82 in the control group. An independent samples *t*-test revealed a statistically significant difference between the groups (t = -4.22, df = 58, p = 0.001), indicating that the initial level of thrombophlebitis was significantly lower in the experimental group compared to the control group. The F-value (2.267) indicates a modest variance between the groups.

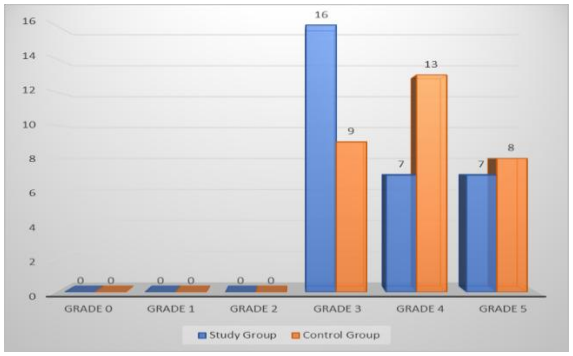


Fig 4.2.1 Comparison of Pretest Scores Between Experimental and Control Groups.

Table 4.2.3 Group Statistics

	group	N	Mean	Std. Deviation	P value	t	df	F
posttest	Experimental	30	1.5	0.974	0.001	-3.4	58	0.059
	Control	30	2.37	0.998				

the posttest mean score reduced to 1.50 ± 0.97 in the experimental group, while it was 2.37 ± 0.99 in the control group. The *t*-test again showed a statistically significant difference (t = -3.402, df = 58, p = 0.001), suggesting the intervention (e.g., warm aloe vera gel application or similar) had a positive effect in reducing the severity of superficial thrombophlebitis in the experimental group. The F-value (0.059) indicates minimal variance post-intervention.

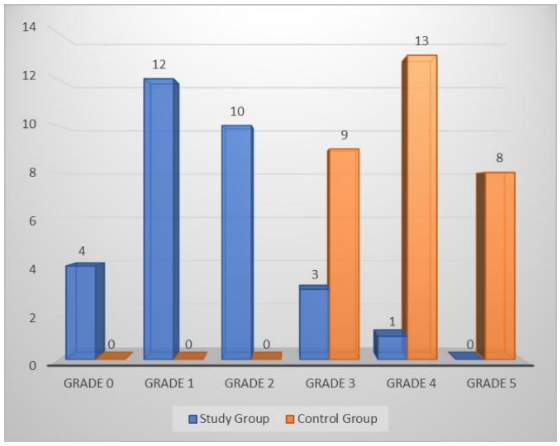


Fig 4.2.1 Comparison of Posttest Scores Between Experimental and Control Groups.

Section C: Effectiveness of Alovera gel application on Superficial Thrombophlebitis among patients receiving Intravenous therapy in the study group. The study showed a clear improvement in superficial thrombophlebitis after Aloe Vera gel application. Pretest scores averaged 4.13, which decreased to 2.37 after the intervention. The mean difference of 1.76 and a t-value of 6.763 (p = 0.001) confirmed significant reduction in symptoms. These results demonstrate Aloe Vera gel is effective.

Section D: Associate the pre-test & post-test level of Superficial Thrombophlebitis among the patients receiving Intravenous therapy with their Sociodemographic variables in study and control group. In the study group, pretest scores had significant links to sex (p = 0.049), occupation (p = 0.479), and hospital stay (p = 0.043). Other variables, like age, education, marital status, ward, IV purpose, cannula size, and cannulization duration, were not significant. In the control group, only the ward of admission was significant (p = 0.045), while the other variables did not show any association. Posttest results in the study group indicated significant links to sex (p = 0.011), occupation (p = 0.041), IV therapy purpose (p = 0.012), and hospital stay (p = 0.034). The other variables remained non-significant. In the control group, only the cannula size was significant (p = 0.045); all other variables showed no association.

IV. DISCUSSION

The study looked at how effective Aloe Vera gel is for treating superficial thrombophlebitis in patients receiving IV therapy. At the start, most patients in both groups were in GRAD 2 and GRAD 3, meaning they had moderate thrombophlebitis. The average pretest scores were 3.10 for the study group and 4.13 for the control group, showing a meaningful difference between the two ($p = 0.001$). This indicated that the control group had slightly more severe symptoms at the beginning, but both groups had similar clinical conditions that were suitable for treatment. These findings matched earlier studies by Das et al. and Malhotra et al., which reported similar severity levels and how cannula size affected initial phlebitis scores. After applying the Aloe Vera, the study group showed significant improvement. The number of patients in GRAD 0 rose to 26.7%, and those in GRAD 1 increased to 33.3%, while no patients were in GRAD 5. The average posttest score fell to 1.50, which was significantly lower than the control group's score of 2.37 ($p = 0.001$). Visual patterns confirmed a drop from higher to lower grades in the study group, while the control group saw only minor changes. These results were consistent with research by Patel et al. and Choudhary et al., both of which emphasized Aloe Vera's strong anti-inflammatory effects on phlebitis. Looking at socio-demographic variables, the study group showed that posttest thrombophlebitis levels were linked to sex, occupation, the purpose of IV therapy, and how long patients stayed in the hospital. This suggests that recovery may vary widely depending on patient traits and clinical conditions. In the control group, only cannula size showed a significant relationship, indicating that mechanical factors had a bigger impact on results without treatment. These patterns were similar to findings from Banu & Rahman and Nair et al., who also noted better improvements in females, unemployed patients, and those with longer hospital stays. Overall, the study confirmed that Aloe Vera gel is an effective, natural, and affordable option for reducing superficial thrombophlebitis, supporting the hypotheses presented.

Nursing Education

- Include Aloe Vera therapy as part of complementary treatment modules in nursing curricula.
- Educate students on assessing phlebitis using the Jackson's VIP Scale.
- Promote awareness of herbal remedies and evidence-based natural care.
- Incorporate clinical demonstrations of Aloe Vera gel application in skill labs.
- Foster critical thinking about low-cost, non-pharmacological interventions.
- Encourage case-based learning from real research like this study.
- Emphasize research methodology through this experimental design as a model.

Nursing Practice

- Nurses can use Aloe Vera gel as a safe intervention to reduce phlebitis symptoms.
- It promotes patient comfort, healing, and satisfaction without side effects.
- Encourages evidence-based, holistic care in IV therapy settings.
- Simple application allows easy incorporation into routine nursing duties.
- Promotes early identification and management of phlebitis.
- Builds nurse confidence in using non-invasive therapeutic alternatives.
- Can be used in home care and community nursing as well.

Nursing Administration

- Aloe Vera gel can be included in hospital IV care protocols.
- Encourages adoption of cost-effective nursing interventions.
- Reduces incidence of phlebitis, thereby lowering patient complaints.
- Enhances quality indicators related to IV therapy management.
- Helps in resource optimization with minimal training required.
- Supports herbal and integrative care policies in hospitals.
- Aids in staff development through training in alternative therapies.

Nursing Research

- Opens avenues for further studies on herbal interventions in clinical care.
- Encourages use of true experimental designs in nursing research.

- Supports publication of findings to strengthen evidence-based practice.
- Promotes interdisciplinary collaboration in natural remedy research.
- Motivates student nurses to undertake practical clinical research.
- Highlights the importance of socio-demographic analysis in interventions.
- Calls for replication studies to validate findings in different settings.

Limitations

- Small sample size (n=60), limiting generalizability.
- Single setting (NMCH, Jamuhar).
- Only mild to moderate cases included; severe phlebitis was excluded.
- No long-term follow-up after intervention.
- Variability in IV site care among patients was not controlled.

Recommendations for Future Research

- Replication with larger, multicentric samples.
- Inclusion of severe cases to test Aloe Vera's limit of effectiveness.
- Longitudinal studies for observing sustained outcomes.
- Comparison of Aloe Vera with other topical agents like magnesium sulfate or calendula ointment.
- Exploring patient satisfaction and comfort levels with Aloe Vera gel.

Here is a clear and polished summary:

V. CONCLUSION

This study looked at how effective Aloe Vera gel is in reducing superficial thrombophlebitis in patients receiving IV therapy in a hospital. The goal was to address the increasing number of IV-related complications and find a simple, affordable nursing method to manage them. Aloe Vera gel, known for its cooling, anti-inflammatory, and healing properties, significantly relieved symptoms. This was confirmed by notable drops in Jackson's VIP scores from the pre- and post-test assessments in the study group, along with clear differences when compared to the control group. The findings showed that Aloe Vera gel consistently helped reduce inflammation, relieve pain, and improve the overall condition of veins. Various demographic factors such as sex, occupation, and purpose of IV therapy affected the level of improvement. This suggests that individual traits can influence how patients respond to natural treatments. These results emphasize the importance of personalized nursing care when providing such interventions. The study highlights the role of nurses in using evidence-based natural remedies to improve patient comfort and lower the risk of complications. Although the study had some limitations, it provides a solid base for future research and clinical use of Aloe Vera in IV care. Overall, Aloe Vera gel has shown to be a safe, practical, and effective way to manage superficial thrombophlebitis, with the potential to enhance both clinical outcomes and patient satisfaction.

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