



International Journal of Advance Research in Medical Surgical Nursing

E-ISSN: 2663-2268
P-ISSN: 2663-225X
IJARMSN 2023; 5(2): 01-06
Received: 04-04-2023
Accepted: 08-05-2023

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A quasi experimental study on effectiveness of thrombophob ointment with & without hot fomentation in preventing local complications of IV cannulisation among patients on intravenous therapy

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DOI: <https://doi.org/10.33545/surgicalnursing.2023.v5.i2a.130>

Abstract

Background of the Study: Intravenous (IV) therapy is an integral part of modern medicine and is practiced in virtually every healthcare setting, dealing with critical and general ailments of a community. Majority of the IV drugs are administered by nurses, who are increasingly involved in the insertion of peripheral vascular access devices. The widespread use of IV therapy can lead to complacency about the risks and may result in poor standards of practice, putting patients at risk of clinical harm and making nurses vulnerable to a claim of negligence.

Methodology: In order to achieve the objectives of the study the study design was factorial time series design. The sample consisted of 40 subjects (20 in each group-1 & group-2) who had developed mild symptoms of intravenous complication, selected by convenience sampling technique. In this study the dependent variables were complications of IV cannulation. The independent variables were two modalities of treatment (thrombophob ointment & hot fomentation). The pre-test score was assessed before treatment and treatment was given for two consecutive days. The post-test data were analysed using statistical tests like One-way ANOVA and T-Test.

Results: The mean value of pre-test of Group-I is 7.650, the SD is 1.843 and mean value of post test of group-I is 3.633, the SD is 1.070 and the 't' value of Group I is 15.325. The obtained 't' value is greater than table value of $t_{(18)} = 2.09$. So thrombophob with hot fomentation is effective in reducing complications of IV cannulation. The mean value of pre-test of Group – II is 7.950, the SD is 1.637 and mean value of post test of group-II is 4.166, the SD is 0.0861 and the 't' value of Group II is 12.281. The obtained 't' value is greater than table value of $t_{(18)} = 2.09$. So thrombophob without hot fomentation is effective in reducing complications of IV cannulation. In order to find out the significant difference between the two scores in group I and group II unpaired 't' test value was computed. The obtained 't' value is lower than the table value of $T_{(38)} = 2.02$. Calculated value is less than the table value so there is no significant difference between the two interventions provided by the researcher. There is no association between the mean differences & the selected background factors among patients on intravenous therapy in experimental group-I & experimental group -II.

Interpretation and Conclusion: The investigator had chosen two modalities of treatment to prevent local complications of IV cannulisation. The study reiterated that both the interventions (Thrombophob ointment with & without hot fomentation) are effective in preventing local complications of IV cannulisation. This result should be incorporated practically and introduced as evidenced-based practice to students and nurses.

Keywords: Thrombophob ointment, hot fomentation, local complications, IV cannulisation, intravenous therapy

Introduction

Intravenous therapy is a routine nursing task in every hospital today, although it is not without potential risks for patients. It has become a major part of patient care. In hospital practice, intravascular lines are used for a variety of purposes from monitoring pressures to administering drugs and fluids. The Society of Infusion Nurses' National Standards of Practice stated that a nurse who administers IV drugs or fluids must know their adverse effects and the appropriate interventions to take before starting an infusion. Current IV therapy is less than 100 years old. However, it was already known in the 1600s that drugs could be administered intravenously.

Due to a lack of understanding of sterility, infection control, and other scientific methods, initial attempts to deliver fluids and drugs intravenously met with little success. The greatest advances in drugs, equipment and procedures have occurred in the last 25 years. The practice and regulation surrounding IV therapy continues to evolve. Intravenous catheterization is one of the most widespread procedures in the healthcare environment. Almost 90% of all hospitalized patients receive intravenous (IV) catheters. The number of patients in hospitals receiving IV therapy is 80% plus. Intravenous catheters (or IVs) are a very important part of the medical treatment of acute illnesses, cancer, surgery, anesthesia, and trauma, allowing drugs to get as quickly and efficiently as possible through the bloodstream to the parts of the body where they work. Catheter-related infections, particularly catheter-related bloodstream infections, are associated with increased morbidity, mortality, and prolonged hospital stay. Different types of cannula sizes Cannula size 14G. The color of the cannula is orange. Cannula size 16G. Cannula size 16G is gray. Cannula size 18G. This size of cannula is green in color. Cannula size 20G. The 20G cannula is supplied in pink. Cannula size 22G. The cannula is blue. Cannula size 24G. What are the complications of IV cannulation Complications include infection, phlebitis and thrombophlebitis, embolism, pain, hematoma or bleeding, extravasation, arterial cannulation, and needlestick injury. Careful adherence to guidelines and procedures can minimize these risks. Which veins should I avoid for cannulation. The veins of choice are cephalic or basilic.

Thrombophob Ointment: Thrombophob Ointment is a combination of two medicines used to treat superficial thrombophlebitis (inflammation or swelling of a vein due to a blood clot). It helps to relieve pain and inflammation by speeding up the healing process. Thrombophob Ointment is also used to treat bruises and hematoma (collection of blood under the skin). It speeds up the dissolution of the blood clot, decreasing the pain and swelling. It should be used in the dose and duration as advised by your doctor. This medicine is for external use only. The affected area must be clean and dry before applying this medicine. Make sure to wash your hands before and after applying this medicine. General instructions apply a thin layer of Thrombophob Ointment to the affected areas as directed by your doctor. Wash your hands thoroughly with soap before and after applying the medicine. For better results, use this medicine for the recommended time. Avoid contact with eyes, mouth, nose or broken skin. In case of accidental contact, rinse thoroughly. In case of accidental ingestion of this medicine, seek medical attention. If you experience any side effects that persist or worsen, consult your doctor. Keep this medicine out of the reach of children and pets. Make sure that expired or unused medicine is properly disposed of. Intravenous Complications Complications include infection, phlebitis and thrombophlebitis, embolism, pain, hematoma or bleeding, extravasation, arterial cannulation, and needlestick injury.

Hot Application: Hot application both help to relief body pain and swelling. Hot application is the act of bringing. Something into contact or of starting an action of heat. In nursing intervention hot application describe as stimulation of the skin and underlying tissues with heat for the purpose of decreasing pain, muscle spasms or inflammation. Hot

application is the application of hot agent, warmer than skin either in a moist or dry form on the surface of the body to relieve pain and congestion, to provide warmth, to promote suppuration, to promote healing, to decrease muscle tone and to softens the exudates.

Need for study: Research launched at the British Pharmaceutical Conference (BPC) in Manchester has shown that a third of patients have unnecessary tubes (cannulas) inserted in hospital, unnecessarily exposing them to serious complications such as infection and blood clots. Complications associated with an intravenous (IV) cannula include problems with the veins (phlebitis), leakage of medication into the tissues around the cannula site (extravasation), serious infection, and blood clots. The investigator felt the need to study this area because intravenous therapy is a common procedure, during practice in the clinical field the investigator encountered a number of local complications due to cases of intravenous cannulation. The investigator was interested in identifying an effective intervention to reduce complications. In the literature search process, the investigator found that the incidence of local complications due to IV cannulation is very high and leads to some serious local and systemic complications, and the investigator was unable to find a study related to the preventive aspect of local complications. For all of the above reasons, the researcher would like to conduct a study of the efficacy of thrombophob ointment with and without hot fomentation in preventing complications of IV cannulation.

Goal of Study

1. To assess the effectiveness of thrombophob ointment with hot fomentation in preventing local complications of IV *cannulisation* among patients on intravenous therapy in experimental group-I.
2. To assess the effectiveness of thrombophob ointment without hot fomentation in preventing local complications of IV cannulisation among patients on intravenous therapy in experimental group-II
3. To compare the effectiveness of thrombophob ointment with & without hot fomentation in preventing local complications of IV canalization among patients on intravenous therapy in experimental group-I & experimental group-II.
4. To find the association between the mean differences & the selected background factors among patients on intravenous therapy in experimental group-I & experimental group-II.

Hypothesis

H₁: There will be significant difference in the local complications related to IV cannulation before and after the application of thrombophob ointment with hot fomentation among patients with IV cannula.

H₂: There will be significant difference in the local complications related to IV cannulation before and after the application of thrombophob ointment among patients with IV cannula.

H₃: There will be significant difference between the reducing local complications among patients receiving thrombophob ointment with and without hot fomentation.

H₄: There will be significant association between mean difference in local complications of IV cannulation and selected background factors of experimental group-I.

H₅: There will be significant association between mean difference in local complications of IV cannulation and selected background factors of experimental group-II.

Assumptions

- Local complications cause pain for the patient.
- Hot fomentation is used to reduce inflammation.
- Thrombophob ointment is used in hospitals to prevent local complications of IV cannulation.

Research Approach: Quasi-experimental study approach.

Research Design: Quasi experimental & Time series design.

Group-I	O _{1A}	X ₁	O _{2A}	X ₁	O _{3A}	X ₁	O _{4A}
Group-II	O _{1B}	X ₂	O _{2B}	X ₂	O _{3B}	X ₂	O _{3B}

Setting: Bhandari Hospital and Research Centre Jabalpur.

Target Population: Patients who had undergone IV therapy for minimum 24 hrs.

Accessible Population: Patients who had undergone IV therapy for minimum 24 hrs. At Hospitals, Jabalpur.

Samples Size: 40 Experimental group-I (20) & Experimental group-II (20).

Sampling Technique: Convenient sampling.

Research Tool for data collection: Demographic Proforma & Observation Checklist.

Demographic proforma/Factors: Age, Sex, Site of insertion, Size of catheter, Medication administration, Ambulatory status, IV cannula patency maintaining methods.

Criterion Measures: Reduction in local complication of IV therapy.

Data Collection Procedure: Data collection was conducted during the first week of December 2021 at Bhandari hospital and research Centre, Jabalpur. The investigator obtained permission from Administrator, prior to the study. Before collecting the data, consent was obtained from the patients under study. Confidentiality and privacy were assured to them. The average time taken by the sample to answer the questions asked was 10-20 minutes. Respectful maternity care was assessed through structured interview schedule. The tool was administered to 40 (10%) patients who fulfilled the sample selection criteria.

Ethical Consideration: Formal Administrative Approval Was Taken from Concerned Authorities, Anonymity, confidentiality, fair treatment from the samples was also considered.

Plan for Data Analysis: The investigator planned to analyze the data on the basis of the objective and the hypothesis of the study. A data analysis plan is a roadmap for how you're going to organize and analyze your survey data—and it should help you achieve three objectives that relate to the goal you set before you started your survey: Answer your top research questions. Use more specific survey questions to understand those answers.

- Organize data in master data sheet.
- Demographic variables would be analyzed by using

Frequency and percentage.

- 't-test' will be used for comparison between two groups.
- Data of signs and symptoms of phlebitis would be analyzed by using 'one-way Anova'.

Descriptive Statistics: Frequency and percentage distribution is used to study the demographic variable. Mean and standard deviation will be used to determine the level of effectiveness on pre-conception counseling and care.

Inferential Statistics: Chi-square test is used to determine the association of effectiveness and selected demographic variables. 't-test' will be used for comparison between two groups.

Data Analysis and Interpretation

Section-I data on background factors of patients on IV therapy

Table 1: Reveals the distribution of patients on IV therapy according to their selected N = 40

Background factors	Thrombophob with hot fomentation		Thrombophob without hot fomentation	
	Frequency	%	Frequency	%
Age				
20-30	4	20	6	30
31-40	4	20	6	30
41-50	5	25	3	15
Above 50	7	35	5	25
Sex				
Male	10	50	10	50
Female	10	50	10	50
Site of insertion				
Dorsum of hand	5	25	5	25
Wrist	5	25	8	40
Forearm	10	50	6	30
Cubital fossa	0	0	1	5
Size OF Catheter				
16G	0	0	0	0
17G	0	0	0	0
18G	7	35	9	45
20G	13	65	11	55
Medication administration				
Q4H	0	0	0	0
Q6H	2	10	6	30
Q12H	12	60	7	35
Q24H	6	30	7	35
Ambulatory Status				
Fully	8	40	9	45
Partially	12	60	11	55
Bed ridden	0	0	0	0
IV Cannula Patency				
Maintained By				
Normal saline flush	0	0	0	0
Heplock	0	0	0	0
None	20	100	20	100

Section II: Data on effectiveness of thrombophob ointment with hot fomentation in preventing local complications of IV cannulation among patients on intravenous therapy in experimental group-1

Table 2: Reveals the data of paired 't' test value of group- I

Group-I		Pre-test value	Post-test value	Paired 't' test value
Thrombophob ointment with hot fomentation (Group-I), (N = 20)	Mean	7.650	3.633	15.325
	SD	1.843	1.070	(p<0.05)

Data presented in table shows that the mean value of pre-test of Group – I is 7.650, the SD is 1.843 and mean value of post test of group-I is 3.633, the SD is 1.070 and the ‘t’ value of Group I is 15.325. The obtained ‘t’ value is greater than table value of $t_{(18)} = 2.09$. So by this data null hypothesis H_{01} is rejected and research hypothesis H_1 is accepted i.e., it is inferred that There will be significant difference in the local complications related to IV cannulation before and after the application of thrombophob ointment with hot fomentation among patients with I V cannula.

Section III: Data on effectiveness of thrombophob ointment without hot fomentation in preventing local complications of IV cannulisation among patients on intravenous therapy in experimental group-2

Table 3: Reveals the data of paired ‘t’ test value of group- II

Group-II		Pre-test value	Post-test value	Paired ‘t’ test value
Thrombophob ointment without hot fomentation (Group - II), (n=20)	Mean SD	7.950 1.637	4.1660 0.861	12.281 ($p < 0.05$)

Data presented in table shows that the mean value of pre-test of Group – II is 7.950, the SD is 1.637 and mean value of post test of group-II is 4.166, the SD is 0.0861 and the ‘t’ value of Group II is 12.281. The obtained ‘t’ value is greater than table value of $t_{(18)} = 2.09$. So by this data null hypothesis H_{02} is rejected and research hypothesis H_2 is accepted i.e., it is inferred that There will be significant difference in the local complications related to IV cannulation before and after the application of thrombophob ointment without hot fomentation among patients with I V cannula.

Section IV: Data on comparison of the effectiveness of

Table 5: Summary of one – way of Analysis of variance (Anova table) of mean differences and background factors among Group-I

Group	Background Factors	Mean	SD	F	Sig.	
Thrombophob ointment with hot fomentation (Group-I)	Age	20-30	5.00	.860	1.214	.337
		31-40	3.75	.166		
		41-50	3.80	1.64		
		> 50	3.76	1.16		
	Site of Insertion	Dorsum of hand	3.73	.98	.333	.722
		Wrist	3.86	1.67		
		Forearm	4.23	1.05		
		Cubital fossa	0	0		
	Medication Administration	Q4H	0	0	2.14	.148
		Q6H	3.00	.00		
		Q12H	4.41	.85		
		Q24H	3.55	1.60		

$p < 0.05$

The above table shows the mean, standard deviation and F value of the selected background factors of Group I such as

thrombophob ointment with & without hot fomentation in preventing local complications of IV canalization among patients on intravenous

Table 4: Reveals the data of unpaired ‘t’ test value of group- I and group-II

Group		Post-test value	Unpaired ‘t’ test value
Thrombophob ointment with hot fomentation (Group - I), (N = 20)	Mean SD	3.633 1.070	-1.736 ($p < 0.025$)
Thrombophob ointment without hot fomentation (Group - II), (N = 20)	Mean SD	4.166 0.861	

In order to find out the significant difference between the two scores in group I and group II unpaired ‘t’ test value was computed. The obtained ‘t’ value is lower than the table value of $t_{(38)} = -1.736$. Calculated value is less than the table value so reject research hypothesis i.e., there is no significant difference between the two interventions provided by the researcher. By this data H_3 : There will be significant difference between the reducing local complications among patients receiving thrombophob ointment with and without hot fomentation, is rejected.

Section V: Association between the mean differences in local complications of intravenous cannulation & the selected background factors among patients on intravenous therapy

This section deals with the Data on the association between the mean differences in local complications of intravenous cannulation & the selected background factors among patients on intravenous therapy.

Age, site of insertion, medication administration.

Table 6: Summary of Independent ‘T’ test to associate the mean differences and background factors among Group- I

Group	Background factors	Mean	SD	‘T’ Value	
Thrombophob ointment with hot fomentation (Group - I)	Sex	Male	4.06	1.34	.186
		Female	3.96	1.03	
	Size Of Catheter	18 G	3.33	1.15	-2.07
		20 G	4.38	1.04	
	Ambulatory Status	Fully	3.95	1.46	-.177
		Partial	4.05	1.00	

$p < 0.05$

H₄: There will be significant association between mean difference in local complications of IV cannulation and

selected background factors of experimental group-I is rejected.

Table 7: Summary of one – way of Analysis of variance (ANOVA table) of mean differences and background factors among Group-II

Group	Background Factors	Mean	SD	F	Sig.	
Thrombophob ointment without hot fomentation (Group-II)	Age	20-30	3.94	1.71	.599	.625
		31-40	3.16	1.44		
		41-50	3.88	.509		
		> 50	4.26	1.29		
	Site of Insertion	Dorsum of hand	4.06	1.68	.162	.921
		Wrist	3.70	1.58		
		Forearm	3.55	1.08		
		Cubetal fosa	4.33	.00		
	Medication Administration	Q4H	0	0	1.92	.176
		Q6H	4.27	1.83		
		Q12H	3.00	.83		
		Q24H	4.14	1.18		

p<0.05

The above table shows the mean, standard deviation and F value of the selected background factors of Group II such as

Age, site of insertion, medication administration.

Table 8: Summary of Independent ‘t’ test to associate the mean differences and background factors among Group-II

Group	Background Factors	Mean	SD	‘T’ Value	
Thrombophob ointment without hot fomentation (Group - II)	Sex	Male	3.86	1.06	.264
		Female	3.70	1.68	
	Size Of Catheter	18 G	3.59	1.19	-.550
		20 G	4.93	1.54	
	Ambulatory Status	Fully	3.74	1.49	-.122
		Partial	3.81	1.34	

p<.0.05

H₅: There will be significant association between mean difference in local complications of IV cannulation and selected background factors of experimental group – II is rejected.

Conclusion

The study was conducted with the objective to find out the most effective method among the two selected nursing interventions to reduce the complications related to intravenous therapy. Researcher had given two interventions such as thrombophob with hot fomentation and thrombophob without hot fomentation. The finding of the study revealed that among the two modalities of treatment both the interventions are effective in reducing local complications of IV cannulation. And there was no significant association between mean difference of IV cannula complications and selected background factors among patients with IV cannula.

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Lodhi DS, Bansal NK. A quasi experimental study on effectiveness of thrombophob ointment with & without hot fomentation in preventing local complications of IV cannulisation among patients on intravenous therapy. International Journal of Advance Research in Medical Surgical Nursing. 2023;5(2):01-06.

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