Research Article

Effectiveness of Proximal Massage and Palm Fisting in Reducing the Risk of Thrombophlebitis among Intravenous Cannulated Inpatients

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Abstract

Background: Thrombophlebitis is the formation of a thrombus in association with an inflammation of vein with blood clot formation inside the vein. Thrombophlebitis is a common complications associated with this affecting between 27% and 70% of all clients receiving intravenous (IV) therapy.

Aim: This study aimed at assessing the effectiveness of proximal massage and palm fisting in reducing the risk of thrombophlebitis among IV cannulated inpatients.

Methodology: A quantitative research approach with true experimental research design was used. Samples were collected by random sampling technique with lottery technique. The data were collected by visual infusion phlebitis (VIP) scale. Collected data were analyzed by descriptive and inferential statistics.

Result: The mean VIP score in the study group is 1.21 ± 0.73, whereas in the control group, the mean VIP score is 2.09 ± 1.23 which shows that the proximal massage and palm fisting reduce the risk of thrombophlebitis. The Chi-square value revealed that the demographic variables of the study group such as age ($\chi^2 = 5.68$), education ($\chi^2 = 4.94$), occupation ($\chi^2 = 4.67$), income ($\chi^2 = 21.67$), comorbidity ($\chi^2 = 4.64$), alcohol intake ($\chi^2 = 4.42$), and smoking history ($\chi^2 = 4.42$) are highly associated with proximal massage and palm fisting in reducing the risk of thrombophlebitis. The obtained *t*-test value is −1.648 which is significant at 0.05 level.

Conclusion: This study concludes that proximal massage and palm fisting are effective in preventing the risk of thrombophlebitis among IV cannulated inpatients.

Keywords: Effectiveness, thrombophlebitis, palm fisting, proximal massage, intravenous cannulated inpatients, visual infusion phlebitis scale

Introduction

Peripheral venous cannulation is the most commonly performed invasive procedure that nurses perform. Over 90% of hospitalized patients will receive some form of intravenous (IV) therapy during the course of admission in hospital. As compared to other routes, IV route delivers fluids and medications very rapidly throughout the body.[1] Nurses are mostly responsible for administering IV medications and infusion and providing education to patients related to this in the hospital. Thrombophlebitis is still an ongoing problem in medical practice.[2]

Thrombophlebitis, the most frequent complication of peripheral venous infusion, is characterized by pain, erythema, swelling, and palpable thrombosis of the cannulated vein. In IV infusion, the development of thrombophlebitis requires withdrawal of cannula and reinsertion of cannula. An

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exploration study reveals 67.2% cannula removals occur due to complications.[3] IV cannula associated thrombophlebitis is not a serious condition in normal situation but it may be fatal if thrombus is changed into emboli.

Regarding the incidence in India, about 50% was found in Kolenchery and 29.8% of phlebitis Chandigarh.[4] In another study hospitalized patients, 5–70% of patients receiving peripheral IV (PIV) therapy develop phlebitis which may lead to mortality and morbidity increased duration of hospital stays and significant increase in cost of treatment.[5]

The main causes of thrombophlebitis are injury to the blood vessel wall, hypercoagulability of blood, and venous stasis (Virchow's triad). The complications can be prevented by means of simple measure. There are various methods used to reduce the risk of thrombophlebitis and other complications like blood infection.[6] Proximal massage is the massage given to the area which is proximal to the cannula site in the direction of fluid flow. Palm fisting refers to the exercise given to the IV cannulated upper extremity by squeezing the soft ball. Proximal massage and palm fisting exercise reduce the blood clot and improve the blood circulation, relax the fear of thrombophlebitis, and reduce the risk of thrombophlebitis among IV cannulated patients.

IV medication administration refers to the process of giving medication directly into a patient's vein. All medications administration carries certain risks, but IV therapy adds another level of complexity. Thrombophlebitis is more prevalent in patients who undergone IV cannulated administration of medication. Even when the nurses follow the six rights, they can go wrong if the practices do not meet the standard of care for IV therapy.[2] Trends in nursing care are challenging with the scientific and technological growth. Nurses must acquaint themselves with changing trends.

Thrombophlebitis is a common complications associated with IV therapy affecting between 27% and 70% of all clients receiving IV therapy. A study reported in the Journal of Infusion Nursing, found an overall complication rate for PIV catheters in place for 96 h to be close to 50%. The current data available on PIV blood stream infection (BSI) peripheral venous catheter (PVC)-BSI suggest incidence density rate of 0.2–0.7 episode per 100 device days, which appear low when compared with other catheters. However, some studies report absolute PVC-BSI numbers in the range of central line-associated infections.[7]

Massage therapy has got the benefits of blood circulation so it can be applied to prevent thrombophlebitis among cannulated patients. Considering the above factors and the reviews, it was felt that the application of massage therapy is beneficial and can use in the general nursing practice to reduce the risk of developing thrombophlebitis in cannulated patients. More research is needed both to capture the dimension of the problem and to provide efficient control measures, so the researcher felt the need to do this study. The need for the study clearly shows that prevention and management of thrombophlebitis is very essential in IV cannulated patients.

Materials and Methods

The research approach adopted for this study is a quantitative approach with true experimental research design. The target population of the study is the IV cannulated patients who are admitted in the hospital. In this study, 32 IV cannulated patients both in the study group and control group were selected by random sampling technique by lottery method. The patients who are not willing to participate, unconscious, admitted in ICU, and diagnosed with cancer are excluded from the study.

Prior permission was obtained from the ethical committee and hospital management. The IV cannulated patients were explained about the purpose of the study in a manner and informed consent was taken to provide privacy and confidentiality. The purpose of the study is explained to involve in this study. Structured questionnaire was distributed by the researcher to collect the data. Visual infusion phlebitis (VIP) scoring scale is used to assess the effectiveness of proximal massage and palm fisting. Pre-test was conducted immediately after IV cannulation and assessment was done at 6 h, 12 h, 24 h, 36 h, 48 h, and 72 h. Descriptive statistics were used to analyze the frequency, percentage, mean, and standard deviation of various variables. Inferential statistics includes "*t*-" test analysis and Chi-square analysis.

Results

The percentage and frequency distribution of the demographic variables are shown in Table 1 where the majority of the samples belong to the age group of 18–34 years both in the study group and control group. Equal 50% of samples were male and female in the study group, whereas in the control group, majority 63% of the samples were male. The majority of the samples were with degree educational qualification in both the groups. In terms of occupation, 41% were doing full time work and another 41% with unemployment in the study group but in the control group, the majority of samples 50% have full time occupation. With regard to the type of family, majority of samples was living in nuclear family, got married, with income of Rs. 5001–15,000, and living in rural area in both the groups. In terms of patients comorbidity, 37% were with diabetes mellitus and remaining 44% were with no comorbidity, whereas in the control group, majority of the samples 44% have diabetes mellitus. In terms of vascular disorder, 12% were with hypertension, other 88% was with no vascular disorder, while in the control group, 44% of the samples have hypertension. Majority of the samples have no alcohol and smoking history in both the groups.

Table 2 shows that in the study group, 91% of the samples were with Grade 0 level of thrombophlebitis. While in the control group, 41% of the samples had Grade 0 level of thrombophlebitis and 34% of the samples had Grade 1 level of thrombophlebitis.

Table 1: Frequency and percentage distribution of demographic variables

S. No.	Demographic variables	Study group, *n*=32		Control group, *n*=32	
		Frequency	%	Frequency	%
1	Age				
	A) 18–34 years	12	38%	13	41%
	B) 35–50 years	11	34%	8	25%
	C) 51–65 years	5	16%	7	22%
	D) Above 66 years	4	12%	4	12%
2	Sex				
	A) Male	16	50%	20	63%
	B) Female	16	50%	12	37%
4	Education				
	A) Illiterate	8	25%	7	22%
	B) Primary school	7	22%	8	25%
	C) Higher secondary	4	12%	6	19%
	D) Degree	13	41%	11	34%
5	Occupation				
	A) Full time	13	41%	16	50%
	B) Retired	1	3%	5	16%
	C) Unemployment	13	41%	7	22%
	D) Others	5	15%	4	12%
6	Types of family				
	A) Nuclear family	20	63%	21	66%
	B) Joint family	12	37%	11	34%
7	Marital status				
	A) Married	25	78%	28	88%
	B) Unmarried	4	13%	2	6%
	C) Separated/widow	1	3%	0	0%
	D) Single	2	6%	2	6%
8	Income				
	A) <Rs. 5000	0	0%	1	3%
	B) Rs. 5001–Rs. 15,000	21	66%	27	85%
	C) Rs. 15,001–Rs 25,000	8	25%	3	9%
	D) >25,000	3	9%	1	3%
9	Area of living				
	A) Rural	26	81%	28	88%
	B) Urban	6	19%	4	12%
10	Comorbidity				
	A) DM	12	37%	14	44%
	B) Kidney disorder	1	3%	2	6%
	C) Obesity	0	0%	1	3%
	D) Bleeding disorder	0	0%	0	0%
	E) Others	5	16%	2	6%
	F) Nil	14	44%	13	41%
11	Vascular disorder				
	A) Stroke	0	0%	2	6%
	B) PVD	0	0%	1	3%
	C) MI	0	0%	2	6%
	D) HTN	4	12%	14	44%
	E) Nil	28	88%	13	41%
12	Alcoholic history				
	A) Never	27	85%	21	66%
	B) Ex-alcoholic	3	9%	4	12%
	C) Current alcoholic	2	6%	7	22%
13	Smoking history				
	A) Never smoked	27	85%	20	63%
	B) Ex-smoker	3	9%	8	25%
	C) Current smoker	2	6%	4	12%

The mean VIP score in the study group which is 0.21 ± 0.73, whereas in the control group, the mean VIP score which is 1.09±1.23 are shown in Table 3**.**

The association between thrombophlebitis and demographic variables is interpreted in Table 4. In association with age, the Chi-square obtained value is 5.68 which is significant at 0.05 level. In association with education of patients, the Chi-square obtained value is 4.941, with occupation, the Chi-square obtained value is 4.67, with income, the Chi-square obtained value is 21.67, with comorbidity, the Chi-square obtained value is 4.64, with alcohol history, the Chi-square obtained value is 4.42, and with smoking history of patients, the Chi-square obtained value in 4.42 which are significant at 0.05 level. The demographic variables such as sex, religion, type of family,

Table 2: Incident of thrombophlebitis

Grade/hours	Study group (n=32)				Control group (n=32)			
	Pre-test	%	Post-test	%	Pre-test	%	Post-test	%
Grade 0	32	100%	29	91%	32	100%	13	41%
Grade 1	0	0%	1	3%	0	0%	11	34%
Grade 2	0	0%	0	0%	0	0%	2	6%
Grade 3	0	0%	2	6%	0	0%	4	13%
Grade 4	0	0%	0	0%	0	0%	2	6%
Grade 5	0	0%	0	0%	0	0%	0	0%

Table 3: Descriptive statistics of thrombophlebitis

S. No.	Study group	Control group
	Post-test (M±SD)	Post-test (M±SD)
1.	0.21±0.73	1.09±1.23

Table 4: Association between thrombophlebitis and demographic variables of the study group n=32

S. No.	Demographic variables	df	χ^2
1.	Age	3	5.68*
2.	Sex	1	1.02
3.	Religion	3	0.01
4.	Education	3	4.941*
5.	Occupation	3	4.67*
6.	Types of family	1	1.89
7.	Marital status	3	0.73
8.	Income	3	21.67*
9.	Area of living	1	1.57
10.	Comorbidity	5	4.64*
11.	Vascular disorder	4	0.393
12.	Alcohol history	2	2.42*
13.	Smoking history	2	4.42*

*Significant at 0.05 level

marital status, vascular disorder, and area of living are not significant at 0.05 level.

Table 5 shows that in post-test, majority of patients 29 (90.6%) had healthy (no phlebitis), 1 (3.1%) had moderate level of thrombophlebitis, and 2 (6.3%) had severe level of thrombophlebitis. The paired "*t*" value is −1.648 which is significant at 0.05 level.

Table 5: Frequency of percentage distribution of pre-test and post-test score of visual infusion phlebitis scale of the study group (n=32)

Area	Pre-test		Post-test		"*t*"-value
	Frequency	%	Frequency	%	
Grade 0	32	100%	29	91%	−1.648*
Grade 1	0	0%	1	3%	
Grade 2	0	0%	0	0%	
Grade 3	0	0%	2	6%	
Grade 4	0	0%	0	0%	
Grade 5	0	0%	0	0%	
Grade 0	32	100%	29	91%	

*Significant at 0.05 level

Discussion

Thrombophlebitis is inflammation of the vein wall due to thrombus that is the most common complication of IV infusion therapy. The incidence of phlebitis in hospitalized patients receiving IV therapy has been reported to be as high as 80%.[3,8] The present study is to assess the effectiveness of proximal massage and palm fisting in reducing the risk of thrombophlebitis among IV cannulated inpatients.

The first objective is to assess the level of phlebitis among IV cannulated patients before and after the palm fisting and proximal massage. The majority of the samples belong to the age group of 18–34 years both in the study group and control group. This finding was similar with the study conducted by Nyika *et al*.,[9] showed that most 65.22% of patients were from the age group of 30–59 years. The majority of the samples were with degree educational qualification in both the groups. This finding was similar with the study[9,10] showed that 62.6% were with bachelor degree. Regarding income, 66% of patients in the study group was with income Rs. 5001/-—Rs. 15,000/- and majority of samples 44% in the study group were with no comorbidity. This study was similar with the study conducted in hospitals[4,11] showed that most patients are getting income and with no concurrent illness. In the present study, majority of samples were with alcoholic history and smoking history in both the groups. This finding was similar with the study conducted by Varghese *et al*., showed that most 60.0% in group uses alcohol and 86.7% has smoking history.[12]

The second objective is to assess the effectiveness of palm fisting and proximal massage among IV cannulated patients. In the study group at the 72nd h, 91% of the samples were noted with Grade 0 level of thrombophlebitis. While in the control group, 41% of the samples had Grade 0 level of thrombophlebitis and 34% of the samples had Grade 1 level of thrombophlebitis. This study was similar with the study conducted by Lakshmi *et al*., showed that 90% of the patients had no phlebitis in the post-test.[13]

In the present study, the mean VIP score in the study group is 0.21 ± 0.73, whereas in the control group, the mean VIP score is 1.09 ± 1.23. The finding of the study conducted by Shiwani Devi and showed that the mean and standard deviation at 6th h (pre-test) 0.13 ± 0.34 and at 72nd h (post-test) 2.73 ± 0.980.[14]

The third objective is to find the association between post-test scores of the level of phlebitis among IV cannulated patients and their selected demographic variables. In the present

study, in association with current alcohol history and current smoking history of patients and thrombophlebitis, the Chi-square obtained value is 4.42 which is significant at 0.05 level. This study is similar with the study conducted by Shiwani Devi and showed that in association with habits (smoking and alcohol), history of patients, and thrombophlebitis, the Chi-square obtained value is significant at 0.05 level.[14] In the present study in association with paired "*t*"–test, value of pre-test and post test results is −1.760. This study was similar with the study conducted by Sarsar.[15]

Conclusion

In the light of the findings of the present study, palm fisting exercise and palm fisting with soft ball were effectiveness in reducing the occurrence of thrombophlebitis among IV cannulated patients, however, further studies can be done to compare proximal massage and palm fisting exercise with soft ball versus other thrombophlebitis management interventions.

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Conflicts of Interest

The author has no conflicts of interest.

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