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"The effectiveness of palm fisting exercise in reducing the risk of thrombophlebitis among intravenous cannulated patients: Quasi Experimental study"

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KEYWORDS

Palm fisting exercise, Thrombophlebitis, Effectiveness, Visual Infusion Phlebitis scale, Verbal Rating Scale

Abstract:

Background: Exercise is an activity that is planned, structured, and repeated for the goal of maintaining physical health. The practice of exercise is evident to improve the blood circulation. The most common complications associated with Intravenous cannulated patients is thrombophlebitis [Thrombo means clot, phlebitis means inflammation in a vein]. Palm fisting exercise highly effective for reducing the risk of thrombophlebitis.

Aim: is to assess the effectiveness of palm fisting exercise in reducing the risk of thrombophlebitis among Intravenous cannulated patients

Methodology: A Quantitative research approach and Quasi experimental [Time series non- equivalent control group design] was used. A sample size of 60 patients (30 in experimental group and 30 in control group) were taken by purposive sampling technique from Maharishi Markandeshwar Medical College & Hospital. Data was collected by Socio- demographic profile, clinical profile of Intravenous cannulated patients and VIP [Visual Infusion Phlebitis], VRS [Verbal Rating Scale].

Results: In experimental group during pre-test (at 0 hour) the mean VIP score was 2.00 with standard deviation of 0.74 while in post -test 1(at 12 hours), post- test 2(at 24 hours), posttest 3(at 36 hours) and post- test 4(at 48 hours) mean VIP score was 1.83, 1.37, 1.00 and 0.57with standard deviation of 0.59, 0.55,0.69 and 0.50.In experimental group, mean VIP rank of post- test 4(at 48 hours) was 1.38, higher than the mean rank of pre- test (at 0 hour) 4.35 (Fr= 95.48*, $p<0.05$). While in VRS mean rank of post- test 4 (at 72 hours) it was 1.68, higher than the pre-test (at 0 hour) which was 4.25 (Fr= 91.67*, $p<0.05$).

Conclusion: There is an effectiveness of palm fisting exercise in reducing the risk of thrombophlebitis among Intravenous cannulated patients.

INTRODUCTION

Peripheral venous cannulation is the commonest and frequently used technique by the nurses for the drug administration. Intravenous routes are the most preferable route in comparison to others as it delivers drug more rapidly but it is not free from complications. Minor instances are usually easy to handle and not very dangerous; however prompt identification and rapid intervention are necessary to avert severe consequences. In the realm of healthcare, thrombophlebitis remains a common concern[1]

Thrombophlebitis is a condition stemming from a blood clot, one or more veins just beneath the skin may become inflamed leading to this condition that usually occurs at the back of the head instead of in front of elbow fascia. Incidence of thromboembolism and associated mortality is affected by the presence of risk factors associated co-morbid conditions increase sensitivity and specificity of diagnostic testing. Phlebitis incidence in various countries like US, Iran, Spain, Sweden, Chandigarh,

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Brazil and Portugal is 41%, 1.9%, 62%, 29.8%, 16.7% and 11.9% which is associated with site of insertion, size of cannula and some other factors are also associated like age, gender and skin integrity of the patients **(Erdogen BC, Denat Y et al. 2016).**[2]

Incidence rate of thrombophlebitis (India) is about 50% in Kolenchery, and 29.8% of phlebitis in Chandigarh **(Saini R, Agnihotri M et al. 2011).** The symptoms of thrombophlebitis include visible veins, edema, redness and localized discomfort.[3] In a study conducted by **Thakur V, Verma SB. Et al (2021)** on the prevalence of thrombophlebitis in IGMC Shimla H.P. found that overall, 53.9% patients developed thrombophlebitis.[4]

Multiple researches showed that thrombus formation is brought about by inflammation due to different stimuli such as phlebitis caused by infusion pumps, infusion rate and pH values, cannula size, position and duration of disease**(Lanbeck P,Odenholt I et al .2002).**[5] Duration of cannula is also an important predictor for peripheral vein infusion thrombophlebitis and the Centre for Disease Control and Prevention (CDC) and the Healthcare Infection Control Practice Advisory Committee (HICPAC) recommends rotation of catheters site every 48 to 72 hours to minimize the risk of thrombophlebitis.[6]

Phlebitis can be divided into 4 types- Mechanical phlebitis, this type occurs when the movement of cannula within the vein causes friction and damages the walls of blood vessels. The selected vein is usually not large enough to accommodate the size of the cannula.For chemical phlebitis to happen, the pH of the solution being infused has to be of lower or higher values, when the osmolarity is too high may be caused by administration of drug (antibiotics and chemotherapy)Bacterial phlebitis is caused by contamination of IV system during catheter insertion of manipulation with the bacteria results in inflammatory response and may also lead to serious complication if left untreated Post-infusion phlebitis occurs normally after 48-96 hours of the removal of cannula .Incidence is mainly based on the material of catheter , length of time the cannula remained in the patient vein .[7]

Phlebitis manifests in four grades: Grade 1- erythema around the puncture site, with or without local pain; Grade 2- pain at the puncture site with erythema and/or edema and hardening; Grade 3- pain at the puncture site with erythema, hardening and palpable venous cord; Grade 4- pain at the puncture site with erythema, hardening and a palpable venous cord that is >1cm, with purulent discharge.[8]

According to previous study conducted by **Kouying Liu et al. Int J Nurs Stud.2018 Oct.** any type of upper limb movement can result in increased blood flow during insertion of intravenous catheter and lower the risk of thrombophlebitis among patients. Although there are different types of upper limb exercises which are helpful in increasing blood flow rate on the catheterization side and encourage venous circulation to decrease the risk of thrombosis.[9] Hand grip exercise is the most basic method for increasing flow of circulation in hands, the muscles of the hands while performing hand exercise and the surrounding blood vessels will relax, allowing more oxygenated blood to flow through. Improved blood circulation is thought to increase the amount of oxygen and others nutrients delivered to the tissues of the muscles, thus helps in reducing the risk of thrombophlebitis among patients. Hand grip exercise using an elastic ball could decrease the incidence of thrombophlebitis as it increases venous blood flow in patients, squeezing the ball will stimulate the upper extremities muscles including fingers, hands and grip[10]. Therefore, the present study was designed to assess the effectiveness of palm fisting exercise in reducing risk of thrombophlebitis among Intravenous cannulated patients.

METHODOLOGY

To achieve the desired objectives a quasi-experimental research [time-series non- equivalent control group design] was adopted with quantitative research approach. Study was conducted in surgery, medicine, Orto, gynae, ENT wards and ICU of Maharishi Markandeshwar Medical College and Hospital Solan, H.P. Data was collected in the month of May 2024. Data was collected from 60 hospitalized intravenous cannulated patients by using purposive sampling technique to see effectiveness of palm fisting exercise. The following inclusion criteria were established to determine study participation 1) patients who expressed willingness to take part in the research 2)individuals with an intravenous cannula inserted in the upper extremity, and 3) those who underwent no more than two cannulation attempts. Data collection was conducted using sociodemographic and clinical assessment tools. Sociodemographic information encompassed age (in years), gender, educational background, religion, residential location, marital status,

occupation, and socioeconomic level. The clinical assessment tool captured duration of cannula, size of cannula, site of cannula, body mass index, co-morbidities. VIP and VRS standardized tools were also used. Visual infusion phlebitis score(VIP) was used to identify the stage of phlebitis or thrombophlebitis , score ranged from 0 (healthy) to 5 (grossly infected). Verbal rating score (VRS) was used to assess level of pain through scoring of 0(no pain) to 3 (severe pain). Tools were validated from 7 experts whereas reliability of the tool was tested using SPSS statistics 23 Karl pearson Correlation coefficient (VIP – 0.9 and VRS 0.7). Ethical permission was taken from the information ethical committee of university (IEC). Data was analyzed in accordance with study's objectives using descriptive and inferential statistics such as frequency and percentage distribution, mean, standard deviation, chi square, Friedman test & Wilcoxon test.

Data collection

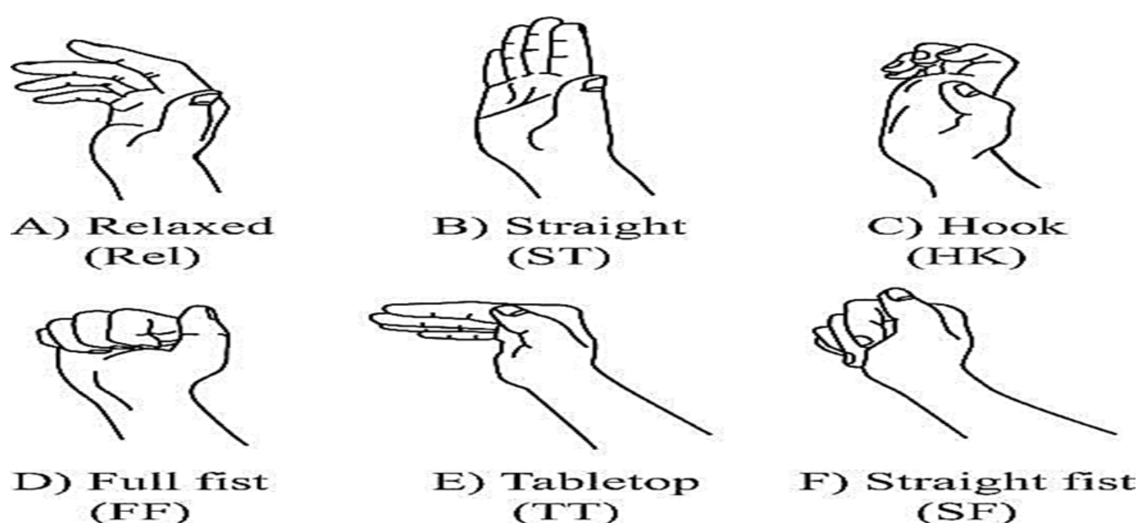
A structured questionnaire underwent pilot testing prior to implementation. The study population comprised hospitalized patients with intravenous cannulas at MMMC&H. Sample size determination was conducted through power analysis, utilizing a 5% margin of error, two-tailed significance testing, 95% confidence interval, and 80% statistical power to ensure adequate representation of the target population. The analysis indicated that a minimum of 30 participants per group was required, totaling 60 intravenous cannulated patients for the entire study. Data collection required approximately 15-20 minutes per participant.

INTERVENTION

Sample selection was conducted based on the study's predetermined inclusion and exclusion criteria, utilizing an observational data collection approach. The final dataset was compiled during May 2024. Initial contact involved establishing rapport with potential participants through introductions and explaining the study's purpose. Participants were encouraged to provide honest responses and subsequently provided written informed consent before enrollment. Data collection commenced with participants completing sociodemographic details, followed by assessment and documentation of clinical variables. The Visual Infusion Phlebitis (VIP) scale was employed to identify phlebitis stages, while the Verbal Rating Scale (VRS) was used to assess pain intensity levels. Following the assessment phase, participants were introduced to the palm fisting exercise intervention. This included a comprehensive explanation of the exercise's purpose and therapeutic benefits.

PROCEDURAL STEPS

1)From straight wrist exercise, close the palm bringing the fingers inward [toward the ball].2)Press all the fingers towards the inner muscles of the palm.3)Repeat this opening and closing by using the elastic ball. **Focus: -** Press the fingers together and open the palm, press the fingers against the inner palm, closing the palm-keep the arms stretched out with the wrist straight-feel the stretch around the wrist and all the fingers. Awareness around the stretches while breathing. Repeat this 20 times in each of twice a day lasting 30 seconds to 1 minute by squeezing the elastic ball. **Benefit: -** Increase flow of circulation in hands and increase the amount of oxygen and other nutrients delivers to the tissue of the muscles.



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Pretest was conducted initially and posttest was done at 12hour, 36hour , 48hour time interval for both experimental and control group. The data was used for scientific purpose and the individual data was kept confidential.

V. I. P. Score (Visual infusion phlebitis score)

Observation	Score	Stage / Action
I.V. site appears healthy	0	No sign of phlebitis; OBSERVE CANNULA
One of the following is evident : Slight pain near the i.v. site or slight redness near the i.v.site	1	Possible first sign of phlebitis; OBSERVE CANNULA
Two of the following are evident: Pale near i.v.site, Erythema, Swelling	2	Early stage of phlebitis; RESITE CANNULA
All of the following are evident: Pain along path of cannula, Erythema, Induration	3	Medium stage of phlebitis; RESITE CANNULA, CONSIDER TREATMENT
All of the following are evident &extensive: Pain along path of cannula, Erythema, Induration, Palpable venous cord	4	Advanced stage of phlebitis or start of thrombophlebitis; RESITE CANNULA, CONSIDER TREATMENT
All of the following are evident &extensive: Pain along path of cannula, Erythema, Induration, Palpable venous cord, pyrexia	5	Advanced stage of theombophlebitis; INITIATE TREATMENT, RESITE CANNULA

VERBAL RATING SCALE

0	1	2	3
No pain	Mild pain	Moderate pain	Severe pain

0. No pain or discomfort
1. Mild pain: feeling pain ,but no oral medication (analgesic)is required;
2. Moderate pain: feeling pain, but no oral medication (analgesic) is required;
3. Severe pain: feeling pain and is no longer able to perform any type of activity, feeling the need to lie down and rest (analgesics have little or no effect on pain relief).

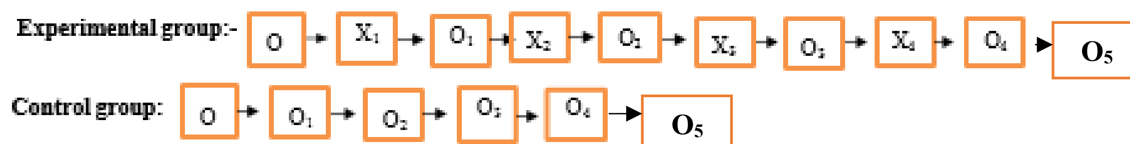
In Experimental group

Written informed consent was secured from participants after the researcher provided a comprehensive explanation of the study objectives and guaranteed confidentiality of their information. Subsequently, sociodemographic and clinical data were collected and assessed. Baseline evaluation was performed using the VIP scale to determine the stage of phlebitis and the VRS to measure pain intensity. The experimental group received the intervention immediately following the pre-test assessment on the same day. Post-intervention assessments were conducted at designated time intervals of 12, 24, 36, 48, and 72 hours.

Control group

The informed consent was taken from participants.

Assessment of sociodemographic characteristics and clinical parameters was conducted. Initial assessment was done using VIP (identify stage of phlebitis) and VRS scales (assess level of pain). On the same day of pre-test was taken, no intervention was given to the control group. Post test was conducted at time interval of 12hour, 24hour, 36hour, 48hour and 72 hour.



Schematic representation of research design

Key-

O – **Pre-test** on 1st observation

X_1 – Palm fisting exercise (**treatment**)

O1- 0bservation at 12 hours

O2- 0bservation at 24 hours

O3- 0bservation at 36 hours

O4-0bservation at 48hours

O5-0bservation at 72hours and **post-test**

Data analysis was conducted in accordance with the study objectives. Both descriptive and inferential statistical methods were employed, including frequency and percentage distribution, mean, standard deviation, chi-square test, Friedman test, and Wilcoxon signed-rank test. Statistical calculations were performed manually using a calculator and through SPSS Statistics version 23 software.

OBJECTIVES OF THE STUDY

1. To examine the Intravenous cannulated site for the risk of thrombophlebitis among patients in experimental and control group.
2. To determine the effectiveness of palm fisting exercise on the occurrence of thrombophlebitis by use of Visual Infusion Phlebitis (VIP) scale and Verbal Rating scale (VRS) among Intravenous cannulated patients in experimental group.
3. To compare the pre- test and post- test scores on the occurrence of thrombophlebitis among Intravenous cannulated patients in experimental and control group.
4. To find out association on the occurrence of thrombophlebitis with selected socio demographic and clinical variables among post -test scores of Intravenous cannulated patients in the experimental group.

RESULTS

Frequency and percentage distribution of selected demographic variable of intravenous cannulated patients admitted in MMMC&H in experimental and control group is shown in table 1.

Table1 - ANALYSIS OF THE SOCIODEMOGRAPHIC VARIABLES BY USING FREQUENCY AND PERCENTAGE IN EXPERIMENTAL AND CONTROL GROUP

N=60

Socio- demographic Variables	**Category**	**Experimental group f(%)**	**Control group f(%)**	**$\chi 2$**	**df**	**p value**
Age	21-40	15(50%)	10(33.33%)	2.78	4	0.59^{NS}
	41-60	10(33.33%)	11(36.66%)			
	61-80	5(16.66%)	9(30%)			
Gender	Male	13(43.33%)	13(43.33%)	0.22	1	0.638^{NS}
	Female	17(56.66%)	17(56.66%)			

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	Others	0	0			
Educational status	Illiterate	5(16.66%)	2(6.66%)	0.83	16	0.83 ^{NS}
	Elementary	6 (20%)	8(26.66%)			
	Secondary	14(46.66%)	13(43.33%)			
	Graduate	4(13.33%)	6(20%)			
	Post graduate	1(3.33%)	1(3.33%)			
Religion	Hindu	30(100%)	30(100%)	Not applicable		
	Muslim	0	0			
	Sikh	0	0			
	Christian	0	0			
Residential area	Urban	10(33.33%)	8(26.66%)	0.08	1	0.77 ^{NS}
	Rural	20(66.66%)	22(73.33%)			
	Semi-urban	0	0			
Marital status	Married	28(93.33%)	25(83.33%)	4.29	4	0.98 ^{NS}
	Unmarried	1(3.33%)	4(13.33%)			
	Separated	0	0			
	Widow	1(3.33%)	1(3.33%)			
Occupational status	Government job	4(13.33%)	2(6.66%)	9.10	9	0.42 ^{NS}
	Private job	6(20%)	5(16.66%)			
	Farmers	9(30%)	7(23.33%)			
	Others	11(36.66%)	16(53.33%)			
Socio economic status	≤1000	8(26.66%)	11(36.66%)	7.87	9	0.54 ^{NS}
	10001– 15000	16(53.33%)	11(36.66%)			
	15001– 20000	2(6.66%)	5(16.66%)			
	≥20001	4(13.33%)	3(3.33%)			

*** Significant ($p < 0.05$)** **^{NS} Non Significant ($p > 0.05$)**

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Table.1 delineates that according to age in experimental group, maximum 15 (50%) of patients belongs to age group of 21-40 years followed by 10 (33.3%) were of 41-60 years age group and minimum 5 (16.66%) lied between the age group of 61-80 years of age group whereas in control group, majority 11 (36.66%) of patients were of age group 41-60 years followed by 10 (33.33%) of patients were of age group 21-40 years and minority 9 (30%) lied between 61-80 years of age group.

According to gender in experimental group maximum 17 (56.66%) were female and minimum 13 (43.33%) were male followed by control group maximum 17 (56.66%) of the patients were females and minimum 13 (43.33%) were male.

According to educational status maximum 14 (46.66%) of patients belongs to secondary category followed by 6 (20%) belongs to elementary education followed by 5 (16.66%) of patients belongs to illiterate category followed by 4 (13.33%) belongs to graduate category and minimum 1 (3.33%) of patients belongs to post graduate category whereas in control group maximum 13 (43.33%) of patients belongs to secondary category followed by 8 (26.66%) were of elementary category followed by 6 (20%) were of graduate category followed by 2 (6.66%) were of illiterate category and minimum 1 (3.33%) of patients belongs to post graduate category

According to religion all the patients were Hindus 30 (100%) in experimental as well as control group.

According to residential area maximum 20 (66.66%) of patients belongs to rural area and minimum 10 (33.33%) of patients belongs to urban area whereas in control group maximum 22 (73.33%) of patients were of rural area and minimum 8 (26.66%) of patients were of urban area.

According to marital status majority 28 (93.33%) of patients were married and minority 1 (3.33%) of patients were unmarried and widow whereas in control group maximum 25 (83.33%) of patients were married followed by 4 (13.33%) were unmarried and minimum 1 (3.33%) of patients were widow.

According to occupational status maximum 11 (36.66%) of patients belongs to other category followed by 9 (30%) of patients were of farmer category followed by 6 (20%) of patients were of private job category and minimum 4 (13.33%) of patients were of government job category whereas in control group maximum 16 (53.33%) of patients were of others category followed by 7 (23.33%) of patients were of farmer category followed by 5 (16.66%) of patients were of private job category and minimum 2 (6.66%) of patients were of government job category.

According to socio-economic status majority 16 (53.33%) of patients belongs to 10001-15000 category followed by 8 (26.66%) of patients belongs to ≤1000 category followed by 4 (13.33%) of patients belongs to ≥20001 category and minority 2 (6.66%) of patients belongs to 15001-20000 category whereas in control group majority 11 (36.66%) of patients were of ≤1000 and 10001-15000 category followed by 5 ((16.66%) of patients were of 15001-20000 category and minority 3 (3.33%) of patients were of ≥20001 category.

Table 2 - ANALYSIS OF CLINICAL VARIABLES BY USING FREQUENCY AND PERCENTAGE IN EXPERIMENTAL AND CONTROL GROUP

N=60

Clinical variables	Category	Experimental group f(%)	Control group f(%)	χ2	df	p value
Duration of cannula	≤06 hours	5(16.66%)	0	5.40	6	0.49 NS
	7 – 9 hours	2(6.66%)	3(10%)			
	10 – 12 hours	6(20%)	13(43.33%)			
	≥13hours	17(56.66%)	14(46.66%)			
Size of cannula	16 G	0	0			

	18 G	0	4(13.33%)	1.85	2	0.39 NS
	20 G	27(90%)	20(66.66%)			
	22 G	3(10%)	6(20%)			
Site of cannula	Dorsum	17(56.66%)	21(70%)	3.35	4	0.50 NS
	Wrist	6(20%)	7(23.33%)			
	Forearm	7(23.33%)	2(6.66%)			
Body mass Index	Normal	18(60%)	24(80%)	7.14	4	0.12 NS
	Underweight	7(23.33%)	5(16.66%)			
	Overweight	5(16.66%)	1(3.33%)			
Comorbidities	Hypertension	2(6.66%)	2(6.66%)	12.45	4	0.01*
	Peripheral vascular disease	0	0			
	Diabetes	3(10%)	4(13.33%)			
	Any other illness	23(76.66%)	21(70%)			
	None	2(6.66%)	3(10%)			

*** Significant ($p < 0.05$)** **NS Non Significant ($p > 0.05$)**

Table 2 depicts that According to duration of cannula in experimental group maximum duration 17 (56.66%) was ≥13hours followed by 6 (20%) duration was of 10-12 hour , 5 (16.66%) duration was of ≤06 hours and minimum duration 2 (6.66%) was of 7-9 hour whereas in control group maximum duration 14 (46.66%) was ≥13hours followed by 13 (43.33%) duration was of 10-12 hour, 3 (10%) duration was of 7-9 hour and minimum duration 0 was of ≤06 hours

of patients were of 22 G category and minority 0 of patients were of 16 G and 18 G category whereas in control group majority 20 (66.66%) of patients were of 20 G category followed by 6 (20%) of patients were of 22 G category followed by 4 (13.33%) of patients were of 18 G category and minority 0 of patients were of 16 G category.

According to site of cannula maximum 17 (56.66%) of patients belongs to dorsum category followed by 7 (23.33%) of patients lies in forearm category and minimum 6 (20%) of patients belongs to wrist category whereas in control group maximum 21 (70%) of patients belongs to dorsum category followed by 7 (23.33%) of patients belongs to wrist category and minimum 2 (6.66%) of patients lies in forearm category.

According to BMI maximum 18 (60%) of patients were normal followed by 7 (23.33%) of patients were underweight and minimum 5 (16.66%) of patients were overweight whereas in control group maximum 24 (80%) of patients were normal followed by 5 (16.66%) of patients were underweight and minimum 1 (3.33%) of patients were overweight.

According to comorbidities maximum 23 (76.66%) of patients belongs to any other illness followed by 3 (10%) of patients were of diabetes followed by 2 (6.66%) of patients belongs to none and hypertension category and minimum 0 of patients were of peripheral vascular disease whereas in control group maximum 21 (70%) %) of patients belongs to any other illness followed by 4 (13.33%) of patients were of diabetes followed by 3 (10%) of patients belongs to none category followed by 2 (6.66%) of patients were of hypertension and minimum 0 of patients were of peripheral vascular disease.

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Table 3. ASSESSMENT OF PRE -TEST AND POST-TEST SCORES OF VISUAL INFUSION PHLEBITIS SCALE (VIP) AMONG INTRAVENOUS CANNULATED PATIENTS IN EXPERIMENTAL GROUP

EXPERIMENTAL GROUP n=30

Grade	Pre- test (At 0 hour) f (%)	Post -test 1 (At 12 hours) f (%)	Post -test 2 (At 24 hours) f (%)	Post -test 3 (At 36 hours) f (%)	Post -test 4 (At 48 hours) f (%)
0	0	0	1(3.33%)	7(23.33%)	13(43.33%)
1	8(26.7%)	8(26.7%)	17(56.7%)	16(53.33%)	17(56.7%)
2	14(46.7%)	19(63.33%)	12(40%)	7(23.33%)	0
3	8(26.7%)	3(10%)	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0

Minimum score = 0

Maximum score = 5

Table 3 delineates that most of the patients in experimental group lies in grade 2,14 (46.7%) during pre-test (at 0 hour) as well as in post-test 1(at 12 hours) it was 19 (63.33%). Where as in post-test 2 (at 24 hours) majority of the patients lies in grade 1, 17 (56.7%) same in post-test 3(at 36 hours) most of the patients lies in grade 2,16 (53.33%). In post-test 4 (at 48 hours) majority of the patients lies in grade 1 (56.7%).

Table 3.1 ASSESSMENT OF PRE -TEST AND POST-TEST SCORES OF VISUAL INFUSION PHLEBITIS SCALE (VIP) AMONG INTRAVENOUS CANNULATED PATIENTS IN CONTROL GROUP

CONTROL GROUP

n=30

Grade	Pre- test (At 0 hour) f (%)	Post -test 1 (At12 hours) f (%)	Post -test 2 (At 24 hours) f (%)	Post -test 3 (At 36 hours) f (%)	Post -test 4 (At 48 hours) f (%)
0	0	0	0	1(3.3%)	2(6.7%)
1	8(26.7%)	8(26.7%)	9(30%)	13(43.33%)	15(50%)
2	15(50%)	15(50%)	15(50%)	14(46.7%)	13(43.33%)
3	7(23.33%)	7(23.33%)	6(20%)	2(6.7%)	0
4	0	0	0	0	0

5	0	0	0	0	0

Maximum score = 5 **Minimum score = 0**

Table 3.1 states that most of the patients in control group lies in grade 2 that is 15(50%) in pre-test (at 0 hour), similarly in post-test 1(at 12 hours) as well as post-test 2 (at 24 hour) . In post-test 2 (at 24 hours) majority of the patients lies in grade 2 that is 15(50%) same in post- test 3 (at 36 hours) most of the patients lies in grade 2 that is 14(46.7%), whereas in post-test 4 (at 48 hours) most of the patients belongs to grade 1 that is 15(50%).

Table 4 -ASSESSMENT OF PRE -TEST AND POST-TEST SCORES OF VERBAL RATING SCALE (VRS) AMONG INTRAVENOUS CANNULATED PATIENTS IN EXPERIMENTAL GROUP

EXPERIMENTAL GROUP

n=30

Grade	**Pre-test (At 0 hour) f (%)**	**Post -test 1 (At 12 hours) f (%)**	**Post -test 2 (At 24 hours) f (%)**	**Post -test 3 (At 36 hours) f (%)**	**Post -test 4 (At 48 hours) f (%)**
No pain (0)	0	0	8(26.66%)	18(60%)	21(70%)
Mild (1)	18 (60%)	20(66.66%)	17(56.66%)	11(36.66%)	9(30%)
Moderate (2)	11 (36.66%)	10(33.33%)	5(16.66%)	1(3.33%)	0
Severe (3)	1 (3.33%)	0	0	0	0

Maximum score = 0 **Minimum score = 3**

Table 4 depicts that according to severity of pain in experimental group most of the patients were having mild pain 18 (60%) during pre-test(at 0 hour) ,similarly in post-test 1(at 12 hours),20 (66.66%) followed by post-test 2 (at 24 hours), 17 (56.66%),whereas in post-test 3(at 36hours), 18(60%) and post-test 4 (at 48 hours), 21 (70%) maximum patients lies in category of no pain.

TABLE 4.1.ASSESSMENT OF PRE -TEST AND POST-TEST SCORES OF VERBAL RATING SCALE (VRS) AMONG INTRAVENOUS CANNULATED PATIENTS IN CONTROL GROUP

CONTROL GROUP

n=30

Grade	**Pre-test (At 0 hour) f (%)**	**Post -test 1 (At 12 hours) f (%)**	**Post -test 2 (At 24 hours) f (%)**	**Post -test 3 (At 36 hours) f (%)**	**Post -test 4 (At 48 hours) f (%)**
No pain (0)	1 (3.33%)	1(3.33%)	4(13.33%)	8(26.66%)	9(30%)
Mild (1)	17 (56.66%)	20(66.66%)	21(70%)	22(73.33%)	21(70%)
Moderate (2)	12 (40%)	9(30%)	5(16.66%)	0	0
Severe (3)	0	0	0	0	0

Maximum score = 0 **Minimum score = 3**

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Table 4.2.4 depicts that according to the severity of pain in control group most of the patients belongs to mild pain category during pre-test (at 0 hour), 17 (56.66%) similarly in post-test 1 (at 12 hours) ,20 (66.66%) followed by post-test 2(at 24 hours), 21 (70%) whereas in post-test 3 (at 36 hours) majority of the patients belongs to mild pain category 22(73.33%) followed by post-test 4 (at 48 hours) 21 (70%).

TABLE 5:-EFFECTIVENESS OF PALM FISTING EXERCISE ON THE OCCURRENCE OF THROMBO-PHLEBITIS BY USE OF VISUAL INFUSION PHLEBITIS (VIP) AND VERBAL RATING SCALE (VRS) AMONG INTRAVENOUS CANNULATED PATIENT IN EXPERIMENTAL GROUP

EXPERIMENTAL GROUP

n=30

VIP					**VRS**			
Time	**Mean ± SD**	**Mean Rank**	**Fr**	**p Value**	**Mean ± SD**	**Mean Rank**	**Fr**	**p Value**
Pre test (At 0 hour)	2.00 ±0 .74	4.35	95.48*	0.00*	1.43 ±0 .56	4.25	91.67*	0.00*
Post-test 1 (At 12 hours)	1.83 ± 0.59	4.05			1.33 ± 0.47	4.07		
Post-test 2 (At 24 hours)	1.37 ± 0.55	3.03			0.90 ± 0.66	3.05		
Post-test 3 (At 36 hours)	1.00 ±0.69	2.18			0.43 ± 0.56	1.95		
Post-test 4 (At 48 hours)	0.57 ± 0.50	1.38			0.30 ± 0.46	1.68		

NS Not Significant (p>0.05) **Significant (p<0.05)**

Maximum VIP score= 5, VRS **Minimum VIP &VRS score = 3**

Table 4.3.1 delineate that in experimental group during pre-test (at 0 hour) the mean VIP score was 2.00 with standard deviation of 0.74 while in post -test 1(at 12 hours), post- test 2(at 24 hours), post -test 3(at 36 hours) and post- test 4(at 48 hours) mean VIP score was 1.83, 1.37,

1.00 and 0.57 with standard deviation of 0.59, 0.55,0.69 and 0.50. Whereas in experimental group during pre-test (at 0 hour) the mean VRS score was 1.43 with standard deviation of 0.56 while in post -test 1(at 12 hours), post-test 2(at 24 hours), post -test 3(at 36 hours) and post-test 4(at 48 hours) mean VRS score was 1.33, 0.90, 0.43 and 0.30 with standard deviation of 0.47, 0.66,0.56 and 0.46.

In experimental group, mean VIP rank of post- test 4(at 48 hours) was 1.38, higher than the mean rank of pre- test (at 0 hour) 4.35 **(Fr= 95.48*, p<0.05).** While in VRS mean rank of post- test 4 (at 72 hours) it was 1.68, higher than the pre-test (at 0 hour) which was 4.25 **(Fr= 91.67*, p<0.05).**

Hence, **research hypothesis (H1) was accepted**. Thus, it was concluded that palm fisting exercise was effective in reducing the risk of thrombophlebitis among intravenous cannulated patients in experimental group.

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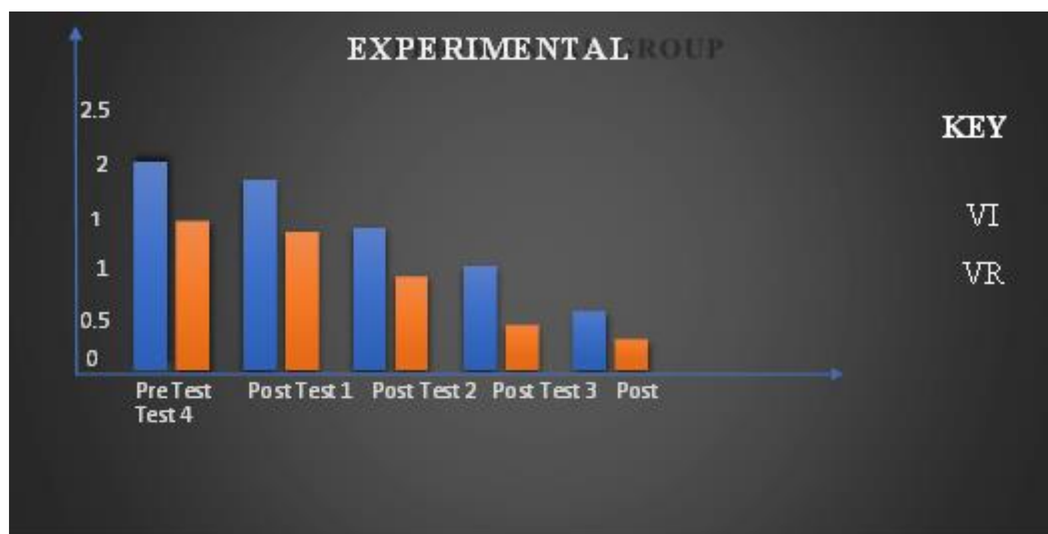

Fig. 1 Mean score with time graph

TABLE 6.COMPARISON OF PRE-TEST AND POST-TEST SCORES OF VISUAL INFUSION PHLEBITIS (VIP) AMONG INTRAVENOUS CANNULATED PATIENTS IN EXPERIMENTAL AND CONTROL GROUP

N=60

VIP (EXPERIMENTAL AND CONTROL GROUP)				
Time	**Mean Rank**	**Sum of Ranks**	**Z**	**p Value**
(At 0 hour) **Pre- test E– Pre- test C**	10.00	90.00	-0.20	0.83 NS
(At 12 hours) **Post-test 1E-Post-test 1C**	8.71	61.00	-0.78	0.43 NS
(At 24 hours) **Post-test 2E-Post-test 2C**	10.50	63.00	-2.67	0.00*
(At 36 hours) **Post-test 3E-Post-test 3C**	10.50	21.00	-2.74	0.00*
(At 48 hours) **Post-test 4E-Post-test 4C**	8.50	17.00	-3.73	0.00*

NS Not Significant **Significant ($p<0.05$)**

Maximum VIP score= 5, VRS = 3 **Minimum VIP &VRS score = 0**

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TABLE 4.4.1 shows mean rank, sum of rank and Z value of Verbal Infusion Phlebitis (VIP) score within the groups. From the above data it has been concluded that in pre-test E - pre-test C there was no significant difference in mean VIP rank (Z=-0.20, p=0.83), similarly no significant difference is found between post-test 1E – post-test 1C (Z=-0.78, p=0.43) whereas between post-test 2E- post-test 2C (Z=-2.67, p=0.00), in post-test 3E-post-test 3C and post-test 4E-post-test 4C there is significant difference in mean VIP rank.

Table 6.1 COMPARISON OF PRE-TEST AND POST-TEST SCORES OF VERBAL RATING SCALE (VRS) AMONG INTRAVENOUS CANNULATED PATIENTS EXPERIMENTAL AND CONTROL GROUP

N=60

VRS (EXPERIMENTAL AND CONTROL GROUP)				
Time	**Mean rank**	**Sum of ranks**	**Z**	**p Value**
(At 0 hour) **Pre- Test E – Pre- Test C**	7.43	52.00	-0.50	0.61^{NS}
(At 12 hours) **Post- Test 1E-Post-Test 1C**	7.50	60.00	-0.53	0.59^{NS}
(At 24 hours) **Post-Test 2E-Post-Test 2C**	7.75	46.50	-0.81	0.41^{NS}
(At 48 hours) **Post-Test 3E-Post-Test 3C**	10.50	21.00	-2.18	0.29^{NS}
(At 72 hours) **Post-Test 4E-Post-Test 4C**	7.50	7.50	-3.20	0.01*

^{NS} Not Significant **Significant ($p<0.05$)**

Maximum VIP score= 5, VRS = 3 **Minimum VIP &VRS score = 0**

TABLE 6.1 depicts mean rank, sum of rank and Z value of Verbal Rating scale (VRS) score within the groups. From the above data it has been concluded that there was no significant difference in mean VRS rank of pre -test E- pre- test C(at 0 hour) (Z=-0.50, p=0.61), post- test 1E- post -test 1C(at 12 hours) (Z=-0.53, p=0.59), post- test 2E-post- test 2C(at 24 hours) (Z=- 0.81, p=0.41), post- test 3E-post -test 3C(at 36 hours)(Z=-2.18, p=0.29) respectively, whereas it was concluded that while comparing between post- test 4E- post- test 4C (at 48 hours) there was significant difference seen in VRS rank (Z=-3.20, p=0.01).

Table7- ASSOCIATION ON THE OCCURRENCE OF THROMBOPHLEBITIS WITH SELECTED SOCIODEMOGRAPHIC VARIABLES AMONG POST- TEST SCORE OF VISUAL INFUSION PHLEBITIS (VIP) SCALE AMONG INTRAVENOUS CANNULATED PATIENT IN EXPERIMENTAL GROUP

n=30

Socio- demographic variables	**Categories**	**POST TEST OF VIP SCORES**		**χ2**	**df**	**Table value**	**p value**
		Grade 0	**Grade 1**				

Age	21-40	5	5	1.88	2	5.99	0.39^{NS}
	41-60	5	4				
	61-80	3	8				
Gender	Male	7	6	1.03	1	3.84	0.31^{NS}
	Female	6	11				
Education	Illiterate	0	6	10.68	4	9.49	0.03*
	Elementary	3	3				
	Secondary	7	6				
	Graduate	3	1				
	Post graduate	0	1				
Religion	Hindu	13	17	Not applicable			
	Muslim	0	0				
	Sikh	0	0				
	Christian	0	0				
Residential area	Urban	4	6	0.06	1	3.84	0.79^{NS}
	Rural	9	11				
	Semi-urban	0	0				
Marital status	Married	13	15	1.63	2	5.99	0.44^{NS}
	Unmarried	0	1				
	Separated	0	0				
	Widow	0	1				
Occupational status	Government job	2	2	1.13	3	7.82	0.77^{NS}
	Private job	3	2				
	Farmers	4	5				
	Others	4	8				
Socio- economic status	≤1000	2	6	1.49	3	7.82	0.68^{NS}
	10001– 15000	8	8				
	15001– 20000	1	1				
	≥20001	2	2				

*** Significant (p < 0.05)** **^{NS} Non Significant (p > 0.05)**

TABLE 7 depicts that there is significant association on the occurrence of thrombophlebitis with selected sociodemographic variables (educational status) among post test score of Visual Infusion Phlebitis scale (VIP) among Intravenous cannulated patients in experimental group that is (p> 0.05).

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DISCUSSION

While assessing the risk with **VIP**, most of the patients in **experimental group** fall in grade 2

-14(46.7%) during pre-test (at 0 hour) as well as in post-test 1(at 12 hours) it was 19(63.33%). Where as in post-test 2 (at 24 hours) majority of the patients lies in grade 1- 17(56.7%) same in post-test 3(at 36 hours) most of the patients lies in grade 1- 16(53.33%). In post-test 4 (at 48 hours) majority of the patients lies in grade1- 17(56.7%). And in **control group** most of the patients in control group lies in grade 2 that is 15(50%) in pre-test (at 0 hour), whereas 15(50%) in post-test 1(at 12 hours). In post-test 2 (at 24 hours) majority of the patients lies in grade 2 that is 15(50%) same in post-test 3 (at 36 hours) most of the patients lies in grade 2 that is 14(46.7%), whereas in post-test 4 (at 48 hours) most of the patients belongs to grade 1 that is 15(50%).

While assessing the risk with **VRS**, present study shows that most of the patients in **experimental group** belongs to mild pain category 18(60%) during pre-test(at 0 hour) , same in post-test 1(at 12 hours) majority of the patients lies in mild pain category 20(66.66%) ,In post-test 2 (at 24 hours)most of the patients again lies in mild pain category 17(56.66%),whereas in post-test 3(at 36 hours) majority of the patients belongs to no pain category 18(60%) same in post-test 4 (at 48 hours) most of the patients belongs to no pain category 21(70%). And in **control group** most of the patients in control group belongs to mild pain category 17(56.66%) during pre-test (at 0 hour), same in post-test 1 (at 12 hours) majority of the patients lies in mild pain category 20(66.66%) ,In post-test 2(at 24 hours) most of the patients again lies in mild pain category 21(70%),whereas in post-test 3 (at 36 hours) majority of the patients belongs to mild pain category 22(73.33%) same in post-test 4 (at 48 hours) most of the patients belongs to mild pain category 21(70%).

Based on findings of second objective revealed that the palm fisting exercise was effective in reducing the risk of thrombophlebitis. Similar findings were reported by study conducted by **Bai. Regi. R (2022)** on the Effectiveness of Proximal massage and Palm fisting exercise in reducing the risk of thrombophlebitis among Intravenous cannulated patients at Coimbatore, Tamil Nadu. The findings of the study concluded that mean VIP score in the experimental group was **1.21±0.73,** whereas in the control group the mean VIP score was **2.09±1.23** which shows that proximal massage and palm fisting reduce the risk of thrombophlebitis. The obtain t-test value is - **1.648** which is significant at 0.05 level[11].

Third objective of the study revealed that while comparing between pre-test and post-test of experimental and control group ,there was significant difference found at 24hour, 36 hour and 48hour in mean VIP rank whereas in at 48 hour significant difference was found in VRS rank.

Present study revealed that there is significant association on the occurrence of thrombophlebitis with selected **sociodemographic variables** (educational status) among post test score of **VIP** among intravenous cannulated patients in experimental group that is **($p<0.05$)** & there is no significant association on the occurrence of thrombophlebitis with selected sociodemographic variables among post test score of **Verbal Rating scale (VRS)** among intravenous cannulated patients in experimental group that is ($p>0.05$) and there is no significant association on the occurrence of thrombophlebitis with selected **clinical variables** among post test score of **VIP** among intravenous cannulated patients in experimental group that is **($p>0.05$)** and there is no significant association on the occurrence of thrombophlebitis with selected clinical variables among post test score of **VRS** among intravenous cannulated patients in experimental group that is **($p>0.05$)**

RECOMMENDATIONS

Based on the study findings, the following recommendations are proposed:

1) Replication of this study with a larger sample size is recommended to validate and generalize the results.2) A true experimental design should be conducted to evaluate the effectiveness of palm fisting exercises in reducing thrombophlebitis risk among patients with intravenous cannulation.3)A comparative study can be conducted to compare the effects of palm fisting exercise and proximal massage on thrombophlebitis. 4)The study can be de limit to all age group people and with cannula insertion of 12 hours to assess the effect of palm fisting exercise on thrombophlebitis 5)Further research can explore the effects of palm fisting exercise on reducing risk of thrombophlebitis. 6)A study can be done in a variety of

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areas.7)A similar study might be conducted again with a large sample size to prove and generalize its results.

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