Effectiveness of Proximal Massage and Palm Fisting Exercise in Preventing Thrombophlebitis among Intravenous Cannulated Patients in a Teaching Hospital

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Background of the Study

- Peripheral intravenous cannula insertion is the **most common procedure** done for about **30-80%** of hospitalized patients (Zhang et al., 2016).
- A systematic review and meta-analysis revealed **phlebitis** (19.3%) as the most **common reason for IV cannula failure** (Marsh et al., 2020) with it's highest prevalence in **Asia (16%)** (Alexandrou et al., 2023).

- The acceptable phlebitis rate is **5%** (Infusion Nurses Society, 2006), however, an observational study in Nepal (N=465) reported a significantly higher phlebitis rate of **33.4%** (Dhungana, 2018), which can lead to **increased** discomfort, increased length of hospital stay and even worst complications like **pulmonary embolism and acute endocarditis** (Lipe et al., 2023; Lee et al., 2019).

Background of the Study cont'd

- Thrombophlebitis is a **significant ongoing** issue which requires a **multifaceted approach** with quality nursing care. Some studies have shown efficacy of **physical measures** like proximal massage and palm fisting exercise (Bai, 2022;Bakhtiar & Sengupta, 2021).
- So, this non-pharmacological approach needs more research to establish the evidence.

Objectives of the Study

General objective

- To **assess the effectiveness** of proximal massage and palm fisting exercise in preventing thrombophlebitis among Intravenous cannulated patients in Patan Hospital, Lalitpur, Nepal.

Specific objectives

- To find out **grade of thrombophlebitis** among experimental group after providing proximal massage and palm fisting exercise and among control group without intervention.
- To **compare the visual infusion phlebitis score** (indication of thrombophlebitis) between experimental group after proximal massage and palm fisting exercise and control group without intervention.

Methodology

Place of study	• Patan Hospital (Medical ward, Geriatric ward, Surgical ward, Orthopedic ward, Post- partum ward and Gyanecology ward
Population of study	• IV cannulated patients who were above 18 years
Duration of Study	• November 2022 to April 2024
Research Design	• A quasi- experimental: post-test only design
Sampling technique	• A non-probability purposive sampling followed by simple random sampling
Sample size	• **50 (with addition of 20% attrition rate)** (25 in each group).Sample mortality of 2 in each group, resulted into total 46 sample with 23 in each group.

Methodology cont'd

Inclusion criteria	Exclusion Criteria
▪Newly Cannulated (1st day of insertion) ▪Hospital stay for more than three days ▪Visual Infusion Phlebitis (VIP) score zero ▪Age >18 years ▪Having IV cannula in upper extremities	▪Not willing to participate in the study ▪Who couldnot comprehend and follow researcher's direction ▪Under Chemotherapy, injection flucloxacillin and injection KCL

Methodology cont'd

Data collection instrument

1. **Structured interview schedule**

2. **Visual infusion phlebitis (VIP) scale:** standardized tool, which provides a score from **0 to 5**

3. **Interventional Protocol** (Content Validity was established with 3 subject matter experts: ICVI=1, SCVI=1). **Pretesting** was done on **10% of total sample** size (n=6).

3. Interventional Protocol

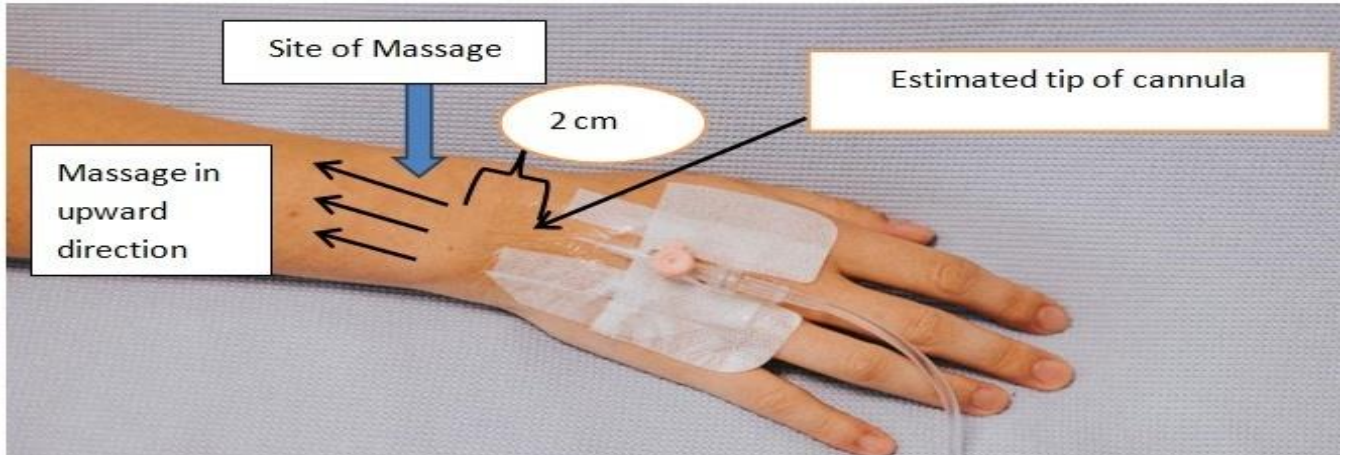

Figure 1: Proximal Massage (20 strokes)

Figure 2: Palm Fisting (20 times)

The intervention was done for **three days**

- **1st day of cannula insertion → 1 time**
- **2nd and 3rd day of cannula insertion → two times in a day at 3 hours interval**
- **The** cannula was observed using **VIP Scale at 2nd, 3rd and 4th day.**
- If VIP score ≥1 in any of the observation, **then intervention was stopped, score was recorded as post test**

Methodology cont'd

Data Processing and analysis	▪SPSS **software version 16**. ▪**Descriptive statistics** and **inferential statistics** [Man Whitney U test, since the data was not normally distributed (**Sapiro Wilk test** *(p=0.00)*] ▪The significance level was considered at p-value<0.05.

Strategies to Minimize threats to Validity	
▪**Selection bias**	Random sampling for allocation of participants to experimental and control groups. Homogeneity between the experimental group and control group was maintained (p>0.05)
▪**Instrumentation**	Same, valid and reliable tool was used for all participants.
▪**Diffusion of treatment**	The participants in the experimental and control group were selected from different rooms
▪**History, Maturation**	Control group was used
▪Sample Mortality	Could not be controlled

Results

Table 1. Socio-demographic Information of the Participants

N=46

Variables	Control group (n=23) Frequency (%)	Experimental group (n=23) Frequency (%)
Age in years*		
Mean ± SD	**51.74±14.98**	**45.09±19.93**
Gender		
Male	11(48)	11(48)
Female	12(52)	12(52)

*Note * Age categorization based on Erik Erikson Psychosocial development*

Table 2. Clinical Information of the Participants

N=46

Variables	Control group(n=23) Frequency (%)	Experimental group(n=23) Frequency (%)
Body mass Index(BMI)		
Mean ± SD	22.80±4.10	22.98±5.01
Site of cannula		
Dorsum	**12(52.2)**	**13(56.6)**
Wrist	6(26.1)	6(26.1)
Forearm	3(13.0)	3 (13.0)
Size of cannula		
22 G	9(39.1)	10(43.5)
20 G	**13(56.6)**	**12(52.2)**
18 G	1(4.3)	1 (4.3)
Type of Medication administered		
Antibiotics	**16(69.6)**	**16(69.6)**
Others	7(30.4)	7 (30.4)

Table 3. Comparison of Participants in Experimental and Control Group

N=46

Variables	Control group(n=23) Frequency (%)	Experimental group(n=23) Frequency (%)	Chi-square value(χ^2)	*p*-value
Age in years				
≤ 48	8(34.8)	12(52.2)	1.415	**0.234**
>48	15(65.2)	11(47.8)		
Gender				
Male	11(47.8)	11(47.8)	0.000	**1.000**
Female	12(52.2)	12(52.2)		
BMI				
Normal	10(43.5)	13(56.5)	0.783	**0.376**
Others	13(56.5)	10(43.5)		

Table 3. Comparison of Participants in Experimental and Control Group cont'd

N=46

Variables	Control group(n=23)	Experimental group(n=23)	Chi-square value(χ^2)	*p*-value
Site of cannula				
Dorsum	12(52.2)	13(56.5)	0.088	**0.767**
Above Dorsum	11(47.8)	10(43.5)		
Size of cannula				
≤20 G	14(60.9)	13(56.5)	0.900	**0.765**
>20G	9(39.1)	10(43.5)		
Type of Medication administered				
Antibiotics	16(69.6)	16(69.6)	0.000	**1.000**
Others	7(30.4)	7(30.4)		

Table 4. Grade of thrombophlebitis among control group and experimental group after intervention

N=46

Grade	Control group (n=23) Frequency (%)	Experimental group (n=23) Frequency (%)	Chi-square test	p-value
0	7(30.4)	**12(52.1)**	6.58	**0.037***
1	5(21.7)	8(34.7)		
2	**11(47.8)**	3(13.04)		

Note: *p-value <0.05=statistically significant

Table 5. Comparison of VIP score between the Participants of Experimental and Control group

N=46

Group	VIP score (Mean ±SD)	VIP score Median	IQR (Q3-Q1)	Mann Whitney U	p-value	Effect size(r)
Experimental (n=23)	0.61±0.72	0	1	**170.5**	**0.028***	**0.71**
Control (n=23)	1.17±0.88	1	2			

*Note: *p-value <0.05=statistically significant,Median 0= no thrombophlebitis, IQR=Inter Quartile Range, Formula to calculate effect size, Cohen's d: M_T-M_C/SD_{pooled}*

Conclusion

- Proximal massage and palm fisting exercise is **simple and non-invasive method which could be performed by nurses** to **prevent intravenous cannula related thrombophlebitis.**

Recommendation

- A **true experimental research study** can be conducted for better generalization of the findings.
- **Future studies** can be conducted by **controlling other confounding factors** like various medications with different dose and frequency.
- Additional **comparative study can be done to compare** the efficacy of proximal massage and efficacy of palm fisting exercise,

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THANK YOU!