

Effectiveness of Structured Teaching Programme Regarding Phlebitis Associated with Peripheral Intravenous Cannulation Among Nurses Working in Selected Wards of BPKIHS

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ABSTRACT

Background and objective: Factors significantly associated with the occurrence of phlebitis are underlying risk for any nosocomial infection. A study was conducted to assess the effectiveness of structured teaching programme regarding phlebitis associated with peripheral intra venous cannulation among nurses working in Selected Wards of BPKIHS, “a tertiary level medical university in Nepal”

Methods: The research design used for this study was one group pre-test and one post-test design. Fifty nurses were selected by non-probability convenient sampling technique. The data were collected in before and after educational intervention to assess the pretest and posttest knowledge about the phlebitis associated with peripheral intravenous cannulation. The data were analyzed and interpreted by descriptive and inferential statistics.

Results and Conclusion: Findings of the study shows that the highest percentage of respondents was in age group ≤ 35 (70%). The mean score of pretest knowledge was found to be 19.80 with Standard Deviation is 3.24 and mean score of posttest knowledge was found to 24.12 with SD 2.63. The difference on knowledge of pretest and posttest was found to be significant ($p= 0.001$). Pretest knowledge score of nurses was less regarding phlebitis associated with peripheral intravenous

cannulation. After implementation of structural teaching programme the knowledge score of Nursing Staffs was improved. So it can be concluded that educational intervention was effective.

Keywords: Effectiveness, Nurses, Phlebitis, Structured teaching programme

INTRODUCTION

Phlebitis is inflammation of the vein. It is due to peripheral intravenous cannulation while setting wrong position, injecting vasoactive drugs, and using prolong time cannulation of the vein. Peripheral venous catheter (PVC), peripheral venous access catheter is a catheter (small flexible tube) placed into a peripheral vein in order to administer medication or fluids. Upon insertion, the line can be used to draw blood.¹

Peripheral vein cannulation is commonly performed for rapid and accurate administration of medications. Phlebitis is one of the commonest complications that develop after intravenous catheter application. Registered nurses must be qualified in practical skill performance to ensure quality in patient care. Practical nursing skills are complex tasks involving technical aspects, theoretical and practical

knowledge, caring intentions adjusted to both patient and environment, and ethical and moral considerations. Although practical skill learning is a core component in nursing education, many newly graduated nurses lack proficiency in practical skills. Peripheral vein cannulation is one of the most frequently performed invasive skills by nurses working in hospitals, with up to 70–80 percent of hospitalised patients requiring medication delivered through a vein cannula. PVC is considered the skill most difficult to master, especially the technical part of the cannula insertion: how to insert the cannula into the vein. Mastering the technical part of PVC is important for completing other elements of the skill and undertaking it in a satisfactory manner.²

Study conducted on 150 patients who were admitted to the medical and surgical division of the hospital during the period from July 2018 to April 2019. The factors studied were age, gender, site of insertion, place of insertion, cannula size, IV medications, and blood products used. Phlebitis was graded using Visual Infusion Phlebitis Score. Finding of the study was Incidence of phlebitis was found to be 31.4% from our study. The increased incidence rate of phlebitis was seen in the female gender, age less than 60 years, insertion in the lower limb, large catheter size, catheters inserted in emergency situations, and IV drugs administration.³

Phlebitis is characterized by inflammation of the vein wall and can be accompanied by symptoms such as edema, pain, and erythema near the catheter insertion site or along the affected vein, sometimes progressing to palpable venous cord, intense redness, tenderness, and fever. Factors affecting the incidence of phlebitis can be classified into individual factors, such as sex, age, underlying health conditions such as infectious or hypertensive disease and surgery, and caregiver residence, chemical factors, such as the osmolality of the injected drug, number of medications, type of antibiotics, and rate and method of drug injection, mechanical factors, such as

catheter dwell time, which can cause friction due to intravascular movement of the catheter, catheter insertion site, and catheter size, and infectious factors, such as hand hygiene of health professionals and nurse's skill in administering intravenous injection. However, there is little literature on phlebitis associated with PIVC, and it is less conclusive.⁴

Peripheral intravenous catheter-related phlebitis is a common and significant problem in clinical practice. This study was carried out to determine the occurrence of peripheral intravenous catheter related phlebitis and to define the possible factors associated to its development. Prospective observational study was carried out on 230 clients who were under first time peripheral infusion therapy during two months period: September - October, 2007. Peripheral infusion site was examined for signs of phlebitis once a day. Jackson Standard visual phlebitis scale was used to measure the severity of the phlebitis. SPSS software was used to enter, edit and analyze the data and t-test, chi-square test, binary logistic regression and ROC curve were used to draw the statistical inferences. Phlebitis developed in 136/230 clients (59.1%). It was very mild in most cases. Increased incidence rates of infusion related phlebitis were associated with male sex, small catheter size (20 gauge), insertion at the sites of forearm, IV drug administration and blood product transfusions. The incidence rate of phlebitis rose sharply after 36 hours of catheter insertion. Peripheral Intravenous therapy related phlebitis at KUTH, Dhulikhel Hospital is a significant problem. Related risk factors as found in the present study were insertion site (forearm), size of catheter (20G) and dwell time (\geq 36 hours). There was higher incident of phlebitis among the client with Intra venous drug administration and especially between ages 21 - 40 years. Therefore more attention and care are needed in these areas by the care provider.⁵

Study conducted by Anabela Salgueiro-Oliveira, Pedro Parreira, Pedro Veiga on

Incident of Phlebitis in patients with peripheral intravenous catheter: The influence of some risk factors, resulted that A total of 1,244 catheters were observed, and 317 were removed/inserted. Incidence of phlebitis was 11.09%. A multivariate analysis of risk factors for phlebitis showed patients with KCI (OR: 2.112; CI: 1.124‑3.969), who were on antibiotics (OR: 1.877; CI: 1.141‑3.088) and who had a catheter in an upper limb (OR: 0.31; CI: 0.111‑0.938) were at higher risk for phlebitis. & The results show the accurate selection of the catheterisation site, which relies entirely on the nursing intervention, is an important factor for phlebitis.⁶

Study conducted by Maki and ringer shows that cannula choosing an inadequate diameter can increase the rate of phlebitis. Phlebitis also found when a cannula is inserted in an antecubital vein or wrist region. One of the major risks for phlebitis incidence is related to placement and maintenance of PVC by insufficiently trained staff and staff with less work experience. Proper stabilization and securing of the insertion site can significantly reduce the risk of phlebitis, and other phlebitis-related complications. The risk of mechanical phlebitis is significantly lower with a proper primary (proximal) and secondary (distal) stabilization of the cannula. Most current standards and best practice guidance indicate that PVC replacement should be considered every 72 - 96 hours. Further researchers found that risk for phlebitis exceeded 50% by day 4 after catheterization. Intravenous antibiotics (relative risk, 2.00), female sex (relative risk, 1.88), prolonged (greater than 48 hours) catheterization (relative risk, 1.79), and catheter material (PEU-Vialon: FEP-Teflon) (relative risk, 0.73) strongly predicted phlebitis in a Cox proportional hazards model (each, P less than 0.003). The best-fit model for severe phlebitis identified

the same predictors plus catheter-related infection (relative risk, 6.19), phlebitis with a previous catheter (relative risk, 1.54), and anatomic site (hand: forearm, relative risk, 0.71; wrist: forearm, relative risk, 0.60). The low incidence of local catheter-related infection was comparable with the two catheter materials (5.4% [95% CI, 3.8% to 7.6%] and 6.9% [CI, 4.9% to 9.6%]); none of the 1054 catheters prospectively studied caused bacteremia.⁷

MATERIALS AND METHODS

The research design adopted for the study was pre-experimental (One group pretest posttest design). The study was conducted in” selected wards of BPKIHS Dharan. Non probability convenient sampling technique was used to select 50 nurses (BN/BSc staff nurse Sr. ANMs) who were working in surgical and orthopedic wards of BPKIHS. Ethical approval was obtained from IRC committee of BPKIHS. Informed written consent was obtained from each participant. Instrument was pretested among 10% of the sample size in the same setting to identify the feasibility, completeness, comprehensiveness and appropriateness. Data was collected by Questionnaire method both in pretest and posttest. Teaching programme or educational intervention was conducted immediately after that pretest. Then post test data was collected after 2 week of educational intervention. Data obtained were coded and entered in Microsoft excel 2010 and converted to SPSS sheet version 11.5 for statistical analysis. Descriptive statistics was used to describe the socio-demographic variables and. Inferential statistics; Pearson’s Chi Square test was used to show the association between the knowledge and selected sociodemographic variables and inferential statistics (Paired “t” test) was used to find out difference in knowledge between pretest and posttest.

RESULT

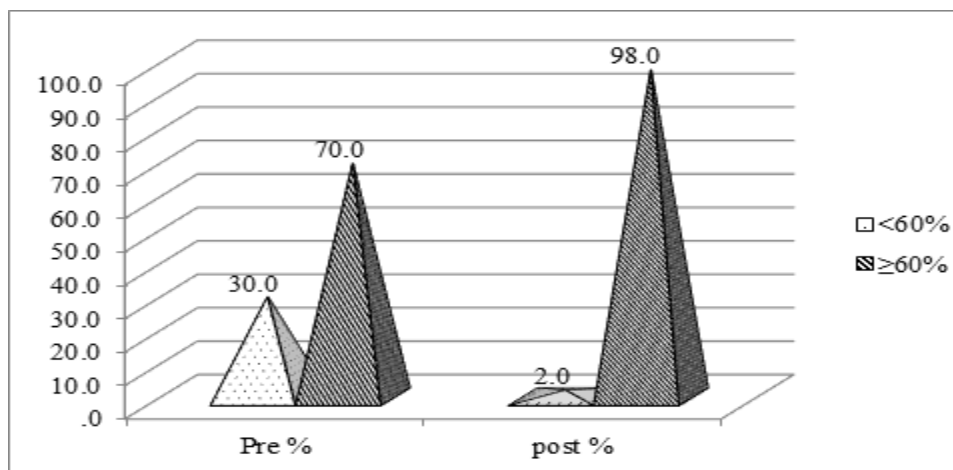
Table 1: Demographic Profile of respondents (n=50)

Demographic Profile	Frequency	Percentage
Age in Years		
≤35 Yrs	35	70%
>35 Yrs.	15	30%
Clinical experience		
Yes	46	92%
No	4	8%
Assisted peripheral iv cannulation		
Yes	48	96%
No	2	4%
Practical peripheral IV cannulation		
Yes	48	96%
No	2	4%
Previous knowledge regarding phlebitis		
Yes	50	100%
No	0	0%
Respondents attended seminar workshop related to phlebitis associated with PIVC		
Yes	15	30%
No	35	70%
Respondents ever been hospitalized and got peripheral IV cannulation		
Yes	30	60%
No	20	40%
Respondents if suffered with phlebitis condition		
Yes	9	18%
No	41	82%

Table 1 shows that majority of respondents (70%) were from the age group of less than 35 years and 30% were from age more than 35 year old. In relation to their clinical experience most of the subjects (92%) were found experienced. Percentage wise distribution of subjects in relation to their assisted peripheral I/V cannulation highest (96%) had assisted peripheral I/V cannulation. Majority (96%) had practiced peripheral intra venous cannulation. Staffs in relation to previous knowledge regarding to phlebitis the highest number means all

the respondents 100% had good knowledge regarding phlebitis, 70% of respondents had not attended seminar, workshop related to phlebitis associated with peripheral intravenous cannulation, Similarly 60% of staffs had been hospitalized and got peripheral intravenous cannulation Percentage wise distribution of staffs in relation to if they suffered with any phlebitis condition the highest number of respondents, majority (82%) had not suffered phlebitis.

Figure 1: Effectiveness of planned teaching program by comparing pre-test and post- test level of knowledge regarding phlebitis associated with peripheral intravenous cannulation



Key =less than 60 % is considered as inadequate knowledge, more than 60 % is considered as adequate knowledge

Figure 1 shows that only 15 (30%) of respondents had inadequate knowledge and 35 (70%) had adequate knowledge in pretest and Most of the respondents 49 (98%) had adequate knowledge and less respondents 1 (2%) respondents had inadequate knowledge in post -test.

Table 2: Mean and Standard Deviation of pre- test and post- test knowledge regarding phlebitis associated with peripheral intravenous cannulation among Nursing Staffs of BPKIHS (n=50)

Overall level of Knowledge score	Mean	SD	Calculated 't' value	P value
Pre test	19.80	3.24	8.77	0.001
Post test	24.12	2.63		

Table 2 Shows that the mean knowledge of pre- test knowledge score was 19.80 with SD 3.26 which was increased in the post test with mean knowledge of 24.12 with SD 2.63, So difference in the knowledge between pretest and posttest was found to be highly significant as (P = 0.001)

Table 3: Association between pretest knowledge score of Nursing Staff with their Selected demographic variable on phlebitis associated with peripheral intravenous cannulation (n=50)

Characteristics	Demographic variable	Adequate (>60%) ²		Inadequate (≤60%) ¹		Chi Square (χ ²) P Value
		Frequency	Percentage	Frequency	Percentage	
Age group	≤35yrs=35	5	10%	10	20%	0.736
	>35 yrs=15	10	20%	25	50%	
Clinical experience	Yes =46	15	30%	31	32%	0.172
	No=4	0	0%	4	8%	
Assisted peripheral I/V Cannulation	Yes =48	14	28%	34	68%	0.529
	No=2	1	2%	1	2%	
Practiced peripheral I/V Cannulation	Yes =48	14	28%	34	68%	0.529
	No=2	1	2%	1	2%	
Attended seminar workshop related to phlebitis associated PIVC	Yes =15	8	16%	7	14%	0.018
	No=35	7	14%	28	56%	
Ever been hospitalized and got peripheral I/V Cannulation	Yes =30	10	20%	20	40%	0.529
	No=20	5	10%	15	30%	
If suffered with any phlebitis condition	Yes =9	4	8%	5	10%	0.562
	No=41	11	22%	30	60%	

Significant at p <0.05 level reject the null hypothesis,

Not significant at p >0.05 reject null hypothesis

PIVC =Peripheral intravenous cannulation

I/V = Intra venous

Table 3 shows that there is no association between pretest knowledge score of nursing staff with their following selected demographic variable i.e. age of respondents, clinical experiences, History of Assisted and practiced peripheral I/V cannulation, their previous knowledge regarding phlebitis, (p>0.05), but the data shows that there is association with respondents age group to attended seminar workshop related to phlebitis associated PIVC to those Nursing Staffs in BPKIHS Dharan (p<0.05)

DISCUSSION

Findings of the current study shows that 35 (70%) respondents had adequate knowledge and 15 (30%) respondents had inadequate knowledge in pre-test and 49 (98%) had

adequate knowledge and 1 (2%) of respondents had inadequate knowledge in post- test regarding phlebitis associated peripheral intravenous cannulation. Finding of the study is supported by the study conducted by R D Scalley, C S Van. The impact of an IV team on the occurrence of intravenous-related phlebitis. A 30-month study - personnel demonstrates a significant and unpredictable benefit of an I.V. team. Beneficial effects include decreased volume and severity of phlebitis after infusion. The benefit appears to be most consistent on Medicine and Neuroscience services, inconsistent on Surgery and Obstetric/ Gynecologic services, and not perceivable in Intensive Care Unit. The primary benefit appears to occur on those services that require the largest volume of venipuncture;

these units account for approximately one half of all venipuncture performed. I.V. team benefit correlates well with increased team activity and, in contrast to other reports, does not correlate well with increasing incidence of phlebitis or cannula dwell time.⁸

Finding in this study shows that the mean knowledge score of pretest was 19.80 with SD 3.26 which was increased in the post test with the mean knowledge of 24.12 with SD 2.63. So difference in the knowledge between pretest and posttest was found to be highly significant ($P = 0.001$) hence research hypothesis is accepted. The finding was found in a study done in Chitwan Medical College Teaching Hospital, Nepal as concluded that most nurses were having a good knowledge of caring and maintaining of peripheral IV cannulation but there were still some nurses who did not have proper knowledge and experience for using IV cannulation which could be a potential risk factor for patient safety. This may be attributed to the fact that most respondents were junior nurses with <1 year experience in the clinical area. Their knowledge towards care and maintenance of IV cannula was very limited which might result in practicing incorrect method. The results should sensitize healthcare managers to improve nursing training and education, according to clinical risk management perspectives.⁹

Findings of the current study shows that there is no association between phlebitis associated with peripheral intravenous cannulation and respondents age group, Assisted peripheral I/V cannulation, Practiced Peripheral intravenous cannulation, Previous knowledge regarding phlebitis, Hospitalized and got peripheral intravenous cannulation and phlebitis condition ($p > 0.05$) but the data shows that there is association with Attended seminar workshop related to phlebitis associated PIVC to those Nursing Staffs in BPKIHS Dharan as ($p < 0.05$).

A study conducted in Barailly U.P about the topic as Effectiveness of Planned Teaching

Programme on Knowledge and Practice regarding cannulation among students Nurses concluded that Cannulation can be performed at the scene of an emergency by first responders who want to make sure that they will have access to a vein and it is also routinely done in hospital settings. Intravenous cannulation is one of the earliest skills learned by health care providers like doctors, nurses, and paramedics. With a view to assess the effectiveness of planned teaching program regarding cannulation among student nurses, the pre experimental study with quantitative approach was undertaken among 30 student. Purposive sampling techniques were used in selecting the student nurses. The result revealed that educating the student nurses about cannulation and its techniques helped in improving the knowledge, practice and skills regarding cannulation and also helped in patient health care by preventing cannulation errors.¹⁰

A study conducted in Karnataka India (2017) on Evaluating the effectiveness of pre- and post-test model of learning in a medical school. Result was significant improvement in the recipient knowledge after post-lecture assessment when compared to pretest. Out of 156 students, only 56 (35.90%) obtained scores between 5 and 8 and 100 (64.10%) were below 5. These scores were improved in post-test by 78.21% (122) obtained scores between 5 and 8, while 21.79% (34) got scores more than 8 indicating the high recipient group reflecting good improvement in cognitive structure.¹¹

CONCLUSION

Knowledge regarding phlebitis associated with peripheral intravenous cannulation of Nursing Staff of selected wards in BPKIHS needed an intervention. Structured teaching programme significantly increased knowledge regarding to phlebitis associated with peripheral intravenous cannulation among Nursing Staff of selected wards in BPKIHS. The study revealed that there was

a significant difference between pretest knowledge and posttest knowledge. Thus, it is concluded that the planned structured teaching programme was helpful in increasing the knowledge of phlebitis associated with peripheral intravenous cannulation.

Conflict of Interest: None

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