Original Research Article

Associated Risk Factors of Phlebitis among Registered Nurses at PMC Hospital Nawabshah, Experience and Education Based Study

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Abstract

Introduction: Intravenous catheterization or Peripheral venous catheterization is one of the most being procedures by health care providers during patient hospitalization. For the purpose of sampling, fluids, diagnostic procedure medication administration, and nutritional supplement. Phlebitis is the most common peripheral catheter related complication. .It appears to local edema and inflammation, discomfort, redness of skin or subcutaneous. Phlebitis can be chemical, mechanical and biological at the site of puncture. *Objectives:* Determine the associating factors of phlebitis among registered nurses on the basis of experience and nursing education. *Material and Methods:* This study was an analytical cross-sectional study and conducted at Peoples Medical College Hospital Nawabshah. In this study, a purposive sampling method was used, and the sample size of the study was 90 Registered nurses. *Results:* The gender distribution among subjects was male 50 (55.6%) and females were 40 (44. 4%). Designation among study subjects was 80(88.8%) were staff nurses and only 10(11.1%) were head nurses. A slum of subjects said antibiotics 70(77.8%) develop phlebitis, significant with experience (p=.000). The continuous I.V fluid 80(88.9%) and intermittent fluid 10(11.1%) develop phlebitis and found significant with experiences. *Conclusion:* The study, examined; nurses have significant awareness for the prevention of phlebitis and maintenance of peripheral I.V. Further study also found the factors associated with phlebitis.
Keywords: Phlebitis, Associated factors, Experience, Nursing Education, Fluid Pattern.

INTRODUCTION

Intravenous catheterization or Peripheral venous catheterization is one of the most being procedures by health care providers during patient hospitalization. For the purpose of sampling, fluids, diagnostic procedure medication administration, and nutritional supplement [1]. Phlebitis is the most common peripheral catheter related complication [2]. It appears to local edema and inflammation, discomfort, redness of skin or subcutaneous. Phlebitis can be chemical, mechanical and biological at the site of puncture [3]. Phlebitis is inflammation of the vein and appears at veins venture site, It increases the patient hospital stay and work burden on the health care providers. Phlebitis is reported in the US, Iran, Spain, Sweden, Chandigarh, Brazil, and Portugal as 41%, 27% to 70%, 1.9%, 62%, 29.8%, 16.7%, and 11.9% and

associated with workload, patient burden, site/area of insertion, size of peripheral catheter and emergency condition, and other factors are also related such as age gender and skin integrity of the patients [4]. Additional factors related factors such as education of the health care provider, experiences, department, and patient admission via emergency or elective [5]. The triggering factors of phlebitis are such as infusion flow rate, pre and post bolus, 3 to 4 days of peripheral catheter retained are associated and medical department and surgical department [6]. Further, it is also reported that 20 to 80% of phlebitis occurs in the United Kingdom due to poor identification or late reporting [7]. The major complication of phlebitis is hospital-acquired infections such as bacteremia, thrombosis, and hematoma, further several guidelines have been developed for the assessment, diagnosis, and treatment of the phlebitis [8]. Several studies also reported that

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nurse's skills do not only reduced the incidence of phlebitis but also decreases the burden from the hospital [6]. Nurses center goal is patient, its good skills and knowledge improve the patients' health, minimum the peripheral catheter complication and also improve the quality of care [9]. In Pakistan, the prevalence of phlebitis is 7% in 2006 which is shifted to 17% in the year of 2016 [10].

According to a study, phlebitis-associated sepsis and mortality in later it leads to morbidity and mortality, furthermore, male compare to female to prone to develop the phlebitis [10, 11].

Very few studies have been done throughout the Pakistan on phlebitis. This study will find the gap among the nurse's knowledge and skills and find those associating factors which become cause of phlebitis.

Phlebitis is common hospital based problem, and its risk factors decreases which level of education and fine practice.

Objective
Determine the associated risk factor of phlebitis on the basis of experience and nursing education.

MATERIAL AND METHODS
Study setting: This is analytical cross sectional study have conducted at Peoples Medical College Nawabshah, Shaheed Benazir Abad.

Sampling technique & sample size: Purposive Sampling method have been used for the data collection and data have been collected from 90 nursing staff working in various department of this Hospital.

Inclusion Criteria
1. Registered Nurse.
2. Have more than 1 years of experiences.
3. Worked more than 3 department of Hospital.

Exclusion Criteria
1. Student nurses
2. Less than one years of experience.

Duration of study: Duration of study was December 2019 and January 2020.

Data Collection Tool
A self-structure questionnaire has been used for data collection from every participant of study. It contains both open ended and close ended questionnaire. Further questionnaire consists of two categories.

Data Collection Procedure
This study was conducted after the written permission taken from the Medical Superintendent of

Peoples Medical College Hospital Nawabshah. Further, a formal written consent /agreement have been taken from every subject/individual for participation in the study.

Data Analysis Procedure
After collection of target number of data, the data will be analyzed in statistical Package for Social sciences (SPSS) for windows version 23. All continuous variables analyzed for frequency, mean and standard deviation and for categorical variables, frequency and percentage was calculated. For the association of variables Chi-square was computed, and < .05 is kept significant.

Data presentation: In the form of results, the data have been presented by tables**.**

Ethical Consideration
* Permission have been taken from the Medical Superintendent of this Hospital.
* Informed consent will be taken at the time of data collection.
* Confidentially of particular will be kept secret.
* No any force will be used to refused participants.

RESULTS
The sample size of the subjects was 90. The mean age of the study population was 33.78 with the SD + 5.9. The gender distribution among subjects was male 50 (55.6%) and females were 40 (44. 4%). Designation among study subjects was 80(88.8%) were staff nurses and only 10(11.1%) were head nurses. According to nursing education among the study population was 60(66.7%) were just completed RN, and BSc Nursing 24(26.7%) were and masters were 6 (6.7%), and their experiences were as up to 5 years 30 (33.3%), 5 to 10 years (22.2%) and above 10 years 40(44.4%) Table-1.

Change of peripheral vascular catheterization (PVC)
Among the study subjects, 30(33.3%) change the PCV up to 48 hours, 17 (18.9%) said 48 to 72 hours, 72 hours to 96 hours were 37(41.1%), and only 6(6.7%) were agreed for the changing of peripheral cannula above 96 hours. Duration of PVC statically significant (p=.001) Table-2.

Drug can increase phlebitis
Slum of the study subjects said antibiotics 73(81.1%) develops phlebitis and 17(18.8%) agreed for KCL. It is statically strongly significant with experience (p=.000) Table no.02, and also significant with nursing education (p=.020) Table-3.

Phlebitis found in
The study subjects said Female 53(58.9%) as compare to male 37(41.1%) develop phlebitis, and statistically significant (p=.036) Table-3.

Most frequently phlebitis develops in:

Most of the subjects said Kids 30 (33.3%), Adults 10(11.1), Older age 9(10) Obesity 22(24.4%) and medical illness 19(19), and also statistically significant with nursing education (p = < .05) Table-3.

Pattern of fluid develop phlebitis

Majority of the subjects said for continues peripheral fluid 80(88.9%) and intermittent fluid 10(11.1%) develop the phlebitis, and found significant with experiences (p = .001) Table-2, and nursing education (p = .001) Table-3.

Phlebitis Leads to Bacteremia

Among 80(88.9%) of the subjects said yes and only 10(11.1%) said no, and also and found significant with experiences (p = .001) Table-2, and nursing education (p = .020) Table-2.

Nursing practice for the prevention of phlebitis

The nursing practice for prevention of phlebitis, and maintains of well-intended peripheral vascular catheterization. Table-4. It shows that among study subjects majority were agreed and strongly agree regarding the nursing practice for the prevention of

phlebiti**s** regarding care and peripheral cannula safe usage.

Table-1: Distribution of study subjects

Item	Frequency	Percentage
Gender		
Male	50	55.6
Female	40	44.4
Total	90	100.0
Designation		
Staff Nurse	80	89.9
Head Nurse	10	11.1
Total	90	100.0
Experience		
Up to 5 years	30	33.3
5 to 10 years	20	22.2
Above 10 years	40	44.4
Total	90	100.0
Nursing Education		
RN	60	66.6
BSC Nursing	24	26.7
MSN/MSPH	6	6.6
Total	90	100.0

Table-2: Contingency table of Experience and study variables

Item	Up to 5 years	5 to 10 years	Above 10 Years	Total	p = Value
Change of Peripheral I.V cannula					
Up to 48 Hours	09	10	11	30	.001
48 to 72 Hours	03	00	14	17	
72 to 96 hours	18	09	01	37	
Above 96 years	10	01	05	6	
Total	40	20	30	90	
Drug can Increase phlebitis					
Antibiotics	27	9	37	73	.000
KCL	3	11	3	14	
Total	30	20	40	40	
Phlebitis mostly develop in					
Male	14	9	14	37	.59
Female	16	11	26	53	
Total	30	20	40	90	
More Frequently found in					
Kids	13	13	22	48	
Adults	4	2	4	10	.19
Old age	4	0	5	9	
Obesity	6	4	5	15	
Medical Illness	3	1	4	8	
Total	30	20	40	90	
Which periphery fluid develops phlebitis					
Continuous	30	20	30	80	.001
Intermittent	7	3	0	10	
Total	37	23	30	90	
Bacteremia Leads to phlebitis					
Yes	30	20	30	80	.001
No	6	4	0	10	
Total	36	24	30	90	

Table-3: Contigency table of Nursing education and study variable

Item	RN Specialty	BSC Nursing	MSN/ MSPH	Total	p = value
Change of peripheral IV cannula					
Up to 48 hours	18	11	01	30	.20
48 to 72 hours	15	1	01	17	
72 to 96 hours	23	10	04	37	
Above 96 hours	4	2	00	06	
Total	60	24	06	90	
Drugs can increase phlebitis					
Antibiotics	43	23	06	72	.020
KCL	17	01	00	18	
Total	60	24	06	90	
Phlebitis mostly develop in					
Male	22	7	8	37	.036
Female	33	17	3	53	
Total	55	20	6	90	
More Frequently found in					
Kids	24	6	0	30	.080
Adults	7	3	0	10	
Old age	4	3	2	9	
Obesity	13	7	2	22	
Medical Illness	12	5	2	19	
Total	60	24	6	90	
Which periphery fluid develops phlebitis					
Continuous	60	14	6	80	.000
Intermittent	0	10	0	10	
Total	60	24	6	90	

Table-4: Nursing practice for the prevention of phlebitis

S.no	Questions	Strongly disagree	Disagree	Nor Agree or Disagree	Agree	Strongly agreed
01	Phlebitis increases the finical burden on the hospital.	7 (7.7%)	13 (14.4%)	8 (8.8%)	19 (21.1%)	43 (47.7%)
02	Phlebitis increases patient stay in the hospital.	15 (16.6%)	29 (7.7%)	12 (13.3%)	15 (16.6%)	19 (21.1%)
03	Experience & expertise reduce the occurrence of phlebitis.	8 (8.7%)	9 (9.8%)	13 (14.4%)	26 (28.8%)	34 (37.3%)
04	Assessing daily punctured area reduce the phlebitis.	3 (3.3%)	6 (6.6%)	10 (11.1%)	13 (14.4%)	58 (64.4%)
05	Routine documentation decreases the risk of phlebitis? (date, time)	2 (2.2%)	7 (7.7%)	16 (17.7%)	17 (18.8%)	48 (53.3%)
06	Vascular catheter size (gauge) increases the risk of phlebitis.	4 (4.5%)	16 (17.7)	31 (34.4%)	28 (31.1%)	11 (12.2%)
07	Pre- bolus administration reduces the risk of phlebitis.	7 (7.7%)	10 (11.1%)	21 (23.3%)	39 (43.3%)	13 (14.4%)
08	Post bolus administration reduces the risk of phlebitis.	13 (14.4%)	19 (21.1%)	31 (34.4%)	20 (2.2%)	7 (7.7%)
09	Vascular cannula for insertion should be selected as per site (area) of puncture.	1 (1.1%)	5 (5.5%)	11 (12.2%)	42 (46.6%)	31 (34.4%)
10	Before cannulation no need of skin preparation.	49 (54.4%)	28 (31.1%)	6 (6.6%)	4 (4.4%)	3 (3.3%)

DISCUSSION

Phlebitis is one of the most frequent complications of peripheral I.V cannula, it occurs due to poor nursing practice, long intacted, and a longer stay of patients stay in the hospital. Phlebitis; increase the burden on the hospital, and ultimately affect the nursing practice too.

Experience and nursing education is directly associated with nursing practice, increasing the level of experiences, and education does not enhance the nursing practice but also increases the level of patient

center care. The current study revealed that; the majority completed RN 66.7%, and BSc Nursing 26.7% were and masters were 6.7%, and their experiences were as up to 5 years 33.3%,5 to 10 years 22.2% and above 10 years 44.4%, which compares with a study conducted for assessing the nurse's knowledge in Lahore stated that education and nursing practice is directly associated with the incidence of phlebitis. Further stated diplomas in nursing and post-Rn were 48% and 23% were respectively.

Long duration intacted of peripheral IV cannula increases the risk of phlebitis and also increase hospital stay of the patient in the hospital "CDC". The current study revealed that 33.3% change the PCV up to 48 hours, 18.9% said 48 to 72 hours, 72 to 96 hours were 41.1%, and only 6.7% change the peripheral cannula after 96 hours. The majority of the nursing staff believed that frequently change of cannula reduces phlebitis, which is comparable with a study conducted sated that, long-duration more than 72 hours increase IV cannula blockage and leakage occurs in those peripheral IV cannulas were intacted more than 72 hours [12].

Drug administration is one of the most important skills of nursing staff, it reflects the nursing skills, and it's depending on nursing education as well as experience. The current study revealed that nurses believed that phlebitis due to antibiotics, KCL, and other drugs, (anticonvulsive, anticoagulants) 77.8%, 14.4%, and 7.8% respectively. According to a study shown that antibiotic-induced phlebitis was 85%, which is more frequently happening as compare to KCL 9% and high osmolality drugs [13].

Gender is one of the major risks of phlebitis, due to biological differences gender is key factor in phlebitis, the literature supports that gender is mild to moderate risk factor in it. The current study revealed that female 58.9% as compare to male 41.1% more prone to develop phlebitis, which compared with a study showed the similarity with results male and female were as 65% and female 35% more risk factors for phlebitis [11].

Further, this is seen in this study, nurses said that ; kids 33.3%, Adults 11.1%, Older age 10%, 24.4% and medical illness 19% develop phlebitis, which compared with age group is another risk factor for phlebitis, the integrity of skin, disease process are risk factors of phlebitis [14].

Literature support the pattern infusion has a significant relation with phlebitis, continuous administration of peripheral fluid, and infusion flow rate increase the risk of phlebitis. The current study revealed that 88.9% of the subjects said for continuous fluid and 11.1% believed for intermittent fluid phlebitis, and found significant, which comparable which is the similarity with a cross-sectional study agreed that continuous peripheral infusion is increased the risk of phlebitis as compare to the intermittent flow of infusion [15].

Each year, more than 2 million mortality occurs throughout the world, and the incidence has been increasing every year. A safe practice, proper hand washing reduces the risk of nosocomial infection, phlebitis is one of the hospital-related infection, literature supports that 37% of phlebitis is related to nosocomial infection [16, 17]. Similarity, to current study, revealed that 88.9% of the subjects said yes, bacteremia leads to phlebitis and also and found significant [9].

CONCLUSION
The study, examined; nurses have significant skills for the prevention of phlebitis and maintenance of peripheral I.V. Further study also found the factors associated with phlebitis. The nurses had well knowledge and experience to minimize the incidence of phlebitis, and also can reduce the risk factors of phlebitis, but malpractice and ignorance decrease quality care.

RECOMMENDATION
Quality of Care enhanced by a higher level of Administration. Nurses –the patient ratio should have maintained according to WHO, and the Nursing council. In addition, health care providers are accountable for safety and quality care delivery to the patients, so they should be well resourced and enough trained nursing staff.

Limitation: This study is performed in a single health care setting, this can be generalized through multiple health care settings.

Conflict of interest: There is no any conflict of interest seen between the patients.

Funding: There is no source of funding governmental and non-governmental institution/organization.

Data availability: It is available from correspondence author on request as per ethical rules.

Acknowledgement regarding author contribution:

Sno.1	Name of author	Contribution
01.	Parveen Imdad Memon	**Study conception and design**
02.	Bashir Ahmed Pirzada Khalid Nadeem	**Help in data collection**
03	Abdul Haque khoso Dr Masood Ali Qureshi	**Data analysis and interpretation**
04	Shabnum Bibi Abdul Haque khoso	**Drafting & Final approval of the version**

REFERENCE

1. Rai, A., Khera, A., Jain, M., Krishnakumar, M., & Sreevastava, D. K. (2019). Bacterial colonization of peripheral intravenous cannulas in a tertiary care hospital: a cross sectional observational study. medical journal armed forces india, 75(1), 65-69.

2. Marsh, N., Mihala, G., Ray- Barruel, G., Webster, J., Wallis, M. C., & Rickard, C. M. (2015). Inter-rater agreement on PIVC- associated phlebitis signs, symptoms and scales. Journal of evaluation in clinical practice, 21(5), 893-899.

3. Webster, J., McGrail, M., Marsh, N., Wallis, M. C., Ray-Barruel, G., & Rickard, C. M. (2015). Postinfusion phlebitis: incidence and risk factors. Nursing research and practice, 2015:1-3.

4. Erdogan BC, Denat Y. The development of phlebitis and infiltration in patients with peripheral intravenous catheters in the neurosurgery clinic and affecting factors. International Journal of Caring Sciences. 2016 May 1;9(2):619-629. Available from: http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=ccm&AN=117593055&site=ehost-live&scope=site&custid=ns206789

5. Chiu, P. C., Lee, Y. H., Hsu, H. T., Feng, Y. T., Lu, I. C., Chiu, S. L., & Cheng, K. I. (2015). Establish a perioperative check forum for peripheral intravenous access to prevent the occurrence of phlebitis. The Kaohsiung journal of medical sciences, 31(4), 215-221.

6. Li, X. F., Liu, W., & Qin, Y. (2016). Nurses' perception of risk factors for infusion phlebitis: A cross-sectional survey. Chinese nursing research, 3(1), 37-40.

7. Higginson, R., & Parry, A. (2011). Phlebitis: treatment, care and prevention. Nursing times, 107(36), 18-21.

8. Capdevila, J. A., Guembe, M., Barberán, J., de Alarcon, A., Bouza, E., Farinas, M. C., ... & Mestres, C. A. (2016). 2016 Expert consensus document on prevention, diagnosis and treatment of short-term peripheral venous catheter-related infections in adults. Cirugía Cardiovascular, 23(4), 192-198.

9. Umakanth, M. (2017). Post dengue fatigue syndrome. International Journal of Current Medical and Pharmaceutical, 3, 2230-2231.

10. Jamal, Z., Umair, M., Zubair, R., Zafar, N., Rauf, F., & Affif, M. (2019). Peripheral Intravenous Catheter related Thrombophlebitis-Incidence and Risk Factors A Cross Sectional Study. Journal of Rawalpindi Medical College, 23(S-1), 22-27.

11. Furtado, L. C. D. R. (2011). Incidence and predisposing factors of phlebitis in a surgery department. British Journal of Nursing, 20(Sup7), S16-S25.

12. Suliman, M., Saleh, W., Al-Shiekh, H., Taan, W., & AlBashtawy, M. (2020). The incidence of peripheral intravenous catheter phlebitis and risk factors among pediatric patients. Journal of pediatric nursing, 50, 89-93.

13. Atay, S. E. L. M. A., Şen, S., & Cukurlu, D. (2018). Phlebitis-related peripheral venous catheterization and the associated risk factors. Nigerian journal of clinical practice, 21(7), 827-831.

14. Racadio, J. M., Doellman, D. A., Johnson, N. D., Bean, J. A., & Jacobs, B. R. (2001). Pediatric peripherally inserted central catheters: complication rates related to catheter tip location. Pediatrics, 107(2), e28-e28.

15. Nagpal, P., Khera, G. K., & Kumar, Y. (2015). A study assess the clinical pattern of phlebitis among children admitted in selected hospital of Ambala, Haryana. Nursing and midwifery research journal, 11(2), 68-77.

16. Atchison, C. M., Arlikar, S., Amankwah, E., Ayala, I., Barrett, L., Branchford, B. R., ... & Goldenberg, N. A. (2014). Development of a new risk score for hospital-associated venous thromboembolism in noncritically ill children: findings from a large single-institutional case-control study. The Journal of pediatrics, 165(4), 793-798.

17. Spurr, S., Bally, J., Hill, P., Gray, K., Newman, P., & Hutton, A. (2020). Exploring the Prevalence of Undiagnosed Prediabetes, Type 2 Diabetes Mellitus, and Risk Factors in Adolescents: A Systematic Review. Journal of pediatric nursing, 50, 94-104.