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Quality Improvement Study Prevention of Phlebitis July 2019 to January 2021 in Himalayan Hospital, Dehradun

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ABSTRACT

The quality improvement project on prevention on phlebitis was undertaken with the purpose of reducing the incidence and also to improve the nursing practice and documentation. The preliminary assessment was done in July 2019 in which 14% of the sample had phlebitis of any degree. The documentation related to the prevention of phlebitis was also inadequate. The assessment of cannula site using VIP score was observed in 2.4% of the file only. The intervention for the prevention of phlebitis include training and sharing of informational materials. The training was given to ward in charges in two sessions and they trained the staff nurses in their respective areas. Informational materials shared include posters on phlebitis and VIP scoring. The monitoring of practice was also done in the clinical area. Periodic clinical audit was conducted to assess the point prevalence of phlebitis and nursing practice and documentation. The rate of phlebitis was reduced by 38% (8.7%) in two months and by 90% (1.4%) in Many 2020. The documentation rate was also found to be better in the periodic audit. The finding of the study concludes the effectiveness of periodic clinical audit and cost-effective interventions in improving the nursing practice for the prevention of phlebitis.

Keywords: *Quality Improvement, Prevention, Clinical Research, Healthcare Intervention*

Introduction

Phlebitis associated with peripheral IV cannula is one of the most common problems among

hospitalized patients.[1] It is usually manifested as pain, erythema, edema, hardening and/or a palpable thread. The incidence of phlebitis varies worldwide, and various studies conducted in different parts of the world has shown a prevalence of 1.3 to 60%[2]

Many factors found to be associated with phlebitis include inadequate technique when inserting the catheter, the patient's clinical situation,[3] the characteristics of the vein, drug incompatibility, tonus and pH of the medicine or solution, ineffective filtration, catheter diameter, size, length and material of manufacture and prolonged use. Using aseptic techniques, selecting cannula of appropriate size, maintaining patency, regular monitoring and documentation,[4] re-siting the cannula at the right time etc. has been shown to reduce the incidence of phlebitis.

The present QI study was undertaken as phlebitis is one of the most common as well as preventable complications among hospitalized patients. Simple and cost-effective intervention of regular assessment and cannula site and removing the cannula in presence of any signs and symptoms can reduce the development of phlebitis. Improving the nursing practice and documentation in one aspect of care may positively influence the other aspects of care also.[5]

The Quality Improvement Study on Phlebitis Prevention endeavors to tackle the prevalent issue of phlebitis in hospitalized patients[7]. Focused on elevating patient care standards, the study seeks to enhance protocols pertaining to peripheral IV cannula care, monitoring, and record-keeping. Drawing insights from prior clinical research, which revealed fluctuating prevalence rates of phlebitis—ranging from 31% in 2012 to 12% in 2019[9]—the study underscores the gravity of this avoidable complication. Additionally, it acknowledges the underreporting of phlebitis cases, emphasizing the necessity for more robust preventive measures and prompt identification strategies[10]. Through this endeavor, the aim is to institute approaches that not only mitigate phlebitis occurrences but also foster a holistic patient care framework, underscoring the imperative nature of continual assessment and meticulous documentation practices[11].

The study aims to decrease phlebitis prevalence by 50% in three months and improve nursing practices and documentation for its prevention. Secondary objectives include utilizing VIP Scoring for phlebitis prevalence identification, evaluating nursing documentation and practices, and enhancing phlebitis incidence reporting to refine intervention strategies.

Need & Significance

Many hospitalized patients rely on IV cannula, with previous clinical studies revealing prevalence rates of 31% in 2012 and 12% in 2019. However, there's notable underreporting of phlebitis incidents. Given that phlebitis is preventable[6,] enhancing practices related to peripheral IV cannula care, monitoring, and documentation is crucial for preventing and identifying phlebitis early. Furthermore, improving assessment and documentation in one area can facilitate enhancements in other areas of patient care[8].

Methods

Approach:

- ***Descriptive survey approach*** to identify the prevalence of phlebitis, nursing practice and documentation. [9]
- ***Evaluative approach***: to improve the practice for the prevention of phlebitis.

Design

- Time series design
- The point prevalence of phlebitis and practice measured very three months .

Setting: All in-patient units of Himalayan Hospital

Sampling:

- ***Total enumeration sampling technique***: All the patients with IV cannula in the selected clinical areas on the day of data collection were included for the study.

Tool for data collection

1. Clinical Audit tool to assess the IV cannula site and related documentation.
    i. Observation checklist to assess the condition of the IV cannula site
    ii. Visual Infusion Phlebitis score
    iii. Checklist for record review to assess the documentation related to IV cannula.

Results

The first clinical was conducted in July 2019. The interventions for improvement was implemented after the audit and a follow up audit was conducted after two months. There after clinical audit was conducted every three months.

The results are presented in the following sections.

1. Findings of the initial assessment
2. Findings of the periodic audits

Section 1

Findings of the initial assessment (July 2019)

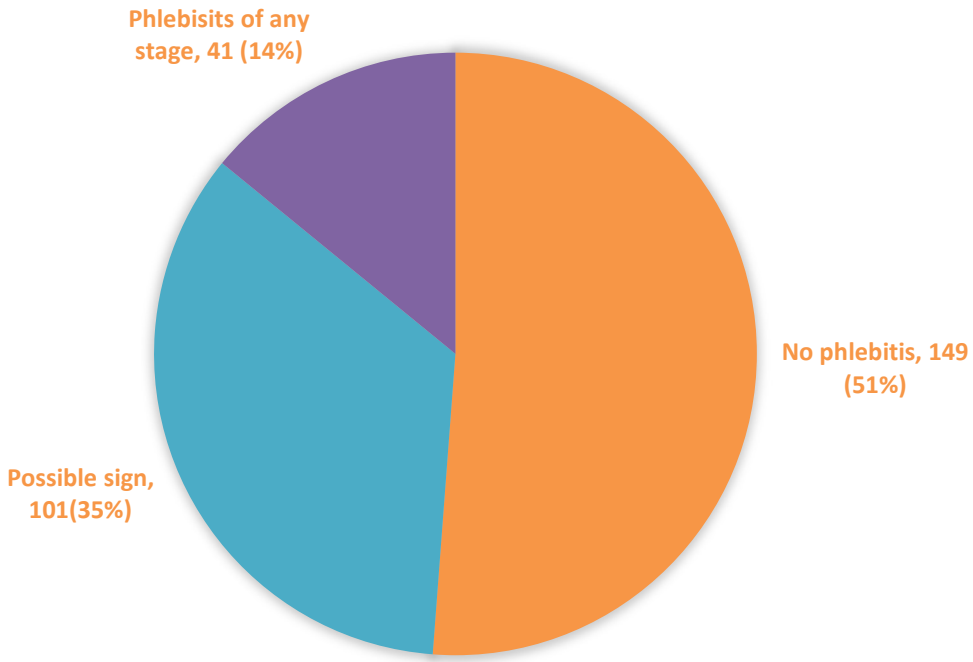

Fig 1. Distribution of sample based on phlebitis (n= 291)

Fig 1 describes the allocation or categorization of a sample population according to the presence or severity of phlebitis, which is the inflammation of a vein often caused by intravenous catheterization.

Table 1: Distribution of the sample based on VIP Score

VIP Score	Categories	July 2019 (N=291)	
		f	%
0	No Phlebitis	149	51.2
1	Possible first Sign of Phlebitis	101	34.7
2	Early Stage of Phlebitis	14	4.8
3	Medium Stage of Phlebitis	9	3.1
4	Early Stage of Thrombophlebitis	13	4.5
5	Advance stage of Thrombophlebitis	5	1.7

	Phlebitis of any stage	**41**	**14**

In table 1 the distribution of samples based on VIP Score assesses the variability and severity of vascular access-related complications in patients.

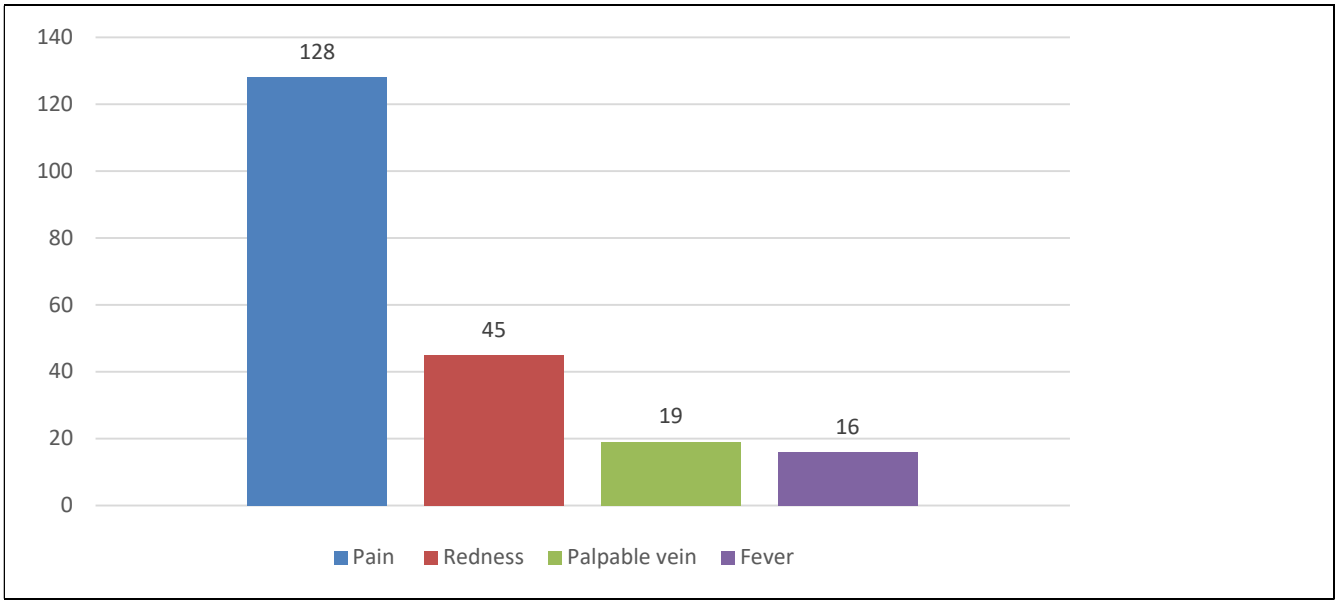

Fig 2. Distribution of the sample-based signs and symptoms of possible phlebitis, July 2019 (n=291)

Fig 2 shows that In July 2019, samples were categorized based on signs and symptoms indicative of potential phlebitis, assessing its prevalence and severity.

Table 2: Distribution of the sample based on the nursing practice and documentation related to prevention of phlebitis.

Sl. No.	**Items**	**July 2019** ***(N=291)***	
		f	**%**
Observation of cannula site			
1.	Date of insertion pasted on dressing	180	61.9
2.	Time of insertion pasted on dressing	0	0

3.	Dressing is Clean	248	85.2
Documentation on patient's record			
1.	Date and time of insertion	88	30.2
2.	Site of IV Cannula	49	16.8
3.	Gauge number of IV Cannula	67	23.0
4.	Number of attempts and sites	45	15.5
5.	Name and signature of staff inserting cannula	23	7.9
6.	Findings of assessment of cannula during each shift	52	17.9
7.	VIP score each shift	**7**	**2.4**

In table 2 Samples were classified according to nursing practices and documentation related to phlebitis prevention in July 2019, aiming to assess adherence and effectiveness of preventative measures in clinical settings.

Table 3 Distribution of the sample (Nurses) based Self-Reported Practices on Peripheral IV Cannula Care, July 2019

(N=47)

Sl No.	Practice	f	%
1	Wash hands before cannulation	46	97.9
2	Clean the hands with hand-rub before the procedure	47	100
3	Gathers all items required for the procedure	47	100
4	Clean the site before the procedure	47	100
5	Inserts needle into the vein at 15º to 30º angle	47	100
6	Secure cannula by adhesive tapes / strips.	47	100
7	The date and time of insertion is labeled in the site	46	97.9

8	Document the Cannulation procedure in the nurses record as soon as the procedure	42	89.4
10	Cannula site is assessed in every shift	45	95.7
11	VIP scoring is used for the assessment of cannula site	22	46.8
12	The findings are documented each time the site is assessed	37	78.7
13	Cannula site is assessed each time drugs/infusions are given though cannula	45	95.7
14	Practice hand hygiene before & after touching the cannula	43	91.5
15	Cannula is flushed with 0.9% sodium chloride after administration of medications	39	83
16	Report the incident if phlebitis develop	45	95.7
17	Cannula is changed after 72 hours of insertion	45	95.7
18	Cannula is changed if pain, redness or swelling is observed in the cannula site	46	97.9
20	Details of cannula in place is included in the handing over	41	87.2
21	Indication for cannula is assessed daily and is removed if no longer indicated	43	91.5
22	The details of cannula removal (if cannula is removed) with condition of site is documented	36	76.6

In table 3 samples of nurses were categorized based on self-reported practices regarding peripheral IV cannula care, aiming to evaluate adherence to guidelines and identify areas for improvement in clinical practice.

Major Findings of the preliminary assessment

Phlebitis rate

1. Phlebitis of any degree was observed in 14% of the samples.
2. Pain at the cannula site was the most common symptom (43.9%)

Nursing practice and Documentation related to prevention of phlebitis.

3. Date of insertion was pasted at the cannula site in 61.9% of sample and none of them had time of insertion mentioned.
4. Documentation related to peripheral IV cannula care is inadequate in all aspects.
5. Assessment of condition of cannula using VIP score was documented only in 2.4%.

Self-reported practice of nurses related to Peripheral IV Cannula Care

6. The nursing practice is reported to be more than 80% in majority of areas. But there was disparity between self-reported practice and observed practice.

Implication of the findings

- The rate of phlebitis reveals need for interventions to reduce its incidence.
- The nursing practice and documentation related to prevention of phlebitis also needs improvement.
- The disparity observed between self-reported practice and observed practice suggest that self-reported practice in not a reliable indicator for the assessment of practice. However, it can be used as a tool for self-assessment and to guide nursing practice

Interventions for improving nursing practice for the prevention of phlebitis implemented from July 2019 to December 2020

1. **Initial interventions Improving the practice of nurses (July 2019- August 2020)**
    a. Guideline for the prevention of phlebitis was prepared and communicated to nurses using different means
        i. Training
            1. Training of Ward in Charges (two sessions)
            2. Ward In Charges train the staff nurses of their clinical area
        ii. Learning materials provided to each clinical area
            1. Poster of IV cannula care
            2. VIP scoring
        iii. Monitoring of cannula site and documentation by Ward in Charges, Faculty and ANS
2. **Periodic Clinical Audit (Every three months)**
3. **Follow up intervention (December 2020)**
    a. Knowledge assessment of staff nurses
    b. Online training for staff nurses

Section 2
Findings of the periodic Clinical Audit

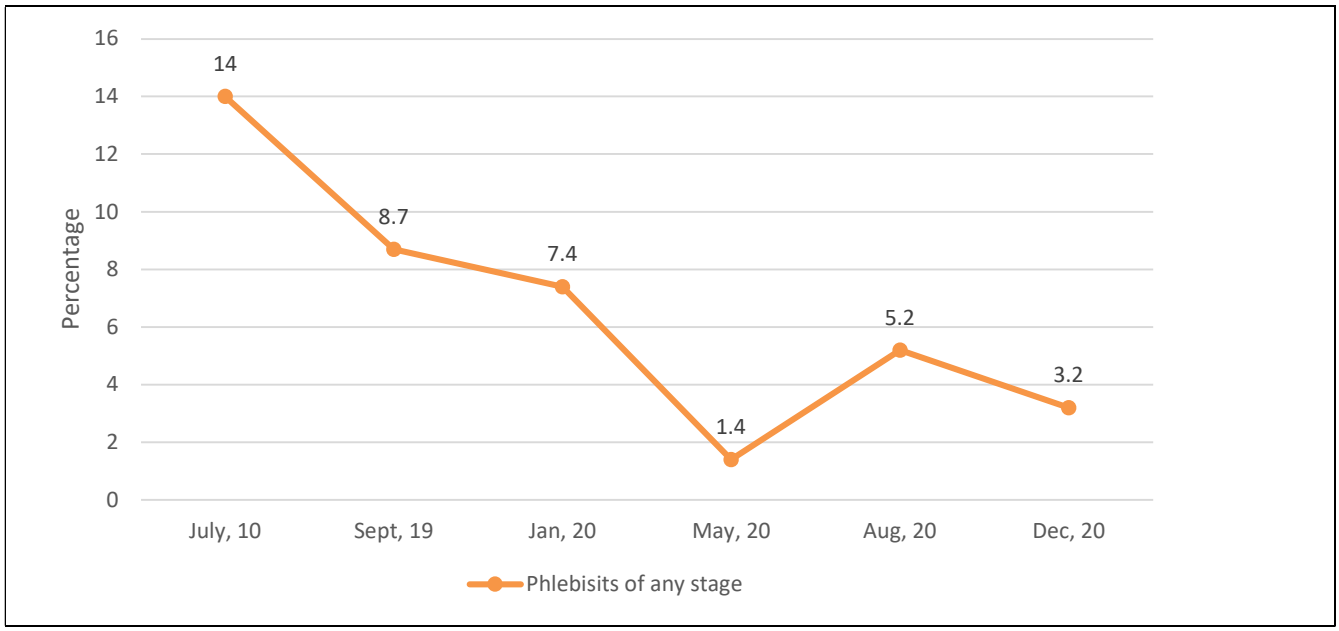

Fig 3. Line diagram on point prevalence of phlebitis of any stage

In fig 3 A line diagram illustrating the point prevalence of phlebitis over time, depicting the incidence of phlebitis across various stages.

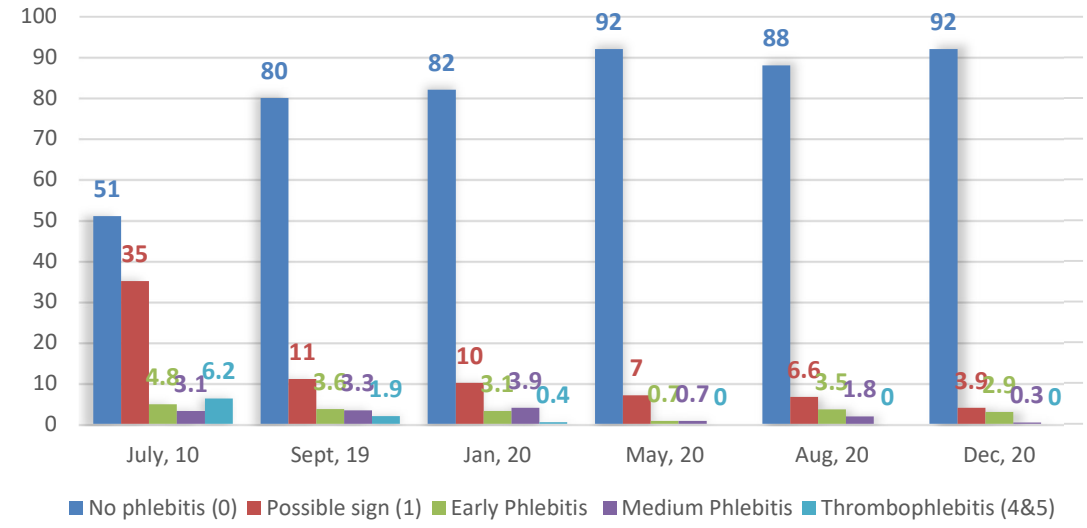

Fig 4. Distribution of the sample based on stages of phlebitis.

In fig 4 Samples were categorized according to the stages of phlebitis, assessing the distribution and severity of inflammation in venous access sites within the study population.

Table 4: Distribution of the sample based on VIP Score

VIP Score	Categories	Jul-19 (N=291)		Sep. 19 (N=365)		Jan 20 (254)		May 20 (287)		Aug 20 (228)		Dec 20 (305)	
		F	%	f	%	f	%	f	%	f	%	f	%
0	No Phlebitis	149	51.2	293	80.3	209	82.3	264	92.0	201	88.2	283	92.7
1	Possible first Sign of Phlebitis	101	34.7	40	10.9	26	10.2	19	6.6	15	6.6	12	3.9
2	Early Stage of Phlebitis	14	4.8	13	3.6	8	3.1	2	0.7	8	3.5	9	2.9
3	Medium Stage of Phlebitis	9	3.1	12	3.3	10	3.9	2	0.7	4	1.8	1	0.3
4	Early Stage of Thrombo-phlebitis	13	4.5	7	1.9	1	0.4	0	0.0	0	0.0	0	0
5	Advance stage of Thrombo-phlebitis	5	1.7	0	0	0	0.0	0	0.0	0	0.0	0	0
Phlebitis of any stage		41	14	32	8.7	19	7.5	4	1.4	12	5.2	10	3.2

In table 4 The sample was stratified based on VIP Score, allowing assessment of vascular access complications' severity and variability among patients undergoing intravenous therapy.

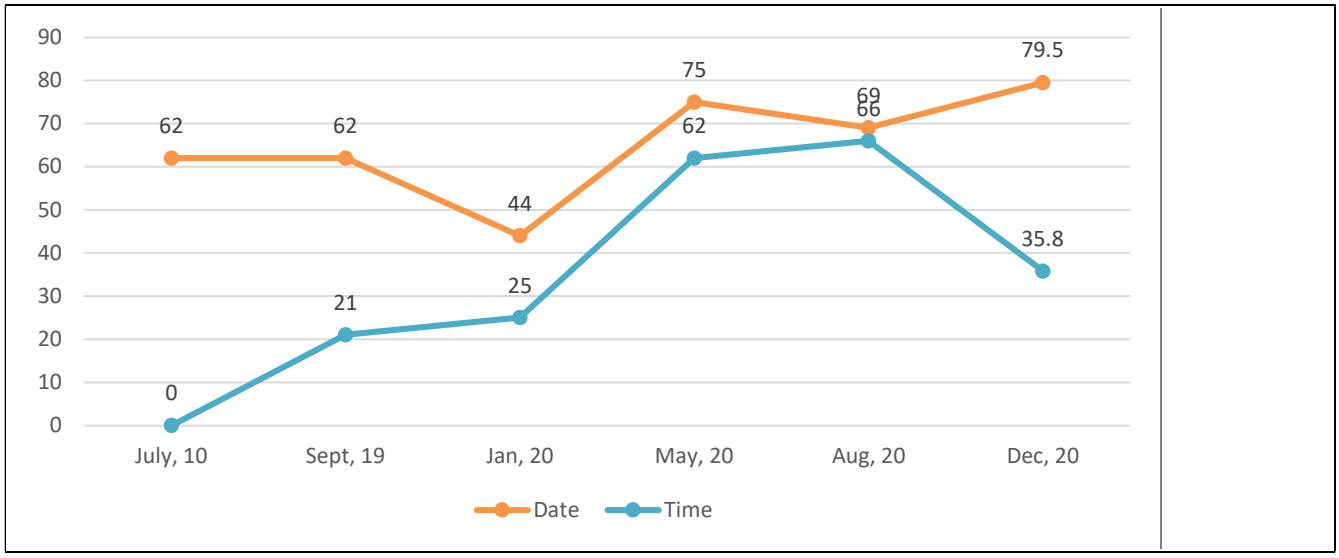

Fig 5. Line diagram showing the proportion of sample with data and time pasted at cannula site (%)

Fig 5 describes ***the*** line diagram illustrating the percentage of the sample population with data and time recorded at the cannula site over time, indicating adherence to documentation practices.

Table 5. Distribution of the sample based on documentation related to IV cannulation.

Sl No.	Items	Jul-19 (N=291)		Sep. 19 (N=365)		Jan 20 (254)		May 20 (287)		Aug 20 (228)		Dec 20 (305)	
		f	%	f	%	f	%	f	%	f	%	f	%
1	Date of insertion	88	**30.2**	153	**41.9**	112	**44.1**	195	**67.9**	124	**54.4**	**194**	**63.2**
2	Time of insertion			74	**20.2**	64	**25.2**	178	**62.0**	123	**53.9**	**122**	**39.7**
3	Site of IV Cannula	49	**16.8**	113	**40**	100	**39.4**	108	**37.6**	148	**64.9**	139	45.3
4	Size of IV Cannula	67	**23**	132	**36.2**	147	**57.9**	166	**57.8**	163	**71.5**	196	63.8
6	Name & sign of staff inserting cannula	23	**7.9**	140	**38.3**	50	**19.7**	194	**67.6**	224	**98.2**	125	45
8	VIP score each shift	7	**2.4**	161	**44.1**	227	**89.4**	201	**70.0**	220	**96.5**	**216**	**70.4**
9	Details of cannula			12		8	3.1	24	8.4	15	**10.6**	17	5.5

	removal*						

In table 5 Samples were classified based on documentation practices related to IV cannulation, assessing the completeness and accuracy of records in clinical settings for quality improvement purposes.

Fig 6. Distribution of the sample based on VIP score documented during current shift.

In fig 6 The sample was categorized according to VIP scores documented during the current shift, enabling evaluation of vascular access complications' severity and management in real-time clinical practice.

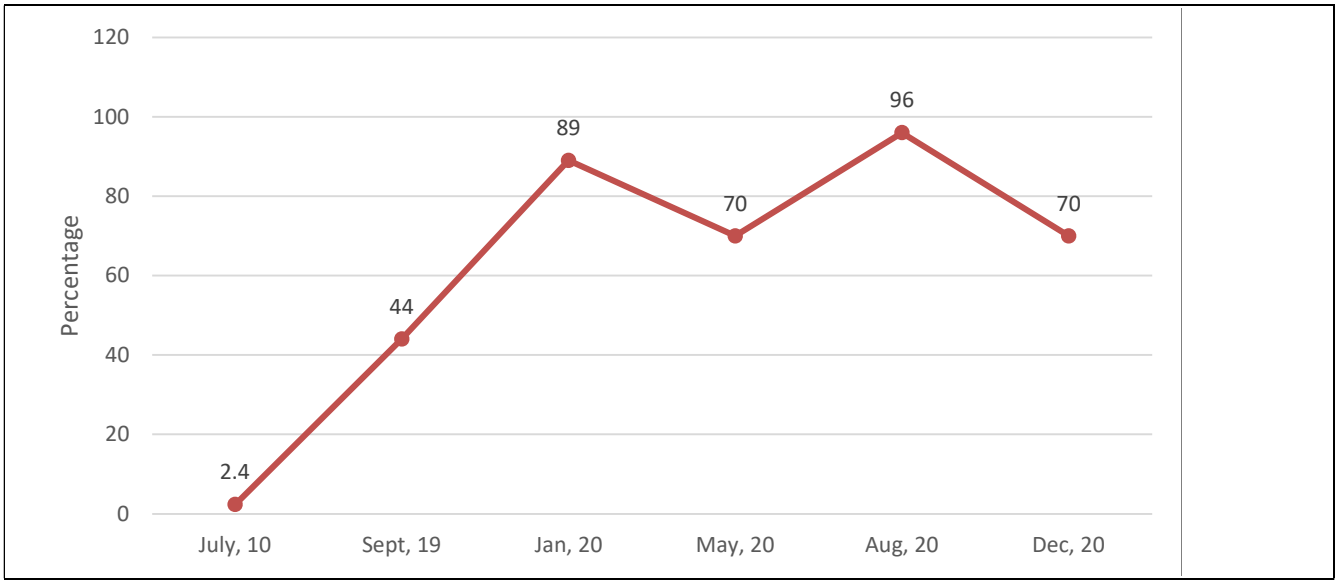

Fig 7. Line diagram on proportion of samples based on documentation of ongoing assessment (VIP score)

In fig 7 A line diagram illustrates the proportion of samples based on documentation of ongoing assessment using VIP scores, depicting adherence to monitoring practices over time**.**

Summary of Findings and implications

1. A reduction in phlebitis rate is observed in all subsequent audits.
    a. There was a reduction of 38 percent within two months. A reduction of 90% by one year of initiation of the project, indicating the effectiveness of the intervention adopted.
    b. But the 4% increase from May to August 2020 highlights need for follow up audits.
2. Improvement in nursing practice and documentation is observed.
    a. Assessment of cannula site with the help of VIP scoring and its documentation increased from 2.4% to 96. % in one year. But there is a fluctuation in the level of practice observed. From August to December 2020 the the practice was reduced from 96% to 70%
    b. The practice of documentation at the time of cannulation required more intervention for improvement.

Conclusion

The quality improvement study on the prevention of phlebitis achieved the objective of reducing the rate of phlebitis. The clinical audit on phlebitis can be continued to ensure continuation of practice. However, the practice of documentation needs to be improved. The findings of the study recommend the need for quality improving projects on improving the documentation practice of nurses.

Recommendations

1. Continue clinical audit every six months to ensure practice and outcome.
2. Future projects to improve nursing documentation.

Reference:

1. Salma U, Sarker MA, Zafrin N, Kazi SA. Frequency of peripheral intravenous catheter related phlebitis and related risk factors: A prospective study. Journal of medicine. 2019;20(1):29.
2. Simin D, Milutinović D, Turkulov V, Brkić S. Incidence, severity and risk factors of peripheral intravenous cannula-induced complications: an observational prospective study. Journal of clinical nursing. 2019 May;28(9-10):1585-99.
3. Lulie M, Tadesse A, Tsegaye T, Yesuf T, Silamsaw M. Incidence of peripheral intravenous catheter phlebitis and its associated factors among patients admitted to University of Gondar hospital, Northwest Ethiopia: a prospective, observational study. Thrombosis Journal. 2021 Dec;19:1-8.
4. Ogston-Tuck S. Intravenous therapy: guidance on devices, management and care. British journal of community nursing. 2012 Oct;17(10):474-84.
5. Hallberg IR, Hansson UW, Axelsson K. Satisfaction with nursing care and work during a year of clinical supervision and individualized care. Comparison between two wards for the care of severely demented patients. Journal of Nursing Management. 1993 Nov;1(6):297-307.
6. Yagnik L, Graves A, Thong K. Plastic in patient study: prospective audit of adherence to peripheral intravenous cannula monitoring and documentation guidelines, with the aim of reducing future rates of intravenous cannula-related complications. American journal of infection control. 2017 Jan 1;45(1):34-8.
7. Alisahal NA. Reducing the development of Phlebitis in adults with Peripheral Intravenous Catheter (Doctoral dissertation, Royal College of Surgeons in Ireland).
8. Petersen PE, Kwan S. Evaluation of community-based oral health promotion and oral disease prevention-WHO recommendations for improved evidence in public health practice. Community dental health. 2004 Dec 1;21(4):319-29.
9. Heng SY, Yap RT, Tie J, McGrouther DA. Peripheral vein thrombophlebitis in the upper extremity: a systematic review of a frequent and important problem. The American journal of medicine. 2020 Apr 1;133(4):473-84.
10. Gunasundram S, Tan M, Lim KZ, Loh VM. Reducing the incidence of phlebitis in medical adult inpatients with peripheral venous catheter care bundle: a best practice implementation project. JBI Evidence Implementation. 2021 Mar 1;19(1):68-83.
11. Jaime FJ, Muñoz A, Rodríguez-Gómez F, Jerez-Calero A. Strengthening privacy and data security in biomedical microelectromechanical systems by IoT communication security and protection in smart healthcare. Sensors. 2023 Nov 3;23(21):8944.