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by

Submission date: 12-Apr-2022 01:09PM (UTC+0700)

Submission ID: 1808597569

File name: 55-Article_Text-327-1-11-20210828.docx (71K)

Word count: 3125

Character count: 17268



Relationship of Secondary Preventive Measures and their Implications for Infusion at the Health Center and the Place of Care

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Type of the Paper (Article)

Received: January 12, 2021; Accepted: April 5, 2021; Published: August 13, 2021
<https://doi.org/10.29253/achnr.2021.3655>

Abstract: *Background:* Intravenous therapy is a procedure in hospital services given to inpatients, giving intravenous therapy can cause complications, one of them is phlebitis. Phlebitis is an inflammation of the venous blood vessels characterized by pain, redness, swelling, and even cuts in the stabbing area. Factors that affect the occurrence of phlebitis include the type of intravenous fluids used. *Purpose:* The purpose of this study was to determine the relationship of long-attached infusion with phlebitis occurrence. *Methodology:* The method in this research is analytic survey by using cross sectional approach that observation only done once according to time determined by researcher by looking at the relation between dependent variable and independent. Population in this research is all hospitalized patient which infused. Sampling in this study using proportional random sampling technique that 55 patients. *Findings:* The result of the study showed that the duration of infusion was mostly categorized > 3 days as many as 32 people (58,2%) and phlebitis incidence mostly categorized phlebitis that was 31 people (56,4%). Based on the result of the data analysis above, it can be concluded that there is a significant relationship between the duration of infusion and the incidence of phlebitis because the value $\alpha > p$ value (0,05 > 0,001) and χ^2 count > χ^2 table (15,018 > 3,841). *Research Limitation:* Further research can be developed by carrying out more specific studies regarding the long association with the incidence of infusion and phlebitis. *Originality:* The different from previous research, name, in the research method, research instrument, time, and the title is taken.

Keywords: phlebitis; old installed infusion

1. Introduction

Hospital is a health service institution for the community with its own characteristics that are influenced by the development of health science, technological advances, and the socio-economic life of the community that must be able to improve quality and affordable services for the community in order to realize the highest health status (Novitasari, n.d.). In Indonesia, there are no definite figures about the prevalence of phlebitis. This may be caused by rare of research and publications related to phlebitis. Data from the Indonesian Ministry of Health in 2013, the incidence of phlebitis in Indonesia was 50.11% for Government Hospitals while in the private hospitals was 32.70% (Suswitha, 2019).

Every patient who is hospitalized requires nursing actions, one of them is intravenous therapy. Intravenous therapy is a procedure that is often applied in medical services in hospitals (Blanco-Mavillard et al., 2019). Administration of intravenous therapy has the aim of correcting or preventing fluid and electrolyte disorders. Intravenous therapy must be continuously regulated because of the changes that occur in the fluid and electrolyte balance that needed by the patient (Lee, Kim, & Kim, 2019). But because this therapy is given continuously and within a certain period of time, it will certainly increase the likelihood of complications from infusion installation, one of which is phlebitis (Mindó, 2018). Phlebitis is defined as venous inflammation caused by chemical or mechanical irritation (Hidayat, Sukadiono, & Wijayanti, 2020).

Efforts to prevent the incidence of phlebitis can be done by routinely changing and rotating the intravenous side at least every 72 hours and aseptic techniques during intravenous catheter insertion (Urbanetto et al., 2017). Meanwhile, the incidence of phlebitis increases with the length of cannulation or the duration of insertion. Because when the infusion is attached it will cause the growth of bacteria in the puncture area (Anggraeni & Widiyanti, 2019). So the longer the installation without optimal care, this may cause bacteria to grow and develop easily. So, in providing nursing services, especially in intravenous therapy, the role of nurses is required to be more active in observing and treating infusion and taking action to prevent phlebitis (Anggita, 2018).

The health center (Puskesmas) with a place of care plays an important role in secondary prevention, nurses can prevent the occurrence of phlebitis by replacing venocatheters and infusion lines every 3 days at the Puskesmas with a place of care. Based on the above background, the problem formulation in this study is "Is there a relationship between the lengths of having an intravenous and the incidence of phlebitis?"

The purpose of this study was to recognize the relationship between the duration of infusion and the incidence of phlebitis. The hypothesis of this study is that there is a significant relationship between the duration of infusion and the incidence of phlebitis.

2. Literature Review

Intravenous therapy is an invasive medical therapy using an effective method for supplying fluids, electrolytes, nutrition and drugs through the blood vessels (Suliman, Saleh, Al-shiekh, Taan, & AlBashtawy, 2020). Cannulas are usually inserted for short-term therapy or for bolus injections or short infusions in hospital or outpatient care (Serane & Kothendaraman, 2015).

The complications of infusion include phlebitis, hematoma, infiltration, thrombophlebitis, air embolism (Chang, Chen, Wang, & Wang, n.d.). Phlebitis itself is an inflammatory reaction that occurs in veins that are painful, reddish, swollen, hot, induration (hardening) in the puncture area, and hardening along the veins (Doesburg et al., 2019). Phlebitis is characterized by redness of the puncture area, pain, swelling, hardening or induration, hardening of the veins, and heat (Lee et al., 2019). Meanwhile, phlebitis is caused either by mechanical, chemical or infective factors. The causes of phlebitis are divided into four categories, namely chemical phlebitis, mechanical phlebitis, bacterial phlebitis, and post-infusion phlebitis (Enes, Opitz, de Faro, & Pedreira, 2016).

Phlebitis can be classified according to the factors causing it. The scale of phlebitis recommended by the Infusion Nursing Standard of Practice consists of five with a scale of 0 up to 4, where the scale 0 indicates no phlebitis occurs while scale 4 shows the most severe degree of phlebitis (Lila, 2017). And the factors that influence the occurrence of phlebitis are age, type of disease (in this case it is distinguished between surgery and non-surgery), size of the cannula, number of insertions (this is assessed by the number of failures in inserting the cannula), the location of the infusion administration, the frequency of bandage change, and the type of fluid (Herlina & Jafa, 2018).

3. Methodology

This type of research used was an analytic survey with a cross sectional study approach. The variable of this research used two variables, namely the independent variable and the dependent variable. The independent variable in this study was the duration of infusion, while the dependent variable was the incidence of phlebitis. The population in this study was all hospitalized patients who were infused in the Class III Internal Medical Room, Ciamis District General Hospital, in May-June 2017 including 3 rooms, namely the Lotus Room, Dahlia Room and Kenanga Room with the number of 123

beds. The sampling technique used in this study was proportional random sampling, namely a portion of the population that could represent the overall target. The data used in this study was primary data. The data collection technique used in this study was observation sheets. This research was conducted in Class III Internal Medical Room, Ciamis District General Hospital on July 6-12, 2017.

4. Result

Univariate Analysis

- a. Duration of Infusion in Class III Internal Medical Room, General Hospital of Ciamis Regency

Table 1. Frequency distribution of infusion duration in Class III Internal Medical Room, General Hospital of Ciamis Regency.

No	Category	F	%
1.	≤ 3 Days	23	41.8
2.	> 3 Days	32	58.2
Amount		55	100

The results showed that the highest frequency of infusion duration was in the category of > 3 days, namely 32 people (58.2%) and the lowest frequency was category 3 ≤, namely 23 people (41.8%) (Table 1).

- b. Incidence of Phlebitis in Class III Internal Medical Room, General Hospital of Ciamis Regency

Table 2. Frequency distribution of phlebitis in Class III Internal Medical Room, General Hospital of Ciamis Regency.

No	Category	F	%
1.	Phlebitis	31	56.4
2.	Non-Phlebitis	24	43.6
Amount		55	100

Based on the table, it was known that the incidence of phlebitis in the Class III Internal Medical Room, General Hospital of Ciamis Regency has the highest frequency, namely the category of occurrence of phlebitis, namely 31 people (56.4%) and the lowest frequency in the category of no phlebitis, namely 24 people (43.6%) (Table 2).

Bivariate Analysis

Table 3. Data frequency distribution of the relationship between the duration of infusion and the incidence of phlebitis in Class III Internal Medical Room, General Hospital of Ciamis Regency.

Duration of Infusion	Incidence of Phlebitis				Total		<i>p</i> value	χ^2_{hitung}
	Phlebitis		Non-Phlebitis					
	F	%	F	%	F	%		
≤ 3 Days	7	30,4	16	69,6	23	41.8	0,001	10,806
> 3 Days	24	75	8	35	32	58.2		
Amount	31	56,4	24	43,6	55	100		

Table 3 shows that out of 23 people (41.8%) with a duration of ≤ 3 days of infusion, 16 people (69.6%) did not have phlebitis and 7 people (30.4%) had phlebitis while 32 people (58, 2%) with infusion duration > 3 days as many as 24 people (75%) had phlebitis and 8 people (25%) did not develop phlebitis.

From the results of the data analysis, it was obtained χ^2 count of 10.806 and a value of *p* value of 0.001. Based on the results of the data analysis above, it could be concluded that there was a significant

relationship between the duration of infusion with the incidence of phlebitis in the Class III Internal Medical Room, General Hospital of Ciamis Regency because the value $\alpha > \rho$ value ($0.05 > 0.001$) and χ^2 count $> \chi^2$ table ($10.806 > 3.841$).

5. Discussion

Most of the infusion duration was installed in the category > 3 days, as many as 32 people (58.2%). The results of this study were in line with previous research conducted by Bouty (2014) at Dr. M.M Dunda Limboto stated that the duration of infusion of ≤ 3 days was 32 respondents (38.1%) and for the duration of infusion > 3 days as many as 52 respondents (61.9%).

The duration of infusion can affect the occurrence of infection, one of which is phlebitis, this is because when the patient is connected to the infusion, it means that as if we inserted a foreign object into the patient's body, the longer the infusion is attached, and it can cause infection (Van, 2018). Because when the infusion is connected, it will cause trauma so that the microorganisms that cause phlebitis can easily enter, especially when the infusion is not carried out in accordance with the SOP, as well as an infusion treatment that is not according to the SOP will be one of the factors that greatly influences the occurrence of phlebitis (Babaieasl, Yarandi, Saeidzadeh, & Kheradmand, 2019). The results of this study were in line with previous research conducted by Bouty (2014) at Dr. M.M Dunda Limboto stated that the duration of infusion of ≤ 3 days was 32 respondents (38.1%) and for the duration of infusion > 3 days as many as 52 respondents (61.9%).

The results of this study indicated that the incidence of phlebitis was mostly categorized as having phlebitis, namely as many as 31 people (56.4%), this was due to inflammation of the vein that was attached to the IV. The results of this study were in line with the research conducted by Suharti (2015) at SMC RS. Telogorejo research results obtained by most of the respondents as many as 42 respondents (51.2%) experienced the incidence of phlebitis compared to those not affected by 40 respondents (48.8%).

Based on the questionnaire item analysis of 31 people who experienced phlebitis as many as 20 people (64.5%) experienced a little pain near the IV line, 18 people (58.1%) experienced slight redness near the IV line, 8 people (25.8%) experienced pain on the IV line, 7 people (22.6%) experienced redness and 3 people (9.7%) experienced swelling. The incidence of phlebitis was known by observing the location of the insertion or infusion by looking for signs and symptoms of phlebitis including pain along the cannula, erythema or redness at the insertion site, fever at the insertion site, induration and palpable cord veins (Joae Brett Nito, Sari Mulia Banjarmasin, & Ahmad Yani, 2017).

The results showed that of 23 people (41.8%) with a duration of category ≤ 3 days of infusion, 16 people (69.6%) did not have phlebitis, whereas 32 people (58.2%) did not have the infusion duration. > 3 days, a great number of 24 people (75%) had phlebitis.

Based on the results of data analysis with the Chi Square statistical test with the error rate used is $\alpha < 0.05$. The number of the influence on each independent variable towards the dependent variable is used the prevalent ratio with 95% CI showed the value χ^2 count of 10.806 and the value of ρ value of 0.001. Based on the results of the data analysis above, it could be concluded that there was a significant relationship between the duration of infusion and the incidence of phlebitis in Class III Internal Medical Room, General Hospital of Ciamis Regency because the value $\alpha > \rho$ value ($0.05 > 0.001$) and χ^2 count $> \chi^2$ table ($10.806 > 3.841$). This relationship was a positive relationship, it meant that the longer the infusion was installed, the higher the risk of phlebitis and vice versa, the faster the infusion was replaced, the lower the risk of phlebitis occurred.

The results of this study were in line with research conducted by Komaling (2014). The results of data analysis were carried out using the chi-square test (X^2), at a significance level of 95% ($\alpha = 0.05$) indicating a value of $p = 0.000$, this value was smaller than $\alpha = 0.05$, so it could be stated that there was a relationship between the duration of infusion (intravenous) and the incidence of phlebitis in patients at IRINA F BLU. RSUP. Prof. Dr. R. D. Kandou Manado, and so the results of research conducted by Suharti (2015) at SMC RS. Telogorejo showed that there was a relationship between the duration of infusion and the incidence of phlebitis at the SMC Telogorejo Hospital, with a p value of 0.001.

The health center (Puskesmas) with a place of care plays an important role in secondary prevention, nurses can prevent the occurrence of phlebitis by replacing venocatheters and infusion lines every 3 days at the Puskesmas with a place of care.

6. Conclusion

From the results of data analysis, it was obtained χ^2 count of 10.806 and a value of ρ value of 0.001. Based on the results of data analysis, it could be concluded that there was a significant relationship between the duration of infusion and the incidence of phlebitis in the Class III Internal Medical Room, General Hospital of Ciamis Regency α value $>$ ρ value (0.05 $>$ 0.001) and χ^2 count $>$ χ^2 table (10.806 $>$ 3,841).

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