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THE EFFECT OF INTRAVENOUS CANNULA SIZE ON THE INCIDENCE OF PHLEBITIS IN PATIENTS ATTACHED TO INFUSIONS IN THE KENANGA ROOM OF RSUD MUHAMMAD SANI IN 2024

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Abstract

In general, phlebitis can be defined as a condition of inflammation of the veins with clinical manifestations of at least 3x24 hours. Data from the PPI Committee of Muhammad Sani Hospital, the incidence of phlebitis in 2023 there were 7 cases of phlebitis (0.23‰), while in the first quarter of 2024 there were 19 cases of phlebitis (3.08‰). This study aims to determine the effect of intravenous cannula size on the incidence of phlebitis in patients attached to infusions. Pre-experimental research design one shot case study posttest only. The population in this study were patients attached to infusions in the Kenanga Room of Muhammad Sani Hospital in June 2024, totalling 93 people, the sampling technique was accidental sampling and the sample size was 48 people, the research instrument used an observation sheet. Univariate results for the size of the intravenous cannula attached to the majority of respondents size 20, as many as 20 people (41.7%), and most respondents did not experience phlebitis, namely 46 people (95.8%), and the results of bivariate analysis with the Wilcoxon test obtained a negative mean rank value of 11.50, positive mean rank 20.46 and P-Value = 0.000 <0.05, meaning that there is an effect of intravenous cannula size on the incidence of phlebitis in patients attached to infusions in the Kenanga room of Muhammad Sani Hospital in 2024. It is expected for nurses to always follow the SOP for infusion correctly to prevent the occurrence of phlebitis in patients who are attached to infusions.

Keywords: Intravenous Cannula Size, Phlebitis Incidence

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Abstrak

Secara umum flebitis dapat diartikan sebagai sebuah kondisi terjadinya inflamasi atau peradangan pada pembuluh darah vena dengan manifestasi klinis sekurang kurangnya 3x24 jam. Data dari Komite PPI RSUD Muhammad Sani, kejadian flebitis pada tahun 2023 terdapat 7 kasus kejadian flebitis (0,23 ‰), sedangkan pada triwulan pertama 2024 terdapat 19 kasus flebitis (3,08‰). Penelitian ini bertujuan mengetahui pengaruh ukuran kanul intravena terhadap kejadian flebitis pada pasien yang terpasang infus. Desain penelitian *pre eksperimental one shot case study posttest only*. Populasi pada penelitian ini adalah pasien yang terpasang infus di Ruang Kenanga RSUD Muhammad Sani pada bulan Juni 2024 yang berjumlah 93 orang, Teknik pengambilan sampel dengan *accidental sampling* dan jumlah sampel sebanyak 48 orang, instrumen penelitian menggunakan lembar observasi. Hasil univariat untuk ukuran kanul intravena yang terpasang pada responden mayoritas ukuran 20, yaitu sebanyak 20 orang (41.7%), dan sebagian besar responden tidak mengalami flebitis, yaitu 46 orang (95.8%), dan hasil analisis bivariat dengan uji *Wilcoxon* diperoleh nilai *negative mean rank* 11.50, *positive mean rank* 20.46 dan *P-Value* = 0.000 < 0.05, artinya terdapat pengaruh ukuran kanul intravena terhadap kejadian flebitis pada pasien yang terpasang infus di ruang Kenanga RSUD Muhammad Sani tahun 2024. Diharapkan untuk tenaga perawat untuk selalu mengikuti SOP pemasangan infus dengan benar untuk mencegah terjadinya flebitis pada pasien yang terpasang infus.

***Kata kunci*: Ukuran Kanul Intravena, Kejadian Flebitis**

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Introduction

One of the most common types of healthcare services provided to patients in hospitals is intravenous therapy (Mutiana, 2014). The use of intravenous therapy in patient care has increased over the years. The average hospitalised patient will receive intravenous therapy during their treatment period (Dougherty and Lamb, 2008 in Yohana. N, S and C. Maria, 2018).

IV insertion that is not in accordance with protocol can spread infectious diseases to patients, known as nosocomial infections. In a survey conducted by the World Health Organization (WHO), about 8.7% of 55 hospitals in 14 countries in Europe, the Middle East, Southeast Asia and the Pacific had cases of nosocomial hospital-acquired infections (HAIs), and 10.0% in Southeast Asia. The incidence of nosocomial infections is also used as an indicator of the quality of hospital services. Types of nosocomial infections that commonly occur in surgical patients include urinary tract infections, postoperative infections, lower respiratory tract infections, and infections due to the use of intravascular catheters, also known as phlebitis (Sjamsuhidayat et al, 2010 in Fransiska, 2018). Phlebitis can be defined as inflammation of the veins caused by trauma (intravenous cannula that is too large for the vein), chemical irritation (type of fluid used), as well as sepsis (errors in aseptic technique). (Salgueiro-Oliviera, et al, 2012 in Ake, 2019)

Phlebitis can prolong the patient's treatment days, resulting in greater costs incurred. In addition, phlebitis is a serious threat because it can cause blood clots or thrombophlebitis which can lead to thrombus, which if a thrombus blocks a blood vessel in the heart suddenly, it can cause death (Fransiska, 2018).

Phlebitis often appears in patients who receive continuous infusions for a long time. Based on data from the Indonesian Ministry of Health in 2013, 50.11% of phlebitis cases occurred in government hospitals, while in private hospitals the incidence of phlebitis reached 32.70% (Yuhelma, 2019). A preliminary survey at the Muhammad Sani Hospital Inpatient Installation, in 2023 there were 7 cases of phlebitis (0.23‰), in the first quarter of 2024 there were 19 cases of phlebitis (3.08‰) (Komite PPI RSUD Muhammad Sani, 2024).

Methods

This research was conducted in Kenanga Room of Muhammad Sani Hospital in August 2024. With a pre experimental research design one shot case study posttest only. The number of respondents in this study was 48 people using accidental sampling technique. Data collection was carried out through observation sheets, where data analysis used univariate analysis to determine the frequency distribution of each variable and bivariate analysis to determine whether there was an influence between the independent variable and the dependent variable. Bivariate analysis uses the Wilcoxon test by comparing the significance value and p value, if the significance value is greater than the p value, the alternative hypothesis is accepted.

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Results and Discussions

1. Research Results

Based on the results of a study entitled "The Effect of Intravenous Size on the Incidence of Phlebitis in Infused Patients in the Kenanga Room at Muhammad Sani Hospital in 2024" obtained data on the frequency distribution of respondents based on the results studied as follows:

A. Univariate Analysis

a. The size of the intravenous cannula in patients attached to infusions in the Kenanga Room of the Muhammad Sani Hospital in 2024

The frequency distribution of intravenous cannula size in patients attached to infusions in the Kenanga Room of Muhammad Sani Hospital in 2024 can be seen in table 4.1 below:

Table 4.1
Frequency Distribution of Intravenous Cannula Size in Patients with Plugged Infusion in Kenanga Room at Muhammad Sani Hospital in 2024

No	Intravenous Cannula Size	Frequency	Percentage
1	18G	11	22.9%
2	20G	20	41.7%
3	22G	11	22.9%
4	24G	6	12.5%
	Total	48	100%

From table 4.1 above, it can be seen that most of the sizes of intravenous cannula attached to respondents are size 20G, as many as 20 respondents (41.7%), size 18 as many as 11 respondents (22.9%) and size 24 as many as 6 respondents (12.5%).

b. Incidence of phlebitis in patients with intravenous fluids in Kenanga Room of Muhammad Sani Hospital in 2024

The frequency distribution of the incidence of phlebitis in patients with intravenous drip in Kenanga Room of Muhammad Sani Hospital in 2024 can be seen in table 4.2 below:

Tabel 4.2
Frequency Distribution of Phlebitis Events in Infused Patients in Kenanga Room, Muhammad Hospital Sani in 2024

No	Phlebitis Occurrence	Frequency	Percentage
1	Phlebitis	2	4.2%
2	No Phlebitis	46	95.8%
	Total	48	100%

From table 4.2 above, it can be seen that most respondents did not have phlebitis, namely 46 respondents (95.8%) and respondents who experienced phlebitis were 2 respondents (4.2%).

B. Bivariate Analysis

In this study, bivariate analysis aims to identify the effect of intravenous cannula size on the incidence of phlebitis in patients receiving infusions in the Kenanga Room of Muhammad Sani Hospital in 2024. The results can be seen in table 4.3 below:

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Tabel 4.3
Effect of Intravenous Cannula Size on the Incidence of Phlebitis in Infused Patients in Kenanga Room, Muhammad Sani Hospital, 2024

Test Statistics[a]

		N	Mean Rank	Sum of Ranks		Intravenous cannula size - incidence of phlebitis
Intravenous cannula size - incidence of phlebitis	Negative Ranks	2[a]	11.50	23.00	Z	-5.253[b]
	Positive Ranks	37[b]	20.46	757.00	Asymp. Sig. (2-tailed)	.000
	Ties	9[c]			a. Wilcoxon Signed Ranks Test	
	Total	48			b. Based on negative ranks.	

Based on table 4.3 above, it can be seen from the Wilcoxon test that the negative rank mean is 11.50, positive rank mean is 20.46, and p value is 0.000. This p value is smaller than the significance value of 0.05 (p <0.005). So the null hypothesis is rejected and the alternative hypothesis is accepted, there is an effect of intravenous cannula size on the incidence of phlebitis in patients attached to infusions in the Kenanga Room of Muhammad Sani Hospital in 2024.

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DISCUSSION

A. Intravenous Cannula Size

In this study, the size of the intravenous cannula in patients attached to infusions in the Kenanga Room of Muhammad Sani Hospital in 2024 was mostly the 20G size, as many as 20 respondents (41.7%). In choosing the size of the intravenous cannula, you should choose a smaller cannula size for patient comfort, also consider the size of the patient's vein (Linda. S, W, 2015). Large cannulae increase the risk of phlebitis, because they can inhibit blood flow in the veins and can cause vein wall irritation (Scales 2008 in Ramadhani 2019). Research by Febriana (2017) states that the larger the size of the intravenous cannula used, the greater the risk of phlebitis. According to the researcher, choosing the right size of cannula is important for patient comfort and preventing complications that can occur from infusion such as phlebitis. The larger the size of the intravenous cannula, the greater the risk of phlebitis. However, the selection of intravenous cannula size also considers the clinical needs and treatment of the patient.

B. Incidence of Phlebitis

In this study, it was found that 46 patients (95.8%) and 2 people (4.2%) who experienced phlebitis were infused in the Kenanga Room of Muhammad Sani Hospital in 2024. Where 2 people who experienced phlebitis were 62 and 56 years old and each respondent required surgery, so they needed a larger intravenous cannula size, namely size 18G. according to Dychter's theory, 2023 in Ramadhani, 2019 states that one of the risk factors that can cause phlebitis is age, where aging results in a decrease in the immune system, thereby increasing the risk of various diseases, including phlebitis. In addition, venous vessels in the elderly tend to become more fragile, less elastic, and more prone to collapse, which can lead to phlebitis. According to researchers, age is also an important aspect to consider in the incidence of phlebitis. Older patients tend to have more vulnerable venous walls and decreased elasticity, so they are more prone to mechanical trauma from the use of large-sized cannulae. In elderly patients, the use of 18G cannulae may cause more significant irritation than in younger patients, who have more elastic venous walls and are better able to withstand mechanical stress.

C. Effect of Intravenous Cannula Size on the Incidence of Phlebitis

The results of the Wilcoxon test to determine whether or not there is an effect of intravenous cannula size on the incidence of phlebitis in patients attached to infusions in the Kenanga room of Muhammad Sani Hospital, is a p-value of 0.000, this result is smaller than the significant value of 0.05 ($p < 0.05$), so the alternative hypothesis is accepted, there is an effect of intravenous cannula size on the incidence of phlebitis in patients attached to infusions in the Kenanga room of Muhammad Sani Hospital in 2024. The results of this study are in line with a study conducted by Dian Safitri (2019), which showed a relationship between intravenous cannula size and the incidence of phlebitis, with a p-value of 0.039. These results are also in line with the theory expressed by Dychter (2012) in Ramadhani (2019), which states that there are several risk factors that can cause phlebitis, one of which is risk factors related to the cannula. The author realizes that in clinical practice, the selection of intravenous cannula size is often tailored to the needs of the therapy, such as blood transfusion or parenteral nutrition, which generally requires a larger intravenous cannula size. However, given the results of this study, it is important to emphasize the importance of balancing therapeutic needs with the risk of potential complications. The use of smaller intravenous cannulae, such as 22G or 24G, may be considered in patients with more fragile veins or those who do not require rapid flow, to minimize the risk of phlebitis. In the field, the use of intravenous cannula size is generally based on clinical conditions and patient needs. In this study, although the 20G intravenous cannula size was most widely used, few respondents experienced

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phlebitis, which could be due to several factors, such as good insertion technique, proper care, or limited duration of cannula use. However, the results of this study still provide important insights that the use of larger intravenous cannulae should be done with caution, especially in patients with a high risk of phlebitis. This suggests that a good understanding of intravenous cannula characteristics and the patient's venous condition is essential in clinical decision-making.

CONCLUSIONS AND RECOMMENDATIONS

A. Conclusion

From the results of the study entitled The Effect of Intravenous Cannula Size on the Incidence of Phlebitis in Infused Patients in the Kenanga Room at Muhammad Sani Hospital in 2024, it can be concluded as follows:

a. The average respondent who was attached to the infusion in the Kenanga Room of Muhammad Sani Hospital in 2024 was using an intravenous cannula with a size of 20G, as many as 20 people (41.7%).
b. Most of the respondents who were infused in the Kenanga Room of Muhammad Sani Hospital in 2024 did not experience phlebitis, as many as 46 people (95.8%).
c. There is an effect of intravenous cannula size on the incidence of phlebitis in patients who are infused in the Kenanga Room of Muhammad Sani Hospital in 2024 with a p value of 0.000.

B. Recommendations

a. For Muhammad Sani Hospital
   It is expected to provide training in infusion installation, and can provide education about management if signs and symptoms of phlebitis are found in patients.
b. For Health Workers
   It is expected to implement the standard operating procedures (SPO) for infusion installation that have been set by the hospital, and it is expected to increase supervision and evaluation of patients who are infused to minimize the incidence of phlebitis or other complications.
c. For Respondents
   The results of this study are expected to make services to patients, especially in the installation of infusions, better and can increase the sense of security and comfort in patients.
d. For Further Researchers
   The results of this study are expected to be a motivation for further researchers to conduct research on phlebitis from the causative factors of fluid type.

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