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# The Placement of Intravenous Catheter Installation with Phlebitis in Disease in In-Patient Room of Ciamis Regional Public Hospital

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**Abstract.** Phlebitis is an inflammation of the veins caused by mechanical, bacterial, or chemical irritants. Based on the Medical Record Data of Ciamis District Hospital (2016) the incidence of phlebitis increases every year. The impact of phlebitis is comfort, the patient's activities and sleep patterns are disrupted. Some references from research and theory obtained from nursing books regarding the setting of intravenous catheters are gaps; the location of the installation of a good intravenous catheter is placed in the hands or arms first to reduce the risk of phlebitis. The purpose of this study is to determine the relationship of intravenous catheter placement with phlebitis in disease in in-patient room of Ciamis Regional Public Hospital in 2017. The method in this study is analytic association/correlation. The population in this study is all in-patients who are infused in the Class III of In-patient Room of the Ciamis Regional Public Hospital in May-June 2017 that covering 3 rooms, namely the Lotus Room, the Dahlia Room, and the Kenanga Room. The sampling technique used is Proportional Random Sampling which is partially in the population that can represent an overall target of 55 people divided into 3 rooms, they are 16 people Lotus Room, 19 people Dahlia Room, 20 people Kenanga Room. The results shows that there is a significant relationship between the Intravenous Catheter Placement and Phlebitis in disease in in-patient room of Ciamis Regional Public Hospital in 2017 because of the value of p-value ( $0.003 < \alpha (0.05)$ ). An OR value of 6.909 was also obtained, meaning that the location of intravenous catheter placement in the hand had a greater risk of 6,909 times for phlebitis compared to the location of catheter placement in the arm. Veins in the hand that often occur phlebitis, namely the radial vein as many as 19 respondents (34.5%), metacarpal veins as many as 13 respondents (23.6%).

## 1. Introduction

More than 60% of patients who enter the hospital receive intravenous therapy. Intravenous therapy is a therapy that is often carried out and recommended to patients in services in hospitals around the world, to deal with a number of conditions, the purpose of intravenous therapy is to maintain, restore fluid, electrolytes, minerals, or body nutrients when experiencing a balance disorder. This therapeutic system allows direct, more effective, faster therapeutic effects, can be done periodically until a certain time, according to the patient's condition and, the patient will feel more comfortable (Hindley, 2004 in Fitriyanti, 2015).

Intravenous therapy is a therapy given to patients using an infusion set that is installed by health workers/nurses to give solutions, vitamins, drugs, and blood transfusions to the patient's body.



Complications that can be obtained from intravenous therapy are divided into two, namely systemic and local complications. Systemic complications are less common but often more serious than local complications such as air embolism, sepsis, and excess circulation. Local complications of intravenous therapy include infiltration, thrombophlebitis, hematoma, and phlebitis (Potter and Perry, 2012).

According to Smeltzer & Bare (2012), phlebitis is an inflammation of the veins (veins), which are caused by mechanical, bacterial, or chemical irritation. As for the incidence of phlebitis experienced by patients undergoing intravenous therapy, there are several causative factors including the technique of intravenous catheter insertion, type of fluid, and the location where the intravenous catheter is placed. If in the area there is redness, pain, swelling, and heats intravenous catheter puncture, the signs and symptoms can be indicated by phlebitis. Potter and Perry (2012), said technically, the infusion set remained sterile within a period of 48 to 72 hours.

According to the *World Health Organization* (WHO) (2010), Health Care Associated (HAIS) or Hospital infection is an important problem throughout the world and an interesting issue to do research especially to prevent infection. Phlebitis is included in HAIs, because phlebitis itself is an inflammatory process caused by several causes, one of which is an infection from microorganisms, in Indonesia the prevalence of phlebitis is 7.1%.

According to the Indonesian Health Ministry (2013) in Lestari et al (2016), the incidence of phlebitis in Indonesia amounted to 50.11% for Government Hospitals while for Private Hospitals at 32.70%, this showed that phlebitis in Government Hospitals is higher than private hospitals. According to Rizki (2016), phlebitis in Indonesia nowadays there are no definite figures officially published, there is a possibility caused by research and dissemination of information relating to phlebitis is rarely done.

The author obtained data of phlebitis in Ciamis Hospital based on the Medical Data of Ciamis Regional Public Hospital (2016), in 2013 there were 109 people (0.97%) out of 11,280 inpatients, in 2014 there were 122 people (1.08%) from 11,277 inpatients in 2015 amounted to 126 people (1.11%) out of 11,317 inpatients. Based on data from the infection prevention and control committee (PPI) of Ciamis Public Hospital in 2017 (2017), the incidence of phlebitis in 2016 was phlebitis 671 people (3.9%) of the total 17,198 inpatients. Based on the incidence, it shows that the incidence of phlebitis every year in Ciamis Regional Public Hospital has increased.

According to the Ministry of Health (2012), the incidence of phlebitis is one of the measures of quality of nursing care obtained from a comparison of the number of phlebitis events with the number of patients receiving infusion therapy. *Infusion Nursing Standards of Practice* (2006) in Alexander, et al., (2010), recommend that the level of phlebitis that must be reported is level 2 or more. While the incidence recommended by the *Infusion Nursing Society* (INS) is 5% or less. If it is found that the incidence of phlebitis is more than 5%, the data must be analyzed re-against the degree of phlebitis and its possible causes to develop a plan to improve nurse performance.

The impact of phlebitis according to the Ministry of Health (2015), will cause many disadvantages including the length of treatment day increases, suffering increases, and costs will increase. As according Radne & Daughter (2016), the real impact on the incidence of phlebitis which can interfere with other matters outside the complaint disease, among others: a sense of comfort, activity and sleep patterns of patients affected, due to the effects of phlebitis can cause tissue area vein transfixion intravenous catheter experiencing pain, swollen and hot. Another impact for the institution in question is the increase in nurses' duties, will lead to public perceptions of the quality of hospital services that are poor and the possibility of perceptions of malpractice actions carried out by the Hospital.

As for several studies related to intravenous therapy with phlebitis. Fitriyanti (2015), about the factors that influence the occurrence of phlebitis, namely: (a) age, (b) gender, (c) comorbidities, (c) needle size, (d) type of intravenous fluids, (e) infusion treatment, ( f) duration of infusion, (g) procedure for infusion, (h) location of intravenous catheter placement. According to Lestari's research, Ismanto & Malara (2016), regarding the relationship between type of fluid and location of infusion stabbing with

phlebitis, stated the results of the study that there was a relationship between the type of fluid and the location of infusion to phlebitis with p values 0,000 and 0,025, which means both  $p < \alpha 0.05$ .

A nurse who performs intravenous or infusion therapy should pay attention to a number of things so that phlebitis does not occur, namely the selection of the location of intravenous catheter placement should be considered in certain veins that should not or should not be recommended intravenous catheter stabbing. The location of an intravenous catheter puncture is common in the area of the hands and arms. Priority is placed distally / hands first then into the area proximal or arm, because if something happens to the hand then it can be transferred to the arm (Potter and Perry, 2012).

However, according to some studies, the location of placement catheter intravenous in the hand / hand is more at risk for phlebitis, while the study of Pujasari (2002) in Lestari, Ismanto & Malara (2016), concludes from the results of 109 respondents, with percentages based on location more cause phlebitis is metacarpal vein (72.7%) and the cephalic vein (27.3%), this shows that the vein in the hand is more at risk of phlebitis. According to Nurdin (2013), where locations often cause complications such as phlebitis are like digitalis veins to dorsal veins. Dorsal vein (metacarpal/back of the hand), where the loss of location/place is a lot of movement and is used for daily activities such as eating, drinking, and doing other movements, this is what can cause phlebitis.

The author conducted a preliminary study on Saturday 18 March 2017 in one of the inpatient rooms of Ciamis Hospital. The author conducted observations and interviews, the authors took 10 patients who were undergoing therapy intravenously, six patients were installed intravenously in the hand catheter, including three patients with phlebitis signs (50%) and no signs of phlebitis in three patients (50%). The four patients had intravenous catheters in their arms, including one patient with a sign of phlebitis in the arm (25%) and no signs of phlebitis in three patients (75%). The average patient who experiences signs of phlebitis is redness and pain.

This study aims to find out the relationship between the location of intravenous catheter placement and phlebitis in the Class III Inpatient Room of Ciamis Regional Public Hospital in 2017.

**2. Research Methods**

This study used an analytical survey method to find out the relationship between intravenous catheter placement and phlebitis. This study used *cross section* approach. The population in this study were all inpatients who were infused in the Class III Inpatient Room of the Ciamis Regional Public Hospital in May-July 2017 for 123 beds. The sample is 55 patients. The sampling technique used is *Proportional Random Sampling*. The instrument is in the form of an observation sheet, using *Visual Infusion Phlebitis score* Nursalam (2013). Bivariate analysis to determine the relationship between the independent variable and the dependent variable using the statistical test *Chi-Square*.

**3. Results**

**Table 1.** Relationship of Location of Intravenous Catheter Placement with Phlebitis in Class III Inpatient Room Ciamis Hospital 2017

Location of Intravenous Catheter Placement	Phlebitis				Cumulative		OR (95% CI)	P value
	Phlebitis (Score 1-5)		Does Not Occur Phlebitis (Score 0)					
	f	%	f	%	f	%		
Hand	19	79.2	5	20.8	24	100.0	<b>6,909</b> <b>(2,020-23,627)</b>	<b>0.003</b>
Arm	11	35.5	20	64.5	31	100.0		
<b>Total</b>	30	54.5	25	45.5	55	100.0		

#### 4. Discussion

Based on data from the study results, the incidence of phlebitis in intravenous catheter on hands higher than on arms. In addition, beside the location factors for intravenous placement, there are other factors that cause phlebitis including age, sex, insertion techniques, type of medication, dressing and type of fluid.

The results of the bivariate analysis showed the p-value of 0.003, that is, when compared with an alpha ( $\alpha$ ) value of 0.05, there was a difference in the proportion of the location of intravenous catheter placement between the hands and arms. This shows a significant relationship between the location of intravenous catheter placement and phlebitis. The results of the analysis showed that OR 6.909 indicated the location of intravenous catheter placement in the hand had a greater risk of 6,909 times for phlebitis to occur than the location of catheter placement in the arm.

According to Lestari, Ismanto & Malara (2016), the location of infusion in the cephalic vein causes more phlebitis compared to the location of infusion in the metacarpal vein. The results of Lindayanti & Priyanto (2013) study that the incidence of phlebitis based on the location of intravenous catheter placement occurs mostly in the distal vein compared to the medial vein.

Phlebitis often occurs in the hand vein or distal vein which is very much influenced by the characteristic of the distal vein. Distal veins have a smaller diameter than the veins of the arm or proximal, allowing for more rapid venous damage. The smaller diameter of the vein allows more frequent friction between the catheter venous and the vein wall so that it is more easily irritated.

#### 5. Conclusion And Recommendations

The location of intravenous catheter placement in the hand or distal vein has a greater risk of phlebitis than in the proximal arm or vein. Nurse must be wiser in considering the location of intravenous catheters to avoid phlebitis.

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