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Factors Related to Phlebitis in Internal, Surgical and Child Hospital Treatment Rooms

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Abstract

Phlebitis is an inflammation of the veins that occurs as a result of unsuccessful vein puncture, contamination of IV equipment and inadequate use of hypertonic solutions which can chemically irritate the veins. To minimize the risk of infection, nurses need to be aware of and recognize which factors are dominant in the incidence of phlebitis. This study aims to determine the incidence of phlebitis in the internal, surgical and pediatric ward of the hospital. The research design used was an analytic survey with a prospective (Study Cohort) approach, which is an observational study, meaning that the risk factors to be studied are identified first. It is then followed up prospectively. Sampling was carried out by purposive sampling method with a total sample of 57 people, then the results were tested using a computer program with the Chi Square test with a significance level of $\alpha = 0.05$. The results of this study showed that there was no relationship between age and the incidence of phlebitis (p value = 0.531 > 0.05), there was a relationship between gender and the incidence of phlebitis (p value = 0.007 <0.005), there was a relationship between the size of intravenous catheter cannula and the incidence of phlebitis (p value = 0.001 < 0.05), there was no relationship between the type of fluid and the incidence of phlebitis (p value 0.373 > 0.05), there was a relationship between the type of infusion set and the incidence of phlebitis (p value 0.016 < 0.05), and There is a relationship between the infusion procedure and the incidence of phlebitis (p value 0.004 <0.05). The conclusion is that there is a relationship between gender, type of infusion set, size of intravenous catheter cannula, infusion procedure and no relationship between age and type of fluid with the incidence of phlebitis.

Keyword : Factors Related, Phlebitis in Internal, Surgical and Child, Hospital Treatment Rooms

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1. Introduction

Body fluids are solutions consisting of water and dissolved substances. Water is the solvent of all dissolved substances in the body both in the form of suspension and solution. Total body water is the percentage of water weight compared to total body weight which varies according to sex, age and body fat content (Irawan, 2007).

Water has 2 main functions, namely as a carrier of nutrients such as carbohydrates, vitamins and minerals and will also function as a carrier of oxygen (O2) into the body's cells. In addition, water in the body will also function to remove metabolic by-products such as carbon dioxide (CO2) and nitrate compounds. Apart from playing a role in metabolic processes, water contained in the body will also have various important functions, including as a moisturizer for body tissues such as the eyes, mouth and nose, a lubricant in the body's joint fluids, a catalyst for cell biological reactions, a protector for organs and body tissues and It will also help in maintaining blood pressure and solute concentration. In addition, so that body functions can run normally, water in the body will also function as a heat regulator to maintain body temperature at ideal conditions, namely ± 370 C (Irawan, 2007).

Patients who are hospitalized in the hospital need to get treatment by the health team. One of the treatments given is in the form of infusion or intravenous (IV) therapy. That is the administration of a number of fluids into the body through a needle into a vein to replace fluids or nutrients from the body. Intravenous therapy is given to patients who experience large amounts of bleeding, patients who experience dehydration, burns, diarrhea and fever (Hidayat, 2006).

Intravenous therapy is useful for correcting or preventing fluid and electrolyte imbalances in the human body. Intravenous therapy is used to provide fluid therapy to acute or chronically ill clients (Potter and Perry, 2005).

In connection with IV therapy, a nursing problem has been identified regarding complications from intravenous therapy, one of the complications that is often found in hospitals is the incidence of phlebitis (Hindley, 2006).

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2. Research Method

The research design used in this study is an analytic survey with a prospective approach (Cohort Study), namely observational or non-experimental research which is the best in assessing the relationship between risk factors and effects, meaning that the risk factors to be studied are identified first and then followed prospectively with the emergence of effects. namely disease or one indicator of health. In this case it is intended to identify factors associated with the incidence of phlebitis in the administration of intravenous fluid therapy in the internal, surgical and pediatric care rooms at Haji Makassar Makassar Hospital.

3. Results And Discussions

a. Result

Sampling in this study used a non-probability sampling method with a porposive sampling technique, namely by determining the sample by selecting samples from among the population according to what the researcher wanted so that they could represent the characteristics of the population. After all the data has been collected, then to do the data processing.

1. Univariate analysis / variables studied

a) Age

Table 1
Frequency Distribution of Respondents Based on Age in Internal, Surgical and Pediatric Care Rooms at Haji Makassar Hospital

Characteristics	F	%
Age (Years)		
0-5	3	5,3
6-11	16	28,1
12-25	12	21,0
26-45	16	28,1
46-55	10	17,5
Total	57	100

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Table 1 shows that the distribution of frequencies based on age characteristics in the treatment room, internal, surgical and children, the highest age is 6-11 years old with 16 people (28.1%) and 26-45 people with 16 people (28.1%).

b) Gender

Table 2
Frequency Distribution of Respondents Based on Gender in Internal, Surgical and Pediatric Care Rooms at Haji Makassar Hospital

Gender	F	%
Man	24	42,1
Woman	33	57,9
Total	57	100

Table 2 shows the distribution of the frequency of sex in the internal, surgical and pediatric care rooms at the Haji Makassar Hospital, the highest sex being female, 33 people (57.9%) and the least male, 24 people (42.1%).

c) Intravenous Catheter Cannula Size

Table 3
Frequency Distribution of Respondents Based on the Size of the Intravenous Catheter Cannula in Internal, Surgical and Pediatric Care Rooms at Haji Makassar Hospital

Cannula Size KIV	F	%
18 G	15	26,3
20 G	20	53,1
22 G	3	5,3
24 G	19	33,3
Total	57	100

Table 3 shows that the frequency distribution based on the size of the intravenous catheter cannula in the internal, surgical and pediatric care rooms at Haji Makassar Hospital was obtained by respondents who used the most KIV cannula size, namely size 20 (53.1%) and the least used cannula size 22 (5 ,3%).

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d) Liquid type

Table 4
Frequency Distribution of Respondents Based on the Type of Fluid in the internal, surgical and pediatric care rooms at the Makassar Haji House

Liquid type	F	%
Hipertonik	1	1,8
Isotonik	56	98,2
Total	57	100

Table 4 shows that the frequency distribution based on the type of fluid in the internal, surgical and pediatric care rooms was obtained by 1 person (1.8%) who used hypertonic fluids and 56 people (98.2%) who used isotonic fluids.

e) Type of infusion set

Table 5
Frequency Distribution of Respondents Based on Type of Infusion Set in Internal, Surgical and Pediatric Care Rooms at Haji Makassar Hospital

Type of infusion set	F	%
Makrodrip	44	77,2
Mikrodrip	13	22,8
Total	57	100

Table 5 shows the frequency distribution based on the type of infusion set in the internal, surgical and pediatric wards, 44 people (77.2%) used macrodrip infusion sets and 13 (22.8%) used microdrip infusion sets.

f) Infusion procedure

Table 6
Frequency Distribution of Respondents Based on Infusion Procedures in Internal, Surgical and Pediatric Care Rooms at Haji Makassar Hospital

Infusion procedure	F	%
Good	43	75,4
Not good	14	24,6
Total	57	100

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Table 6 shows the frequency distribution based on the infusion procedure, it was found that 43 respondents (75.4%) received good infusion procedures and 14 respondents (24.6%) received poor infusion.

g) Phlebitis

Table 7
Frequency Distribution of Respondents Based on the Incidence of Phlebitis in Internal Care, Surgery and Pediatrics Hospital Haji Makassar

Phlebitis	F	%
Yes	32	56,1
No	25	43,9
Total	57	100

Table 7 shows the frequency distribution based on the occurrence of phlebitis in the internal, surgical and child care rooms at Haji Makassar Hospital obtained from 57 respondents, who experienced phlebitis as many as 32 people (56.1%), and who did not experience phlebitis as many as 25 people (43.9%).

2. Bivariate analysis

Bivariate analysis was carried out to obtain a relationship between the dependent variable (the incidence of phlebitis) and the independent variable (age, sex, size of the intravenous catheter cannula, type of fluid, type of infusion set and infusion procedure), so the description is as follows:

a) The relationship between age and the incidence of phlebitis

Table 8
The relationship between age and the incidence of phlebitis in the internal, surgical and children's wards at Haji Makassar Hospital

Age	Phlebitis				Amount		P value
	Yes		No				
	n	%	n	%	n	%	
0-5	3	100	0	0	3	100	
6-11	9	56,2	7	43,8	16	100	

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12-25	5	41,7	7	58,3	12	100	0,531
26-45	10	62,5	6	37,5	16	100	
46-55	5	50	5	50	10	100	
Amount	32	56,1	25	43,9	57	100	

Table 8 shows that of the 3 respondents aged 0-5 years all had phlebitis (100%), of the 16 respondents aged 6-11 years who had phlebitis as many as 9 people (56.2%) and no phlebitis as many as 7 people (43 .8%), out of 12 respondents aged 12-25 years who experienced phlebitis as many as 5 people (41.7%) and did not experience phlebitis as many as 7 people (58.3%), out of 16 respondents aged 26-45 who experienced phlebitis as many as 10 people (62.5%) and who did not experience phlebitis as many as 6 people (37.5%), while for patients aged 46-55 there were 10 people and who had phlebitis as many as 5 people (50%) and no phlebitis as many as 5 people (50%).

Based on the results of the Fisher's Exact Test statistic, a P value of 0.531 was obtained, which means that the p value is greater than 0.05 and thus is not significant or Ha is rejected and Ho is accepted, meaning that there is no relationship between age and the incidence of phlebitis.

b) The relationship between gender and the incidence of phlebitis

Table 9
The relationship between gender and the incidence of phlebitis in the internal, surgical and child care rooms at Haji Makassar Hospital

Gender	Phlebitis				Amount		P value
	Yes		No				
	n	%	N	%	n	%	
Man	19	79,2	5	20,8	24	100	0,007
Woman	13	39,4	20	60,6	33	100	
Amount	32	56,1	25	43,9	57	100	

Table 9 shows that the number of male respondents was 24 people and 19 people (79.2%) had phlebitis and 5 people (20.8%) did not experience phlebitis, while 33 female respondents had phlebitis. as many as 13 people (39.4%) and who did not experience phlebitis as many as 20 people (60.6%).

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Based on the results of the Continuity Correction statistical test, a P value of 0.007 was obtained, which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between gender and the incidence of phlebitis.

c) The relationship between the type of fluid and the incidence of phlebitis

Table 10
The relationship between the type of fluid and the incidence of phlebitis in space internal care, surgery and children at the Makassar Haji Hospital

Liquid type	Phlebitis				Amount		P value
	Yes		No				
	n	%	N	%	n	%	
hipertonik	1	100	0	0	1	100	0,373
Isotonik	31	55,4	25	44,6	56	100	
Amount	32	56,1	25	43,9	57	100	

Table 10 shows that 1 respondent used hypertonic fluids and these respondents experienced phlebitis, while 56 respondents used isotonic fluids and 31 people (55.4%) had phlebitis and 25 people (44.6%) did not have phlebitis.

Based on the results of the Chi Square statistical test, a P value of 0.373 was obtained, which means that the p value is greater than 0.05 and thus it is not significant or Ha is rejected and Ho is accepted, meaning that there is no relationship between the type of fluid and the incidence of phlebitis.

d) The relationship between the type of infusion set and the incidence of phlebitis

Table 11
The relationship between the type of infusion set and the incidence of phlebitis in the internal, surgical and children's ward of the Hajj Makassar Hospital

Type of infusion set	Phlebitis				Amount		P Value
	Yes		No				
	N	%	n	%	n	%	
Makrodrip	29	65,9	15	34,1	44	100	0,016
Mikrodrip	3	23,1	10	76,9	13	100	

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Amount	32	56,1	25	43,9	57	100	

Table 11 shows that of the 44 respondents who used the macrodrip infusion set type, 29 people (65.9%) had phlebitis and 15 people (34.1%) did not use phlebitis, while the respondents who used the microdrip infusion set type were 13 people. and those with phlebitis were 3 people (23.1%) and those who were not phlebitis were 10 people (76.9%).

Based on the results of the Continuity Correction statistical test, a P value of 0.016 was obtained, which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between the type of infusion set and the incidence of phlebitis.

e) The relationship between the infusion procedure and the incidence of phlebitis

Table 12
Correlation between infusion procedures and phlebitis in the internal, surgical and pediatric wards at Haji Makassar Hospital

Infusion procedure	Phlebitis				Amount		P value
	Yes		No				
	n	%	n	%	n	%	
Good	19	44,2	24	55,8	43	100	0,004
Not good	13	92,9	1	7,1	14	100	
Amount	32	56,1	25	43,9	57	100	

Table 12 shows that of the 43 respondents who received a good infusion procedure, 19 people (44.2%) experienced phlebitis and 24 people (55.8%) did not get phlebitis, and 14 people who got a bad infusion procedure and 13 people (92.9%) had phlebitis and 1 person (7.1%) did not have phlebitis.

Based on the results of the Continuity Correction statistical test, a P value of 0.004 was obtained, which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between the infusion procedure and the incidence of phlebitis.

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b. Discussion

1) Umur

According to Kozier (2009), one of the factors that influence the occurrence of phlebitis is the age factor, phlebitis occurs most often in children and the elderly or the elderly because the veins in the elderly have become fragile, inelastic and the anatomical structure of the veins affects the administration of intravenous fluid therapy. due to physiological changes, whereas in children the blood vessels are still fragile so that the blood vessels break easily especially with uncontrolled movements.

The results of research conducted by Darmanto in 2008 in the cempaka room of Sunan Kalijaga Demak Hospital, obtained from 33 respondents, aged 20-50 years, showed that aged 30-40 years had more phlebitis, namely 12.1%, this means that there is a relationship between age by gender.

The results of the research conducted by the researchers were not in line with the research conducted by Darmanto which stated that there was a relationship between age and the incidence of phlebitis. Where, based on the results of the Fisher's Exact Test statistic, a P value of 0.531 was obtained, which means that the p value is greater than 0.05 and thus is not significant or Ha is rejected and Ho is accepted, meaning that there is no relationship between age and the incidence of phlebitis.

The absence of a relationship based on the results of the research is due to the division of criteria/age categories that are too many so it is difficult to get a relationship because in this study the division of age categories is divided into 5 categories while in research conducted by Darmanto the division of age categories is only divided into 2 criteria so it is easy to determine seen the location of the age difference with the incidence of phlebitis.

Age does not matter because there are other factors that influence the incidence of phlebitis, such as the sex of the patient, the type of infusion set used, the size of the IV cannula and the procedure. Bakta (2007) also put forward the

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theory that there is no age relationship with the incidence of phlebitis that phlebitis can occur to anyone without an age limit. The occurrence of phlebitis is preceded by the presence of a thrombus in the vein wall. The incidence of thrombus increases at the age of> 40 years. Age is considered as a risk factor for thrombus. It is estimated that the hypercoagulable state increases in direct proportion to age caused by increased activation of coagulation and degenerative factors of the body's cells.

2) Gender

Gender is a physical or spiritual characteristic that distinguishes two beings as women and men. Kelmain type is one of the internal factors of phlebitis. According to Arif (2010) the male sex has the most phlebitis compared to the female sex because women have the hormone estrogen which plays a role in increasing the female body's immunity against infectious diseases. A study conducted by a research team at McGill University, Canada, indicates that the hormone estrogen plays a role in increasing a woman's immunity against infectious diseases. The estrogen hormone is thought to strongly fight against the expression of enzymes that have been blocking the inflammatory process of the body's defense against invasion by foreign bacteria and viruses. The enzyme in question is Caspase-12. so the response to microorganisms that cause phlebitis is better in women than men. From a study conducted by Nassaji-Zavareh M, Ghorbani.R based on gender, of 155 female patients, 48 patients had phlebitis (31.0%) and of 145 male patients, 30 patients had phlebitis (20.7%). (Darmawan, 2008).

The results of a study conducted by Fitria in 2007 at Mokopido Toli-toli General Hospital found that most men experienced phlebitis, this is in line with research conducted by researchers where, based on the results of the Continuity Correction statistical test, a P value of 0.007 was obtained. which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between gender and the incidence of phlebitis.

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3) Intravenous Catheter Cannula Size

In general, a smaller cannula size should be selected to prevent damage to the intima of blood vessels and maintain blood flow around the cannula to reduce the risk of phlebitis. and venous conditions (Mary, 2010).

The results of a study conducted by Nassaji Zavareh and Ghorbani.R in 2007 studied the frequency of phlebitis in 300 patients treated in the internal and surgical wards of Purbalingga Hospital. Based on the size of the cannula, there were 109 samples using a 20 G cannula and phlebitis occurred in 30 patients (27 .5%), and patients who used 18 G cannulas of 190 patients had phlebitis (24.5%).

This study is in line with research conducted by researchers, based on the results of the Fisher's Exact Test statistic, a P value of 0.001 was obtained, which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between the size of the cannula KIV with phlebitis. Based on the research, it was found that there was a relationship because there were still many respondents who did not use the size of the intravenous catheter cannula according to their age, for example the use of the cannula size that should be used for adults is used for children, and vice versa, this happened because at the time of the study it was found that there were limitations available intravenous catheter cannula.

However, the use of the size of the cannula is also influenced by other factors such as the suitability between the age and the use of the patient's cannula and the position of the patient's cannula, usually in pediatric patients more phlebitis occurs due to uncontrolled movements that affect the rate of infusion flow and cause.

4) Phlebitis

Apart from its size, the material (material) and length of the cannula also affect where, the material (material) of the cannula should be non-irritating, radiopaque (a material made of metal which, when photographed with X-rays, will be easily visible), and does not affect the emergence of thrombus (Dougherty and

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Watson, 2008). Cannula placement is also one of the causes of mechanical phlebitis. Cannulas inserted in the indentation area often produce mechanical phlebitis. The size of the cannula must be chosen according to the size of the vein and properly fixed. Many types and types of cannulas are used with various lengths, compositions and designs. Needle sizes range from 18-24 in length and 25-45 mm in length.

5) Type of liquid

Phlebitis occurs more frequently in patients using hypertonic fluids because hypertonic fluids have a higher osmotic pressure than normal blood plasma/body fluids (> 375 mOsm) (Lisa and Limb, 2008).

Research on the effect of fluids on the incidence of phlebitis was conducted by Sri Mulyani in 2011 at the Semarang Hospital in August, found that the incidence of phlebitis was 19 people. Where, 11 patients (57.9%) used hypertonic fluids and 8 patients (42.1%) installed isotonic fluids.

This research is not in line with research conducted by researchers where, based on the results of the Chi Square statistical test, a P value of 0.373 is obtained, which means that the p value is greater than 0.05 and thus is not significant or Ha is rejected and Ho is accepted, meaning that there is no relationship between type of fluid with the incidence of phlebitis.

According to the researchers, there was no relationship between the type of fluid and the incidence of phlebitis because in this study the lack of respondents used non-isotonic fluids made it difficult to distinguish or difficult to see the level of significant differences between patients using isotonic fluids and non-isotonic fluids.

6) Type of infusion set

Types of infusion sets in the provision of intravenous fluid therapy are divided into 2 types, namely macrodrip and microdrip. A micro drip tube is an infusion tube that has a smaller number of drops than a macro drip, usually has a

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small iron in between, and is usually used for infants, children and heart and kidney patients. and macro 60 drops (Potter and Perry, 2005).

Based on the results of the Continuity Correction statistical test, a P value of 0.016 was obtained, which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between the type of infusion set and the incidence of phlebitis.

The use of this type of macro infusion set that is not in accordance with the patient's age will cause phlebitis, meaning that if a child uses this type of macro infusion set, he will have the potential to experience phlebitis because it is also related to the drip factor where for patients who use macrodrip the drops are larger or more than patients who using microdrip. On the other hand, fewer drops for patients using microdrip.

7) Procedure for infusion

The infusion procedure is a mechanical and bacterial factor that causes phlebitis due to not carrying out the SOP properly, resulting in contamination when microorganisms from the patient's skin or the staff's hands come into direct contact with the intravenous catheter cannula which is in direct contact with the blood vessels.

The results of research conducted by Ince Marlia and Erlin Kurnia at Kediri Baptist Hospital in 2012 related to nurse compliance in implementing Standard Operating Procedures (SOP) for infusions for phlebitis were obtained from 68 actions of infusion, the majority were obtained, namely 60 actions by nurses. comply with the SOP for infusion. Of the 60 times the infusion was obediently known, the majority, namely 60 patients, did not develop phlebitis (88.2%). 8 times the infusion was carried out by nurses who did not comply with the SOP for infusion (11.8%), the result was that at most 2 patients had phlebitis and 6 people did not have phlebitis.

This research is in line with research conducted by researchers where based on the results of the Continuity Correction statistical test, a P value of 0.004

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was obtained, which means that the p value is less than 0.05 and thus is significant or Ha is accepted and Ho is rejected, meaning that there is a relationship between the infusion procedure and phlebitis.

4. Conclusion

a) Based on the results of hypothesis testing with bivariate analysis, it can be seen that there is no relationship between age and the incidence of phlebitis in the internal, surgical and pediatric ward of Haji Makassar Hospital.

b) There is a relationship between gender and the incidence of phlebitis in the internal, surgical and child care rooms at Haji Makassar Hospital, where phlebitis occurs most often in males.

c) There is a relationship between the size of the IV cannula and the incidence of phlebitis in the internal, surgical and pediatric wards of Haji Makassar Hospital, where phlebitis occurs when using a size 24 intravenous catheter cannula.

d) There is no relationship between the type of fluid and the incidence of phlebitis in the internal, surgical and child care rooms at Haji Makassar Hospital.

e) There is a relationship between the type of infusion set and the incidence of phlebitis in the internal, surgical and child care rooms at Haji Makassar Hospital, where phlebitis occurs with the use of the macrodrip infusion set type.

f) There is a relationship between the infusion procedure and the incidence of phlebitis in the internal, surgical and child care rooms at Haji Makassar Hospital, where phlebitis occurs in respondents who received poor infusion / did not follow all SOPs properly.

5. Compliance with ethical standards

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Disclosure of conflict of interest

his research collaboration is a positive thing for all researchers so that conflicts, problems and others are absolutely no problem for all writers.

Statement of informed consent

Every action we take as authors is a mutual agreement or consent.

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