

Research Article

Swaddling to Overcome the Challenges of Peripheral Venous Access in Infants: A Pilot Study

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Abstract. Peripheral intravenous catheter insertion in children in the emergency room has a number of risks, and these increase while the infusion is given to infants. Health personnel attempt to cope with several difficulties in this situation. This study aimed to describe the difficulty of peripheral intravenous insertion factors as well as the interventions implemented to overcome these challenges. This study used a quantitative design with descriptive analysis. 34 nurses and four midwives participated in this study by filling out a questionnaire. According to the findings, the average respondent had four years of work experience and all respondents had infused infant patients in the emergency room in the previous two months. 44.7% of health workers identified venous characteristics of patients as a challenge and 44.1% identified active children as a challenge. Emergency room personnel use a venous viewer 50% of the time and a swaddle 44.7% of the time to overcome infusion difficulties. Due to the challenges of deep palpable veins and small veins, nurses use a vein viewer, whereas for active babies, nurses use the swaddling method.

Keywords: difficulty factors of venous insertion, swaddling, infants

1. Introduction

The majority of intravenous catheter placements are done in the emergency department. 84 % of ED patients had intravenous access, and 80 % had peripheral intravenous access. Children were fitted with a peripheral intravenous catheter to collect blood samples and administer drugs, blood products, and fluids. Peripheral insertion is recommended for short-term treatment and should be observed daily [1][2]. This is also an invasive procedure that can only be performed by certified health workers from the government [3]. This is due to the fact that intravenous installation necessitates specialized knowledge and skills. Intravenous access is also important when performing

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resuscitation. One of the challenges of intravenous installation is the child's age [4]. Installation of a peripheral intravenous catheter is more commonly known as an infusion, and infusion installation in children, particularly infants, has many difficulty factors.

The success rate of intravenous catheter placement in children (successful in one attempt) is only 35%. Even in a children's hospital, the success rate of doctors and nurses in placing intravenous catheters in children was only 23% and 44%, respectively [5]. In general, the causes of difficulty in installing intravenous catheters in children are factors related to the patient himself, factors related to the patient's clinical condition, and factors related to previous disease history [4]. As the most often person who performs peripheral intravenous catheter insertion, nurses in the emergency department should apply nursing theory. One of them is by implementing points 6 and 8 of the 10 Caritas Process of Human Caring. The point is that nurses are expected to be creative problem solvers and to be able to create a comfortable and supportive environment for patients while carrying out the treatment process [6]. The emergency department staff's inventiveness can be seen in their efforts to overcome difficulty factors during infant infusion.

Based on the aforementioned phenomena, the purpose of this study is to describe the complicating factors encountered by nurses when installing infusions, as well as to determine what interventions are implemented to reduce complicating factors when infusions are installed by officers in the emergency department (ED).

2. Methods

2.1. Study Design, Setting and Sample

This is a quantitative study with a descriptive design. Total sampling was used as the sampling technique. The sample for this study consisted of 38 health workers (nurses and midwives) from Airlangga University Hospital Surabaya's emergency department (including the maternal and neonatal emergency room in the ED). The data was collected in April 2021.

2.2. Instrument and Statistical Analysis

The method used was a survey of respondents regarding factors that made infant infusions difficult and efforts made by officers in the ED to overcome difficulties in infusions. Health workers who had not infused infants in the previous two months were

not eligible. The research team created a questionnaire on their own. A questionnaire consist of five items. Each item is open questions used G-form, and the answer change to categories for data analyzed. Before deciding to participate in the study by filling out a questionnaire, all respondents were explained to by the research team. Data processing is the process of modifying, coding, and entering data into computer programs. The data was analyzed in univariate form, with numerical data displayed in terms of mean and standard deviation. Meanwhile, categorical data is displayed as proportions and percentages.

2.3. Ethical consideration

The research was approved by the Airlangga University Hospital (Ref. No. 022/UN.3.9.1/IGD/2021). Informed consent was made in google form to the all respondent, and their consent were verbally obtained before being included in the study.

3. Result and Discussion

According to the findings of this study, 34 respondents are nurses and the remaining four are midwives. In the previous two months, all respondents had infused babies in the emergency room. The average age of respondents is 28 years old, with the oldest age being 35 years old, and respondents having the most work experience, which is 10 years. Professional education is held by 68.4 % of those polled. When inserting an infusion in infants, the majority of respondents (55.3 %) succeeded in one puncture, and the majority of respondents were frequently asked for assistance in another room to infuse infant patients (52.6 %). However, some respondents have never received neonatal training (73.7 %) (see **table 1**). Non trained staff should be minimized because knowing the complications of infusion is proven to increase the success rate of infusion. However, this certainly does not apply to people who have longer work experience. But, mostly nurses in ED are ners, according to Casman, Pradana, edianto and Rahman [7] stated that increased quality of nurse Indonesia in hospital, could used minimum education of nurse itself. Minumum education for nurse should be ners (profession program after bachelor degree).

In the perinatology room, the high complication rate of infusion remains a challenge. As a vulnerable group, neonates require special care; however, increasing knowledge about complication factors during infusion can help reduce morbidity [8]. The success of IV insertion in pediatric patients can be improved by increasing the staff's ability

TABLE 1: Respondent Characteristics (N=38)

Variable	Result		
	n	%	x(SD):Min-Max
Ages	-	-	28.11(2.94):21-35
Work's experience (in years)	-	-	4.16(2.58):0-10
A month infused infant	-	-	4.55(4.37):1-20
Gender Male Female	16 22	42.1 57.9	- -
Education Diploma Bachelor Profession	8 26	21.1 10.5 68.4	- - -
Profession Nurse Midwife	34 4	189.5 10.5	- -
Neonatal Training Yes No	10 28	726.3 73.7	- -
One Insertion Yes No	21 17	755.3 44.7	- -
Help other ward Yes No	20 18	752.6 47.4	- -

TABLE 2: Difficulty Factor Infusion of Infant (N=38)

Category	Result	
	n	%
Vein's Characteristic (deep palpable, small vein, location)	17	44.7
Active/Un-Cooperative	16	44.1
Others	5	10.5

in the initial anatomical assessment of the patient, the staff's ability to act, the staff's experience in action, and the staff's confidence during the procedure [9]. Some factors, including less than two years of clinical experience, the absence of an infusion pump, the location of injection, the baby's weight, and parenteral nutrition, can all increase the risk of phlebitis during infusion in infants. In neonates alone, the prevalence of phlebitis is 27%. The dorsalis pedis or distal lower extremity is the location of the puncture with a high risk of increasing phlebitis [10].

The condition of the infusion location is similar with the results in this study, which obtained data that the factors that made it difficult for infusions in infants were felt by nurses and midwives in the ER, 44.7 % of venous characteristics, 44.1 % of active and uncooperative infants, other factors are uncooperative parents, after repeated infusions, dehydrated, or obesity (see **table 2**). The most difficult locations for infusion were the dorsalis pedis vein (60.3 %), 18.4 % metacarpal, 13.2 % median cubitus, and 7.9 % basilica (see **table 3**).

TABLE 3: Difficult location of Infusion (N=38)

Vein Location	Result	
	n	%
Dorsalis pedis	23	60.3
Metacarpal	7	18.4
Cubitus median	5	13.2
Basilica	3	7.9

TABLE 4: Intervention of Difficulty Infusion (N=38)

Intervention	Result	
	n	%
Vena viewer	19	50
Swaddling	17	44.7
Others	2	5.3

This study supports previous research that found the dorsalis pedis or the distal lower extremity to be the stabbing site with the highest risk of increasing phlebitis [10]. In children, the easiest anatomical location for a peripheral intravenous catheter is on the dorsum of the hand. Installation in this area is also more visible. Another location where it can be installed is on the forearm. However, because of the large amount of tissue surrounding the veins in the forearm, they are more difficult to inspect and observe, but once it is successful, intravenous access to the area is more stable. Veins in the scalp can also be inserted, but they are more difficult anatomically and frequently cause parental anxiety [1].

The survey results also revealed that 50 % of staff in the ER at Airlangga University Hospital used a venous viewer, 44.7 % used a swaddle, and others stated that they were accompanied by coworkers and asked parents not to accompany their children in order to overcome the difficulty of infusion in infants. (see **table 4**). This means that one approach to reducing the complications of infusion in infants is to intervene with a swaddle.

A swaddle is a type of cloth that is traditionally used by parents to cover their children. The goal of swaddling is to provide the baby with an environment similar to the mother's womb. Swaddling is also used to make the baby feel more comfortable, prevent hypothermia, and improve the baby's sleep quality. Swaddling is typically performed on newborns up to the age of 5 months [11]. Nowadays, there are several types of swaddling. Swaddling used to be in the form of a thick long cloth, but nowadays there are triangular, rectangular, and even instant swaddles. The materials used also differ in thickness,

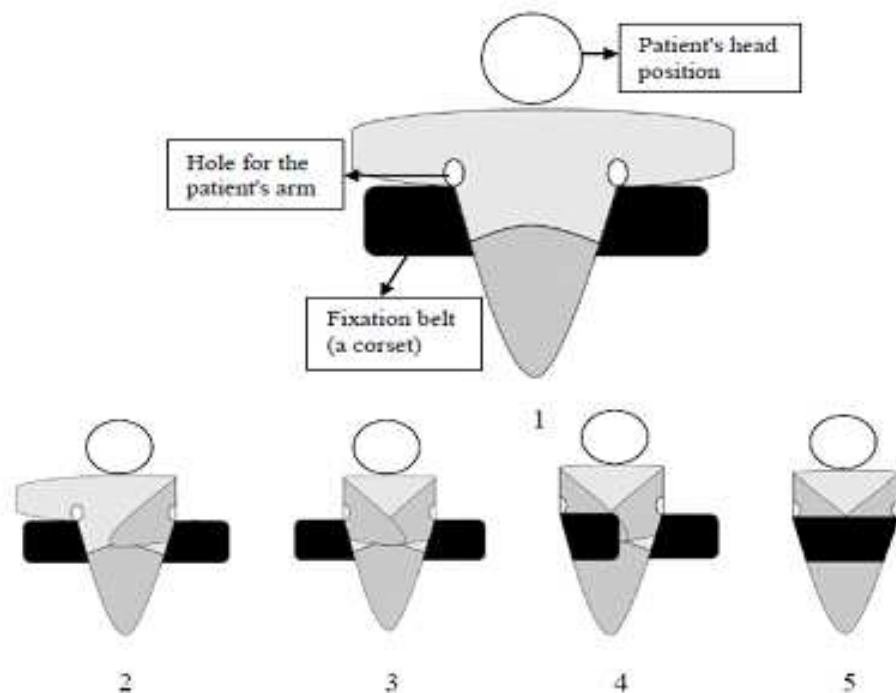


Figure 1: Model and How to Used BEDOM.

ranging from thin to thick [12]. Swaddling necessitates innovation in order to create nursing actions that are both comfortable for children and adhere to service standards. A modified swaddle can be used as a solution [11]. Swaddling during needle sticking has been shown in studies to be effective in reducing pain response, reducing crying duration in infants, and maintaining stable vital signs during the insertion procedure [13][14]. In emergency rooms, where every action on a patient must be performed with precision and speed, innovation is required. Swaddling innovation is required to reduce the difficulty of infusion caused by an active and uncooperative baby.

The author creates a proposal for a need-specific instant swaddle. "BEDOM" is the name given to the instant modification of the swaddle model. The bed is made up of two parts. The first is a foldable bed with an air hole to keep the child cool. The second is a corset-style locking element that allows the baby's swaddling tightness to be adjusted based on his or her condition. It is simple to use this Bedom; it has five stages, as shown in Figure 1.

4. Conclusion

Infusion in infants is still complicated by a number of factors. The anatomy of the veins, whether deep or small, is the most difficulty factor. The dorsalis pedis vein is the most

difficult to access with an IV needle. The second factor is whether the infant is non-cooperative or active. In order to overcome the complications of overactive babies, the majority of health workers in the ER use assistive devices such as a vein viewer and the swaddling method.

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