



Factors Affecting Obedience of Nurses in Applying Intravenous Catheter Procedure

Yanis Kartini^{1,2*} , Dian Istianti¹, Imamatul Faizah¹ , Ratna Yunita Sari¹ , Nursalam Nursalam³ 

¹Department of Nursing, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya, Surabaya, East Java, Indonesia; ²Doctoral Program of Nursing, Faculty of Nursing, Universitas Airlangga, Surabaya, East Java, Indonesia; ³Department of Nursing, Faculty of Nursing, Universitas Airlangga, Surabaya, East Java, Indonesia

Abstract

Edited by: Ana Vucurevic

Citation: Kartini Y, Istianti D, Faizah I, Sari RY, Nursalam N. Factors Affecting Obedience of Nurses in Applying Intravenous Catheter Procedure. Open-Access Maced J Med Sci. 2022 May 26; 10(G):585-589.
<https://doi.org/10.3889/oamjms.2022.9898>

Keywords: Intravenous therapy; Intravenous catheter; Obedient; Phlebitis

***Correspondence:** Yanis Kartini, Department of Nursing, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya, Surabaya, East Java, Indonesia.
E-mail: yanis_youarenice@unusa.ac.id

Received: 09-May-2022

Revised: 11-May-2022

Accepted: 16-May-2022

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Funding: This research did not receive any financial support

Competing Interest: The authors have declared that no competing interest exists

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BACKGROUND: Intravenous therapy is one of the most common procedures in patients hospitalized. Applying intravenous catheter procedure requires obedience not to cause infections that can cause phlebitis. The characteristics of nurses are predicted to influence obedience to intravenous catheter installation procedures.

AIM: This study aims to analyze factors affecting obedience of nurses in applying intravenous catheter procedure.

METHODS: Research objectives were to analyze the characteristics factor of nurses related to obedience to applying intravenous catheter procedures. Samples of nurses in the Mitra Keluarga Surabaya Hospital, with a total of 93 respondents selected with a simple random sampling technique. Independent variables in this study are age, education, career ladders, knowledge, and attitudes. Dependent variables are the obedience of nurses. The instruments used are questionnaires and observation sheets. Data were analyzed using Chi-square and logistics regression test.

RESULTS: The results of the study showed that nurses in Mitra Keluarga Surabaya Hospital are mostly 26–35-year-old respondents, mostly educated Nurse Profession Program, mostly a career ladder of Clinical Nurse II, and mostly are obedient. The factors that affect the obedience of nurses in Applying Intravenous Catheter Procedure are age (0.03), education (0.000), career level (0.001), knowledge (0.029), and attitude (0.000). Of these five factors after being tested with multiple logistic regression, the most influential of obedience is the attitude, with the largest B value of 53.748 $p = 0.000$.

CONCLUSIONS: For hospitals, it is expected to make efforts to increase the obedience of nurses by providing training on safe injection and providing supervision to the nurse to comply with intravenous catheter procedure.

Introduction

Patients who are hospitalized almost entirely carried out infusion, to obtain intravenous therapy. The World Health Organization (WHO) Surveillance Data are stated that the incidence rate of infusion in the emergency installation is high enough 85% per year, 120 million people from 190 million patients hospitalized with infusion [1]. Intravenous therapy is an integral part of nursing practice professionals in all health institutions in Indonesia. A nurse in the intravenous intervention must adhere to the operational procedure standard, given that intravenous therapy is often accompanied by complications, namely, phlebitis [1], [2], [3].

The WHO (2017) reported that there are 10 global public health facts about nosocomial infections, including those are phlebitis which is a serious problem, found 1 in 300 patients likely injured during treatment in health care, especially in hospitals [2], [4], [5] and about 6.2% infections due to intravenous therapy [6]. The incidence rate of phlebitis in Southeast Asia annually

reaches 10%, data from the CDC (2017) indicate that the incidence of phlebitis ranks fourth as an infection often found in patients during hospital treatment. The figures of the highest phlebitis in developing countries were: India (27.91%), Iran (14.20%), Malaysia (12.70%), Philippine (10.10%) and Indonesia (9.8%) [7].

Factors that contribute to the incidence of phlebitis are divided into four main groups, namely, (1) patient factors such as age, gender, and underlying conditions; (2) chemical factors such as type of drugs and fluids; (3) mechanical factors such as catheter material, size, and duration of cannulation; and (4) health professional practice [8]. Health Professional Practice is a factor that contributes greatly to the incidence of phlebitis related to the disobedience of the standard operational procedures (SOP) and soft skills [9], [10]. Based on the results of the survey obtained, 70% of nurses are not obedient in carrying out infusion installation standard based on predefined standards [9]. Non-compliance with procedure standards is influenced by the individual aspects of the worker, working conditions, and organizational structure [2]. Another

opinion suggests that disobedience is influenced by lack of training, lack of knowledge, provision of inadequate protective equipment and equipment, and inadequate working conditions [3]. Complications that can occur due to intravenous therapy, among others, the patient's quality of life, morbidity, mortality, treatment costs, and the length of day hospitalization are increasing.

Given that intravenous therapy often causes complications, which inflict a lot of harm, the nurse has a responsibility to minimize incidents by complying with the SOP. Efforts can be made to address the problem of infection that occurs by providing training on the basic principles of infection prevention, as well as supervision in the implementation of SOP to maintain the quality of service and patient safety [2], [11].

Aim

The purpose of this study is to determine the factors that affect the compliance of nurses with the standard operating procedure infusion in the Mitra Keluarga Surabaya Hospital, with a focus on individual nurses; including age, level of education, level of knowledge, attitude, and career ladder.

Hypothesis

The hypothesis proposed in this study is the factor of age, level of education, career ladder, level of knowledge, and attitudes that affect nurse compliance in applying intravenous catheter procedures.

Methods

This study used descriptive analytic research design with cross-sectional approach [12], [16]. Independent variables in this study are age, level of education, career ladder, level of knowledge, and attitude. Dependent variables are obedience of nurses in applying intravenous catheter procedure.

Sample of research

The population of all nurses in the in-patient wards of the stated Mitra Keluarga Surabaya hospital was 119 nurses from which 93 respondents were chosen using cluster random sampling technique. The inclusion criteria involved the nurses who were willing to be the respondents and who have the clinical authority to install infusion, whereas the exclusion criteria included the nurses taking maternity leave and nurses with a working period of <6 months.

Instrument

Data collection was carried out using observation sheets and questionnaire. Independent variable was collected by questionnaire with validity 0.369–0.916 and reliability 0.745. Obedience of nurses in applying intravenous catheter procedure was collected by observation, conducted by researchers.

Data analysis

The preliminary data were analyzed using univariate analysis using percentage. Further, they were analyzed using Chi-square test and logistics regression test with the significance level of $\alpha = 0.05$.

Ethical consideration

This research has been ethically reviewed by the research ethics committee of Universitas Nahdlatul Ulama Surabaya (ref: Certificate No248/EC/KEPK/UNUSA/2019) and was certified ethically eligible.

Results

Respondent's characteristics

Table 1 shows that respondent's characteristics comprising sex, marital status, age, level of education, career ladder, level of knowledge, attitude, and compliance. The result showed of 93 nurses almost entirely (90.3%) were female, almost entirely (87.1%) the status of marriage, most (53.8%) aged 26–35 years, most (53.8%) the educated diploma 3 of nursing, most (58.1%) with the career ladder of Clinic nurse II, most (62.4%) knowledge level enough, most (68.8%) have a positive attitude, and most (67.7%) obedient with the applying intravenous catheter procedure.

Factors related to obedience of nurses in applying intravenous catheter procedure

Table 2 shows that the factors related to obedience of nurses in applying intravenous catheter procedure are shown in Table 2. The table explained that factor age ($\rho = 0.000$), level of education ($\rho = 0.000$), career ladder ($\rho = 0.001$), level of knowledge ($\rho = 0.001$), and attitude ($\rho = 0.001$). Based on the results of the Chi-square test, all factors result $\rho < \alpha (0.05)$ means the accepted hypothesis where age, education level, career path, knowledge level, and attitude relate to nurses' obedience in applying intravenous catheter procedures.

Table 1: Frequency distribution of the respondents based on sex, marital status, age, level educational, level of a career, level of knowledge, attitude, and obedience

Variable	Frequency (n)	Percentage
Sex		
Male	9	9.7
Female	84	90.3
Total	93	100.0
Marital status		
Single	12	12.9
Married	81	87.1
Total	93	100.0
Age (in year)		
15–25	20	21.5
26–35	50	53.8
36–45	19	20.4
45–64	4	4.3
Total	93	100.0
Level of education		
Associate of nursing	50	63.8
Nurse profession program	43	46.2
Total	93	100.0
Career ladder		
Clinical Nurse I	21	22.6
Clinical Nurse II	54	58.1
Clinical Nurse III	15	16.1
Clinical Nurse IV	3	3.2
Total	93	100.0
Level of knowledge		
Good	21	22.6
Enough	58	62.4
Less	14	15.1
Total	93	100.0
Attitude		
Positive	64	68.8
Negative	29	31.2
Total	93	100.0
Obedience		
Obedient	63	67.7
Disobedient	30	32.3
Total	93	100.0

Factors mostly correlating with to obedience of nurses in applying intravenous catheter procedure

Based on Table 3, bivariate with Chi-square test obtained $p < \alpha$ (0.05) is then tested multivariate using double logistic regression test. From the double regression test results, obtained results are shown in Table 3. Based on the results of double logistic regression test of Model 1, there are 3 factors related

Table 2: Cross tabulation between individual characteristics of nurses and obedience of nurses in applying intravenous catheter procedure at Mitra Keluarga Surabaya Hospital

Characteristics Respondent	Compliance				n	%	p
	Obedient		Disobedient				
	n	%	n	%			
Age (years)							
15–25	9	45	11	55	20	100	0.000
26–35	33	66	17	34	50	100	
36–45	17	89.5	2	10.5	19	100	
45–64	4	100	0	0	4	100	
Total	63	67.7	30	32.3	93	100	
Level of education							
Associate of nursing	25	50	25	50	50	100	0.000
Nurse profession program	38	88.4	5	11.6	43	100	
Total	63	67.7	30	32.3	93	100	
Career ladder							
Clinical Nurse I	7	33.3	14	66.7	21	100	0.001
Clinical Nurse II	40	74.1	14	25.9	54	100	
Clinical Nurse III	13	86.7	2	13.3	15	100	
Clinical Nurse IV	3	100	0	0	3	100	
Total	63	67.7	30	32.3	93	100	
Level of knowledge							
Good	18	85.7	3	14.3	21	100	0.001
Enough	39	67.2	19	32.8	58	100	
Less	6	42.9	8	57.1	14	100	
Total	63	67.7	30	32.3	93	100	
Attitude							
Positive	38	88.4	5	11.6	43	100	0.001
Negative	25	50	25	50	50	100	
Total	63	67.7	30	32.3	93	100	

to compliance in applying the intravenous catheter procedures i.e., education, career ladder and the attitude of $p < \alpha$ (0.05). Also, there are 2 factors that do not relate to obedience in applying the procedure of intra-venous catheter i.e., knowledge level $p = 0.645$ and age $p = 0.377$.

Table 3: Multivariate test first stage multiple logistic regression test

Variable	B	P Wald	OR	95 and CI	
				Lower	Upper
Age	-522	0.377	0.583	0.186	1.891
Level of education	2.467	0.008	11.786	1.926	72.105
Career ladder	-1.780	0.003	0.169	0.052	0.549
Level knowledge	-283	0.654	0.754	0.226	2.509
Attitude	3.972	0.000	53.101	8.331	338.449
Constant	-5.434	0.050	0.004		

The final result of multiple logistic regression test is shown in Table 4. Based on Table 4, factors related to compliance with the procedure of installation of intravenous catheter are education (0.004) with the value of OR = 13,106 that has meaning, respondents with education nurse profession program have a chance 13 times more obedient than on the educated diploma 3 nursing. Career ladder (0.002), with the value of OR = 0.166, and attitudes (0.000) with the value of OR 53.748 that have the meaning of respondents who have a positive attitude have the 53 times opportunities to be more obedient than those who have negative. From the interaction test, $p = 0.000$ means that the variables interact with each other.

Table 4: Multivariate final stage multiple logistic regression test with interaction model

Variable	B	P Wald	OR	95 & CI	
				Lower	Upper
Level of education	2.573	0.004	13.106	2.254	76.201
Career ladder	-1.795	0.002	0.166	0.053	0.519
Attitude	3.984	0.000	53.748	9.744	296.493
Constant	-7.203	0.001	0.001		

Discussion

Factors related to nurse compliance in the application of intravenous catheter insertion procedures based on the Chi-square test include; age, education level, career path, level of knowledge, and attitude. Based on Table 2, age is related to nurse obedience in applying intravenous catheter procedure ($p = 0.000$). The older the respondent, the more obedient they are. Increasing age will increase a person's maturity to increase awareness of obeying the rules [13]. However, when tested together with other factors using multiple logistic regression, age was not associated with nurses' obedience in applying intravenous catheter procedure ($p = 0.377$). This shows that age is a confounding factor for nurses' obedience in applying intravenous catheter procedures.

The education level factor, the results showed that the background of the nurse's education level was related to the nurse's compliance in applying the

intravenous catheter procedure, ($p = 0.000$), both in bivariate testing using the Chi-square test, and when tested multivariate using multiple logistic regression tests (value = 0.008) when tested together with five factors. When tested together with these three factors, $p = 0.008$ was also obtained. This is in line with the results of research from Ratanto *et al.* which state that the level of education affects performance [14]. According to Notoadmodjo, the level of education will affect a person's level of thinking and acting which will lead to wise actions [13]. The results also show that nurses who have a nursing professional education program are 13 times more obedient than nurses who have a diploma 3 nursing education.

The career ladder is related to nurse compliance in applying the intravenous catheter procedure, ($p = 0.001$), both tested bivariate using the Chi-square test and multivariate testing using multiple logistic regression (0.002). These results are in accordance with research conducted by Ratanto *et al.* that career ladder affects compliance [14]. The nurse career ladder is the level of nurses in the roles and responsibilities of clinical authority [15]. The results of the study in Table 2 show that the higher the career ladder of the nurse, the better the nurse's compliance in applying the intravenous catheter procedure.

The level of knowledge related to nursing compliance in applying the intravenous catheter procedure ($p = 0.001$) when tested bivariate using the Chi-square test. However, if tested multivariate with other factors, the level of knowledge is not related ($p = 0.754$). This is accordance with research from Milutinović *et al.*; Osti *et al.* which state that although knowledge is a predisposing factor in behavior [2], [6], it is not necessarily high knowledge that will show good behavior in obedience because many factors affect compliance [11]. In this study, knowledge is a confounding factor of obedience in applying the intravenous catheter procedure.

The attitude related to obedience in the applying intravenous catheter procedure ($p = 0.001$) in the bivariate test and ($p = 0.000$) in the multivariate test. From the results of the multivariate test using multiple logistic regression, attitude is the most dominant factor influencing obedience in applying intravenous. This finding is in accordance with the results of research WHO that attitude is related to infection prevention practices in hospitals [5]. This finding also shows that attitude is the most dominant factor influencing adherence to the applying intravenous catheter procedure. The findings of this study based on the results of the odds ratio obtained the results of 53, 748 which means nurses who have a positive attitude have the opportunity to be 53 times more obedient than nurses who have a negative attitude. This is in accordance with the theory proposed by Notoadmodjo and according to the findings by Osti *et al.* and Abalkhail *et al.* that attitudes will shape behavior [6], [13], [17]. This study also found that there

is an interaction between attitudes, education, and career ladder. This means that nurses who have a high level of education correlate with a high career ladder, and a positive attitude in carrying out their professional duties and responsibilities.

Conclusions

Factors related to obedience of nurses in applying intravenous catheter procedure at Mitra Keluarga Hospital Surabaya are education, career ladder, and attitude. These three factors interact with each other. Attitude is the most dominant factor related to obedience.

Suggestions

In this study, the focus of research is on the characteristics of nurses, so suggestions for further researchers are to conduct research on organizational characteristics, including leadership factors of the head of the room and organizational culture. It can also be from job characteristics, namely, job design, correction, and feedback regarding compliance with standard operating procedures for intravenous catheter insertion.

Suggestions for hospital leaders or nursing managers, it is important to increase the positive attitude of nurses, to always comply with standard operating procedures to improve service quality and patient safety through infection prevention.

Suggestions for nurses are to always improve compliance with standard operating procedures for nursing actions to improve quality and patient safety.

Acknowledgments

We would like to thank all the respondents who have taken the time to participate in this study.

Authors' Contributions

Yanis Kartini: Conceptualization, methodology, writing – original draft, and supervision; Dian Istianti: Visualization, project administration, and funding acquisition; Imamatul Faizah: Formal analysis, writing

– review and editing; Ratna Yunita Sari: Software and validation; Nursalam: Investigation, resources, and data duration.

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