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## Analysis of Nurse Compliance towards the Incidence of Phlebitis in East Indonesia

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### Abstract

**Introduction:** *Peripheral intravenous insertion is one of the most frequently performed nursing procedures in hospital settings and serves as a key method for administering medications and fluids. Several studies report that the incidence of phlebitis ranges from 13% to 56% in hospitalized patients receiving IV therapy. Ensuring that nurses strictly adhere to Standard Operating Procedures (SOPs) during this process is crucial, as non-compliance can lead to complications such as phlebitis. Despite the importance of following SOPs, there are instances where nurses do not consistently comply with these guidelines, which ultimately increases the risk of adverse outcomes for hospitalized patients.*

**Methodology:** *This study employed a quantitative analytical approach using a cross-sectional research design to examine factors associated with nurses' compliance with infusion Standard Operating Procedures (SOPs). A purposive sampling technique was utilized to select participants from the target population. The total population consisted of 73 nurses, from which 49 respondents who met the inclusion criteria were recruited for the study. Data were collected using a structured questionnaire consisting of 39 items, which was adapted from the hospital's infusion Standard Operating Procedure (SOP). The questionnaire was designed to assess nurses' compliance with the established guidelines for infusion procedures. For data analysis, bivariate analysis was conducted using the Chi-square test to determine the association between variables. The level of statistical significance was set at  $p < 0.05$ , indicating that results with a  $p$ -value less than 0.05 were considered statistically significant.*

**Results:** *The findings of this study indicate a significant association between certain nurse characteristics and compliance with Standard Operating Procedures (SOPs). Specifically, educational level ( $p = 0.001$ ) and marital status ( $p = 0.034$ ) were found to have a statistically significant relationship with nurses' compliance with SOPs. These results suggest that nurses with different educational backgrounds and marital statuses may demonstrate varying levels of adherence to established clinical guidelines.*

**Discussion:** *The findings highlight that nurse compliance with SOPs is shaped not only by individual factors but also by organizational and environmental influences. Elements such as the culture of patient safety, the effectiveness of supervision, and the presence of a supportive work environment all play a role in compliance behaviors. Given these insights, hospital management is recommended to reinforce supervision systems and ensure that all nurses fully understand and consistently implement SOPs across all aspects of nursing care. Attention should also be directed toward external factors that may impact compliance. These results provide important guidance for nurses and healthcare institutions to improve compliance with infusion SOPs, thereby reducing the risk of complications and enhancing the overall safety and quality of patient care.*

**Keywords:** *Compliance, Nurses, Phlebitis, Standard Operating Procedures*

## **1. Background**

Peripheral intravenous insertion procedures are among the most common invasive procedures performed on hospitalized patients (Urbanetto et al., 2016). The use of peripheral intravenous catheters is crucial for administering drugs and blood components and maintaining the necessary body fluid balance in hospitalized patients (Lv & Zhang, 2020). Although peripheral intravenous devices offer many therapeutic benefits, they can also cause local and systemic complications such as extravasation, infiltration, hematoma, infection, and phlebitis (Sampaio Enes et al., 2016). Phlebitis, a complication of intravenous catheter insertion, can prolong hospitalization and treatment, increase healthcare costs, reduce patient satisfaction, and lead to other issues like sepsis, pain, discomfort, stress, clotting, thrombophlebitis, and embolism (Guanche-sicilia, 2021). One of the main risks of phlebitis is associated with poorly trained or inexperienced staff in the placement and maintenance of peripheral intravenous catheters (Milutinović et al., 2015). Inadequately trained staff may fail to adhere to standard operating procedures established by health authorities (Ahmil, 2018).

According to WHO (World Health Organization) data, in 55 hospitals across 14 countries in Europe, the Middle East, Southeast Asia, and the Western Pacific region, an average of 8.7% of patients at home experienced phlebitis, amounting to 1.4 million people worldwide who developed the condition in hospitals. The highest rate of phlebitis was reported in hospitals in the Middle East and Southeast Asia, at 11.8% of 59 patients, with prevalence of 7.7% among 385 patients from Europe and the Western Pacific, respectively. The phlebitis rate in Indonesia had reached 50.11% (Kshatri et al., 2022). However, data on phlebitis in Indonesia are limited—which data were only available at 10 public hospitals, with 16,435 cases among 588,328 patients (about 2.8%), and 293 cases among 18,800 at-risk patients in specialized or private hospitals in 2011 (approximately 1.5%) (Defi & Fibriana, 2020).

According to a study by Muhajirin (2018), a relationship was found between nurse compliance in implementing SPO for infusion installation and the incidence of phlebitis in the hospital rooms of class 2, class 3, and IGD RSAU Dr. M. Hassan Toto Bogor in 2016, with a p-value of 0.009 ( $p < 0.05$ ). The issue of nurse non-compliance with Standard Operating Procedures (SOPs) is apparent at Kartini Mojokerto Hospital and is corroborated by findings from prior research. It has been observed that not all nurses consistently adhere to established protocols during the installation of intravenous catheters, which may contribute to the increased incidence of phlebitis among hospitalized patients. Studies results conducted at Kartini Hospital amplified further evidence of this concern. Among observed nurses, the following behaviors were (n=10) nurses (50%) did not wash their hands prior to intravenous catheter insertion, (n=12) nurses (60%) failed to use gloves during the procedure, (n=15) nurses (75%) did not apply transparent dressings and (n=9) (45%) touched the area that had been disinfected. These findings highlight considerable lapses in compliance and are likely contributing factors to the high prevalence of phlebitis among patients at Kartini Hospital. Addressing these issues is essential for enhancing patient safety and minimizing complications associated with intravenous therapy.

Nurse compliance refers to the extent to which nurses adhere to established regulations or organizational security policies (Kim & Kim, 2017). The theoretical foundation for understanding nurse compliance can be drawn from the work of Nola J. Pender (2015), who identifies two main factors that influence behavior: previous related behavior and personal factors. Personal factors are further divided into biological and psychological components. Biological factors include characteristics such as age, body mass index, puberty status, menopausal status, aerobic capacity, physical strength, agility, and balance. Psychological factors encompass elements like self-esteem, self-motivation, and perceived health status. These factors collectively contribute to shaping behavior-specific cognitions and emotional responses, which are essential for fostering a commitment to positive behavior change; in this case, improving compliance. Considering these factors, this study aims to investigate the relationship between nurse compliance and the incidence of phlebitis at Kartini Mojokerto Indonesia Hospital.

## **2. Literature Review**

### **2.1 Phlebitis**

Phlebitis is a common complication of intravenous injections, with its effects potentially affecting nerves, tendons, and joints (Chang & Peng, 2018). According to Braga et al. (2018), phlebitis refers to inflammation of the venous intima lining. This inflammation develops as a response to tissue injury resulting from factors connected to the insertion and use of peripheral intravenous lines, as well as the medications administered through them. Clinically, phlebitis is characterized by manifestations such as pain, erythema, redness, edema, and the presence of a palpable venous cord.

### **1. Chemical Phlebitis**

Chemical phlebitis may arise from several factors related to the characteristics of the infusate and the infusion technique. Infusates containing dextrose concentrations greater than 10%, as well as those with extreme pH or osmolality, can irritate the venous intima and contribute to phlebitis. Certain medications, such as potassium chloride, amiodarone, and some antibiotics, are also associated with an increased risk, especially when administered at specific doses or over prolonged infusion periods. Additionally, particulates present within the infusate may act as irritants and further promote inflammation. Other contributing factors include the selection of a catheter with an outer diameter that is too large for the vessel, particularly when hemodilution is inadequate (Harris et al., 2020). Excessive infusion rates for short intravenous catheters can exacerbate irritation and increase the likelihood of phlebitis. Moreover, the use of skin antiseptic solutions that have not dried completely, and are subsequently aspirated into the vein during catheter insertion, may also initiate chemical irritation.

To mitigate the risk of chemical phlebitis, it is recommended to carefully consider the anticipated duration of therapy and the length of infusion time. For infusates identified as potential causes of phlebitis, the use of a central catheter or other central vascular access device (CVAD) may be appropriate. Furthermore, allowing the skin to dry completely after the application of antiseptic solution before proceeding with catheter insertion is advised to reduce chemical irritation (Ayat-Isfahani et al., 2017).

### **2. Mechanical Phlebitis**

Mechanical phlebitis results from irritation of the vein wall, which can arise from several factors. These include the use of a catheter with an outer diameter that is too large for the vessel, improper catheter insertion angle and tip positioning, catheter movement, trauma during insertion, and the material and stiffness of the catheter itself. To minimize the risk of mechanical phlebitis, it is recommended to select the smallest possible catheter outer diameter suitable for the required therapy. Additionally, securing the catheter using safety technology, avoiding insertion in areas of flexion, and stabilizing the joint when necessary are important preventative measures (Licensed et al., 2021).

### **3. *Phlebitis / Bacterial Phlebitis***

Infectious phlebitis is commonly associated with emergency insertion of intravenous catheters, poor aseptic technique, and use of contaminated dressings. These factors can increase the risk of infection and subsequent inflammation at the catheter site. To reduce the risk of infectious phlebitis, catheters inserted under suboptimal aseptic conditions should be replaced as soon as the patient is stabilized, ideally within 48 hours. For adult patients, the catheter should be moved from the lower extremity to the upper extremity. In pediatric patients, relocating the catheter to a new proximal site or the opposite side is advisable when feasible (Suliman et al., 2020)

## **2.2 Nola J. Pender (Health Promotion Model)**

In 1990, Pender conducted the first pilot test of the Health Promotion Model (HPM), as documented by Pender, Walker, Sechrist, and Frank-Stromborg. The HPM serves as a comprehensive framework that brings together the perspectives of nursing and behavioral sciences, focusing on the diverse factors influencing individuals' health behaviors. This model is particularly valuable for understanding the complex biopsychosocial dynamics that motivate people to adopt behaviors aimed at enhancing health. The initial development of the HPM encouraged research to demonstrate how various cognitive-perceptual and modifying factors could predict health-related behaviors. The cognitive-perceptual factors identified by the model include the importance of health, perceived health control, definition of health, perceived health status, perceived self-efficacy, perceived benefits, and perceived barriers. Modifying factors encompass demographic and biological characteristics, interpersonal influences, situational influences, and behavioral factors.

The theoretical assumptions and propositions of the HPM, as well as empirical support for its constructs and studies utilizing the model, are described in earlier editions of Pender's work and can also be accessed via the University of Michigan website (Pender, Murdaugh, & Parsons, 2002). Importantly, the HPM is classified as a competency or approach-oriented model. Unlike prevention models such as the Health Belief Model (HBM), the HPM does not consider "fear" or "threat" as primary motivators for health behavior. While immediate health threats can motivate action, threats perceived as distant lack the same motivational impact. Thus, the HPM is applicable to a wide range of health behaviors where motivation does not stem from fear or threat.

The relevance of the HPM to the current study lies in its capacity to explore the cognitive-perceptual and interpersonal factors that may predict nurse compliance with intravenous therapy SOPs. By utilizing the HPM as a guiding framework, the study can investigate how nurses' beliefs about the importance of compliance, their perceived control over their practice, and their self-efficacy contribute to adherence. Moreover, situational and interpersonal influences such as organizational culture and peer support can also be examined as modifying factors affecting compliance. This approach allows for a nuanced understanding of the biopsychosocial motivations behind SOPs compliance, beyond simple response to perceived threats, and helps identify specific areas for intervention to improve practice and patient outcomes. The original HPM has since been updated, and the revised version continues to offer valuable guidance for research and practice, including studies focused on SOP compliance in intravenous therapy (Pender et al., 2015).

### **3. Methodology**

#### **3.1 Design**

This research design is correlational analytic research with a cross-sectional approach.

#### **3.2 Variable**

The independent variable in this study was nurse compliance at Kartini Hospital. The dependent variable in this study was the incidence of phlebitis at Kartini Mojokerto Hospital.

#### **3.3 Population, Sample and Sampling**

The population of this study consisted of all nurses working at Kartini Mojokerto Hospital, totaling 73 individuals. From this population, a sample of 49 nurses was selected based on specific inclusion and exclusion criteria. The sampling method employed was non-probability sampling, specifically using the purposive sampling technique. The inclusion criteria for participants were: (1) nurses who had been employed at the hospital for more than three months and had completed their orientation phase; and (2) nurses who were not currently participating in education or training programs outside the hospital. The exclusion criteria were: (1) nurses who were newly employed and still in the orientation period; and (2) nurses who did not consent to participate as respondents in the study.

#### **3.4 Time and Place of Research**

This study was conducted from January to February 2025 at Kartini Mojokero Hospital, including the Inpatient Unit, Emergency Room, Perina and PICU, Outpatient Unit, and ICU.

#### **3.5 Data Collection and Collection Procedures**

The instrument used in this study was a questionnaire. Questionnaire on compliance with standard operating procedures.

#### **3.6 Data Analysis**

Data analysis using SPSS with Univariate Statistical Test using frequency distribution analysis, Bivariate Statistical Test using Chi Square Statistical Test with p value <0.05).

## 4. Result

### 4.1 General Data

**Table 1 Frequency Distribution of Characteristic Data Based on Education, Length of Service, Employment Status, Age, Career Level, Marital Status, Gender at Kartini Mojokerto Hospital Indonesia**

Source : Primary Data (2025)

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Education</b>		
Diploma/Bachelor	25	51 %
Nurse	24	49 %
<b>Length of Work</b>		
< 1 Years	5	10.2 %
1-3 Years	18	36.7 %
>3-5 Years	4	8.2 %
>5 Years	22	44.9 %
<b>Age</b>		
20-30 Years	26	53.1 %
>30-40 Years	3	6,1 %
>40 Years	20	40.8 %
<b>Career Level</b>		
PK I	10	20.4 %
PK II	35	71.4 %
PK III	4	8.2 %
PK IV	0	0 %
<b>Marriage Status</b>		
Marry	40	81.6%
Unmarried	9	18.4%
<b>Gender</b>		
Male	12	24.5 %
Female	37	75.5 %

The demographic characteristics of the respondents reveal important patterns in education, work experience, employment status, age, career level, marital status, and gender. Based on Table 1 above, the majority of respondents possess either a Diploma or Bachelor's degree, totaling 25 individuals (51%), while a smaller segment, 24 people (49%), hold the educational level of Ners. Work experience is predominantly more than five years, as evidenced by 22 respondents (44.9%), whereas only 4 individuals (8.2%) have between three and five years of experience. Most respondents are contract employees, numbering 41 (83.7%), while permanent employees represent a minority at 8 people (16.3%). In terms of age, 26 respondents (53.1%) fall within the 20 to 30-year age group, and a small proportion (6.1%) are aged 31 to 40 years. Career level data shows that 35 respondents (71.4%) are at the PK II level, compared to 4 people (8.2%) at PK III. Marital status indicates that 40 respondents (81.6%) are married, while 9 (18.4%) are unmarried. Gender distribution is weighted toward females, with 37 individuals (75.5%), and males constitute a smaller portion, numbering 12 (24.5%). These findings collectively illustrate the dominant trends among the surveyed population and provide a comprehensive overview of their demographic profile.

#### 4.2 Customized Data

**Table 2 Description of Nurses Based on Compliance in Implementing Standard Operating Procedures for Infusion Installation at Kartini Mojokerto Hospital**

Variable	Frequency	Percentages
Good	7	14.3 %
Enough	26	53.1 %
Less	16	32.7 %

Source : Primary Data (2025)

Based on Table 2 above, the majority of respondents demonstrated moderate compliance, with (n=26) individuals accounting for 53.1% of the total. In contrast, only (n=7) respondents exhibited a good level of compliance, representing 14.3%.

## 5. Bivariat Analysis

**Table 3 Chi Square Statistical Test Results Relationship between Education Level and Nurse Compliance in Implementing Standard Operating Procedures for Infusion Insertion**

Characteristics	Nurse		Compliance			Statistical Test
	n	(%)	Good	Enough	Less	
<b>Education</b>						
Diploma/Bachelor	25	51	0	9	16	P =0.001
Nurse	24	49	7	17	0	
<b>Length of Work</b>						
< 1 Years	5	10.2 %	2	3	0	P = 0.134
1-3 Years	18	36.7 %	4	1	7	
>3-5 Years	4	8.2 %	1	2	1	
>5 Years	22	44.9 %	0	14	8	
<b>Age</b>						
20-30 Years	26	53.1 %	3	14	9	P = 0.607
>30-40 Years	3	6,1 %	0	1	2	
>40 Years	20	40.8%	4	11	5	
<b>Career Level</b>						
PK I	10	20.4 %	2	7	1	P = 0.125
PK II	35	71.4 %	4	19	12	
PK III	4	8.2 %	1	0	3	
PK IV	0	0 %	0	0	0	
<b>Marriage Status</b>						
Marry	40	81.6%	3	6	0	P = 0.034
Unmarried	9	18.4%	4	20	16	
<b>Gender</b>						
Male	12	24.5 %	1	8	3	P = 0.540
Female	37	75.5 %	6	18	13	

\*Correlation is significant at the 0.05 level (2-tailed).

Source: Primary Data (2025)

The analysis of Table 3 above provides detailed insights into the relationship between various nurse characteristics and their compliance with standard operating procedures (SOPs) for infusion insertion. The findings indicate a significant relationship between nurses' education level and their compliance with infusion SOPs, with a p-value of 0.001, which is below the significance threshold ( $\alpha = 0.05$ ). This suggests that higher educational attainment among nurses is associated with greater adherence to established procedures during infusion insertion. In terms of work experience, the data show no significant relationship between length of service and nurse compliance with SOPs for infusion. This is supported by a p-value of 0.134, which exceeds the significance level ( $\alpha = 0.05$ ), indicating that tenure does not necessarily affect the likelihood of compliance with infusion protocols.

The results pertaining to age characteristics reveal no significant association between a nurse's age and their compliance with infusion SOPs. The p-value for this relationship is 0.607, which exceeds the significance threshold, suggesting that age does not play a determining role in SOP adherence. Similarly, career level was not significantly related to nurse compliance with infusion SOPs, with a p-value of 0.125, which is above the set significance level. This implies that a nurse's position or advancement within their career does not necessarily influence compliance rates. In contrast, marital status appears to be significantly related to compliance with SOPs for infusion, with a p-value of 0.034, which is below the significance threshold. This finding suggests that marital status may influence how strictly nurses adhere to standard procedures during infusion insertions. Finally, the analysis shows that gender does not have a significant impact on nurse compliance with infusion SOPs, as indicated by a p-value of 0.540, which is greater than the significance level. This suggests that both male and female nurses exhibit similar levels of compliance in this context.

## **6. Discussion**

### **The relationship between education level and nurse compliance in implementing standard operating procedures for infusion insertion**

Based on table 3, there is a relationship between the level of nurse education and compliance with the implementation of standard operating procedures, indicated by a p-value of 0.001, which is less than  $\alpha = 0.05$ . This finding is supported by research from Ahmil (2018), who found a significant relationship between education level and compliance with the implementation of standard operating procedures for infusion. In addition, Raghupathi V & Raghupathi W (2020) explain that individuals with higher education levels tend to have greater knowledge and can more easily understand new information. Therefore, education plays a crucial role in increasing knowledge for proper infusion installation and in preventing complications such as phlebitis (Guanche-Sicilia, 2021).

Further supporting this, Lisnadiyanti et al. (2022) found a significant relationship between nurses' knowledge of infusion therapy and the incidence of phlebitis ( $p = 0.000$ ;  $\alpha = 0.05$ ), as well as with quality indicators ( $p = 0.000$ ;  $\alpha = 0.05$ ). These findings highlight the importance for nurses to continually improve their knowledge and skills in infusion therapy, as this can help reduce complications and discomfort related to infusion procedures. However, it should be noted that not all studies are in agreement. For example, research by Nur et al. (2025) showed no significant relationship between education level and compliance ( $p = 0.189$ ). Despite this, Furroidah (2023) still supports the idea that higher education has the potential to enhance nurses' knowledge and skills.

### **The relationship between length of service and nurses' compliance in implementing standard operating procedures for infusion insertion**

Based on table 3, there is no relationship between length of service and nurse compliance in implementing standard operating procedures with a  $p\text{-value} = 0.134 > \alpha = 0.05$ . According to the results of research by Nur et al., (2025) no significant relationship between length of work and compliance was identified ( $p = 1.000$ ) (Nur et al., 2025). These results prove that longer work experience does not always guarantee better compliance. Some nurses who have worked longer may feel overconfident and rely on personal experience rather than following the applicable standard operating procedures (Sulastri et al., 2018). Conversely, nurses with less work experience may be more compliant with standard operating procedures because they are still in the adaptation stage with the applicable standard procedures (Ekaputra & Fatmawati, 2022). According to (Hafidz & Astuti, 2022), it is likely that nurses are not compliant / compliant enough due to work saturation and work habits that have been formed over the years. These results prove that longer work experience does not always guarantee a better level of compliance. Some nurses who have worked longer may feel overconfident and rely on personal experience rather than following applicable SOPs (Nursalam, 2018). Conversely, nurses with less work experience may be more compliant with SOPs because they are still in the adaptation stage with the applicable standard procedures (Ekaputra, 2022). According to (Hafidz & Astuti, 2022 ; Nur et al., 2025) It is most likely that nurses are not compliant / moderately compliant due to work saturation and work habits that have been formed over the years. This study is in line with research by (Furroidah, 2023) who found that there is no relationship between tenure and compliance. The possibility of similar work pressure for all nurses resulted in no difference in the results obtained, especially related.

### **The relationship between age and nurse compliance in implementing standard operating procedures for infusion insertion**

Based on table 5.3 shows that there is no relationship between age and nurse compliance in implementing standard operating procedures. This is not in line with the results of this study in line with previous research conducted by (Idawati, 2020) on the relationship between nurse compliance in performing hand hygiene to the incidence of phlebitis obtained, namely nurses obedient to standard operating procedures are aged 20-30 years, namely (45%) with the most education is S1, namely (55%).

The relationship between career level and nurse compliance in implementing standard operating procedures for infusion insertion.

Based on table 3, the findings indicate that there is no significant relationship between career level and nurse compliance in implementing standard operating procedures for infusion, as evidenced by a  $p\text{-value} = 0.125 > \alpha = 0.05$ . This suggests that career level, in this study, does not play a determining role in the consistency of nurses' adherence to standard procedures. However, these results contrast with those found in the research of Muhni et al. (2022), which examined the attitudes of nurses during handwashing practices at Nur Hidayah Yogyakarta Hospital. According to Muhni et al. (2022), the attitude of nurses can influence goal achievement and can serve as a motivator for either positive or negative behaviors. As such, some nurses may consistently perform nursing care in accordance with their duties and authority due to their positive attitudes. Since handwashing is a mandatory part of the procedure for infusion insertion, these attitudes are particularly relevant.

Based on these considerations, it can be concluded that nurses with a higher career level (PK level) tend to exhibit a good level of compliance and maintain a positive attitude towards the implementation of standard operating procedures, even if statistical significance was not observed in this particular study. Thus, while the data does not show a direct relationship, the importance of nurse attitudes and their role in ensuring compliance with procedures should not be overlooked.

#### **The relationship between marital status and nurse compliance in implementing SOPs for infusion insertion**

Analysis based on table 3 reveals a significant association between marital status and nurse compliance in adhering to standard operating procedures for infusion insertion. This finding aligns with Abidin's research (2021), which also identified a relationship between marital status and the implementation of operational procedures. These results highlight the influence of marital status as a factor contributing to nurses' adherence to established protocols, suggesting that personal circumstances may affect professional behaviour and compliance levels within clinical settings.

#### **The Relationship Between Gender and Nurse Compliance in Implementing SOPs for infusion insertion**

Based on the findings presented in table 5.6, there is no significant relationship between marital status and nurse compliance with the implementation of standard operating procedures. This indicates that whether a nurse is married or single does not directly influence their adherence to established protocols when performing infusion procedures. Despite this result, it contrasts with the findings of Abidin (2021), whose research identified a relationship between marital status and the implementation of operational procedures. Thus, there appears to be inconsistency in the evidence regarding the impact of marital status on nurse compliance, suggesting that other factors may play a more influential role in determining adherence to standard operating procedures.

### **7. Conclusion**

The findings of this study demonstrate a significant relationship between certain nurse characteristics—specifically educational level and marital status and compliance with the implementation of Standard Operating Procedures (SOPs). Nurses with different educational backgrounds and marital statuses exhibited varying levels of adherence to SOPs, highlighting the impact of these personal attributes on compliance. On the other hand, the study did not find any significant relationship between other demographic factors such as length of service, age, career level, and gender, and nurses' compliance with SOPs. This suggests that these particular characteristics may not directly influence how strictly nurses follow established procedures.

Overall, the results indicate that while individual characteristics play a role in determining compliance, other elements, such as the culture of patient safety, effective supervision, and a supportive work environment, are also influential. In light of these findings, it is essential for hospital management to reinforce supervision systems and ensure that all nurses are knowledgeable about and consistently adhere to SOPs across all aspects of nursing practice.

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