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Factors associated with patient safety management activities among clinical nurses

Faktor yang Berhubungan dengan Aktivitas Manajemen Keselamatan Pasien oleh Perawat Klinis

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ABSTRACT

Background: *Nurses play a critical role in preventing patient safety incidents through the implementation of patient safety management activities. However, evidence on the individual and organizational factors related to these activities among clinical nurses in Indonesian hospitals remains limited.*

Objective: *This study aimed to identify factors associated with patient safety management activities among clinical nurses.*

Methods: *This cross-sectional study was conducted in three hospitals in Malang Raya, East Java, Indonesia, involving 225 nurses recruited using proportional quota sampling. Data were collected using the Nurse Professional Competence Scale, the Practice Environment Scale of the Nursing Work Index, the Safety Motivation Tool, and the Safety Care Activity Scale. Data analysis included descriptive statistics, bivariate analysis (Mann-Whitney test, Kruskal-Wallis test, and Spearman correlation), and multiple linear regression.*

Results: *The final regression model indicated that motivation ($\beta = 0.762$, $p < 0.001$) and work environment ($\beta = 0.161$, $p < 0.001$) were significantly associated with patient safety management activities, explaining 68.9% of the variance.*

Conclusion: *These findings highlight the importance of nurse motivation and supportive work environments in strengthening patient safety practices, while providing empirical evidence on the combined role of individual and organizational factors in Indonesian hospital settings.*

Keywords: *clinical nurses, motivation, patient safety, safety acitivity, work environment*

ABSTRAK

Latar Belakang: Perawat memiliki peran penting dalam pencegahan insiden keselamatan melalui pelaksanaan keselamatan pasien sesuai standar. Namun, bukti empiris mengenai faktor individu dan organisasi yang berkaitan dengan aktivitas keselamatan pada perawat klinis di rumah sakit Indonesia masih terbatas.

Tujuan: Penelitian ini bertujuan untuk mengidentifikasi faktor yang berhubungan dengan aktivitas manajemen keselamatan pasien oleh perawat klinis.

Metode: Penelitian ini menggunakan pendekatan cross sectional dan dilaksanakan di tiga rumah sakit di wilayah Malang Raya, Jawa Timur, Indonesia. Sebanyak 225 perawat dipilih sebagai responden menggunakan teknik proportional quota sampling. Instrumen penelitian meliputi *Nurse Professional Competence Scale, Practice Environment Scale of the Nursing Work Index, Safety Motivation Tool, dan Safety Care Activity Scale.* Analisis data dilakukan secara deskriptif, dilanjutkan analisis bivariat (uji Mann-Whitney,

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Kruskal-Wallis, dan korelasi Spearman), serta analisis multivariat regresi linier berganda. **Hasil:** Analisis multivariat menunjukkan bahwa motivasi (β = 0,762; p < 0,001) dan lingkungan kerja (β = 0,161; p < 0,001) merupakan faktor yang paling berkontribusi dalam menjelaskan variasi aktivitas manajemen keselamatan pasien sebesar 68,9%. **Kesimpulan:** Temuan ini menegaskan pentingnya motivasi dan lingkungan kerja yang suportif dalam memperkuat praktik keselamatan pasien, mengenai hubungan faktor individu dan organisasi dengan keselamatan pasien di rumah sakit Indonesia.

Kata kunci: aktivitas keselamatan pasien, keselamatan pasien, lingkungan kerja keperawatan, motivasi, perawat klinis

INTRODUCTION

Patient safety incidents (PSI) remain a serious global issue due to their high occurrence rates. World Health Organization (WHO) 2021 reports that approximately 134 million incidents occur each year in low- and middle-income countries, causing 2.6 million deaths, while in high-income countries approximately 10% of inpatients experience similar incidents.[1] Direct patients' reporting reached 5.3% of 1,329 respondents in the UK and Australia.[2] Adverse Events (AE) are the most frequently reported type of patient safety incidents globally. South Africa recorded 4.4 incidents per 10,000 patients per day, with 72.5% classified as AE.[3] Indonesia's national patient safety data show that AE made up 87.78% of all reported incidents in 2021,[4] with the most common events including medication errors, patient falls, nosocomial infections, procedural or diagnostic errors, and transfusion safety and patient identification.

The significant impact of AE underscores the need to consider various efforts to improve the healthcare system. AE can lead to physical harm, prolonged treatment, increased risk of complications and mortality, additional workload and psychological stress for healthcare workers, and substantial consequences for healthcare institutions, including higher costs and reputational damage.[5–7] Globally, AE also hinders the achievement of Universal Health Coverage (UHC) and Sustainable Development Goals (SDGs).[8] Therefore, the patient safety management activities to prevent any errors must be a priority for healthcare organizations. Nurses, as the healthcare professionals who spend the most time with patients, play an important role in patient safety practices.[9]

Nurses' patient safety management activities refer to the International Patient Safety Goals (IPSG), such as patient identification, effective communication, medication safety, appropriate surgical procedures, nosocomial infections prevention, and falls prevention. According to the Korean Safety Accident Yearbook (2020), AE most often occurs in hospital inpatient wards and is related to areas covered in IPSG.[10] These findings indicate that the implementation of several IPSG standards by nurses still faces challenges. A meta-analysis study by Janes et al.,(2021) shows that nurse engagement in patient safety is influenced by the interaction of individual and organizational factors.[11] Therefore, it is important for organizations to pay attention to these factors in order to improve nurses' compliance in patient safety.[12]

The nursing work environment has been mentioned in previous studies as an organizational factor that most affects patient safety practices. A positive environment that supports collaboration, team communication, and professional autonomy is known to have a direct effect on nurses' compliance with nurses' patient safety management activities.[7,13,14] A healthy work environment enhances job satisfaction and commitment, while high workloads and lack of organizational support can trigger burnout and reduce safety motivation.[15–17]

Motivation and competence are individual factors that have been mentioned in many previous studies as being related to patient safety management activities. Nurse motivation is known to be associated with compliance with IPSG standards. [18–20] Nurses

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with high professional competence demonstrate strong skills and knowledge, have greater confidence and autonomy in carrying out nursing practice, thereby fostering intrinsic motivation. [21] Professional competence has been proven to be significantly related to the quality of care and patient safety. [22,23] These competencies are developed through formal education, training, and continuous clinical experience, as emphasized in Benner's theory *From Novice to Expert*. [24] Therefore, strengthening the two internal factors of nurses mentioned above is a key strategy for improving the effectiveness of patient safety management activities in healthcare facilities. However, the findings of Kim et al.,(2022) indicate that patient safety management activities is not determined by a single factor, but rather by a combination of various factors that interact with each other and are influenced by the organizational context, as well as the nurses' internal and external conditions. [25] The World Health Organization's Global Patient Safety Action Plan 2021-2030,[26] emphasizes the prevention of avoidable harm and the strengthening of healthcare systems, including workforce-related factors. In Indonesia, patient safety is reinforced through national policies and hospital accreditation standards (STARKES). [27]

However, variations in organizational structural may contribute to differences in patient safety practices at regional healthcare system such as Malang Raya. Therefore, this study aims to identify factor associated with patient safety management activities among clinical nurses in three hospitals in Malang Raya.

METHODS

Study design

This study used a correlational quantitative design with a cross-sectional approach and was conducted from August to September 2025 in three hospitals in the Malang Raya, East Java, Indonesia.

Data source and sampling procedure

Primary data were collected through questionnaires distributed to clinical nurses. The study population consisted of 381 clinical nurses working in inpatient units. Inclusion criteria were clinical nurses (diploma or registered nurses) with at least one year of working experience, while nurses on leave, sick leave, study assignment, or those within two years of retirement were excluded. The minimum sample size was determined using the Slovin formula, resulting in total of 215 respondents. The sampling technique employed was proportional quota sampling, with respondents selected proportionally from each hospital. After the screening and data verification processes, a total of 225 questionnaires were included in the analysis.

Variables of the study

The variables in this study consisted of independent and dependent variables. The independent variables were nursing work environment, professional competence, and motivation. The dependent variable was patient safety management activities. Demographic variables, including age, gender, education level, years of experiences, clinical career level, and institution, was also included as covariates in the analysis. Nursing work environment was defined as nurses' perceptions of organizational conditions that facilitate or hinder nursing practice. Professional competence was defined as nurses' perceived ability to integrate theoretical knowledge, technical skills, professional attitudes, clinical reasoning, and decision-making in nursing care. Motivation was defined as internal drives influencing nurses' enthusiasm, initiative, and commitment to performing patient safety practices. Patient safety management activities were defined as actions undertaken by nurses to prevent, identify, and reduce the risk of patient safety incidents.

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Measurement and instruments

The demographic questionnaire was used to obtain information regarding nurses' characteristics, including age, gender, education level, years of experiences, clinical career level, and institution. The nursing work environment was measured using The Practice Environment Scale of the Nursing Work Index (PES-NWI: The PES-5). [28] Professional competence variables were measured using the short version of the Nurse Professional Competence Scale (NPC). [29,30] Motivation was measured using the Safety Motivation Tool in accordance with the context of patient safety. [31,32] Patient safety management activities was measured using the Safety Care Activity Scale. [33]

All adapted questionnaires were evaluated through validity and reliability testing using IBM SPSS version 24 to ensure their appropriateness for use in the local context of Indonesian nurses. Validity and reliability testing were conducted on 30 nurses from a separate inpatient isolation unit that was not included in the main study sample. Validity was assessed using Pearson Product Moment correlation, with validity determined by $r \geq 0.361$ or $p \leq 0.05$. Reliability was assessed using Cronbach's alpha analysis, with values of Cronbach's alpha ≥ 0.70 considered acceptable.

Data collection

Data were collected using Google Forms questionnaires distributed to eligible nurses who met the inclusion criteria and agreed to participate in the study. Completed questionnaires underwent screening and data verification procedures before inclusion in the final analysis.

Ethical consideration

Ethical approval for this study was obtained from three independent institutional ethics committees, with the following approval numbers: (1) 184/UN10.F17.10.4/TU/2025; (2) TK.02.04/D.XXXXVII.3.6/11252/2025; and (3) 072.1/EA.KEPK-032/35.07.302.101/2025. Participants received complete information regarding the study objectives and procedures and provided informed consent prior to participation. Confidentiality and anonymity were maintained by protecting participant data, restricting unauthorized access, and ensuring that no personal identifiers were included in the research report.

Data analysis

Data analysis was performed using univariate, bivariate, and multivariate analyses using IBM SPSS version 24. Univariate analysis described the frequency distribution of each respondent characteristic. Bivariate analysis was performed using the Mann-Whitney and Kruskal-Wallis tests for demographic characteristics and Spearman's correlation test for work environment, professional competence, and motivation. Multivariate analysis used multiple linear regression with manual stepwise selection to obtain the best model.

RESULTS

Univariate analysis is described in Table 1, which shows that most respondents were female (80%), middle-aged (24-44 years) (80%), and had more than 15 years of experiences (33%). The majority of nurse respondents had a Diploma in Nursing (54.7%) and were at the clinical career level III (36%).

Table 1. Frequency Distribution of Nurse Characteristics (n=225)

Nurse characteristics	Category	Frequency (n=225)	%
Gender	Male	45	20.0
	Female	180	80.0
Age	Young adult (24-44 years old)	45	80.0
	Middle adult (45-59 years old)	180	20.0

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Nurse characteristics	Category	Frequency (n=225)	%
Years of Experiences	1 - 5 years	52	23.1
	5 - 10 years	59	26.2
	10 - 15 years	38	16.9
	>15 years	76	33.8
Education Level	Diploma in Nursing	123	54.7
	Registered Nurse	102	45.3
Clinical Career Level	Level I	55	24.4
	Level II	76	33.8
	Level III	81	36.0
	Level IV	13	5.8
Institution	Hospital A	22	9.8
	Hospital B	120	53.3
	Hospital C	83	36.9

Table 2. Descriptive Statistics of Main Study Variables

Variable	Min - Max Value	Median	IQR
Work Environment	65.00 - 112.00	83.00	4.00
Professional Competence	47.00 - 84.00	63.00	6.00
Motivation	13.00 - 20.00	17.00	5.00
Patient Safety Management Activities	68.00 - 104.00	89.00	24.00

Descriptive statistics of the main study variables are presented in Table 2. Since the data were not normally distributed, the variables are presented using minimum - maximum value, median, and interquartile range (IQR).

Table 3. Bivariate Analysis of Potential Predictors of Patient Safety Management Activities

Variable	p-value	Interpretation
Gender	0.950	Not Significant
Age	0.916	Not Significant
Years of Experiences	0.274	Not Significant
Education Level	0.552	Not Significant
Clinical Career Level	0.447	Not Significant
Institution	0.237	Not Significant
Work Environment	0.000	Significant
Professional Competence	0.000	Significant
Motivation	0.000	Significant

***Statistical tests: Mann-Whitney, Kruskal-Wallis, and Spearman correlation

Bivariate analysis is described in Table 3, which shows that three variables have a significant relationship with patient safety management activities, such as work environment (p = 0.000), professional competence (p = 0.000), and motivation (p = 0.000). Meanwhile, the variables of gender (p = 0.950), age (p = 0.916), years of experiences (p = 0.274), education level (p = 0.552), clinical career level (p = 0.447), and institution (p = 0.237), did not show a significant relationship (p > 0.05).

The criteria for selecting candidate variables in multivariate analysis were p-values < 0.25 in the bivariate analysis. Based on this criterion, institutions, work environment, professional competence, and motivation, were eligible for inclusion in the model. In addition, variables such as years of experiences, education level, and clinical career level of clinical nurses were also included in the multivariate analysis despite having p-values > 0.25, as these variables were considered theoretically relevant based on previous studies on patient safety management activities.

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Table 4. Final Multivariate Regression Model of Predictors of Patient Safety Management Activities

Variable	B	SE	Beta	t	p-value
Work Environment	0.207	0.051	0.161	4.058	0.000
Motivation	3.736	0.195	0.762	19.156	0.000

*Statistical tests: Multiple Linear Regression ($R = 0.832$; $R^2 = 0.692$; Adjusted $R^2 = 0.689$; $F(2,222) = 249.354$; $p < 0.001$)

Multivariate analysis at the initially included all variables with $p < 0.25$ in bivariate analysis, along with variables considered theoretically relevant as candidate variables. The stepwise elimination process produced a final model consisting of two significant variables, such as motivation and work environment (Table 4.). Motivation showed the strongest association with patient safety management activities ($\beta = 0.762$, $p < 0.001$), followed by work environment ($\beta = 0.161$, $p < 0.001$). This regression model explains 68.9% of the variation in patient safety management activities (Adjusted $R^2 = 0.689$; $F(2,222)= 249.354$; $p < 0.001$).

DISCUSSION

The results indicate that motivation and work environment were the two main factors significantly associated with patient safety management activities among clinical nurses, with motivation showing the strongest association. Meanwhile, other variables such as professional competence, years of experiences, education level, clinical career level, and institutions did not show a significant relationship in the final model. The final model provides important insights that the interaction between individual factors (motivation) and organizational factors (work environment) plays the most dominant role in patient safety management activities.

The finding that motivation is the strongest association is consistent with previous studies that nurses with high motivation are more likely to pay attention to important details in patient care, including safety aspects.[34] Other study reported that safety motivation directly and significantly enhances safety behavior, including nurses' compliance and participation in patient safety.[32] This shows that safety motivation encourages nurses to be more committed to recognizing risks, complying with procedures, and maintaining consistency in implementing patient safety. This explanation is also in line with *Self-Determination Theory* (SDT), which emphasizes the importance of individual autonomous motivation in driving performance.[35] Meanwhile, autonomous motivation also depends on the provision of a work environment that gives nurses the space to empower themselves, learn independently, and make professional decisions in accordance with their responsibilities.[35]

Findings that work environment as factor associated also support many previous studies that a nursing work environment that supports professional autonomy, teamwork, and interprofessional collaboration contributes significantly to patient safety management activities.[36–38] This indicates that a supportive work environment is not merely a supporting factor but also a key foundation in fostering nursing safety behaviors within healthcare facilities. A work environment characterized by staff shortages or other resource constraints that lead to high workloads can increase the risk of burnout, trigger turnover intention, reduce motivation to report safety incidents, and undermine perceptions of patient safety culture.[39–42] Additionally, other study state that there are challenges in maintaining adequate nursing staff levels in hospitals. [43]

The final model showed that motivation and work environment were the main factors associated with patient safety management activities. Professional competence was not retained in the final model despite showing an association with patient safety management activities in the bivariate analysis. Nurses with high professional

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competence tend to exhibit stronger work motivation, as advanced skills and knowledge enhance confidence and autonomy in clinical practice.[21] Furthermore, other study reported that a supportive work environment that provides adequate educational and training opportunities, contribute to improved professional competence and stronger patient safety culture.[44]

These findings suggest that professional competence is closely linked to motivation and work environment, which play a more dominant role in the model. This is consistent with the perspective that factors associated the patient safety management activities do not separately, but interact with each other and form complex influences within the organizational context.[25] These findings highlight the managerial importance of strengthening nurse motivation and fostering supportive work environments, consistent with national patient safety policies and STARKES accreditation standards. Therefore, hospital management and nursing managers should prioritize effective supervision, continuous professional development, constructive feedback, and performance-based recognition to enhance nurses' patient safety management activities.

CONCLUSION

This study underscores the importance of both motivation and the nursing work environment in nurses' patient safety management activities. Healthcare organizations are encouraged to develop quality improvement strategies that focus on fostering a supportive work environment and enhancing individual nurse motivation through positive feedback, performance-based reward systems, supervision, and improved access to safety training.

These findings are consistent with international recommendations emphasizing the need to address both individual and organizational determinants of patient safety. Furthermore, this study provides empirical evidence from the Indonesian context, offering valuable insights for the development of patient safety policies and targeted intervention strategies at regional and national levels.

This study has several limitations, particularly the absence of comparative analysis across the three hospitals, which limits the ability to identify potential organizational contextual variations. Future research could employ path analysis to further explore how individual and organizational factors interact to shape patterns of influence on safety practices across diverse organizational contexts.

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