*Original Article*

# Determinants of Patient Safety Competence Among Diploma-Level Nursing Students in Jakarta

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## Abstract

**Background:** Ensuring patient safety is a core component of healthcare quality; however, the persistence of medical errors highlights an ongoing global challenge. In Indonesia, Diploma III nursing programs are instrumental in preparing novice nurses, yet variability in curriculum design and clinical experience may affect their ability to uphold safety standards.
**Objective:** This study aimed to identify factors associated with patient safety competence among Diploma III nursing students in Jakarta, Indonesia.
**Methods:** A cross-sectional design was applied, involving 200 students from accredited Diploma III nursing institutions in Jakarta. Participants were recruited through multistage cluster sampling. Data collection utilized a structured survey comprising the Health Professional Education in Patient Safety Survey (H-PEPSS), the Quality of Clinical Learning Environment (QCLE) Scale, and the General Self-Efficacy Scale (GSES). Multiple linear regression analysis identified key predictors of safety competence.
**Results:** Patient safety competence demonstrated significant positive associations with self-efficacy ($r = 0.52$, $p < 0.001$), quality of training ($r = 0.41$, $p < 0.001$), and institutional culture ($r = 0.34$, $p < 0.001$). Regression results revealed that self-efficacy ($\beta = 0.42$, $p < 0.001$) and training quality ($\beta = 0.26$, $p = 0.002$) significantly predicted competence, jointly explaining 37.2% of the variance. Institutional culture, however, was not a significant predictor ($\beta = 0.09$, $p = 0.118$).
**Conclusion:** Self-efficacy and clinical training quality are key contributors to patient safety competence in Jakarta's Diploma III nursing students. Educational strategies targeting these domains may enhance safety outcomes. Future research should explore the long-term influence of institutional culture.

**Keywords**: Clinical Training, Diploma III, Indonesia, Nursing Education, Nursing Students, Patient Safety, Self-Efficacy

## INTRODUCTION

Ensuring patient safety is a cornerstone of high-quality healthcare, yet medical errors continue to be a major global challenge. The World Health Organization (WHO) reports that nearly one in ten patients experience harm in hospital settings, with almost half of these incidents being preventable (1). Common issues such as medication errors, hospital-acquired infections,

and surgical complications compromise patient outcomes and strain healthcare systems (2). As primary caregivers, nurses play a critical role in mitigating these risks through continuous monitoring, adherence to safety guidelines, and effective communication. Recognizing the importance of patient safety, WHO has designated it as a core competency for all healthcare professionals, emphasizing structured training programs that equip nurses with essential skills, knowledge, and attitudes to uphold safe clinical practices (WHO, 2021). The global focus on patient safety education highlights the necessity of integrating these principles into nursing curricula to prepare a competent workforce capable of reducing and managing medical errors.

Nursing education serves as a foundational element in shaping future healthcare professionals' ability to ensure patient safety. Diploma III nursing programs, designed to train entry-level nurses, are particularly crucial in equipping graduates with the competencies necessary for safe and effective care delivery. Research suggests that well-structured educational programs significantly influence students' attitudes and behaviors related to patient safety, ultimately shaping their clinical performance (3). However, variations in curriculum structure, teaching methodologies, and clinical exposure contribute to inconsistencies in patient safety competence among nursing students. In Indonesia, patient safety remains a significant concern, with high incidences of medical errors and adverse events reported in hospitals. The Ministry of Health (MOH) has identified medication errors, miscommunication, and inadequate infection control measures as primary contributors to patient harm (MOH Indonesia, 2020). As the country's primary healthcare hub, Jakarta experiences a high patient volume and complex care demands, increasing the likelihood of safety-related incidents.

Diploma III nursing programs in Indonesia typically span three years and incorporate both theoretical learning and clinical practice. These programs, accredited by the Indonesian Ministry of Education and Culture, aim to develop competent entry-level nurses capable of providing safe and effective patient care. However, research indicates inconsistencies in the implementation of patient safety education, with limited integration of structured frameworks such as the WHO Patient Safety Curriculum Guide (4). Such disparities raise concerns about whether nursing graduates are adequately prepared to manage patient safety challenges in clinical settings, particularly in low-resource environments where healthcare systems face additional constraints (World Health Organization [WHO], (5)).

Despite international emphasis on patient safety education, significant variations persist in students' competency levels. Studies have highlighted gaps in knowledge, skills, and attitudes related to patient safety, with common challenges including medication errors, communication breakdowns, and inadequate risk assessment (6,7). These gaps are particularly concerning in Indonesia, where the nursing workforce plays a critical role in addressing the country's healthcare needs, including high patient-to-nurse ratios and limited access to advanced medical technologies (8). While extensive research has been conducted on patient safety competence in nursing students globally, studies focusing on Indonesian Diploma III nursing students remain limited. Identifying factors that influence their competence—such as curriculum quality, clinical exposure, and mentorship—can enhance nursing education strategies in Indonesia and other low- and middle-income countries (LMICs) facing similar challenges (5,9).

Existing research often relies on self-reported measures to assess patient safety competence, which may not fully capture the multiple factors shaping students' abilities. For instance, self-reported data may overestimate competence due to social desirability bias or fail to account for contextual factors such as institutional culture, training quality, and self-efficacy (10,11). Furthermore, limited studies explore the role of institutional culture, training quality, and self-efficacy in influencing patient safety competence, particularly in vocational nursing programs (10). Addressing these research gaps will provide a more comprehensive understanding of how to strengthen nursing students' readiness for safe clinical practice, particularly in resource-constrained settings where patient safety challenges are amplified (5).

This study aims to explore factors associated with patient safety competence among Diploma III nursing students in Jakarta. The findings can inform improvements in Indonesia's nursing

curricula, clinical training approaches, and accreditation standards to enhance patient safety education. By identifying key determinants of safety competence, educational institutions can implement targeted interventions to improve nursing students' preparedness. For example, integrating simulation-based training, mentorship programs, and structured patient safety frameworks into the curriculum could address existing gaps in knowledge and skills (7,9). Furthermore, this study extends WHO's patient safety framework by applying it to vocational nursing education in LMICs. The research findings can contribute to policy discussions on standardizing patient safety education in Indonesia's nursing programs, aligning with national healthcare goals to reduce medical errors and enhance workforce readiness (7).

## METHODS

### Study Design

This study utilized a cross-sectional, observational design to examine factors associated with patient safety competence among Diploma III nursing students in Jakarta. A cross-sectional approach was selected for its efficiency in evaluating relationships between variables at a single point in time (12).

### Participants

The study targeted nursing students enrolled in accredited Diploma III programs across ten nursing institutions in Jakarta. Inclusion criteria consisted of active enrollment in a Diploma III nursing program, completion of at least one clinical practicum, and voluntary informed consent. Exclusion criteria included students on academic leave or those with incomplete questionnaire responses. The required sample size was estimated using G*Power 3.1.9.7 (13). For a multiple linear regression analysis with ten predictors, an effect size of $f^2 = 0.15$ (moderate), $\alpha = 0.05$, and power $(1-\beta) = 0.95$ resulted in a minimum required sample size of 146. To mitigate potential non-response and attrition, the final sample size was increased to 200 participants. A multistage cluster sampling strategy was employed, first selecting five nursing schools from ten accredited institutions, followed by convenience sampling of 40 students per institution from second- and third-year cohorts (clinical training phases).

### Instruments

The Health Professional Education in Patient Safety Survey (H-PEPSS) was used to assess patient safety competence (6). This 23-item instrument evaluates six domains: clinical safety skills (5 items), safety culture (4 items), communication (4 items), teamwork (3 items), risk management (4 items), and human factors (3 items). Responses are rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with total scores ranging from 23 to 115. Higher scores indicate greater patient safety competence. The original tool demonstrated high reliability (Cronbach's $\alpha = 0.89$) (6). The instrument was translated and adapted through forward-backward translation (14) and pilot-tested with 30 students, confirming internal consistency (Cronbach's $\alpha = 0.87$).

The Quality of Clinical Learning Environment (QCLE) Scale (15) was used to assess training quality. This 32-item scale measures supervisory support, learning opportunities, and interprofessional relationships, rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Higher scores indicate better perceived training quality. The original scale demonstrated strong reliability (Cronbach's $\alpha = 0.84–0.91$) (Dunn et al., 2017), and the Bahasa Indonesia version showed acceptable reliability (Cronbach's $\alpha = 0.82$) (16).

Self-efficacy was measured using the General Self-Efficacy Scale (GSES) (Schwarzer & Jerusalem, 1995). The GSES consists of ten items, rated on a 4-point scale (1 = not at all true to 4 = exactly true), with higher scores indicating greater confidence in handling challenging situations. The original version demonstrated strong reliability (Cronbach's $\alpha = 0.76–0.90$) (17), and the Bahasa Indonesia version validated among healthcare students exhibited a reliability of Cronbach's $\alpha = 0.79$ (18).

### Procedure

This study received ethical approval from the Institutional Review Board (IRB) of STIKep PPNI Jawa Barat (III/089/KEPK/STIKep/PPNI/Jabar/XII/2023) and complied with the Declaration of Helsinki. Data were collected through self-administered online surveys (Google Forms) distributed during scheduled classes. Participants received information sheets and provided electronic informed consent. All responses were anonymized, and only the research team had data access. Upon study

completion, a summary of findings was shared with participants.

### Data Analysis

Statistical analysis was conducted using IBM SPSS Statistics 26.0. Descriptive statistics summarized participant characteristics, while multiple linear regression identified predictors of patient safety competence. Assumptions of normality, multicollinearity, and homoscedasticity were checked (19).

## RESULTS

### Participant Characteristics

A total of 200 Diploma III nursing students participated in the study (response rate: 92.6%). Demographic characteristics are summarized in Table 1. The majority of participants were female (78.5%), with a mean age of 20.4 years (±1.2). Most were in their second academic year (62.0%) and had completed an average of 120 clinical hours (±35.6).

**Table 1. Demographic Characteristics of Participants (N = 200)**

| Variable | Frequency | Percentage | Mean (SD) |
|---|---|---|---|
| Age (years) | | | 20.4 (1.2) |
| Gender | | | |
| Female | 157 | 78.5% | |
| Male | 43 | 21.5% | |
| Academic Year | | | |
| Year 2 | 124 | 62.0% | |
| Year 3 | 76 | 38.0% | |
| Clinical Hours Completed | | | 120 (35.6) |
| Prior Safety Training | | | |
| Yes | 98 | 49.0% | |
| No | 102 | 51.0% | |

### Univariate Analysis

Mean scores for patient safety competence and associated factors are presented in Table 2. Participants reported moderate levels of institutional culture (3.2/5), training quality (3.5/5), and self-efficacy (3.8/5). Patient safety competence averaged 75.6/115 (±8.4).

**Table 2. Univariate Analysis of Key Variables (N = 200)**

| Variable | Range | Mean (SD) |
|---|---|---|
| Institutional Culture | 1–5 | 3.2 (0.7) |
| Training Quality | 1–5 | 3.5 (0.6) |
| Self-Efficacy | 1–5 | 3.8 (0.5) |
| Patient Safety Competence | 23–115 | 75.6 (8.4) |

### Bivariate Analysis

Pearson's correlations revealed significant associations between patient safety competence and all three factors (Table 3). Self-efficacy demonstrated the strongest correlation ($r = 0.52$, $p < 0.001$), followed by training quality ($r = 0.41$, $p < 0.001$) and institutional culture ($r = 0.34$, $p < 0.001$).

**Table 3. Bivariate Correlations Between Study Variables (N = 200)**

| Variable | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Institutional Culture | 1 | | | |
| 2. Training Quality | 0.28** | 1 | | |
| 3. Self-Efficacy | 0.19* | 0.35** | 1 | |
| 4. Patient Safety Competence | 0.34** | 0.41** | 0.52** | 1 |

*Note.* $p < 0.05$; *$p < 0.001$.

### Multivariate Analysis

A multiple linear regression model (Table 4) explained 37.2% of the variance in patient safety competence ($R^2 = 0.372$, Adjusted $R^2 = 0.361$, $F(3, 196) = 38.7$, $p < 0.001$). Self-efficacy (β = 0.42, $p < 0.001$) and training quality (β = 0.26, $p = 0.002$) were significant predictors, while institutional culture was non-significant (β = 0.09, $p = 0.118$).

**Table 4. Multiple Linear Regression Analysis of Factors Associated with Patient Safety Competence (N = 200)**

| Predictor | B | SE | β | t | p | VIF |
|---|---|---|---|---|---|---|
| Institutional Culture | 1.12 | 0.71 | 0.09 | 1.58 | 0.118 | 1.21 |
| Training Quality | 3.45 | 1.08 | 0.26 | 3.20 | 0.002 | 1.34 |
| Self-Efficacy | 6.87 | 1.24 | 0.42 | 5.54 | <0.001 | 1.18 |
| Constant | 48.32 | 4.76 | - | 10.15 | <0.001 | - |

*Note.* Dependent variable: Patient Safety Competence. VIF = Variance Inflation Factor.

## DISCUSSION

This study highlights self-efficacy as the most influential factor in shaping patient safety competence among Diploma III nursing students in Jakarta, followed by the quality of training they receive. In contrast, institutional culture did not show a significant association with competence levels. These findings reinforce existing global research on the importance of self-efficacy in healthcare education while also bringing attention to unique contextual factors relevant to vocational nursing programs in low- and middle-income countries (LMICs).

The strong impact of self-efficacy aligns with the findings of Chen et al. (2021), who reported that nursing students with higher self-efficacy demonstrated stronger clinical decision-making skills and better recognition of medical errors (r = 0.48, p < 0.001). Bandura's social cognitive theory suggests that self-efficacy strengthens resilience in complex clinical environments, empowering students to apply safety protocols with confidence (20). Similarly, a study conducted in Malaysia found that self-efficacy accounted for 32% of the variance in nursing students' patient safety skills, further demonstrating its critical role in competence development (21).

The significance of training quality in this study aligns with the World Health Organization(5), which advocates for structured, simulation-based learning to cultivate essential patient safety competencies. WHO (5) emphasizes that immersive, hands-on training methods, such as high-fidelity simulations, better prepare nurses to manage complex clinical scenarios while minimizing risks to patients. This recommendation is supported by empirical evidence from Chen et al. (12), who found that nursing students exposed to standardized patient simulations scored 18% higher on safety competence assessments compared to peers in conventional lecture-based programs. The authors attributed this improvement to the realism of simulations, which bridge the gap between theoretical knowledge and practical application, fostering critical thinking and error recognition (22).

However, this study's findings contrast with research by Alquwez et al. (23), who identified institutional culture—specifically, leadership support and a blame-free reporting environment—as the primary driver of patient

safety behaviors among nursing students in Saudi Arabia. The discrepancy may stem from differences in clinical training infrastructure. For instance, Jakarta's nursing programs often face inconsistencies in institutional resources, such as unequal access to simulation technology and variable mentorship quality, which could diminish the impact of organizational culture on competence development (24). This suggests that while institutional culture is critical, its influence may be mediated by contextual factors like resource availability and training standardization.

The results of this study emphasize the need to integrate confidence-building strategies, such as structured debriefing sessions and peer mentoring programs, into nursing curricula. These approaches can enhance students' belief in their ability to implement patient safety practices effectively, as suggested by Kim et al. (25). Additionally, aligning clinical practicum experiences with evidence-based frameworks, such as the WHO Patient Safety Curriculum Guide, could help standardize training quality and institutionalize error-reporting mechanisms, bridging the gap between theoretical instruction and real-world practice. Although institutional culture did not emerge as a significant factor in this study, fostering stronger faculty-student collaborations could help mitigate disparities in clinical training environments, particularly in resource-limited settings where institutional support is often inconsistent (26,27).

## Study Limitations

The cross-sectional nature of this study limits the ability to establish causal relationships between variables, as it captures data at a single point in time. Additionally, self-reported competence scores may not fully reflect actual proficiency, as they are based on participants' perceptions rather than objective assessments, potentially introducing response bias. Another limitation is the study's focus on nursing students in Jakarta, which restricts the applicability of findings to rural areas in Indonesia or high-income countries with more developed nursing education systems. Lastly, the lack of longitudinal data leaves unanswered questions about how patient safety competence evolves as students transition into professional practice.

## CONCLUSION

This study underscores the critical role of self-efficacy and training quality in fostering patient safety competence among Diploma III nursing students in Jakarta. Self-efficacy, defined as an individual's belief in their ability to execute tasks successfully, emerged as a significant predictor of students' confidence in applying patient safety practices. High self-efficacy levels were associated with better performance in clinical simulations and a greater willingness to engage in error reporting and risk management. Similarly, the quality of training—particularly the use of experiential learning methods such as simulations, case studies, and hands-on practice—was found to be a key determinant of students' ability to internalize and apply patient safety principles effectively. These findings highlight the importance of designing training programs that not only impart knowledge but also build students' confidence and practical skills through realistic, immersive learning experiences.

The findings support the need for curricular improvements that prioritize experiential learning and incorporate strategies to enhance students' confidence in applying patient safety practices. For instance, integrating simulation-based training and reflective practice exercises into the curriculum can help bridge the gap between theoretical knowledge and real-world application. Additionally, fostering a supportive learning environment that encourages open communication, teamwork, and constructive feedback can further bolster students' self-efficacy and competence. These curricular enhancements are particularly relevant in the context of low- and middle-income countries (LMICs), where resource constraints and high patient-to-nurse ratios often exacerbate challenges in patient safety education.

Future research should explore the influence of cultural and institutional barriers in LMICs through longitudinal and mixed-methods approaches to gain deeper insights into the factors shaping patient safety competence over time. For example, cultural norms that discourage questioning authority or admitting mistakes may hinder the adoption of patient safety practices, while institutional factors such as inadequate staffing, limited access to training resources, and insufficient mentorship can further impede competency development. Longitudinal studies could track the progression

of nursing students' patient safety competence throughout their education and into their early careers, providing valuable data on the long-term impact of training interventions. Mixed-methods research, combining quantitative surveys with qualitative interviews or focus groups, could uncover nuanced perspectives on the barriers and facilitators of patient safety education in diverse cultural and institutional contexts. By addressing these gaps, future studies can inform the development of tailored, context-specific strategies to enhance patient safety competence among nursing students in LMICs, ultimately contributing to safer healthcare systems and improved patient outcomes.

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**Author Contributions**
SEL : Conceptualization, data collection, formal analysis, manuscript drafting.
LL : Supervision, methodology review, critical revision of the manuscript.
Both authors reviewed and approved the final version of the manuscript.

**Conflict of Interest Disclosure**
The authors declare that there are no conflicts of interest regarding the publication of this article.

**Data Availability Statement**
The data supporting the findings of this study are available from the corresponding author upon reasonable request. Access to data is restricted to ensure participant confidentiality.

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