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The Influence of Nurse Knowledge and Clinical Leadership on Patient Safety Incident Reporting with Patient Safety Culture as a Mediation Variable at Abdi Waluyo Hospital

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Abstract

Patient safety incident reporting is essential for identifying potential risks, preventing adverse events, and improving the quality of hospital care. At Abdi Waluyo Hospital, limitations in nurses' understanding of incident reporting procedures and access to feedback have presented challenges to effective patient safety management. This study examined the relationships between nurses' knowledge, clinical leadership, and patient safety incident reporting, with patient safety culture serving as a mediating variable. A quantitative cross-sectional study was conducted from May to June 2026, involving 150 nurses providing direct patient care at Abdi Waluyo Hospital in Central Jakarta, Indonesia. Participants were recruited using total population sampling, and data were collected through a structured questionnaire employing a four-point Likert scale. Data were analyzed using the Three-Box Method for descriptive analysis and partial least squares structural equation modeling (PLS-SEM) with SmartPLS 4. The findings revealed that nurses' knowledge and clinical leadership were positively and significantly associated with both patient safety culture and incident reporting. Patient safety culture demonstrated the strongest direct association with incident reporting ($\beta = 0.511$, $p < 0.001$) and partially mediated the relationships between nurses' knowledge, clinical leadership, and incident reporting. The structural model explained 48.5% of the variance in patient safety incident reporting. Descriptive findings indicated that incident reporting had the lowest index among the four constructs, with feedback provision representing its lowest-scoring indicator. The study concluded that strengthening nurses' knowledge, promoting participatory clinical leadership, and fostering a supportive patient safety culture could improve incident reporting practices. Hospitals should prioritize continuous training, nurse involvement in safety-related decisions, and consistent feedback mechanisms to promote transparent reporting and organizational learning.

INTRODUCTION

Hospital healthcare delivery is inherently complex, involving intensive multidisciplinary collaboration, advanced medical technologies, and high-risk diagnostic and therapeutic procedures. Within this complex healthcare environment, patient safety constitutes a fundamental component of healthcare quality. According to Regulation of the Minister of Health of the Republic of Indonesia No. 11 of 2017 and Government Regulation No. 28 of 2024, patient safety encompasses a systematic approach to preventing avoidable harm through risk assessment, identification and management of patient safety risks, incident reporting and

analysis, organizational learning, and the implementation of corrective measures to minimize risks and prevent patient injuries (Kementerian Kesehatan Republik Indonesia, 2017; Pemerintah Republik Indonesia, 2024).

The World Health Organization (WHO, 2019, 2021), in its patient safety initiatives associated with the Global Patient Safety Action Plan 2021–2030, emphasized that preventable patient harm remained a significant global public health concern. An estimated 134 million adverse events occur annually in hospitals in low- and middle-income countries, contributing to approximately 2.6 million deaths. In the United States, the landmark estimates of the Institute of Medicine (2000) indicated approximately 98,000 annual deaths associated with medical errors. Meanwhile, the National Health Service (NHS, 2021) in the United Kingdom recorded more than 2.3 million patient safety incident reports annually. In developing countries, including Indonesia, patient safety incident reporting remains a substantial challenge. Data from the Ministry of Health of the Republic of Indonesia indicated that, among 2,877 hospitals nationwide, approximately 334 hospitals (11.6%) actively submitted incident reports to the National Patient Safety Committee (Komite Nasional Keselamatan Pasien, KNKP). This limited reporting coverage does not necessarily indicate a low incidence of patient safety events but may reflect substantial underreporting (Hamed & Konstantinidis, 2022). Such underreporting can involve adverse events (Kejadian Tidak Diharapkan, KTD), near-miss events (Kejadian Nyaris Cedera, KNC), no-harm incidents (Kejadian Tidak Cedera, KTC), and reportable circumstances with the potential to cause injury (Kondisi Potensial Cedera, KPC; Kementerian Kesehatan Republik Indonesia, 2017).

Patient safety incident reporting represents an essential professional practice influenced by individual competencies, organizational structures, and clinical leadership. Pronovost et al. (2007), through their work on incident reporting and organizational learning, emphasized that reporting should not be regarded merely as an administrative obligation but as an essential component of continuous quality improvement. Effective incident reporting enables healthcare organizations to investigate contributing factors, conduct root cause analyses, develop corrective interventions, and communicate lessons learned to healthcare professionals. Without systematic reporting and feedback mechanisms, hospitals may lose valuable opportunities to identify organizational weaknesses, address system failures, and prevent the recurrence of similar incidents (Reason, 2000; Tresfon et al., 2025).

At the individual level, nurses' knowledge constitutes an important cognitive foundation for recognizing, classifying, and reporting patient safety incidents. Drawing on Carper's (1978) patterns of knowing in nursing and Bandura's (1986) Social Cognitive Theory, adequate knowledge of incident definitions, reporting classifications, reporting procedures, and organizational improvement processes may strengthen nurses' confidence and competence in fulfilling their reporting responsibilities. Nurses who understand the distinctions among near-miss events, adverse events, and other reportable circumstances may be better equipped to recognize incidents and initiate appropriate reporting procedures. Conversely, insufficient knowledge of reporting requirements, incident classifications, and escalation pathways may contribute to uncertainty, delayed reporting, and failure to report relevant incidents (Elmi et al., 2025; Fekadu et al., 2025; Gad et al., 2025).

Beyond individual knowledge, clinical leadership plays a critical role in shaping nurses' reporting behaviors and perceptions of organizational support. Nursing unit managers and other clinical leaders influence patient safety practices through communication, supervision, professional mentoring, and the establishment of supportive working environments. The NHS Clinical Leadership Competency Framework (NHS Leadership Academy, 2011) and transformational leadership theory (Bass & Avolio, 2004) emphasize the importance of effective communication, professional guidance, role modeling, and staff empowerment in strengthening clinical performance. Supportive clinical leadership may promote psychological

safety by encouraging nurses to communicate concerns, acknowledge errors, and report incidents without disproportionate fear of blame or punitive consequences. Such leadership practices can strengthen transparency, professional accountability, and organizational learning (Al-Oweidat et al., 2023; El-Sayed et al., 2025).

Patient safety culture represents another essential organizational factor influencing incident reporting practices. According to the Agency for Healthcare Research and Quality (AHRQ, 2024) and Reason's (1997) organizational safety framework, a positive patient safety culture is characterized by effective teamwork, open communication, continuous organizational learning, and fair responses to errors. Healthcare institutions with supportive safety cultures encourage employees to identify potential hazards, communicate safety concerns, and participate in improvement initiatives. However, punitive organizational environments may discourage incident reporting when healthcare professionals perceive that reporting errors could result in disciplinary action, professional criticism, or reputational damage. These conditions can undermine reporting transparency and limit opportunities for organizational learning (Han et al., 2024; Karmila et al., 2023).

The discrepancy between the complexity of healthcare delivery and the effectiveness of patient safety incident reporting was also evident at Abdi Waluyo Hospital in Central Jakarta, Indonesia. Abdi Waluyo Hospital is a private Type C hospital with a capacity of 110 beds and advanced medical facilities, including a hybrid catheterization laboratory, 3-Tesla magnetic resonance imaging (MRI), photon-counting computed tomography (CT), and specialized brain and cardiovascular services. These services involve complex clinical procedures, multidisciplinary coordination, and the transfer of responsibility for patients requiring specialized care. However, internal hospital records from 2024 to 2025 indicated fluctuations in patient safety incident reporting that warranted further investigation in relation to the hospital's clinical service activities.

Preliminary observations and interviews with the Head of Nursing and 10 staff nurses identified several challenges affecting patient safety incident reporting. Six of the 10 nurses reported an incomplete understanding of reportable incident criteria, reporting escalation procedures, and their individual responsibilities. Clinical leadership at the nursing unit level was also perceived as insufficient in providing continuous mentoring, constructive feedback, and professional motivation. Internal patient safety culture assessments indicated that the frequency of incident reporting received the lowest score (64%), while only 59% of staff expressed confidence in reporting incidents and 41% reported reluctance due to concerns about blame or disciplinary consequences. Communication openness and handoffs also received relatively low scores of 61% and 58.7%, respectively, while the nonpunitive response to errors dimension reached 65%. Furthermore, the hospital continued to rely on paper-based incident reporting forms that had not been fully integrated into its hospital information system, potentially contributing to administrative inefficiencies and reporting delays.

These preliminary findings suggested that patient safety incident reporting at Abdi Waluyo Hospital was influenced by interconnected individual, leadership, and organizational factors. Variations in nurses' knowledge of reporting procedures, incident classifications, and postincident corrective actions could contribute to uncertainty regarding reporting responsibilities. Similarly, limitations in clinical leadership practices, particularly participatory decision-making, professional guidance, and psychological safety, could affect nurses' willingness to report incidents. The relatively low scores for communication openness, reporting frequency, and nonpunitive responses further indicated the importance of examining patient safety culture as a potential mechanism linking nurses' knowledge and clinical leadership with incident reporting practices.

Although previous studies have examined the relationships between nurses' knowledge, clinical leadership, patient safety culture, and incident reporting, further investigation is needed

to understand how these factors interact within specific hospital environments. Existing research has frequently examined individual or organizational determinants separately, potentially overlooking the mechanisms through which knowledge and leadership contribute to reporting behavior. In particular, the mediating role of patient safety culture requires further examination to clarify whether organizational safety values and practices help explain the relationships between nurses' knowledge, clinical leadership, and incident reporting. This research gap is especially relevant in hospitals where technological complexity, multidisciplinary coordination, and organizational reporting challenges coexist (Winata & Paramarta, 2025).

To address this gap, the study integrated Organizational Learning Theory (Argyris & Schön, 1978), the incident reporting and organizational learning framework discussed by Pronovost et al. (2007), Social Cognitive Theory (Bandura, 1986), and the NHS Clinical Leadership Competency Framework (NHS Leadership Academy, 2011). These theoretical perspectives provided a basis for examining how individual knowledge, leadership behaviors, and organizational safety culture were associated with patient safety incident reporting. Organizational Learning Theory emphasized the importance of feedback and continuous improvement, while Social Cognitive Theory supported the examination of knowledge and behavioral competence. Clinical leadership frameworks provided additional insights into how managerial support, communication, and staff empowerment could influence reporting practices.

The study focused on nurses providing direct patient care at Abdi Waluyo Hospital, including diploma-qualified nurses, bachelor's degree graduates in nursing, and professionally qualified nurses assigned to inpatient units, outpatient departments, the emergency department (Instalasi Gawat Darurat, IGD), intensive care units (ICUs), operating rooms, and other clinical service units. The research model included nurses' knowledge (X1) and clinical leadership (X2) as independent variables, patient safety culture (Z) as the mediating variable, and patient safety incident reporting (Y) as the dependent variable. This framework enabled the examination of both direct and indirect relationships among the study variables within the hospital's organizational context.

The central research question was whether nurses' knowledge and clinical leadership were significantly associated with patient safety incident reporting, both directly and indirectly through patient safety culture, at Abdi Waluyo Hospital in Central Jakarta. Specifically, the study examined the relationships between nurses' knowledge and incident reporting, clinical leadership and incident reporting, and patient safety culture and incident reporting. It also investigated whether nurses' knowledge and clinical leadership were associated with patient safety culture and whether patient safety culture mediated their respective relationships with incident reporting.

Accordingly, this study aimed to analyze the relationships between nurses' knowledge, clinical leadership, and patient safety incident reporting, with patient safety culture serving as a mediating variable. The specific objectives were to examine the direct associations of nurses' knowledge and clinical leadership with incident reporting, assess their relationships with patient safety culture, determine the association between patient safety culture and incident reporting, and evaluate the indirect associations of nurses' knowledge and clinical leadership with incident reporting through patient safety culture. By examining these relationships within a single structural model, the study sought to provide a more comprehensive understanding of the individual and organizational factors associated with incident reporting practices.

Theoretically, this study was expected to contribute to the literature on hospital management, nursing leadership, and patient safety by examining the mediating role of patient safety culture within a partial least squares structural equation modeling (PLS-SEM) framework. The findings were also intended to provide empirical insights into the relationships

among professional knowledge, clinical leadership, organizational culture, and incident reporting behavior. Practically, the study sought to inform the management and Quality Committee of Abdi Waluyo Hospital in developing targeted interventions to strengthen nurses' reporting competencies, promote participatory clinical leadership, improve reporting system accessibility, and establish consistent feedback mechanisms. These initiatives could support the development of a just culture, strengthen organizational learning, and contribute to continuous improvements in patient safety and healthcare quality.

METHOD

Design, Place, and Time of Research

This study employed a quantitative observational approach with a cross-sectional design to examine the relationships among exogenous, mediating, and endogenous variables. The research was conducted at Abdi Waluyo Hospital in Central Jakarta, Indonesia, with primary data collected from May to June 2026.

Population and Research Sample

The population in this study is all nurses who are actively working in the direct patient service unit of Abdi Waluyo Hospital Central Jakarta as many as 150 people (including emergency room, inpatient, outpatient, ICU/Intensive care, Operating Room/OK, and other clinical service units). Given the relatively small size of the affordable population and allowing comprehensive access, the sampling technique used is total sampling (census), where all populations that meet the eligibility criteria are used as a research sample (N = 150 respondents).

Inclusion criteria include: (1) nurses with D3 Nursing, S1 Nursing, or S1 Nurses qualifications; (2) serving in direct clinical service units; (3) having passed the work orientation period and carrying out independent duties; and (4) willing to participate by signing an informed consent. The exclusion criteria include nurses who are undergoing maternity leave/childbirth or do not fill out a questionnaire completely.

Variable Operational Definition

The research variables were grouped into independent/exogenous variables, namely Nurse Knowledge (X1) and Clinical Leadership (X2), mediation/intervening variables, namely Patient Safety Culture (Z), and bound/endogenous variables, namely Patient Safety Incident Reporting (Y). Operational definitions, dimensions, and indicators are presented in Table 1.

Table 1. Operational Definitions, Dimensions, and Indicators of Research Variables

Research Variables	Operational Definition	Theoretical Dimensions	Focus of Empirical Indicators
Nurse Knowledge (X1)	Cognitive abilities obtained through learning, observation, and work experience in understanding patient safety principles and incident reporting flows (Bandura, 1986).	1. Behavioral capability 2. Observational learning 3. Self-efficacy	Understanding of the definition of IKP, risk prevention, incident classification (KNC/KTD/KTC/sentinel), reporting path, role models, and self-confidence in reporting.
Clinical Leadership (X2)	The ability of clinicians/room heads to direct, support, and motivate work teams to improve patient quality and safety (NHS Leadership Academy, 2011).	1. Personal quality 2. Teamwork 3. Manage services 4. Improve service 5. Determine the direction	Self-reflection, calmness during incidents, courage to speak, collaboration between units, effective communication, clear work directions, corrective actions, and staff involvement.

Patient Safety Culture (Z)	Shared values, perceptions, beliefs, and norms in organizations that support transparency, learning from mistakes, and non-punitive responses (AHRQ, 2024).	1. Teamwork 2. Leadership support 3. Staff load & tempo 4. Non-punitive response 5. Reporting & feedback 6. Openness of communication	Teamwork unit, staff adequacy, periodic evaluation, learning from mistakes, a sense of safety reporting, near miss reporting, hospital priorities, and handover communication.
Patient Safety Incident Reporting (Y)	Nurses' systematic behavior in detecting, recording, and communicating patient safety incidents in a continuous improvement cycle (Pronovost et al., 2007).	1. Introduction & reporting 2. Incident analysis 3. Analysis of results 4. Process changes 5. Feedback	Understanding of incident definitions, filling out forms, involvement of the investigation team, submission of analysis results, SOP changes, staff training, and real feedback.

Source: Developed by researchers based on theoretical synthesis (2026).

Research Instruments and Data Quality Tests

The data collection instrument was in the form of a structured questionnaire with a Likert scale of 4 points: Strongly Disagree (score 1), Disagree (score 2), Agree (score 3), and Strongly Agree (score 4). The questionnaire consists of 10 items of Nurse Knowledge statements, 10 items of Clinical Leadership, 15 items of Patient Safety Culture, and 10 items of Patient Safety Incident Reporting (a total of 45 items).

Instrument trials were conducted on 30 nurses outside the study sample. The item validity test used Pearson Product Moment correlation, where the item was declared valid if the r-count ≥ r-table (0.361 at $\alpha = 0.05$). The validity test results showed that all 45 statements had r-count values between 0.412 and 0.958, so that all were declared valid. The reliability test using Cronbach's Alpha coefficient resulted in a value of 0.953 for Nurse Knowledge; 0.947 for Clinical Leadership; 0.954 for Patient Safety Culture; and 0.977 for Incident Reporting. Since the entire Cronbach's Alpha value was well above the critical threshold of 0.70, the instrument was declared very reliable.

Data Analysis Techniques

The data analysis technique in this study combines descriptive analysis and inferential analysis:

a) Descriptive Analysis (Three Box Method)

Used to describe the distribution of respondents' perceptions on each variable and indicator. The index score is calculated by the formula: Index = [(F1×1) + (F2×2) + (F3×3) + (F4×4)] / 4. With 150 respondents, the index range ranged from 37.50 to 150.00, which was categorized into three tiers: Low (37.50–75.00), Medium (75.01–112.50), and High (112.51–150.00).

b) Inferential Analysis (SEM-PLS)

Using Partial Least Squares Structural Equation Modeling assisted by SmartPLS software version 4. The evaluation of the measurement model (outer model) included convergent validity (loading factor > 0.70 and AVE > 0.50), discriminant validity (Fornell-Larcker criterion and HTMT < 0.90), and composite reliability (rho_c > 0.70). The evaluation of the structural model (inner model) included multicollinearity tests (inner VIF < 5.0), determination coefficients (R^2), effect size (f^2), predictive relevance (Q^2), and direct and mediated hypothesis testing through a nonparametric bootstrapping procedure of

5,000 subsamples (t-count > 1.96 and p-value < 0.05). Simultaneous influence tests were assessed through model suitability estimation.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

Demographic data from 150 nurse respondents at Abdi Waluyo Hospital, Central Jakarta showed that the absolute majority of respondents were women, namely 146 people (97.33%), while men amounted to 4 people (2.67%). The age distribution was dominated by the productive young age group ≤ 30 years old as many as 73 people (48.67%), followed by 37 people aged 31–40 years (24.67%), 41–50 years old as many as 30 people (20.00%), and > 50 years old as many as 10 people (6.67%).

Based on the latest education level, the majority of nurses have professional qualifications of S1 Nurses as many as 66 people (44.00%), S1 Nursing as many as 44 people (29.33%), D3 Nursing as many as 39 people (26.00%), and S2 Nursing as many as 1 person (0.67%). The distribution of work units shows that the largest proportion is in Inpatient Installations as many as 54 people (36.00%) and Outpatient as many as 42 people (28.00%), followed by Other Service Units (12.00%), Emergency Rooms (10.00%), Intensive Care/ICU (8.00%), and Operating Rooms/OK (6.00%). In terms of working period, as many as 80 nurses (53.33%) had a working period of 5 years ≤, 35 people (23.33%) worked 11-20 years, 25 people (16.67%) worked 6-10 years, and 10 people (6.67%) worked > 20 years.

Descriptive Analysis of Variables (Three Box Method)

The descriptive analysis of the Three Box Method produced an overview of the respondents' perception index of the four research variables as summarized in Table 3.1.

Table 1. Summary of Three Box Method Analysis of All Research Variables (N = 150)

Research Variables	Average Index	Categories	Highest Indicators (Indices)	Lowest Indicator (Index)
Nurse Knowledge (X1)	93,38	Medium	Patient safety definition (116.50; High)	Incident reporting path (74.50; Low)
Clinical Leadership (X2)	92,78	Medium	Team clear communication (113.50; High)	Staff involvement in decisions (74.25; Low)
Safety Culture (Z)	91,72	Medium	Upper support (114.75; High)	Reporting near miss (71.50; low)
IKP Reporting (Y)	83,68	Medium	Understanding of the definition of IKP (98.75; Medium)	Feedback reception (70.25; Low)

Source: Results of Questionnaire Primary Data Processing (2026).

The results of the Three Box Method analysis showed that all variables were in the 'Medium' category. Nurses' knowledge obtained the highest average index (93.38), while IKP reporting recorded the lowest index (83.68). These findings indicate a gap between what nurses theoretically understand and actual reporting behavior in the field. In the Nurse Knowledge variable, nurses understand the definition of patient safety very well (116.50), but are very weak in understanding the technical pathways and flows of reporting (74.50). In Clinical Leadership, operational communication is rated very good (113.50), but staff involvement in safety decision-making is in the low category (74.25). In the Patient Safety Culture, the commitment of the boss was felt to be high (114.75), but the reporting of near-injury incidents (71.50) and staff adequacy (74.75) were in the low category. This had a direct impact on the

IKP Reporting, where the dimensions of procedure changes (74.63) and the receipt of report feedback (70.25) occupied the lowest scores.

Evaluation of Measurement Models (Outer Model)

The evaluation of the measurement model was carried out to ensure that all indicators met the requirements of convergent validity, internal consistency reliability, and discriminant validity. The results of the evaluation of the outer model are presented in Table 2.

Table 2. Evaluation Results of Measurement Model (Outer Model SEM-PLS)

Variable Constructs	Loading Range	Cronbach's α	rho_c	AVE	Validity Status
Nurse Knowledge (X1)	0,797 – 0,864	0,949	0,956	0,684	Valid & Reliable
Clinical Leadership (X2)	0,805 – 0,869	0,954	0,960	0,706	Valid & Reliable
Safety Culture (Z)	0,791 – 0,864	0,967	0,970	0,684	Valid & Reliable
IKP Reporting (Y)	0,812 – 0,867	0,954	0,960	0,706	Valid & Reliable

Source: PLS Algorithm SmartPLS Output 4 (2026).

Table 2 proves that all indicators have an outer loading between 0.791 and 0.869, well beyond the threshold value of 0.70. The AVE value of each construct is above 0.50 (ranging from 0.684–0.706), proving the fulfillment of strong convergent validity. Cronbach's Alpha (> 0.94) and composite reliability rho_c (> 0.95) values indicate excellent internal consistency.

The discriminant validity test using the Heterotrait-Monotrait Ratio (HTMT) criterion showed that the entire ratio value was between 0.171 and 0.697 (below the threshold of 0.90). The highest value was recorded in the relationship between Patient Safety Culture and Incident Reporting at 0.697. The evaluation of the Fornell-Larcker criteria also confirmed that the square root value of AVE at the diagonal (0.827–0.840) was always higher than the correlation between the constructs in the columns and rows concerned, so that the discriminant validity of the model was perfectly met.

Evaluation of Structural Models (Inner Model)

Structural model evaluation was carried out through testing for multicollinearity, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and fit model:

a) Multicollinearity Test (Inner VIF): The inner VIF value of the entire structural pathway is between 1.029 and 1.804. This value is well below the critical threshold of 5.00, so that the model is free from multicollinearity problems.
b) Coefficient of Determination (R^2): The R^2 value for Patient Safety Culture was 0.446 (R^2 adjusted = 0.438), which means that 44.6% of the variance in patient safety culture was explained by Nurse Knowledge and Clinical Leadership. The R^2 value for Patient Safety Incident Reporting was 0.485 (R^2 adjusted = 0.475), indicating that 48.5% of the variance in IKP reporting was able to be explained simultaneously by Nurse Knowledge, Clinical Leadership, and Patient Safety Culture (moderate-high category).
c) Effect Size (f^2): Nurse Knowledge has a major effect on Patient Safety Culture (f^2 = 0.364). The Effect of Clinical Leadership on Patient Safety Culture (f^2 = 0.304) and Patient Safety Culture on CPI Reporting (f^2 = 0.282) is in the moderate/moderate category. In contrast, the direct effect of Nurse Knowledge (f^2 = 0.037) and Clinical Leadership (f^2 = 0.034) on CPI Reporting is relatively low, confirming the crucial role of safety culture as a key transmission route.

d) Predictive Relevance (Q^2): The blindfolding procedure resulted in a Q^2 value of 0.299 for Patient Safety Culture and 0.331 for KIP Reporting. Both values were well above zero, proving the model has good predictive relevance capabilities.
e) Model Fit: The Standardized Root Mean Square Residual (SRMR) value of 0.051 is below 0.08, proving an excellent fit model between the empirical data matrix and the theoretical model.

Research Hypothesis Test Results

Hypothesis testing was carried out through a bootstrapping procedure with 5,000 subsamples at a significance level of $\alpha = 0.05$ (t-table = 1.96). A summary of the hypothesis test results is presented in Table 3.3.

Table 3. Results of Testing the Hypothesis of Direct and Indirect Influence (Mediation)

Hypothesis	Structural Relationship Pathway	Coefficient (β)	T-Statistics	p-value	Verdict
H1 (Simultaneous)	**Knowledge, Leadership, & Culture → IKP Reporting**	**F = 45.82***	**Chi² = .000**	**< 0.001**	**Accepted**
H2 (Direct)	Nurse Knowledge (X1) → IKP Reporting (Y)	0,164	2,398	0,017*	Accepted
H3 (Direct)	Clinical Leadership (X2) → IKP Reporting (Y)	0,153	2,283	0,022*	Accepted
H4 (Direct)	Safety Culture (Z) → IKP Reporting (Y)	0,511	6,229	< 0.001***	Accepted
H5 (Direct)	Nurse Knowledge (X1) → Safety Culture (Z)	0,456	7,482	< 0.001***	Accepted
H6 (Direct)	Clinical Leadership (X2) → Safety Culture (Z)	0,417	7,661	< 0.001***	Accepted
H7 (Mediation)	**Knowledge (X1) → Culture (Z) → IKP Reporting (Y)**	**0,233**	**4,767**	**< 0.001*** **	**Accepted (Partial)**
H8 (Mediation)	**Leadership (X2) → Culture (Z) → IKP Reporting (Y)**	**0,213**	**4,696**	**< 0.001*** **	**Accepted (Partial)**

Note: *p < 0.05; p < 0.001; t-table = 1.96 at 5% significance.

As shown in Table 3.3, all research hypotheses (H1 to H8) are conclusively accepted. Patient safety culture had the strongest direct influence on CPI reporting ($\beta = 0.511$; $p < 0.001$). Because the direct influence of X1 and X2 on Y remained significant, while the indirect influence through Z was also significant, the role of patient safety culture mediation was classified as complementary partial mediation. This suggests that nurse knowledge and clinical leadership can directly influence incident reporting, but the total influence becomes much greater when transmitted through strengthening patient safety culture.

Simultaneous Effects on Patient Safety Incident Reporting

The results of the test prove that Nurse Knowledge, Clinical Leadership, and Patient Safety Culture simultaneously have a significant effect on IKP Reporting at Abdi Waluyo Hospital (H1 accepted). These findings confirm the integrative paradigm that incident reporting behavior cannot be shaped by a single, isolated intervention. Increased reporting requires nurses' cognitive readiness, clinical leadership examples, and an organizational climate that supports openness. This is in line with Organizational Learning Theory (Argyris & Schön, 1978), where the detection and correction of systemic errors requires synergy between individual capacity to act (action strategies), governing variables, and theory-in-use norms.

The Influence of Nurse Knowledge on IKP Reporting and Safety Culture

Nurse knowledge has been shown to have a positive and significant effect on CPI reporting ($\beta = 0.164$; $p = 0.017$; H2 accepted) and on patient safety culture ($\beta = 0.456$; $p < 0.001$; H5 accepted). Nurse knowledge even recorded the largest effect size on safety culture ($f^2 = 0.364$). Nurses who understand the concept of patient safety, types of incidents, and the benefits of reporting will have a more positive perception of just culture and are more motivated to report incidents.

However, the Three Box Method analysis revealed the crucial fact that the main weakness of nurses' knowledge lies in procedural knowledge, namely understanding of reporting pathways (74.50) and follow-up of post-incident improvements (75.00). Nurses understand the definition of patient safety conceptually, but are hesitant about the technicalities of filling out forms, reporting deadlines, and to whom reports are submitted. These findings are consistent with Social Cognitive Theory (Bandura, 1986) and the results of studies by Gad et al. (2025) and Elmi et al. (2025), which found a significant gap between high general awareness of patient safety and low reporting compliance due to systemic procedural misunderstandings.

The Influence of Clinical Leadership on CPI Reporting and Safety Culture

Clinical leadership has been shown to have a positive and significant effect on CPI reporting ($\beta = 0.153$; $p = 0.022$; H3 accepted) and on patient safety culture ($\beta = 0.417$; $p < 0.001$; H6 accepted). Heads of rooms who show composure in the face of incidents, communicate transparently, and do not blame staff have been shown to be effective in creating a sense of psychological safety (psychological safety; Edmondson, 1999). When nurses believe that leaders view incidents as a means of system improvement, the courage to report increases.

However, the descriptive analysis showed that staff involvement in safety decision-making was still in the low category (74,25). This indicates that the leadership that runs at Abdi Waluyo Hospital is still instructive one-way, has not been fully transformed into shared leadership as mandated by the NHS Clinical Leadership Competency Framework (NHS Leadership Academy, 2011). These results support the findings of El-Sayed et al. (2025) and Pamela et al. (2025) that coaching and participatory leadership are the main catalysts in building a culture of safety.

The Influence of Patient Safety Culture on IKP Reporting

Patient safety culture was the most dominant direct determinant of CPI reporting ($\beta = 0.511$; $p < 0.001$; $f^2 = 0.282$; H4 accepted). This high path coefficient value confirms that the safety climate in the work unit is the main determinant of whether nurses will report or choose to remain silent. These findings strongly support Safety Culture Theory (Reason, 1997) and the Incident Reporting System Framework (Pronovost et al., 2007): reporting culture will only thrive on the land of just culture and learning culture.

The Three Box Method data shows that the biggest obstacle to safety culture at Abdi Waluyo Hospital is the low reporting of near miss incidents with an index of 71.50 and the lack of report feedback (72.00). Staff still consider incidents that have not injured patients to need to be reported, and feel that reporting does not have a real impact due to the lack of information from the investigation results. As emphasized by Moon et al. (2026), near miss reporting is the best source of learning to prevent fatal incidents before injuries occur to patients.

The Mediating Role of Patient Safety Culture

Mediation testing proved that patient safety culture partially mediated the influence of nurses' knowledge on IKU reporting ($\beta = 0.233$; $p < 0.001$; H7 accepted) and the influence of clinical leadership on IKP reporting ($\beta = 0.213$; $p < 0.001$; H8 accepted). Interestingly, the indirect influence of knowledge (0.233) and leadership (0.213) through safety culture was shown to be greater than the direct influence (0.164 and 0.153). These findings prove empirically that cognitive knowledge and leadership direction will not be able to boost incident

reporting on an ongoing basis without internalizing it into norms, values, and practices of a fear-free work culture.

Theoretical and Managerial Implications

Theoretically, this study proves the applicability of Organizational Learning Theory in type C private hospitals, where incident reporting acts as a bridge from single-loop learning (momentary error correction) to double-loop learning (fundamental changes in policies and systems). Managerially, these findings provide concrete guidance for Abdi Waluyo Hospital: (1) the transformation of manual reporting forms into an integrated web-based/application electronic reporting system that ensures the confidentiality of the reporter; (2) standardization of the reporting flow through a one-sheet visual guide and QR barcode in each nursing room; (3) the implementation of daily safety huddle to discuss potential risks and near-injury incidents in a participatory manner; and (4) the establishment of a closed-loop reporting mechanism that requires the submission of feedback on the results of the investigation to the reporting unit within a maximum of 14 working days.

Research Limitations

This study has several limitations: (1) The measurement of incident reporting is based on the subjective perception of respondents through cross-sectional questionnaires, not auditing the actual incident logbook data longitudinally; (2) The research locus is limited to one type C private hospital (single center) in Central Jakarta, so the generalization of findings in government hospitals or other types of classes needs to be done carefully; and (3) This study has not analyzed external variables such as quantitative workload, nurse-patient ratio per shift, and electronic reporting information system technology factors.

CONCLUSION

Based on the findings and discussion, this study concluded that nurses' knowledge, clinical leadership, and patient safety culture were positively associated with patient safety incident reporting at Abdi Waluyo Hospital in Central Jakarta. The findings indicated that incident reporting was associated with the combined contributions of nurses' ability to recognize and understand patient safety incidents, supportive clinical leadership practices, and an organizational environment that encouraged healthcare professionals to communicate safety concerns without fear of inappropriate blame or punitive consequences. These results highlighted the importance of integrating individual competencies, leadership support, and organizational culture to strengthen incident reporting practices.

The individual relationships among the study variables further demonstrated that nurses' knowledge, clinical leadership, and patient safety culture were positively associated with incident reporting. Nurses with greater knowledge of incident classifications, patient safety risks, reporting procedures, and postincident management demonstrated more favorable reporting practices. Supportive clinical leadership, characterized by effective communication, constructive responses to errors, and staff participation in decision-making, was associated with greater willingness to report incidents. Similarly, a positive patient safety culture encouraged transparent reporting by promoting open communication, fair responses to errors, and the use of incident reports as opportunities for organizational learning and continuous quality improvement.

Nurses' knowledge and clinical leadership were also positively associated with patient safety culture. Adequate knowledge contributed to a shared understanding of risk identification, incident reporting procedures, error management, and preventive measures, while supportive leadership practices helped establish an organizational environment that valued transparency, accountability, and continuous learning. Furthermore, patient safety culture partially mediated the relationships between nurses' knowledge and incident reporting and between clinical leadership and incident reporting. These findings suggested that the

associations of nurses' knowledge and clinical leadership with reporting practices operated both directly and indirectly through patient safety culture. Consequently, strengthening patient safety culture represented an important organizational strategy for supporting the relationships between professional competence, leadership practices, and incident reporting.

The findings were consistent with Organizational Learning Theory (Argyris & Schön, 1978), which emphasizes the identification and correction of errors as fundamental mechanisms of organizational improvement. Patient safety incident reporting provides essential information for evaluating clinical processes, identifying system weaknesses, implementing corrective actions, and preventing recurrent incidents. The findings also aligned with Social Cognitive Theory (Bandura, 1986), which explains behavior through reciprocal interactions among personal factors, environmental influences, and behavioral processes. The positive association between nurses' knowledge and incident reporting suggested that procedural understanding and professional competence were important factors associated with reporting behavior within the organizational environment.

The positive relationships of clinical leadership with patient safety culture and incident reporting were consistent with the NHS Clinical Leadership Competency Framework (NHS Leadership Academy, 2011), which emphasizes personal qualities, collaborative working relationships, service management, continuous improvement, and strategic direction. Similarly, the association between patient safety culture and incident reporting supported Reason's (1997) organizational safety framework, particularly the importance of a reporting culture, fair accountability, and organizational learning. The findings also aligned with the incident reporting and organizational learning principles discussed by Pronovost et al. (2007), emphasizing that incident reporting should extend beyond documentation to include systematic analysis, corrective interventions, evaluation, and feedback to reporting personnel.

Empirically, these findings were consistent with Pamela et al. (2025) and El-Sayed et al. (2025), who highlighted the importance of leadership in shaping safety-related attitudes and reporting practices. The findings concerning patient safety culture were also consistent with Karmila et al. (2023), Al-Oweidat et al. (2023), Ko and Kang (2023), and Alsobou et al. (2025), who identified relationships among organizational safety culture, just culture, leadership support, open communication, and incident reporting. Furthermore, the positive association between nurses' knowledge and incident reporting supported the findings of Gad et al. (2025), Elmi et al. (2025), Fekadu et al. (2025), and Smit and Peddle (2025), which emphasized the importance of professional knowledge, training, and familiarity with reporting systems in promoting patient safety reporting practices.

Based on the hypothesis testing results and descriptive findings obtained using the Three-Box Method, this study identified three principal managerial implications for Abdi Waluyo Hospital. First, nurses' procedural knowledge should be strengthened through structured competency development programs incorporating observational learning, practical demonstrations, and incident reporting simulations. These programs should address incident classification, reporting pathways, designated reporting authorities, reporting deadlines, documentation procedures, and postincident corrective actions. Integrating these competencies into new nurse orientation, continuing professional development, refresher training, and periodic competency assessments could improve nurses' understanding of reporting responsibilities and support more consistent reporting practices.

Second, clinical leadership development should be strengthened through standardized leadership competencies, periodic performance assessments, targeted professional training, and structured coaching and mentoring programs. Particular attention should be directed toward participatory decision-making, effective communication, goal setting, and change management. Nursing unit leaders should be encouraged to involve staff in patient safety discussions, establish measurable safety objectives, and ensure the timely implementation of

corrective actions. Incorporating these responsibilities into leadership performance indicators could support a more consistent and accountable approach to clinical leadership across hospital units.

Third, patient safety culture should be strengthened by addressing staffing adequacy, workload distribution, communication openness, and organizational responses to errors. Hospital management should conduct periodic staffing assessments based on patient volume, dependency levels, service complexity, workload intensity, and unit-specific operational demands. The findings of these assessments could inform staffing allocation, competency distribution across shifts, personnel redistribution, and contingency staffing arrangements. Such measures may help reduce excessive workloads and create organizational conditions that support safe clinical practices and timely incident reporting.

The Three-Box Method findings also identified specific indicators requiring targeted improvement. Within the nurses' knowledge construct, understanding of reporting pathways and postincident corrective actions represented areas requiring additional attention. Accordingly, the hospital should develop concise reporting guidelines containing incident classifications, reporting procedures, responsible personnel, submission deadlines, and follow-up requirements. These guidelines could be made accessible in clinical units through printed materials and quick-response (QR) codes. Practical simulations using representative incident scenarios should also be incorporated into training activities to strengthen nurses' ability to complete reporting procedures independently and accurately.

Within the clinical leadership construct, staff involvement in decision-making and clarity of work direction required further improvement. Hospital management should establish structured leadership development initiatives that encourage staff participation in patient safety management. These initiatives could include standardized safety huddles, collaborative incident reviews, and the involvement of staff nurses in developing corrective action plans. Unit-level patient safety objectives should be clearly defined, measurable, and regularly evaluated. Standardized documentation of staff recommendations, corrective decisions, assigned responsibilities, and implementation deadlines could further strengthen accountability and facilitate systematic monitoring of improvement activities.

Regarding patient safety culture, particular attention should be directed toward near-miss reporting, staffing adequacy, workload management, and feedback following incident submissions. Hospital management should simplify near-miss reporting procedures, periodically evaluate workloads in high-risk clinical units, protect the confidentiality of reporting personnel, and establish clear standards for reporting and feedback timelines. Near-miss incidents should be examined as opportunities to identify potential system weaknesses and implement preventive measures rather than as grounds for automatic individual blame. Strengthening these practices could promote a just culture and reinforce staff confidence in the hospital's commitment to organizational learning.

Future research should involve multiple hospitals or compare clinical units with different patient safety risk profiles to improve the generalizability and contextual understanding of incident reporting practices. Subsequent studies could incorporate incident report audits, direct observations, qualitative interviews, and hospital administrative records to compare self-reported perceptions with actual reporting behavior, response times, investigation quality, and implemented corrective actions. Longitudinal or intervention-based research would also be valuable for examining whether improvements in nurses' knowledge, clinical leadership, and patient safety culture are followed by measurable changes in reporting practices. Additionally, future research models could incorporate reporting system usability, psychological safety, workload, staffing adequacy, perceived reporting barriers, confidentiality, organizational support, previous incident experiences, feedback quality, and self-efficacy to provide a more comprehensive understanding of the factors associated with patient safety incident reporting.

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CONFLICT OF INTEREST

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTION

All authors contributed to the preparation and writing of this article.

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

In the preparation of this manuscript, the authors utilized Artificial Intelligence (AI) solely for the purposes of improving grammar and checking language usage.

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