



Transformational Leadership and Knowledge on Patient Safety Culture: The Mediating Role of Organizational Commitment

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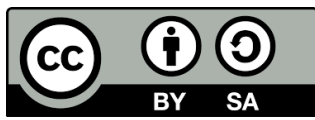
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Keywords:

transformational leadership;
knowledge; organizational
commitment; patient safety
culture; PLS-SEM.

Abstract

Patient safety culture is a critical determinant of hospital service quality; however, its implementation in Indonesian regional public hospitals often remains challenging despite existing leadership capabilities and staff knowledge. This study examined the effects of transformational leadership and knowledge on patient safety culture, both directly and indirectly through organizational commitment as a mediating variable. A quantitative cross-sectional design was applied to all healthcare workers at RSUD Teluk Pucung, Bekasi City, with a population of 148 individuals. The sample was selected using total sampling, resulting in 147 valid respondents. Data were collected using an electronic questionnaire measuring transformational leadership, knowledge, organizational commitment, and patient safety culture. The data were analyzed using higher-order construct Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The results showed that transformational leadership and knowledge had positive and significant effects on organizational commitment and patient safety culture, both directly and indirectly. Organizational commitment was found to partially mediate both relationships, with mediation proportions of 43.4% and 56.6%, respectively. The research model explained 56.1% of the variance in organizational commitment and 48.9% of the variance in patient safety culture. Further Importance-Performance Map Analysis (IPMA) indicated that affective commitment was the indicator with the highest intervention priority. These findings confirmed that strengthening patient safety culture requires simultaneous improvement in leadership, knowledge, and organizational commitment, with affective commitment serving as a primary managerial intervention focus.



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INTRODUCTION

Patient safety is a fundamental dimension of modern healthcare systems. The Institute of Medicine (2000), through its report *To Err Is Human*, documented that tens of thousands of patient deaths annually in the United States were associated with preventable medical errors. This finding triggered a global paradigm shift from blaming individuals toward a systemic approach focused on organizational improvement. Two decades after the publication of the report, the World Health Organization (2023) reported that approximately one in ten inpatients worldwide still experiences a preventable safety incident, with the greatest burden occurring in lower-middle-income countries, including Indonesia. Systematic reviews of hundreds of hospitals across various countries indicate that patient safety problems are more frequently rooted in weaknesses within organizational culture rather than solely in individual technical errors among healthcare workers (Carvalho et al., 2023).

In Indonesia, the government has established a patient safety regulatory framework through Regulation of the Minister of Health Number 11 of 2017 concerning Patient Safety, which requires every hospital to implement a comprehensive patient safety management system (Ministry of Health of the Republic of Indonesia, 2017). However, implementation remains challenging. National accreditation data indicate that only approximately 62% of hospitals in Indonesia consistently implement patient safety systems according to national standards (Liana et al., 2024), while a study in West Java Province found that only 45% of healthcare workers had a comprehensive understanding of the patient safety culture concept (Utari et al., 2020). At the municipal level, Bekasi City Health Office data recorded a 27% increase in patient safety incidents compared with the previous year, with most incidents associated with interprofessional communication errors and weak coordination among medical teams (Bayna et al., 2023). Persistent under-reporting of incidents, in which the number of reported cases remains substantially lower than the estimated actual incidence, is also a significant challenge in Indonesian hospitals (Dhamanti et al., 2022).

RSUD Teluk Pucung, a regional public hospital owned by the Bekasi City Government, represents this challenge. A preliminary survey conducted among 35 healthcare workers at RSUD Teluk Pucung in May 2026 revealed a paradox that became the basis of this study. Transformational leadership was perceived as strong by staff (89.9%; categorized as strong according to AHRQ criteria), and staff knowledge regarding the six national patient safety goals was considered adequate (72.4%). However, the overall patient safety culture score remained at a moderate level (68.1%) and had not reached the strong threshold ($\geq 75\%$). This gap was more evident at the dimension level, where two dimensions fundamental to transparent incident reporting, namely staffing/workload adequacy (46.4%) and non-punitive response to errors (52.4%), were categorized as weak. Furthermore, 48.6% of healthcare workers had never attended patient safety training, even though 62.9% worked in high-risk units, including the emergency department, ICU/HCU, and operating rooms. This condition, in which relatively strong leadership and knowledge had not yet translated into a strong safety culture, indicated the possibility of a mediating variable that required further empirical examination in the context of a regional public hospital.

Previous studies have contributed significantly to explaining the determinants of patient safety culture. Makiah et al. (2023) found that clinical leadership significantly influenced patient safety culture with knowledge management as a mediator. Lotfi et al. (2018) demonstrated a positive relationship between ethical leadership, organizational commitment, and nurses' perceptions of safety culture, while Ayu et al. (2024) showed that knowledge and leadership directly influenced clinical risk management in the Indonesian hospital context. Nevertheless, several research gaps remain. First, a contextual gap exists because most studies have focused on large or national referral hospitals, leaving the dynamics of safety culture in resource-limited regional public hospitals insufficiently explored (Carvalho et al., 2023). Second, a conceptual gap remains because previous research has primarily examined direct effects without investigating the indirect mechanism through organizational commitment (Demeke et al., 2025), despite the preliminary findings of this study suggesting the importance of such a pathway. Third, an empirical gap exists because the role of knowledge as an independent variable distinct from leadership has rarely been explicitly examined in Indonesian regional hospital settings (Azyabi & Karwowski, 2021). Fourth, a methodological gap remains

because many studies in Indonesia still apply descriptive-correlational approaches without comprehensively testing causal relationships through Partial Least Squares Structural Equation Modeling (PLS-SEM), which enables mediation analysis using bootstrapping procedures (Hair et al., 2022; Makiah et al., 2023).

This study addressed these gaps by examining the effects of transformational leadership and knowledge on patient safety culture, both directly and indirectly through organizational commitment as a mediating variable among healthcare workers at RSUD Teluk Pucung, Bekasi City. The novelty of this study lies in three aspects. First, it applied a higher-order construct (HOC) PLS-SEM approach, allowing transformational leadership, knowledge, and patient safety culture to be modeled as multidimensional reflective constructs. Second, it explicitly examined the mediating role of organizational commitment in the context of a resource-limited regional public hospital, which remains underexplored. Third, it incorporated Importance–Performance Map Analysis (IPMA) to provide more precise managerial implications regarding indicators requiring intervention. This article is organized as follows: the second section presents the literature review and hypothesis development, the third section describes the research methodology, the fourth section presents the results, the fifth section discusses the findings within the theoretical framework, and the sixth section presents the conclusions and managerial implications.

The contribution of this research lies in three main aspects. Theoretically, this study extends the application of Transformational Leadership Theory, Social Exchange Theory, and the Three-Component Model of Organizational Commitment within the context of a resource-limited regional public hospital by providing empirical evidence regarding the mediating role of organizational commitment. Methodologically, the application of higher-order construct PLS-SEM and IPMA provides a more comprehensive analytical approach than previous studies in similar contexts. Practically, the findings provide evidence-based recommendations for hospital management, particularly regarding the prioritization of affective commitment as an intervention focus. The benefits of this research include providing empirical evidence for hospital policymakers, contributing to the development of patient safety science, and serving as a reference for future studies on patient safety culture in Indonesian hospitals.

Theoretical Foundation

This study builds on the integration of five main theoretical frameworks. First, Transformational Leadership Theory (Bass & Avolio, 1995), which explains transformational leadership through five components, namely idealized influence-attributed, idealized influence-behaviors, inspirational motivation, intellectual stimulation, and individualized consideration, which collectively build subordinates' psychological attachment to the leader and organization. Second, the AHRQ Safety Culture Framework (Sorra et al., 2021), which conceptualizes patient safety culture as a multidimensional construct reflected in teamwork, management support, organizational learning, communication openness, and non-punitive response to error. Third, the Three-Component Model of Organizational Commitment (Meyer & Allen, 1991), which distinguishes organizational commitment into three dimensions, namely affective commitment (emotional attachment), continuance commitment (consideration of the cost of leaving), and normative commitment (moral obligation to remain). Fourth, Social Exchange Theory (Blau, 1964), which explains that staff attachment to the organization grows through a reciprocal mechanism in response to the support they receive from their leader. Fifth,

the Theory of Planned Behavior (Ajzen, 1991), which positions knowledge as an important cognitive antecedent that shapes attitudes, intentions, and ultimately safe behavior.

Theoretically, patient safety culture is not formed by a single factor but is the result of the simultaneous interaction of various determinants. Transformational leadership provides direction and a safety climate, knowledge forms the basis of safe-behavior competence, while organizational commitment strengthens employees' attachment to safety goals (Demeke et al., 2025; Lotfi et al., 2018). Accordingly, these three variables are hypothesized to simultaneously affect patient safety culture (H1).

Hypotheses Development

H1: Transformational leadership, knowledge, and organizational commitment simultaneously have a positive and significant effect on patient safety culture.

The three exogenous and intervening variables in this research model are hypothesized to work simultaneously, rather than partially, in shaping patient safety culture. Transformational leadership provides direction and role-modeling for safe behavior, knowledge equips staff with the technical competence to prevent error, while organizational commitment bridges the two into consistent collective action. The integration of Transformational Leadership Theory (Bass & Avolio, 1995), the Three-Component Model of Organizational Commitment (Meyer & Allen, 1991), and the AHRQ Safety Culture Framework (Sorra et al., 2021) jointly underlies the hypothesis that these three variables simultaneously explain a significant proportion of the variance in patient safety culture.

H2: Transformational leadership has a positive and significant effect on organizational commitment.

Transformational leadership fosters staff emotional attachment and loyalty by building a shared vision and providing personal attention, as explained by Bass and Avolio (1995). Leaders who inspire and empower tend to increase subordinates' affective and normative commitment (Lotfi et al., 2018). This relationship can be explained through Social Exchange Theory (Blau, 1964), in which the attention and support provided by a transformational leader is perceived as a form of social exchange that subordinates reciprocate through increased affective attachment to the organization. Accordingly, the stronger the transformational leadership perceived by staff, the higher the organizational commitment formed.

H3: Knowledge has a positive and significant effect on organizational commitment.

Adequate knowledge of patient safety can increase professional responsibility and attachment to organizational goals. Healthcare workers who understand the importance of patient safety tend to feel more morally bound to support organizational efforts toward safe care (Phuong & Hoang, 2022). This relationship is consistent with the Theory of Planned Behavior (Ajzen, 1991), in which knowledge is a cognitive antecedent of attitude that subsequently shapes behavioral intention and commitment, and is also consistent with the normative commitment dimension of the Three-Component Model (Meyer & Allen, 1991), in which adequate competence strengthens staff's sense of moral obligation toward the organization.

H4: Transformational leadership has a positive and significant effect on patient safety culture.

In addition to working through organizational commitment, transformational leadership is also hypothesized to directly affect patient safety culture. The AHRQ Safety Culture Framework (Sorra et al., 2021) establishes management support as one of the ten core

dimensions of patient safety culture, so that role-modeling and active leader involvement in safety programs, such as patient safety walk-rounds and post-incident debriefing, are hypothesized to directly strengthen the climate of open reporting and organizational learning, independent of their role in shaping staff commitment.

H5: Knowledge has a positive and significant effect on patient safety culture.

Adequate knowledge of the six national patient safety goals enables healthcare workers to identify risks earlier, prevent errors before they reach the patient, and respond to incidents appropriately (Phuong & Hoang, 2022; Bayna et al., 2023). Based on the Theory of Planned Behavior (Ajzen, 1991), knowledge affects behavior both directly and indirectly through attitude and behavioral intention, so knowledge is hypothesized to still exert a direct effect on patient safety culture, although part of its effect is expected to be channeled through organizational commitment.

H6: Organizational commitment has a positive and significant effect on patient safety culture.

Healthcare workers with high organizational commitment tend to be more consistent in applying safety standards, more active in reporting incidents, and more responsive to policy changes (Öztürkçi & Filiz, 2023). The Three-Component Model of Organizational Commitment (Meyer & Allen, 1991) explains that affective, continuance, and normative attachment jointly encourage staff willingness to go beyond formal obligations (extra-role behavior), including in the context of incident reporting and adherence to safety protocols, so organizational commitment is hypothesized to have a direct positive effect on patient safety culture.

H7: Organizational commitment mediates the effect of transformational leadership on patient safety culture.

As synthesized from Social Exchange Theory (Blau, 1964) and Transformational Leadership Theory (Bass & Avolio, 1995), the effect of transformational leadership on patient safety culture is hypothesized not to be entirely direct, but partly channeled through the strengthening of organizational commitment. Effective leadership first builds staff trust and emotional attachment, which is subsequently manifested in collective safe behavior, so organizational commitment is hypothesized to play a significant linking role on this pathway.

H8: Organizational commitment mediates the effect of knowledge on patient safety culture.

Consistent with the Theory of Planned Behavior (Ajzen, 1991) and the Three-Component Model (Meyer & Allen, 1991), the effect of knowledge on patient safety culture is hypothesized to work largely indirectly, that is, knowledge first strengthens staff's normative and affective attachment to the organization, which then drives the collective realization of safe behavior. Accordingly, organizational commitment is hypothesized to significantly mediate the effect of knowledge on patient safety culture.

Conceptual Model

This hypothesized framework is visualized in Figure 1, which depicts the conceptual research model with transformational leadership (X1) and knowledge (X2) as exogenous variables, organizational commitment (Z) as the intervening variable, and patient safety culture (Y) as the main endogenous variable.

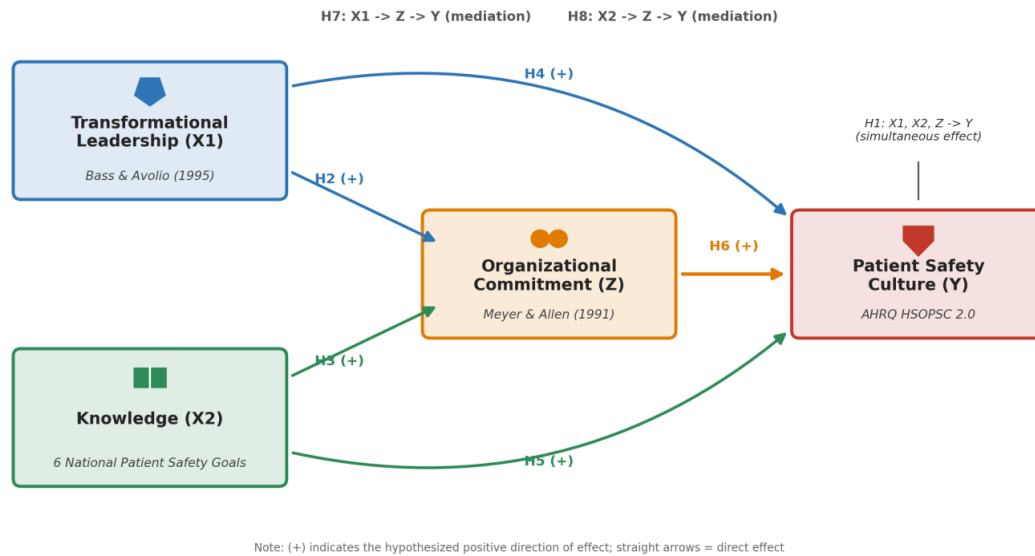


Figure 1. Research Conceptual Model

METHOD

This study employed a quantitative approach with a cross-sectional design, in which all variables were measured at a single point in time among the respondents (Sugiyono, 2019). This design was selected to efficiently measure all research constructs within the data collection period, although its cross-sectional nature limited the ability to establish definitive causal relationships. Therefore, the relationships examined in this study were interpreted as predictive associations based on the tested structural model.

The study population consisted of all healthcare workers who actively worked and had direct interactions with patients at RSUD Teluk Pucung, Bekasi City. The population included general practitioners, medical specialists, nurses, midwives, pharmacists, pharmaceutical technicians, health analysts, radiographers, nutritionists, physiotherapists, and other functional healthcare workers, totaling 148 individuals based on personnel records as of January 2026. The study used total sampling, in which all members of the population were included as respondents. After excluding incomplete or inconsistent responses during data cleaning, 147 valid respondents were included in the analysis. This sample size was considered adequate for PLS-SEM analysis based on the structural paths examined in the research model (Hair et al., 2022).

Primary data were collected using an electronic questionnaire distributed through Google Forms to all respondents. The data collection process involved explaining the research objectives and confidentiality procedures through an informed consent form before respondents completed the questionnaire independently. The questionnaire consisted of demographic information and measurement items for the four research variables, as presented in Table 1. Transformational leadership, organizational commitment, and patient safety culture were measured using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The knowledge variable was assessed using an objective multiple-choice test with four answer options covering six national patient safety goal domains, with scores calculated based on the percentage of correct responses.

Table 1. Operational Variables and Research Instrument

No	Variable	Dimension	Number of Items	Source
1	Transformational Leadership (X1)	Idealized Influence-Attributed, Idealized Influence-Behaviors, Inspirational Motivation, Intellectual Stimulation, Individualized Consideration	20	Bass & Avolio (1995)
2	Knowledge (X2)	Six National Patient Safety Goals	6 indicator scores	Kemenkes RI (2017)
3	Organizational Commitment (Z)	Affective Commitment, Continuance Commitment, Normative Commitment	16	Meyer & Allen (1991)
4	Patient Safety Culture (Y)	10 HSOPSC 2.0 dimensions	34	Sorra et al. (2021)

Source: Processed data (2026)

All reflective instruments were tested for feasibility through a pilot study involving 30 healthcare workers at another hospital with comparable characteristics, separate from the preliminary survey ($n = 35$) conducted during the initial identification of the research phenomenon. Validity was assessed using item-total correlation, with items considered valid when the calculated r -value exceeded the r -table value of 0.361 ($n = 30$, significance level of 5%). Reliability was evaluated using Cronbach's Alpha with a threshold of 0.70. The pilot study results indicated that all instruments were reliable, with Cronbach's Alpha values ranging from 0.867 to 0.954. Items that did not meet the validity criteria were removed before the final instruments were used for the main data collection.

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with a higher-order construct (HOC) approach through SmartPLS 4 (Ringle et al., 2022), following established PLS-SEM reporting guidelines (Hair et al., 2019; Sarstedt et al., 2024). The HOC approach was applied because transformational leadership, knowledge, and patient safety culture are multidimensional constructs that require hierarchical modeling through lower-order constructs (LOCs) and higher-order constructs (HOCs).

Model evaluation was conducted in two stages. The first stage involved measurement model (outer model) assessment, including indicator reliability through loading factors (threshold ≥ 0.708), internal consistency reliability through Composite Reliability and Cronbach's Alpha (threshold ≥ 0.70), convergent validity through Average Variance Extracted (AVE; threshold ≥ 0.50), and discriminant validity using the Fornell–Larcker criterion (1981) and Heterotrait–Monotrait Ratio (HTMT) (Henseler et al., 2015) with a threshold of < 0.90 . Common method bias was also assessed using the full collinearity test based on the Variance Inflation Factor (VIF), following the procedure recommended by Podsakoff et al. (2003).

The second stage involved structural model (inner model) assessment, including the evaluation of the coefficient of determination (R^2), predictive relevance (Q^2) using the blindfolding procedure (Shmueli et al., 2019), and the Standardized Root Mean Square Residual (SRMR). The analysis also included multicollinearity testing among exogenous variables using Inner VIF values, hypothesis testing through bootstrapping with 5,000 subsamples (Streukens & Leroi-Werelds, 2016) at a 5% significance level ($p < 0.05$), and mediation analysis using Variance Accounted For (VAF) following Hair et al. (2022). Mediation was categorized as no mediation ($VAF < 20\%$), partial mediation ($20\% \leq VAF \leq$

80%), or full mediation ($VAF > 80\%$). Furthermore, Importance–Performance Map Analysis (IPMA) was conducted to identify managerial intervention priorities based on the relationship between indicator importance (total effects) and actual performance.

RESULTS AND DISCUSSION

Respondent Profile and Descriptive Statistics

This section presents the results of the analysis of data collected from 147 healthcare-worker respondents at RSUD Teluk Pucung, covering the respondent profile, measurement model (outer model) evaluation, structural model (inner model) evaluation, hypothesis testing, and further Importance-Performance Map Analysis (IPMA).

Table 2. Respondent Profile

<i>Characteristic</i>	<i>Category</i>	<i>n</i>	<i>%</i>
Gender	Male	49	33.3
	Female	98	66.7
Age	<= 25 years	23	15.6
	26-35 years	73	49.7
	36-45 years	38	25.9
	> 45 years	13	8.8
Highest Education	D-III Health	59	40.1
	D-IV/Bachelor's Health	38	25.9
	Master's/Professional/Specialist	17	11.6
	Other	33	22.4
Profession/Position	Nurse	44	29.9
	Midwife	31	21.1
	General Practitioner	8	5.4
	Pharmacist/Pharm. Tech	13	8.8
	Analyst/Radiographer/Physio/Nutritionist	17	11.6
	Other	34	23.1
Tenure	6 months-1 year	22	15.0
	> 1-3 years	43	29.3
	> 3-5 years	76	51.7
	> 5-10 years	6	4.1
Employment Status	PNS/ASN	19	12.9
	PPPK	71	48.3
	Contract/Honorary	57	38.8
Work Unit	Inpatient	16	10.9
	Outpatient	5	3.4
	IGD/ICU/HCU	33	22.4
	OR/Obstetrics	22	15.0
	Medical Support	32	21.8
	Other	39	26.5
Patient Safety Training History	Never	65	44.2
	> 1 year ago	56	38.1
	Within the last year	26	17.7

Source: Processed data (2026)

Table 2 shows that the majority of respondents were female (66.7%), aged 26-35 years (49.7%), held a D-III health diploma (40.1%), worked as nurses (29.9%), had 3-5 years of tenure (51.7%), and held PPPK (48.3%) or contract/honorary (38.8%) employment status. The proportion of non-civil-servant staff, reaching 87.1% of total respondents, is an important note given that employment status may affect the stability of continuance commitment among healthcare workers. As many as 44.2% of respondents had never attended any patient safety training at all, while only 17.7% had attended training within the past year.

Descriptive analysis of respondents' response scores using the Three Box Method (Ferdinand, 2014) showed that the transformational leadership variable obtained an overall mean index of 114.76 (high category), with the idealized influence-attributed dimension the highest (116.90) and the inspirational motivation dimension the lowest (113.65). The knowledge variable obtained an overall mean percentage of correct answers of 81.3% (good category), with the highest achievement on the surgical safety dimension (88.3%) and the lowest on the fall-risk-reduction dimension (70.6%). The organizational commitment variable obtained an overall mean index of 111.76 (high category), although the continuance commitment dimension was the sole dimension in the moderate category (101.04), well below the affective commitment dimension, which was the highest (117.20). The patient safety culture variable obtained an overall mean index of 108.99 (high category), although five of its ten dimensions, namely management support, overall perceptions of safety, non-punitive response to error, staffing adequacy, and handoff and transitions, remained in the moderate category, with the teamwork dimension the highest (122.00) and the staffing dimension the lowest (99.20)

Measurement Model Evaluation (Outer Model)

Testing of the HOC outer model was conducted through four sequential evaluation stages, namely assessment of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, as summarized in Table 4.

Table 4. HOC Outer Model Test Results (Indicator's Reliability, Internal Consistency, Convergent Validity)

No	Construct	Dimension (HOC Indicator)	LF	AVE	CR	CA
1	X1	X1.1 Idealized Influence-Attributed	0.904	0.794	0.951	0.935
		X1.2 Idealized Influence-Behaviors	0.885			
		X1.3 Inspirational Motivation	0.875			
		X1.4 Intellectual Stimulation	0.904			
		X1.5 Individualized Consideration	0.888			
2	X2	X2.1 Accurate Patient Identification	0.808	0.665	0.922	0.899
		X2.2 Effective Communication (SBAR & TBAK)	0.824			
		X2.3 High-Alert Medication Safety	0.841			
		X2.4 Surgical Safety	0.814			
		X2.5 Infection Prevention and Control	0.796			
		X2.6 Fall Risk Reduction	0.809			
3	Y	Y.1 Teamwork within Units	0.877	0.709	0.960	0.952
		Y.2 Management Support	0.902			
		Y.3 Overall Perceptions of Safety	0.872			
		Y.4 Frequency of Event Reporting	0.535			

No	Construct	Dimension (HOC Indicator)	LF	AVE	CR	CA
		Y.5 Communication Openness	0.886			
		Y.6 Feedback & Communication about Error	0.866			
		Y.7 Just Culture	0.872			
		Y.8 Organizational Learning	0.845			
		Y.9 Staffing	0.844			
		Y.10 Handoff & Transitions	0.858			
4	Z	Z.1 Affective Commitment	0.899	0.839	0.940	0.904
		Z.2 Continuance Commitment	0.923			
		Z.3 Normative Commitment	0.925			

Note: LF = loading factor of the dimension LV score onto the HOC construct; AVE, CR, and CA are reported on the first row of each construct as they are constant across its constituent dimensions.

Source: Processed data (2026)

The results show that all indicators (dimension-level latent variable scores) had loading factors above 0.708, except LV Score Y.4 (Frequency of Event Reporting), which was 0.535. This value still falls within an acceptable range, and because the overall reliability of construct Y remained very good (CR=0.960; AVE=0.709) with or without this indicator, and given that incident reporting frequency is one of the ten official AHRQ framework dimensions that is conceptually important to retain, this indicator was retained in the model. All constructs had Composite Reliability values between 0.922 and 0.960 and Cronbach's Alpha values between 0.899 and 0.952, well above the 0.70 threshold, indicating very good internal consistency for all constructs. The AVE values of the four constructs ranged from 0.665 (Knowledge) to 0.839 (Organizational Commitment), all above the 0.50 threshold, so the convergent validity of the HOC model was confirmed.

Table 5. Discriminant Validity (Fornell-Larcker and HTMT)

Construct	<i>sqrt(AVE)</i>	Correlation Range	HTMT Range
X1	0.891	0.074 - 0.504	0.094 - 0.543
X2	0.815	0.074 - 0.590	0.094 - 0.647
Y	0.842	0.452 - 0.662	0.481 - 0.709
Z	0.916	0.504 - 0.662	0.543 - 0.709

Source: Processed data (2026)

Table 5 shows that the square root of AVE for each construct (0.815 to 0.916) exceeds its highest correlation with any other construct (0.074 to 0.662), satisfying the Fornell-Larcker (1981) criterion. Inter-construct HTMT values ranged from 0.094 to 0.709, all below the 0.90 threshold recommended by Henseler et al. (2015), with the highest value for the Patient Safety Culture and Organizational Commitment construct pair. All constructs in the HOC model therefore satisfy discriminant validity requirements under both criteria

Table 6. Common Method Bias (Full Collinearity VIF)

No	Path	VIF Value	Cut-off	Conclusion
1	X1 -> Y	*)	< 5,00	Pending from SmartPLS collinearity output

No	Path	VIF Value	Cut-off	Conclusion
2	X1 -> Z	*)	< 5,00	Pending from SmartPLS collinearity output
3	X2 -> Y	*)	< 5,00	Pending from SmartPLS collinearity output
4	X2 -> Z	*)	< 5,00	Pending from SmartPLS collinearity output
5	Z -> Y	*)	< 5,00	Pending from SmartPLS collinearity output

Note: (*) values not yet available in the SmartPLS output received at manuscript preparation; column to be completed from the Collinearity Statistics (VIF) menu before submission. Source: Processed data (2026)

Testing for potential common method bias via full collinearity VIF, as recommended by Podsakoff et al. (2003), could not be fully reported in this manuscript because these values were not yet available in the SmartPLS output received at the time of manuscript preparation. As a preliminary indication, the AVE and discriminant validity results already met for all constructs are generally associated with low collinearity, though confirmation of actual VIF values is still required before this manuscript is finalized for submission.

Structural Model Evaluation and Hypothesis Testing (Inner Model)

Structural model (inner model) evaluation began with an assessment of goodness of fit through three parameters, namely R2, Q2, and SRMR, as presented in Table 6.

Table 7. Structural Model Goodness of Fit

Parameter	Value	Criterion	Conclusion
R2 (Z)	0.561	0.33-0.67 = moderate	Moderate
R2 (Y)	0.489	0.33-0.67 = moderate	Moderate
Q2 (Z)	0.461	> 0	Good predictive relevance
Q2 (Y)	0.335	> 0	Good predictive relevance
SRMR	0.050	< 0.08	Good model fit

Source: Processed data (2026)

The R2 value for the Organizational Commitment variable was 0.561 and for the Patient Safety Culture variable was 0.489, both falling into the moderate category per Hair et al.'s (2022) criteria. The Q2 values for both endogenous variables were positive (0.461 and 0.335), indicating that the structural model has good predictive relevance for the research data (Shmueli et al., 2019). The SRMR value of 0.050 was well below the 0.08 threshold, indicating that the structural model overall has good fit with the empirical data from the 147 study respondents.

Hypothesis testing was conducted through a bootstrapping procedure with 5,000 subsamples at a 5% significance level. The results of direct and indirect effect testing, along with a recap of the results for all hypotheses, are presented in Table 7.

Table 8. Inner Model and Hypothesis Testing Results

Hyp.	Path (Direct/Indirect)	Path Coeff.	p-value	VAF	Result
H1	X1, X2, Z -> Y (simultaneous)	R2=0.489	F=47.53>2.67	-	Supported
H2	X1 -> Z (direct)	0.463	0.000	-	Supported
H3	X2 -> Z (direct)	0.556	0.000	-	Supported
H4	X1 -> Y (direct)	0.257	0.000	-	Supported
H5	X2 -> Y (direct)	0.182	0.009	-	Supported

Hyp.	Path (Direct/Indirect)	Path Coeff.	p-value	VAF	Result
H6	Z -> Y (direct)	0.426	0.000	-	Supported
H7	X1 -> Z -> Y (indirect)	0.197	0.000	43.4%	Partial mediation
H8	X2 -> Z -> Y (indirect)	0.237	0.000	56.6%	Partial mediation

Source: Processed data (2026), 5,000-subsample bootstrapping procedure

The results show that all eight research hypotheses were supported by the data. The simultaneous test (H1) showed an F-value of 47.53, far exceeding the F-table value of 2.67 at $df_1=3$ and $df_2=149$, so transformational leadership, knowledge, and organizational commitment jointly have a significant effect on patient safety culture. On the direct pathway to organizational commitment, knowledge (H3: coefficient 0.556) had a larger effect than transformational leadership (H2: coefficient 0.463). Conversely, on the direct pathway to patient safety culture, transformational leadership (H4: coefficient 0.257) had a larger effect than knowledge (H5: coefficient 0.182), while organizational commitment (H6: coefficient 0.426) showed the second-largest direct effect in the overall model. Both mediation pathways (H7 and H8) were significant with a partial mediation classification, with mediation proportions (VAF) of 43.4% for the transformational leadership pathway and 56.6% for the knowledge pathway, indicating that more than half of the effect of knowledge on patient safety culture is channeled through the strengthening of organizational commitment.

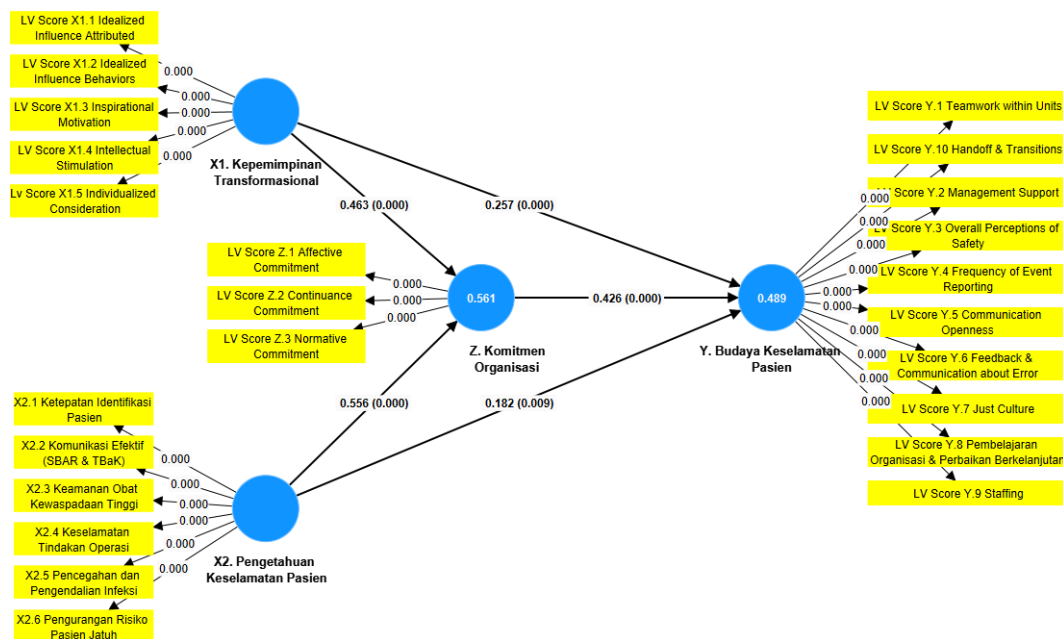


Figure 2. HOC Model Estimation (Bootstrapped Path Coefficients)

Importance-Performance Map Analysis (IPMA)

As a further analysis, this study conducted an Importance-Performance Map Analysis (IPMA) to map the contribution of each indicator more precisely, by combining the importance value (total effect) and the actual performance value, so that indicators requiring priority for managerial intervention could be identified.

The IPMA analysis with Organizational Commitment as the target involved eleven indicators from the two exogenous constructs, with the quadrant cut point at an importance of

0.105 and a performance of 49.743, as visualized in Figure 3. All Knowledge dimension indicators (X2_1 through X2_6, except X2_5) fell into the upper-right quadrant (high importance, high performance), so this condition needs to be consistently maintained by management. All Transformational Leadership dimension indicators (X1.1 through X1.3) along with X2_5 (Infection Prevention and Control) fell into the lower-left quadrant (low importance, low performance), while X1.4 and X1.5 fell into the upper-left quadrant (low importance, high performance/possible overkill). No indicators were found in the lower-right quadrant (high importance, low performance/high priority), indicating that overall there is no indicator forming Organizational Commitment with critically low performance despite high importance, a relatively positive condition for RSUD Teluk Pucung, Bekasi City.

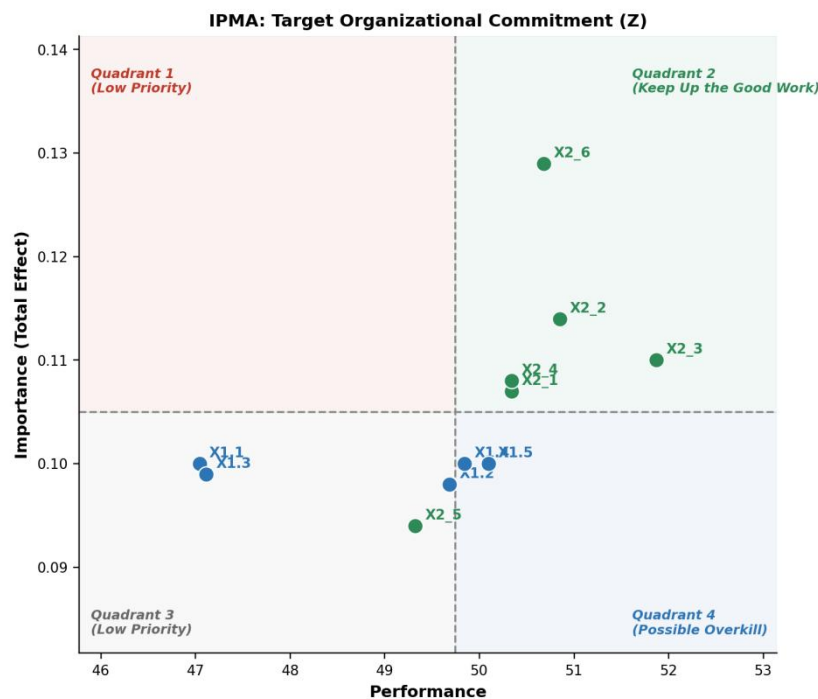


Figure 3. IPMA Map - Target Organizational Commitment (Z)

The IPMA analysis with Patient Safety Culture as the target involved fourteen indicators from three constructs, with the quadrant cut point at an importance of 0.111 and a performance of 50.114, as visualized in Figure 4. The most notable finding is the position of indicator Z.1 (Affective Commitment) in the lower-right quadrant (high priority), with the highest importance level among all indicators yet an actual performance (49.917) slightly below the cut point. In contrast, Z.2 (Continuance Commitment) and Z.3 (Normative Commitment) fell into the upper-right quadrant (keep up the good work), indicating already-optimal importance and performance levels. All Transformational Leadership dimension indicators along with X2_5 fell into the lower-left quadrant (low priority), while the remaining Knowledge dimension indicators (X2_1, X2_2, X2_3, X2_4, X2_6) fell into the upper-left quadrant (possible overkill), showing already-high performance but relatively small contribution to Patient Safety Culture compared to Organizational Commitment.

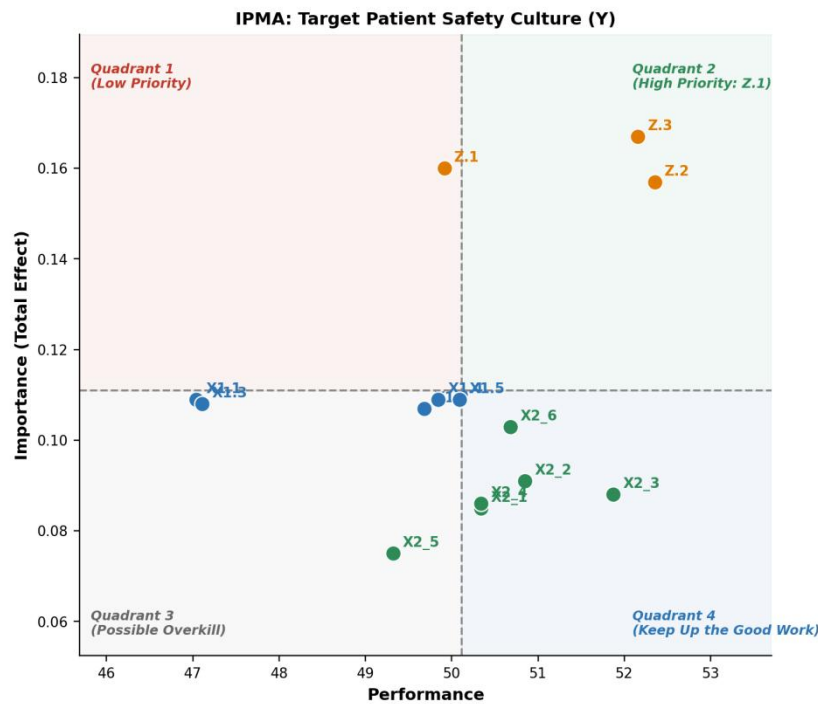


Figure 4. IPMA Map - Target Patient Safety Culture (Y)

Table 9. Importance-Performance Map Analysis (IPMA) Results

No	Endogenous Target Construct	HP [High Priority]	KU [Keep Up]	LP [Low Priority]	PV [Possible Overkill]	Strategy
1	Z. Organizational Commitment	None	X2_1, X2_2, X2_3, X2_4, X2_6	X1.1, X1.2, X1.3, X2_5	X1.4, X1.5	Sustain Knowledge dimension performance; gradually improve X1.1-X1.3 performance
2	Y. Patient Safety Culture	Z.1 (Affective Commitment)	Z.2, Z.3	X1.1, X1.2, X1.3, X1.4, X1.5, X2_5	X2_1, X2_2, X2_3, X2_4, X2_6	Prioritize strengthening Affective Commitment; sustain Z.2 & Z.3

Source: Processed data (2026)

Overall, the IPMA results confirm that the Knowledge dimension is the primary priority area for building Organizational Commitment, while Affective Commitment is the indicator with the highest intervention priority for directly strengthening Patient Safety Culture. These findings complement the hypothesis-testing results by providing more precise, data-driven direction for managerial intervention.

This section discusses the eight hypothesis findings in relation to the theoretical framework and prior research, organized sequentially from the most fundamental finding (the simultaneous effect) to the specific findings on each pathway.

The simultaneous test (H1) shows that transformational leadership, knowledge, and organizational commitment jointly explain 48.9% of the variance in patient safety culture, a substantial proportion for research in the field of organizational behavior (Hair et al., 2022; Hilmy et al., 2025). This finding confirms that patient safety culture at RSUD Teluk Pucung

cannot be built through a single intervention alone, but requires a combination of strengthened transformational leadership, increased knowledge, and strengthened organizational commitment simultaneously and complementarily. The significance of this simultaneous effect also provides a strong statistical basis for interpreting the subsequent partial hypotheses, as it demonstrates that the overall structural model built is valid for explaining the mechanism of patient safety culture formation in the context of a regional public hospital.

Transformational leadership was found to have a positive and significant effect on organizational commitment (H2: coefficient 0.463; $p=0.000$). This finding is consistent with Transformational Leadership Theory (Bass & Avolio, 1995), which explains that the five components of transformational leadership collectively build subordinates' psychological attachment to the leader and organization, and is also consistent with Social Exchange Theory (Blau, 1964), which explains that organizational commitment grows from a reciprocal mechanism, whereby staff who receive attention and role-modeling from their leader reciprocate with greater attachment. This finding reinforces the results of Lotfi et al. (2018), who showed that ethical leadership positively affects nurses' organizational commitment, and aligns with Tangatarova and Gao (2021) on the role of transformational leadership in shaping healthcare workers' safety behavior. Managerially, this finding implies the need to prioritize the development of transformational leadership capacity at the level of head nurses, unit heads, and nursing managers through structured, ongoing training programs.

Knowledge proved to be the most dominant determinant of organizational commitment (H3: coefficient 0.556; $p=0.000$), exceeding the effect of transformational leadership. This finding is consistent with the Theory of Planned Behavior (Ajzen, 1991), which positions knowledge as an important antecedent of attitude that subsequently shapes behavioral intention and commitment, and is also consistent with the normative commitment dimension of the Three-Component Model (Meyer & Allen, 1991). This finding reinforces the results of Phuong and Hoang (2022) and Makiah et al. (2023), who consistently position knowledge as an important cognitive factor for staff attachment to the organization. Managerially, this finding implies that RSUD Teluk Pucung management should make knowledge-enhancement programs a top priority, given their larger contribution to organizational commitment formation compared to transformational leadership, for example through continuing education on the six national patient safety goals based on periodic evaluation using objective test instruments.

On the direct pathway to patient safety culture, transformational leadership (H4: coefficient 0.257; $p=0.000$) had a larger effect than knowledge (H5: coefficient 0.182; $p=0.009$). The H4 finding is consistent with the AHRQ Safety Culture Framework (Sorra et al., 2021), which establishes management support as one of the ten core dimensions of patient safety culture, and is also consistent with Demeke et al. (2025) and Tangatarova and Gao (2021). Meanwhile, the relatively small H5 path coefficient indicates that the effect of knowledge on patient safety culture works largely indirectly through organizational commitment, consistent with the Theory of Planned Behavior (Ajzen, 1991), which explains that knowledge affects behavior mainly through attitude and intention. Managerially, both findings imply that management needs to ensure that leaders at every level are actively involved as role models for safe behavior daily, while not relying solely on knowledge programs without integrating them with organizational commitment-strengthening strategies.

Organizational commitment was found to have a positive and significant effect on patient safety culture (H6: coefficient 0.426; $p=0.000$), the second-largest direct effect in the overall model. This finding is consistent with the Three-Component Model (Meyer & Allen, 1991) and the AHRQ Safety Culture Framework (Sorra et al., 2021; Hilmy et al., 2026), and reinforces the results of Öztürkçi and Filiz (2023) and Lotfi et al. (2018), who consistently show a link between organizational commitment and perceived safety culture among nursing staff. This finding confirms the central role of organizational commitment, not only as a mediating variable as tested in H7 and H8, but also as a strong direct determinant of patient safety culture, so management should make strengthening organizational commitment, for example through reward programs for units that actively report incidents without fear of blame, one of its main strategies.

Mediation testing confirmed that organizational commitment partially mediates the effect of transformational leadership (H7: indirect coefficient 0.197; VAF 43.4%) and knowledge (H8: indirect coefficient 0.237; VAF 56.6%) on patient safety culture. Both partial mediation findings address gaps in the research of Demeke et al. (2025), Tangatarova and Gao (2021), and Makiah et al. (2023), who had not explicitly tested the mediating role of organizational commitment. The larger mediation proportion on the knowledge pathway (H8) compared to the leadership pathway (H7) indicates that more than half of the benefit of knowledge-enhancement programs for patient safety culture will only be fully realized when accompanied by strengthened organizational commitment, for example through case-based learning approaches and participatory, reflective, values-based training, rather than merely one-way technical knowledge transfer.

The Importance-Performance Map Analysis findings enrich the interpretation of the hypothesis-testing results by providing more precise intervention direction. The position of all Knowledge dimension indicators in the keep-up-the-good-work quadrant for the Organizational Commitment target, combined with the position of Affective Commitment in the high-priority quadrant for the Patient Safety Culture target, consistently directs RSUD Teluk Pucung management to prioritize strengthening staff emotional attachment as the next strategic step, once the already-relatively-good knowledge capacity is sustained. Conversely, the fact that all Transformational Leadership dimensions fall into the low-priority quadrant in both IPMA analyses does not mean they can be ignored, but rather indicates that investment in their development is long-term and foundational relative to the more urgent intervention needs on other dimensions.

Overall, the findings of this study reinforce the relevance of Transformational Leadership Theory, Social Exchange Theory, and the Three-Component Model of Organizational Commitment in explaining the mechanism of patient safety culture formation in the context of a resource-limited regional public hospital, while extending the literature with empirical evidence on the partial mediating role of organizational commitment, which has not been widely tested explicitly in similar contexts.

CONCLUSION

This study demonstrated that transformational leadership and knowledge had positive and significant effects on patient safety culture at RSUD Teluk Pucung, Bekasi City, both directly and indirectly through organizational commitment as a partial mediator. The research

model explained 48.9% of the variance in patient safety culture. Knowledge was the strongest determinant of organizational commitment, while transformational leadership showed the largest direct effect on patient safety culture. Furthermore, IPMA identified affective commitment as the indicator with the highest intervention priority. Theoretically, these findings reinforced the relevance of Transformational Leadership Theory, Social Exchange Theory, and the Three-Component Model of Organizational Commitment in the context of a regional public hospital while extending understanding of the mediation mechanism, which has rarely been explicitly examined in similar settings. Practically, the management of RSUD Teluk Pucung, Bekasi City, should integrate patient safety education programs with efforts to strengthen staff affective commitment while maintaining the quality of transformational leadership at all managerial levels to establish a strong and sustainable patient safety culture.

This study had several limitations that should be considered in future research. First, the cross-sectional design limited the ability to establish definitive causal relationships; therefore, longitudinal studies are recommended to confirm the direction of relationships among variables. Second, Inner VIF values were not fully reported in this manuscript; therefore, further analysis is needed to confirm the absence of multicollinearity issues. Third, this study was conducted at a single regional public hospital, limiting the generalizability of the findings to hospitals with different characteristics. Future studies are encouraged to expand the sample to multiple regional public hospitals with comparable characteristics. Fourth, future research may incorporate moderating variables, such as tenure or professional category, to examine whether the strength of relationships among variables differs across respondent groups. Further studies may also explore additional organizational psychological factors beyond organizational commitment, such as work engagement and organizational trust, to provide a more comprehensive understanding of the determinants of patient safety culture.

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