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The Effect of Effort-Reward Imbalance and Transformational Leadership Style on The Implementation of Six Patient Safety Goals with Work Motivation as an Intervening Variable in Hospitals

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effort–reward imbalance; transformational leadership; work motivation; patient safety; SEM-PLS

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Abstract

Patient safety is a key indicator of hospital healthcare quality; however, implementing the Six International Patient Safety Goals (IPSG) remains challenging due to workforce-related factors. Preliminary findings indicated that 69.75% of healthcare workers perceived an imbalance between their efforts and rewards, 58.9% reported decreased work motivation, 54.82% perceived inadequate leadership support, and 36.7% reported noncompliance with patient safety standard operating procedures (SOPs). This study aimed to examine the relationships between effort–reward imbalance (ERI), transformational leadership, and the implementation of the six patient safety goals, with work motivation as a mediating variable. A quantitative cross-sectional study was conducted at a Type B private hospital in Banten Province, Indonesia, from September to October 2025. A total of 180 nurses were recruited through purposive sampling. Data were collected using a five-point Likert-scale questionnaire and analyzed using partial least squares structural equation modeling (PLS-SEM). The results indicated that ERI, transformational leadership, and work motivation collectively explained 64.5% of the variance in patient safety goal implementation ($R^2 = 0.645$; $F = 109.14$). ERI was significantly associated with work motivation ($\beta = 0.580$) and patient safety implementation ($\beta = 0.197$). Transformational leadership was significantly associated with work motivation ($\beta = 0.226$) and patient safety implementation ($\beta = 0.282$), while work motivation demonstrated the strongest direct association with patient safety implementation ($\beta = 0.425$). Work motivation partially mediated the relationships between ERI ($\beta = 0.247$) and transformational leadership ($\beta = 0.096$) and patient safety implementation. These findings highlight the importance of integrating effort–reward management, transformational leadership practices, and employee motivation strategies to strengthen patient safety performance.

INTRODUCTION

Patient safety is a fundamental component of healthcare quality and a central responsibility of hospital management (Alanazi et al., 2024; Anders, 2025; Sarkhosh et al., 2022; Zabin et al., 2025). Complex clinical care pathways, high workloads, and coordination among multiple healthcare professionals increase the risk of medical errors and preventable patient harm. Consequently, preventing avoidable harm requires more than individual vigilance; it demands coordinated organizational systems, adequate resources, effective leadership, and consistent monitoring. A systems-based approach recognizes that patient safety incidents often result from interconnected weaknesses in organizational processes, working conditions, and institutional safeguards rather than isolated individual errors (Reason, 1990; Vincent, 2003).

At the global level, the World Health Organization (WHO) has consistently emphasized patient safety as an international healthcare priority, focusing on reducing unnecessary healthcare-associated harm to the minimum acceptable level (World Health Organization, 2004, 2010, 2019, 2023). In hospital settings, the Six International Patient Safety Goals (IPSG) provide a structured framework for ensuring accurate patient identification, improving effective communication, enhancing the safety of high-alert medications, ensuring correct-site, correct-procedure, and correct-patient surgery, reducing healthcare-associated infections, and preventing patient harm resulting from falls. These goals translate broader patient safety principles into standardized clinical practices that healthcare professionals are expected to implement consistently throughout the care delivery process.

Despite the establishment of formal patient safety standards, their implementation remains inconsistent because compliance is influenced by organizational conditions, psychosocial factors, and professional competencies (Abdi et al., 2023; Nieva & Sorra, 2003). One important organizational factor is effort–reward imbalance (ERI), which occurs when employees perceive that their occupational efforts are not adequately compensated through financial rewards, professional recognition, job security, or career advancement opportunities; a recent meta-analysis estimated that about half of nurses experience such an imbalance (Zhang et al., 2024). According to Siegrist (1996), prolonged exposure to disproportionate effort and insufficient rewards may contribute to occupational stress and adverse psychological outcomes. This theoretical perspective is consistent with the job demand–control model, equity theory, and conservation of resources theory, which emphasize the relationships among occupational demands, perceived fairness, and psychological resources (Adams, 1963; Hobfoll, 1989; Karasek, 1979). In hospital environments, persistent occupational strain may contribute to fatigue, reduced concentration, and difficulties maintaining consistent adherence to patient safety protocols (Liang et al., 2023; Zabin et al., 2023).

Transformational leadership represents another organizational factor potentially associated with patient safety performance. This leadership approach emphasizes idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, which encourage employees to pursue shared organizational objectives and continuously improve professional performance (Bass & Avolio, 1994; Burns, 1978). In healthcare settings, transformational leadership may strengthen communication, promote constructive feedback, enhance employee engagement, and support adherence to established patient safety procedures

(Singh et al., 2024). Hospital leaders also influence the organizational climate by encouraging transparent incident reporting, facilitating collaborative problem-solving, and providing psychological support to healthcare professionals. Research on high-reliability organizations and patient safety highlights the importance of examining leadership practices alongside working conditions to understand how organizational factors contribute to safer healthcare delivery (Weick & Sutcliffe, 2001; Ystaas et al., 2023).

Work motivation may serve as a mediating mechanism linking organizational conditions and leadership practices to patient safety implementation. McClelland's theory of needs identifies achievement, affiliation, and power as fundamental motivational drivers, while Maslow (1943), Herzberg et al. (1959), Vroom (1964), and Deci and Ryan (2000) provide complementary theoretical perspectives on how individual needs, rewards, expectations, and autonomy influence workplace behavior. In nursing practice, work motivation may influence adherence to clinical procedures, willingness to communicate potential risks, and consistency in performing routine patient safety checks. Accordingly, work motivation may explain how perceived effort–reward imbalance and transformational leadership are associated with the implementation of patient safety goals, particularly in demanding clinical environments where nurses rely on organizational support, professional recognition, and effective supervision.

The importance of examining these relationships was reinforced by preliminary observations conducted at the study hospital. The preliminary assessment indicated that 69.75% of healthcare workers perceived an imbalance between workload and received rewards, 58.9% reported decreased work motivation under certain working conditions, 54.82% perceived inadequate leadership support, and 36.7% reported noncompliance with patient safety standard operating procedures (SOPs). Although these descriptive findings did not establish causal relationships, they highlighted potential organizational and behavioral challenges affecting patient safety practices. Furthermore, these observations suggested that the availability of formal patient safety procedures might be insufficient to ensure consistent implementation without adequate attention to psychosocial working conditions, employee motivation, and managerial support.

Previous studies have investigated occupational stress, leadership, work motivation, and patient safety performance; however, limited research has simultaneously examined effort–reward imbalance and transformational leadership in relation to the implementation of all six patient safety goals, with work motivation as a mediating variable, within a single integrated analytical framework. Addressing this research gap, the present study aimed to examine the direct associations of effort–reward imbalance and transformational leadership with the implementation of the six patient safety goals and to assess the mediating role of work motivation among nurses at a Type B private hospital in Banten Province, Indonesia. The study's novelty lies in integrating psychosocial working conditions, transformational leadership, and employee motivation into a unified model of patient safety implementation. The findings are expected to contribute to organizational and healthcare management literature while providing practical insights for improving reward management, leadership development, employee motivation, and patient safety practices. Given the cross-sectional research design, the observed relationships were interpreted as statistical associations rather than definitive causal effects.

THEORETICAL STUDY AND HYPOTHESIS DEVELOPMENT

Implementation of Six Patient Safety Goals

Patient safety is a systematic effort to prevent injuries to patients due to the health service process (World Health Organization, 2009). Its implementation requires compliance with standards, effective communication, cooperation between professions, organizational support, and commitment of health workers. Reason (1990) through *the Swiss Cheese Model* explains that patient safety incidents occur when various weaknesses in the organization's defense system simultaneously allow errors to occur, so that mistakes are not only caused by individuals but also by system weaknesses (Vincent, 2003). In this study, the implementation of six patient safety goals is defined as the level of compliance of health workers in carrying out patient safety goals during the service process, with the dimensions of accuracy of patient identification, increased effective communication (including through SBAR and *read-back methods*), increased drug safety that needs to be watched out, certainty of the right location – the right procedure – the right patient for surgery, the reduction of the risk of infection, and the reduction of the risk of injury due to patient falls.

Effort–Reward Imbalance (ERI)

The ERI model (Siegrist, 1996) states that work stress arises when the effort expended by employees is not proportional to the rewards received, such as salary, recognition, and job security. Imbalance is not only influenced by external factors such as workload and organizational rewards, but also internal factors in the form of *overcommitment*, which is the tendency of individuals to over-engage in work. This concept is in line with *Equity Theory* which explains that the inequity of the input–output ratio triggers dissatisfaction (Adams, 1963) and *the Conservation of Resources Theory* which emphasizes that loss of resources due to high effort and low rewards triggers stress (Hobfoll, 1989). The dimensions of ERI in this study include *effort*, *reward*, and *overcommitment*.

Transformational Leadership Style

Transformational leadership is a leadership style that emphasizes positive change through inspiration, motivation, and the development of subordinate potential. Burns (1978) states that transformational leadership occurs when leaders and followers raise each other's morale and motivation to a higher level. Bass and Avolio (1994) formulated four main dimensions, namely *idealized influence*, *inspirational motivation*, *intellectual stimulation*, and *individualized consideration*, while the *Full Range Leadership Model* placed this style as the most effective style compared to transactional and *laissez-faire styles* (Bass & Avolio, 1997). Other leadership perspectives such as pathway–goal theory (House, 1971) and leader–member exchange (Graen & Uhl-Bien, 1995) also emphasize the importance of leader support for subordinate motivation and performance. Various studies have shown that transformational leadership has a positive effect on job satisfaction, motivation, and performance of health workers (Boamah et al., 2018; Wong et al., 2013).

Work Motivation

Work motivation is an internal and external drive that affects an individual's enthusiasm, intensity, and perseverance in carrying out work (Deci & Ryan, 2000; Herzberg et al., 1959). Work motivation is influenced by intrinsic factors such as achievement and self-development, as well as extrinsic factors such as salary, working conditions, leadership, work environment,

and career opportunities. Previous research has shown that fulfilling the needs of autonomy and competence increases safe work behavior, while work motivation has a significant effect on the performance of health workers and the quality of service. The dimension of work motivation in this study is the need for achievement, affiliation, and power.

A summary of previous research relevant to this research variable is presented in Table 1.

Table 1. Relevant Previous Research

No.	Researcher	Method	Variable	Key Results
1	Boamah et al. (2018)	SEM	Transformational leadership, job satisfaction, patient safety outcomes	Increases job satisfaction and lowers adverse patient outcomes
2	Wong et al. (2013)	Systematic review	Leadership behavior, *patient* outcomes	Transformational leadership reduces *adverse events*

Source: Research data (author verification required).

Hypothesis Development

ERI, transformational leadership, and work motivation together are thought to contribute to patient safety implementation. ERI imbalances increase the risk of *burnout* and clinical errors, transformational leadership improves safety culture and decreases *adverse events* (Wong et al., 2013), while work motivation increases adherence to safety SOPs. **H1:** *Effort-reward imbalance*, transformational leadership style, and work motivation have a simultaneous effect on the implementation of the six patient safety goals.

The imbalance between effort and reward decreases motivation because workers feel underappreciated by the organization. Herzberg et al. (1959) explained that rewards and working conditions are *hygiene* factors that if not met can reduce motivation. Research proves that ERI is related to motivation, satisfaction, and work engagement. **H2:** *Effort–reward imbalance* affects work motivation.

ERIs cause stress, fatigue, and *burnout*, resulting in health workers becoming less focused, prone to making mistakes, and less complying with safety SOPs. High ERIs increase the risk of medical errors and decrease adherence to patient safety procedures, as well as being associated with increased safety incidents. **H3:** *Effort–reward imbalance* affects the implementation of six patient safety goals.

Transformational leaders increase motivation through strong vision, exemplary, support, and individual attention to staff (Bass & Avolio, 1994). This leadership style has been shown to increase motivation, satisfaction, and positive work behavior (Boamah et al., 2018). **H4:** Transformational leadership styles have an effect on work motivation.

Transformational leaders create a safe work environment through effective communication, encouraging incident reporting, fostering safe behaviors, and exemplifying SOP compliance. Transformational leadership has a positive impact on the safety climate and lowers safety incident rates (Hughes, 2008; Wong et al., 2013). **H5:** Transformational leadership styles have an impact on the implementation of six patient safety goals.

Motivated individuals have a high attention to detail, a commitment to working safely, and stronger adherence to patient safety goals. Motivation has a significant effect on safe

behavior and SOP compliance of healthcare workers. **H6:** Work motivation affects the implementation of six patient safety goals.

An imbalance of effort and reward can reduce work motivation which in turn negatively impacts patient safety behavior, while high motivation is a protective factor that encourages compliance despite high work demands (Basu et al., 2017). **H7:** *Effort-reward imbalance* affects the implementation of six patient safety goals through work motivation as an intervening variable.

Transformational leadership can increase work motivation through inspiration, recognition, and emotional support, which further encourages healthcare workers to behave safely and comply with SOPs (Wong et al., 2013). **H8:** Transformational leadership styles affect the implementation of six patient safety goals through work motivation as an intervening variable. The framework of the research concept is presented in Figure 1.

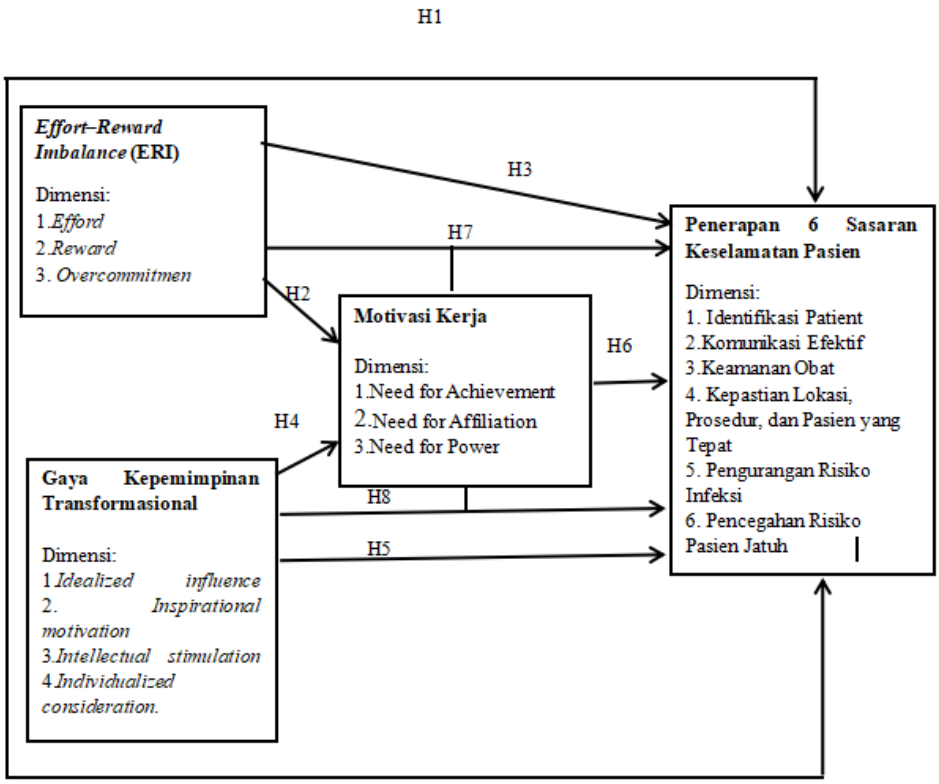


Figure 1. Research Concept Framework

Source: Research documentation (author verification required).

RESEARCH METHODS

This quantitative study employed a cross-sectional design and was conducted from September to October 2025 at a Joint Commission International (JCI)-accredited Type B private hospital in Banten Province, Indonesia, with approximately 175 beds. The study population comprised 220 inpatient and outpatient nurses, from whom 180 participants were selected using purposive sampling. The minimum sample size was estimated at 80 respondents based on a ratio of five respondents per indicator across 16 measurement indicators.

Primary data were collected through an online questionnaire administered using Google Forms. The questionnaire assessed effort–reward imbalance, transformational leadership, work motivation, and implementation of the Six International Patient Safety Goals (IPSG) using a

five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The operational definitions, construct dimensions, and questionnaire items are presented in Table 2. Before the main data collection, the questionnaire was pilot-tested with 30 respondents. Item validity was assessed using corrected item–total correlations in IBM SPSS Statistics version 26, with a reported critical correlation value of 0.361 at a significance level of 0.05. Internal consistency reliability was evaluated using Cronbach's alpha, with a minimum acceptable threshold of 0.70.

Table 2. Operational Definition, Dimensions, and Number of Research Variables

Variable	Operational Definition	Dimensions	Item
Effort–Reward Imbalance (x1)	Healthcare workers' perceptions of the imbalance between workload, demands, and responsibilities with financial rewards, recognition, and job security	*Effort*, *reward*, *overcommitment* (Siegrist, 1996)	30
Transformational Leadership Style (X2)	Healthcare workers' perceptions of leadership behaviors that provide inspiration, motivation, support, and individual attention in encouraging a culture of patient safety	*Idealized influence*, *inspirational motivation*, *intellectual stimulation*, *individualized consideration* (Bass & Avolio, 1994)	36
Work Motivation (Z)	Internal and external encouragement of health workers in carrying out their duties according to service standards and patient safety	The need for merit, affiliation, and power	33
Implementation of Six Patient Safety Goals (Y)	The level of compliance of health workers in carrying out patient safety goals during the service process	Patient identification, effective communication, drug safety, location–procedure–patient, risk reduction of infection risk, prevention of patient falls	54

Source: Research data (author verification required).

Descriptive data were summarized using a three-box index classification, categorized as low (36–84), moderate (85–132), and high (133–180). Inferential analysis was performed using partial least squares structural equation modeling (PLS-SEM) with SmartPLS software. The measurement model was evaluated using indicator loadings, Cronbach's alpha, composite reliability, average variance extracted (AVE), the heterotrait–monotrait ratio (HTMT), the Fornell–Larcker criterion, and cross-loadings. The structural model was assessed using the coefficient of determination (R^2), adjusted R^2, effect size (f^2), predictive relevance (Q^2), standardized root mean square residual (SRMR), and variance inflation factor (VIF). Hypothesis testing was conducted using a bootstrapping procedure with 5,000 resamples, applying a two-tailed significance threshold of $|t| > 1.96$ and $p < 0.05$. Importance–Performance Map Analysis (IPMA) was subsequently performed to identify potential priorities for managerial improvement.

RESULTS AND DISCUSSION

Respondent Characteristics

This study involved 180 respondents, all of whom were nurses. The respondents were dominated by women, with a S1 education, and were in young adulthood (21–30 years), as presented in Table 3.

Table 3. Characteristics of Respondents (n = 180)

Characteristics	Categories	Quantity (n)	Percentage (%)
Gender	Women	163	90,56
	Male	17	9,44
Education	S1	142	78,89
	D3	38	21,11
Age	21–30 years old	78	43,33
	30–40 years old	52	28,89
	≥ 40 years old	50	27,78

Source: Research data (author verification required).

Instrument Validity and Reliability Test

The results of the instrument test on 30 respondents showed that all statements in the four variables had a calculated r-value greater than the r of the table of 0.361 so that it was declared valid. All variables also had a Cronbach's Alpha value above 0.70 so that they were declared reliable, with the highest value in the transformational leadership style variable (0.994) and the lowest in the *effort–reward imbalance variable* (0.946). A summary of the test results is presented in Table 4.

Table 4. Summary of Instrument Validity and Reliability Test Results

Variable	Number of Valid Items	r count (min–max)	r Table	Cronbach's Alpha	Remarks
Effort–Reward Imbalance	30	0,389–0,789	0,361	0,946	Valid, reliable
Transformational Leadership Style	36	0,541–0,983	0,361	0,994	Valid, reliable
Work Motivation	33	0,381–0,801	0,361	0,990	Valid, reliable
Six Patient Safety Goals	54	0,494–0,910	0,361	0,961	Valid, reliable

Source: Research data (author verification required).

Descriptive Analysis of Variables

The results of the descriptive analysis using *the threebox* method are presented in Table 5. The *effort–reward imbalance variable* is in the medium category (index 128.78), with the three dimensions, namely *effort*, *reward*, and *overcommitment*, also in the medium category. These findings show that nurses feel considerable work demands, especially related to time pressure, the number of patients, and responsibility for patient safety, while financial rewards such as salaries and incentives are perceived to be not optimal. Some nurses also show a

tendency to *overcommitment*, such as accepting additional tasks, delaying break time, and difficulty disconnecting from work outside of working hours.

The transformational leadership style was in the high category (index 136.93). The dimensions *of idealized influence* (147.60), *inspirational motivation* (146.80), and *intellectual stimulation* (146.07) were in the high category, while the *individualized consideration dimension* obtained the lowest index (107.27; medium category). This shows that nurse leaders are considered to be able to be role models, convey vision, and encourage innovation, but attention to the individual needs of staff, such as willingness to listen to aspirations and support for self-development, is not optimal. Work motivation is in the medium category (index 119.97), with high extrinsic motivation dimensions (152.81) and medium intrinsic motivation (87.95). The implementation of six patient safety goals is in the high category (index 157.37), with the highest index in the goal of reducing the risk of infection (160.80) and the lowest in the identification of patients appropriately (152.22).

Table 5. Results of Descriptive Analysis of Research Variables

Variable	Dimensions	Index Value	Categories
Effort–Reward Imbalance	*Effort*	130,67	Medium
	Reward	125,87	Medium
	Overcommitment	129,80	Medium
	Variable averages	128,78	Medium
Transformational Leadership Style	*Idealized influence*	147,60	Height
	Inspirational motivation	146,80	Height
	Intellectual stimulation	146,07	Height
	Individualized consideration	107,27	Medium
	Variable averages	136,93	Height
Work Motivation	Extrinsic motivation	152,81	Height
	Intrinsic motivation	87,95	Medium
	Variable averages	119,97	Medium
Implementation of Six Patient Safety Goals	Precise patient identification	152,22	Height
	Effective communication	158,53	Height
	Drug safety to watch out for	158,67	Height
	Certainty of the right location, procedure, and patient	156,40	Height
	Reduced risk of infection	160,80	Height
	Reduced risk of patients falling	157,60	Height
	Variable averages	157,37	Height

Source: Research data (author verification required).

Description: low = 36–84; medium = 85–132; high = 133–180.

Evaluation *of the Outer Model*

The results of the *outer model* estimation after the ineligible indicators are issued are presented in Figure 2. All remaining indicators have a *loading factor* above 0.70 (0.767–0.954), so that each indicator is able to reflect the latent construct it measures strongly and consistently.

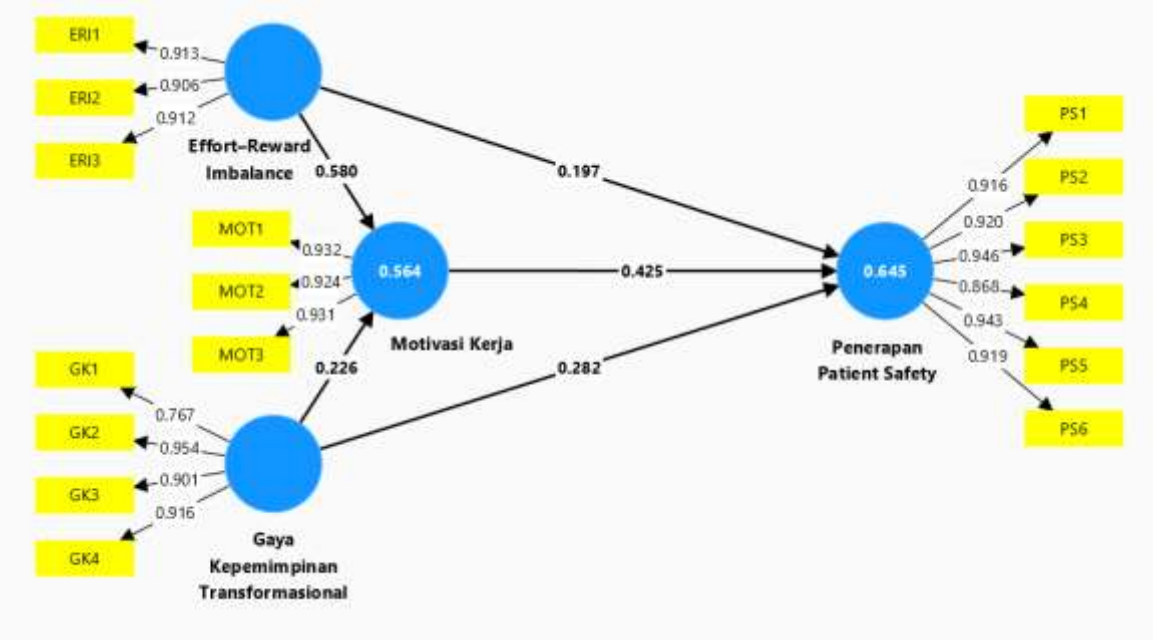


Figure 2. Outer Model Estimation Results

Source: Research documentation (author verification required).

Table 6 shows that the entire construct has Cronbach's Alpha (0.897–0.963) and *Composite Reliability* (0.936–0.970) values above 0.70 so that it meets the internal consistency reliability criteria. The AVE value of the entire construct (0.787–0.863) is above 0.50 so that the convergent validity is met.

Table 6. Convergent Reliability and Validity Test Results

Construct	Indicator	*Loading Factor*	Cronbach's Alpha	*Composite Reliability*	AVE	Remarks
Effort–Reward Imbalance (ERI)	ERI1–ERI3	0,906–0,913	0,897	0,936	0,829	Valid, reliable
Transformational Leadership Style (GK)	GK1–GK4	0,767–0,954	0,908	0,936	0,787	Valid, reliable
Work Motivation (MOT)	MOT1–MOT3	0,924–0,932	0,921	0,950	0,863	Valid, reliable
Patient Safety (KP)	KP1–KP6	0,868–0,946	0,963	0,970	0,845	Valid, reliable

Source: Research data (author verification required).

The discriminant validity was evaluated using HTMT, Fornell–Larcker criteria, and *cross loading*. Table 7 shows that the entire HTMT value is below 0.90 and that the square root of AVE of each construct (diagonal) is higher than its correlation with other constructs. The

results *of cross loading* also show that each indicator has the highest load on the construct it measured, so that the discriminant validity is met.

Table 7. Results of the Discriminant Validity Test (HTMT and Fornell–Larcker)

Criteria	Construct	ELI	GK	WORD	CD
HTMT	GK	0,738			
	WORD	0,797	0,667		
	CD	0,746	0,715	0,783	
Fornell–Larcker	ELI	0,910			
	GK	0,673	0,887		
	WORD	0,732	0,617	0,929	
	CD	0,699	0,677	0,744	0,919

Source: Research data (author verification required).

Inner Model *Evaluation*

Table 8 shows that the R^2 value of work motivation is 0.564 and patient safety is 0.645, which means that ERI and transformational leadership style explain 56.4% of work motivation variations, while ERI, transformational leadership style, and work motivation explain 64.5% of patient safety implementation variations. Positive Q^2 values (0.481 and 0.538) indicate good predictive relevance, and SRMR values of 0.074 meet the model suitability criteria. The overall VIF values (1.830–2.603) are below 5 so that the model is free from multicollinearity problems.

Table 8. Goodness of Fit and Model Collinearity Diagnostic Results

Evaluation Aspects	Construct / Line	Value	Remarks
R^2 (R^2 *adjusted*)	Work motivation	0,564 (0,560)	Strong
	Patient safety	0,645 (0,639)	Strong
Q^2	Work motivation	0,481	Predictively relevant
	Patient safety	0,538	Predictively relevant
f^2	ERI → WORD	0,422	Small–medium
	ERI → KP	0,042	Small
	NOT → WORD	0,064	Small–medium
	GK → KP	0,116	Small–medium
	MOT → KP	0,222	Small–medium
SRMR	*Saturated* / *estimated model*	0,074 / 0,074	Meets the criteria (≤ 0.10)
VIVID	ERI → WORD; GK → WORD	1,830; 1,830	< 5 (no multicollinearity)
	ERI → KP; GK → KP; MOT → KP	2,603; 1,947; 2,296	< 5 (no multicollinearity)

Source: Research data (author verification required).

Hypothesis Testing

The results of the structural model estimation through *bootstrapping* of 5,000 subsamples are presented in Figure 3. Simultaneous influence testing showed that ERI and transformational leadership style had a simultaneous effect on work motivation (F calculated 116.90 > F table 3.05), while ERI, transformational leadership style, and work motivation had a simultaneous effect on patient safety implementation (F calculated 109.14 > F table 2.65). The results of the direct influence test are presented in Table 9 and indirect effects in Table 10.

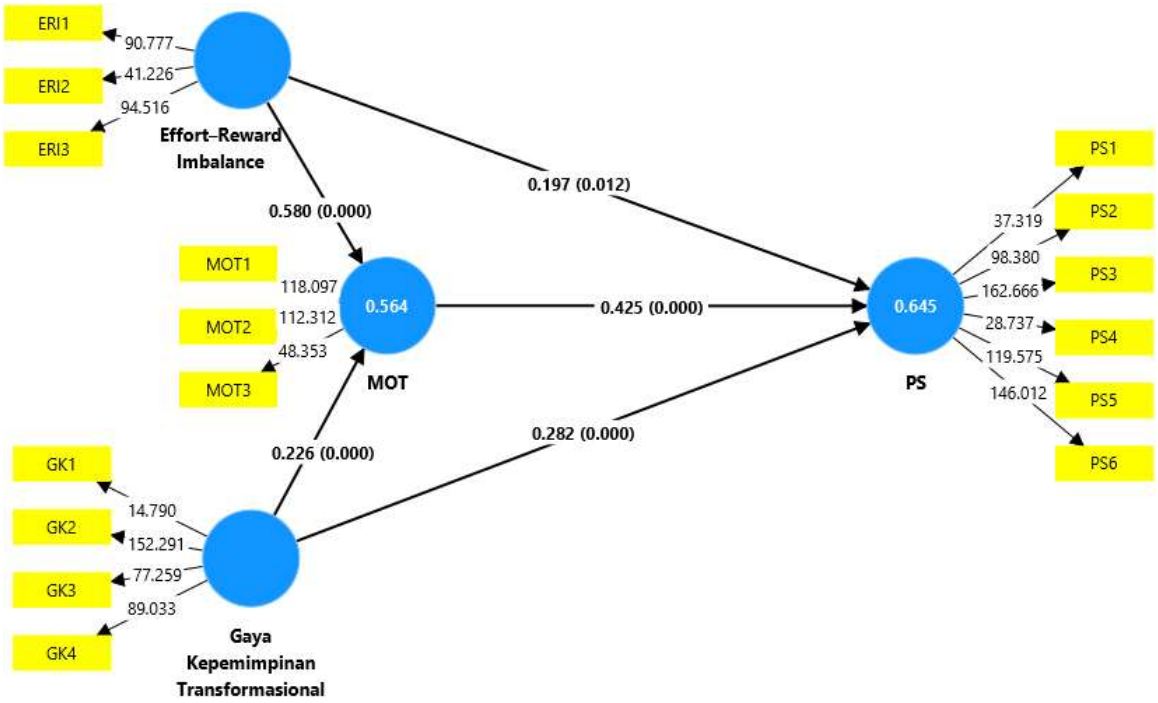


Figure 3. SEM-PLS Model Estimation Results (Bootstrapping 5,000 Subsamples)

Source: Research documentation (author verification required).

Table 9. Simultaneous Influence and Direct Influence Test Results

Hypothesis	Pathway	Coefficients / Statistics	T-Statistics	p-value	Verdict
H1	ERI, GK, MOT → KP (simultaneous)	F = 109.14 > 2.65; R^2 = 0.645	–	< 0.05	Accepted
H2	ERI → WORD	0,580	12,541	0,000	Accepted
H3	ERI → KP	0,197	2,515	0,012	Accepted
H4	NOT → WORD	0,226	4,571	0,000	Accepted
H5	GK → KP	0,282	4,268	0,000	Accepted
H6	MOT → KP	0,425	6,316	0,000	Accepted

Source: Research data (author verification required).

Table 10. Indirect Effect Test Results (Mediation Effect)

Hypothesis	Indirect Pathway	Coefficients	T-Statistics	p-value Direct	Indirect p-value	Conclusion
H7	ERI → MOT → KP	0,247	6,408	0,012	0,000	Partial mediation; accepted
H8	NOT → WORD → KP	0,096	3,610	0,000	0,000	Partial mediation; accepted

Source: Research data (author verification required).

Based on Table 9 and Table 10, all hypotheses (H1–H8) are accepted. The largest direct influence on work motivation comes from ERI (β = 0.580), while the largest direct influence on patient safety implementation comes from work motivation (β = 0.425). Because the direct influence of ERI and transformational leadership styles on patient safety remains significant after work motivation is included in the model, work motivation plays a role as a partial mediator in both relationships.

***Importance–Performance Map Analysis* (IPMA)**

The IPMA is used to identify indicators with *a high level of importance but* relatively low performance as a priority for improvement. Table 11 and Figure 4 show that for the implementation of patient safety, the indicators ERI1 (0.176) and ERI3 (0.164) have the *highest importance*, but their *performance* (49.094 and 45.109) is below average (55.32), so they are in the high-priority quadrant. Indicators of work motivation, especially MOT2 and MOT3, have *a high* importance with relatively good *performance* so that they need to be maintained, while the indicators of transformational leadership style have *relatively high* performance but lower *importance*. A similar pattern was found in the IPMA on work motivation, where ERI1 (0.230) and ERI3 (0.215) had the highest *importance* with *performance* below or close to average (53.82).

Table 11. Importance –Performance Map Analysis Results on Work Motivation and Patient Safety

Indicator	*Importance* (target: MOT)	*Performance* (target: MOT)	*Importance* (target: KP)	*Performance* (target: KP)
ERI1	0,230	49,094	0,176	49,094
ERI2	0,192	57,609	0,147	57,609
ERI3	0,215	45,109	0,164	45,109
GK1	0,048	57,473	0,080	57,473
GK2	0,071	59,103	0,118	59,103
GK3	0,064	49,094	0,107	49,094
GK4	0,070	59,239	0,118	59,239
MOT1	–	–	0,158	56,522
MOT2	–	–	0,158	59,511
MOT3	–	–	0,142	60,462
Average	0,127	53,817	0,137	55,322

Source: Research data (author verification required).

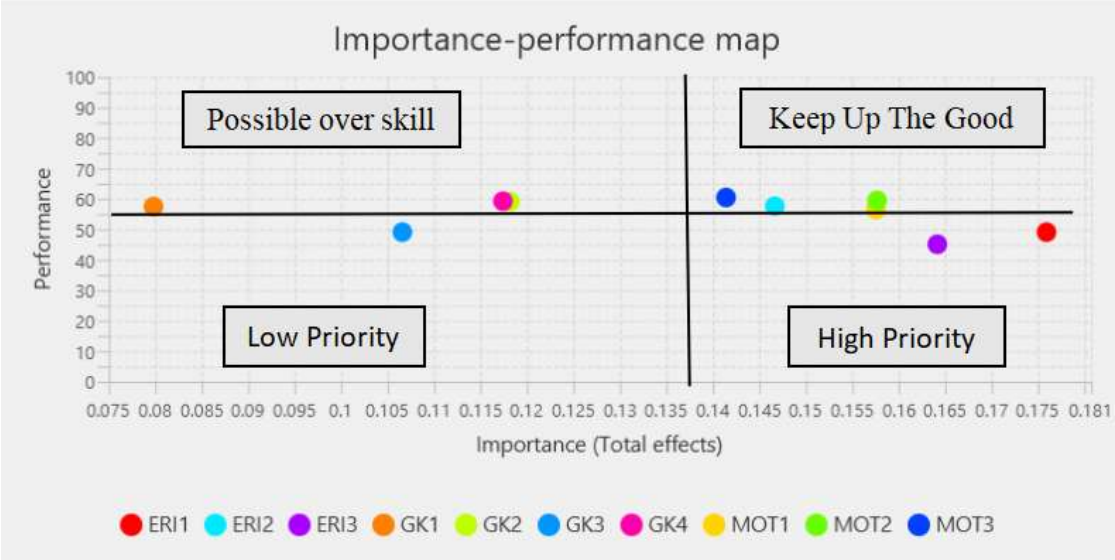


Figure 4. Importance–Performance Map Analysis (IPMA) on the Implementation of Patient Safety

Source: Research documentation (author verification required).

Discussion

The simultaneous influence of ERI, transformational leadership style, and work motivation on the implementation of six patient safety goals. The results showed that the three variables simultaneously had a significant effect on the implementation of six patient safety goals with an R^2 of 0.645. The implementation of patient safety was not the result of a single factor, but the interaction of work psychosocial factors, leadership, and motivation. Theoretically, ERI explained how the imbalance of effort and reward affects the psychological state of the workforce (Siegrist, 1996), transformational leadership forms a work culture that supports safety (Bass & Avolio, 1994), and work motivation is a driver of individual consistency in carrying out tasks. These findings are in line with Wong et al. (2013) who stated that leadership, working conditions, and staff psychological factors together influence the incidence of *adverse events*. The remaining 35.5% variation was influenced by other factors outside the model, such as organizational culture, objective workload, or the physical environment of the hospital (Nieva & Sorra, 2003).

The effect of ERI on work motivation. ERI has a significant effect on work motivation with a path coefficient of 0.580, which is the largest influence in the model. These results are in line with ERI's theory (Siegrist, 1996) that the imbalance of effort and reward causes psychological stress that has an impact on work attitudes. The theory of justice (Adams, 1963) explains that the injustice of the input–output ratio causes dissatisfaction that decreases motivation, while the theory of resource conservation (Hobfoll, 1989) explains that the depletion of physical and emotional resources due to high demands without adequate compensation decreases psychological energy to work. Empirically, these findings are consistent with Kowalski et al. (2010), who found that workload is associated with emotional exhaustion among nurses. Descriptive results that show intrinsic motivation are still in the moderate category reinforce the importance of improving the effort-reward balance.

The effect of ERI on the implementation of six patient safety goals. ERI had a significant effect on the implementation of patient safety ($\beta = 0.197$; $p = 0.012$). Prolonged

work stress due to imbalance can lower concentration and increase the risk of errors in professional actions. From the perspective of *job strain* (Karasek, 1979), high work pressure without adequate control and reward increases the risk of deteriorating work quality, including negligence in patient identification, effective communication, and safe medication delivery. A moderate coefficient indicates that ERI has a direct impact on safety behavior, but is also influenced by other factors such as leadership and work motivation.

The influence of transformational leadership style on work motivation. Transformational leadership style has a significant effect on work motivation (β = 0.226). Through its four dimensions, transformational leaders push subordinates beyond personal interests for organizational goals, so that the leader's support and trust fosters a sense of appreciation that strengthens motivation (Bass & Avolio, 1994; Burns, 1978). These findings are in line with Boamah et al. (2018), who showed that transformational leadership increases nurses' job satisfaction. The low individualized consideration dimension index indicates that attention to the individual needs of staff is still room for improvement to magnify the influence of leadership on motivation.

The influence of transformational leadership styles on the implementation of six patient safety goals. Transformational leadership had a significant effect on patient safety implementation (β = 0.282), stronger than the direct influence of ERI. Each safety goal requires consistent managerial oversight and commitment; leaders who actively monitor and provide feedback will improve staff compliance, while passive leadership weakens implementation controls. These results are consistent with Wong et al. (2013), who found that relational leadership styles are associated with fewer adverse patient outcomes.

The effect of work motivation on the implementation of six patient safety goals. Work motivation had the most dominant influence on the implementation of patient safety (β = 0.425). Individuals with high achievement needs were encouraged to achieve superior performance standards, and the implementation of six patient safety goals required high precision so that motivated individuals were more compliant with operational standards. The theory of self-determination (Deci & Ryan, 2000) also explains that internalized motivation results in more consistent behaviors.

The mediating role of work motivation. Work motivation partially mediates the influence of ERI (β = 0.247) and transformational leadership styles (β = 0.096) on patient safety implementation. The imbalance of effort and reward degrades psychological well-being and weakens optimal work motivation, which in turn decreases adherence to safety procedures. Psychological needs become a bridge between work pressure and performance. On the other hand, transformational leadership influences patient safety not only through policy and example, but also through increased motivation that encourages healthcare workers to be more proactive in preventing errors and reporting incidents (Wong et al., 2013). The IPMA results reinforce this finding by placing the ERI indicator as the main improvement priority, accompanied by the maintenance of work motivation indicators.

Managerially, the results of this study imply that the balance between effort and reward needs to be placed as a strategic priority for human resource management, transformational leadership needs to be strengthened, especially in the aspect of individual attention, and work motivation needs to be seen as an organizational asset. Patient safety is not only the responsibility of a specific quality unit or committee, but must be integrated into the hospital's

managerial and operational system as a whole. This study has limitations, namely the cross-sectional design that cannot explain the cause-and-effect relationship in depth, the use of *self-report* questionnaires that allow perception bias, the implementation in one hospital so that generalizations are limited, and the variables studied do not include all factors that may affect patient safety.

CONCLUSION

This study concluded that effort–reward imbalance (ERI), transformational leadership, and work motivation were significantly associated with the implementation of the six patient safety goals, collectively explaining 64.5% of the variance in patient safety implementation ($R^2 = 0.645$). Individually, ERI and transformational leadership were significantly associated with both work motivation and patient safety implementation, while work motivation demonstrated the strongest direct association with patient safety implementation. Furthermore, work motivation partially mediated the relationships between ERI and patient safety implementation and between transformational leadership and patient safety implementation. These findings highlighted the importance of addressing psychosocial working conditions, leadership practices, and employee motivation through an integrated organizational approach. Hospital management should strengthen reward and recognition systems to address perceived effort–reward imbalances, promote transformational leadership through inspirational communication, role modeling, and individualized support, and establish continuous employee development programs incorporating training, coaching, and performance feedback. Patient safety indicators should also be integrated into employee performance evaluation systems to encourage consistent adherence to established safety procedures.

Future research should incorporate additional organizational and psychosocial variables, such as patient safety culture, workload, and occupational stress, to provide a more comprehensive understanding of the factors associated with patient safety implementation. Longitudinal research designs are recommended to examine temporal relationships and strengthen causal inference. Additionally, multicenter studies involving hospitals with different organizational characteristics, accreditation statuses, and healthcare service levels should be conducted to improve the generalizability of the findings. Further investigation into the mediating and moderating mechanisms underlying these relationships may also provide deeper insights into strategies for improving patient safety performance.

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AUTHOR'S CONTRIBUTION

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

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

In the preparation of this manuscript, the author used artificial intelligence (AI) solely to improve grammar and check the use of language.

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