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Transformational Leadership, Team Cooperation, and Motivation in Shaping Patient Safety Culture Among Healthcare Professionals

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ABSTRACT

Introduction: Patient safety remains a critical global health agenda, as emphasized by the WHO and IOM. Fostering a robust patient safety culture within hospitals is paramount for minimizing adverse events and improving the quality of care. Understanding the psychosocial factors that drive this culture is essential for effective organizational interventions. This study aims to explore the direct and indirect effects of transformational leadership and team cooperation on patient safety culture, with a particular focus on assessing the mediating function of motivation within these relationships among healthcare professionals.

Methods: An analytical cross-sectional research design was applied in this study. Study utilized a survey to collect data from 198 Healthcare Providers (HCPs) at Sulianti Saroso Infectious Disease (SSIDH). The primary instrument was the Hospital Survey on Patient Safety Culture (HSOPS) Version 2.0. Data analysis involved Structural Equation Modelling (SEM) based on Partial Least Squares (PLS-SEM) using SmartPLS 4.0 to test the proposed causal relationships.

Results: Descriptive analysis showed that the variables of Transformational Leadership, Team Cooperation, Motivation, and Patient Safety Culture were all in the moderate category. However, hypothesis testing revealed significant findings. Both transformational leadership and team cooperation demonstrated a direct and significant positive influence on patient safety culture. Crucially, motivation was found to significantly mediate the relationship between transformational leadership and safety culture, as well as the relationship between team cooperation and safety culture.

Conclusion: This study confirms that transformational leadership and teamwork are crucial factors that effectively enhance patient safety culture. The central finding of this study is the vital role of motivation as a psychological mechanism that translates managerial initiatives and team collaboration into proactive safety behaviors. Therefore, the practical recommendations from this research focus on strategies that directly target motivation, such as strengthening programs for recognition and responsibility, accompanied by improved interprofessional communication and more specific leadership training programs.

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INTRODUCTION

Patient safety is widely acknowledged as a foundational dimension of healthcare quality, reflecting the ethical imperative that clinicians should, above all, avoid causing harm to those in their care. Global health organizations, including the World Health Organization (WHO) and the Institute of Medicine (IOM), have consistently highlighted patient safety as a critical global issue (1). Unsafe care remains a major global public health problem, with at least one in ten patients experiencing harm in healthcare settings and millions of deaths each year, particularly in low- and middle-income countries (2). This global safety challenge directly intersects with the national and institutional context of this study. In Indonesia, patient safety incidents are still under-reported and only a fraction of hospitals systematically report safety problems, highlighting persistent gaps in safety culture and systems (3,4). As a national infectious disease referral hospital facing complex, high-risk care pathways, the study site is inherently vulnerable to preventable harm, underscoring the need to strengthen patient safety culture among healthcare professionals. The necessity for robust patient safety measures is codified in Indonesian law, which mandates the implementation of patient safety standards through incident reporting and analysis to reduce adverse events (4). A critical mechanism for reducing these incidents is the development of a strong Patient Safety Culture (PSC).

Patient safety culture (PSC) is an integral part of organizational culture, focusing on the shared values, beliefs, and norms regarding safety, where individuals, work units, and the organization as a whole contribute to the fundamental assumption that patient safety is paramount (5). This culture requires understanding values and behaviors related to safety, promoting openness, fairness, and actively learning from errors rather than engaging in individual blame (6,7). As such, assessing and improving PSC is vital for healthcare organizations (8). The establishment of a positive PSC is influenced by a complex set of socio-technical factors, including organizational elements, human factors, and technical systems (9). Key factors consistently identified in the literature include leadership, teamwork, and employee engagement (10,11).

Transformational Leadership is a crucial element in shaping PSC. This leadership style inspires and motivates staff to transcend self-interest, playing a dominant role in creating a desired safety vision and supporting professional development (12). Extensive evidence shows that leadership styles, particularly transformational leadership, are closely linked to patient safety culture and safety practices in hospitals across diverse settings (13). Numerous studies support the positive influence of effective leadership on PSC implementation (1,14,15). However, some findings present conflicting results, noting that leadership may not always have a significant direct effect on organizational culture, suggesting the need for exploring mediating mechanisms (16,17).

Equally important is team cooperation (teamwork), is a key dimension of patient safety culture because it underpins effective communication, coordination, and collaboration among healthcare professionals across hospital settings (18,19). International systematic reviews consistently show that “teamwork within units” is one of the strongest Hospital Survey on Patient Safety Culture dimensions globally and is associated with fewer adverse events and better quality of care (19,20). Cohesive teams are better able to detect, share, and manage potential problems before they escalate into serious incidents, thereby contributing directly to improved patient safety and staff well-being (21,22).

Despite the established roles of leadership and teamwork, the psychological mechanism that translates these organizational inputs into proactive safety behaviors the "how" is often underspecified. Motivation is conceptualized as a psychological process that energizes and directs goal-oriented behavior, and, in line with self-determination theory, reflects the extent to which healthcare professionals’ needs for autonomy, competence, and relatedness are fulfilled, there by sustaining engagement and performance (23–25). Research suggests that motivation significantly affects PSC (26). High motivation enhances individual and team performance, promoting behaviors that support safety (27). Furthermore, transformational leadership is known to boost employee satisfaction and motivation.

However, the majority of previous research has focused on exploring the direct relationships involving transformational leadership, teamwork, and patient safety culture, without explicitly modeling healthcare professionals’ work motivation as a mediating psychological mechanism (13). Evidence from high-income settings may not fully capture the dynamics of motivation and safety culture in infection-focused referral hospitals in lower-middle income countries, where resource constraints and prolonged organizational stressors are pronounced. Therefore, there is a need for empirical research that simultaneously examines team work, transformational leadership, and healthcare professionals’ motivation in relation to patient safety culture within infectious disease

referral hospitals in Indonesia. This study aims to explore the direct impact of transformational leadership and team cooperation on patient safety culture and crucially to test the mediating role of motivation among Healthcare Providers (HCPs). By elucidating the function of motivation, this research will offer actionable insights for designing more effective interventions to bolster patient safety outcomes.

METHOD

This research adopts a structured and transparent methodology designed to maintain the reliability and validity of the results. The methodological components are outlined as follows:

Research Type

This research adopted a quantitative, causal-explanatory design combined with a descriptive analytical approach to explore both direct and indirect linkages among variables. The design sought to analyze a structural model in which motivation acts as a mediating factor between transformational leadership, team cooperation, and the culture of patient safety.

Population and Sample

The target population consisted of 324 healthcare providers (HCPs) at Sulianti Saroso Infectious Disease Hospital, encompassing various professions including Physicians (General, Specialist, Dentist), Nurses, Midwives, Pharmacists, Nutritionists, Radiographers, Physiotherapists, and Laboratory Analysts. In determining the required minimum sample size. This research followed the general guideline for Partial Least Squares Structural Equation Modeling (PLS-SEM), suggesting that at least 10 to 20 observations are required for each estimated path or for every indicator within the most complex construct, while also targeting adequate statistical power (0.80) and a 5% significance level (two-tailed) (28,29). Considering the number of structural paths leading to the most complex endogenous construct and assuming a medium effect size, the minimum sample required consisted of 180 healthcare professionals. To anticipate non-response or incomplete questionnaires, an additional 10% was added, resulting in a final target sample size of 198 HCPs. A systematic random sampling technique, based on employee identification numbers (NIP), was used to select participants from the eligible population. Inclusion criteria required HCPs to have a minimum of one year of service at SSIDH and to have received patient safety training. The one-year service criterion was established to ensure respondents had sufficient experience to understand and participate in the organizational safety culture. Exclusion criteria included HCPs on extended leave (e.g., maternity leave, study assignment) or those who had not yet received patient safety training.

Research Location

The research was conducted at Sulianti Saroso Infectious Disease Hospital (SSIDH), Referal Hospital in Indonesia, over a period of two months (July–September 2025).

Research Instrument

This quantitative study utilized a self-administered closed-ended questionnaire based on a Likert scale to measure four latent variables. The model includes two independent variables (exogenous): transformational leadership (X_1) and team cooperation (X_2); one mediating variable (Intervening): motivation (Z); and one dependent variable (endogenous): patient safety culture (Y). The dependent variable, patient safety culture (Y), was measured using the Indonesian version of the established and validated Hospital Survey on Patient Safety Culture (HSOPS) version 2.0. This 4-point scale (1=Strongly Disagree to 4=Strongly Agree) showed high reliability in previous studies (Cronbach's $\alpha>0.70$) (30). The mediating variable, motivation (Z) was measured using an instrument adapted from Herzberg's Two-Factor Theory, which required subsequent validity and reliability testing (Cronbach's $\alpha\geq0.60$) and used a 4-point scale (1=Strongly Disagree to 4=Strongly Agree). Finally, transformational leadership (X_1) and team cooperation (X_2) were measured using instruments adapted from safety climate model. These instruments, which used a 4-point frequency scale (1=Never to 4=Always), had previously demonstrated acceptable reliability (Cronbach's $\alpha\geq0.60$) and construct validity in related contexts.

Data Collection Procedures

The primary data were obtained through self-administered questionnaires that were distributed to qualified respondents, complemented by semi-structured interviews conducted during the preliminary phase to support instrument adaptation. Secondary data were obtained from literature reviews, official reports, and hospital documents of SSIDH.

Data Analysis

Data analysis was conducted using SPSS version 26 and SmartPLS 4.0. Univariate analysis was employed to describe respondent characteristics. The main analysis utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4.0, which is appropriate for examining path relationships among latent variables. Model evaluation consisted of two phases: the Measurement Model (outer model) assessed validity (indicator loadings ≥ 0.50–0.60) and reliability (Composite Reliability and Cronbach's α ≥ 0.60), while the Structural Model (inner model) evaluated Path Coefficients (T-statistics) and the Coefficient of Determination (R^2). Hypotheses for both direct and indirect (mediating) effects were tested using the bootstrapping procedure, with statistical significance determined at $P < 0.05$.

Ethical Approval

This research received ethical approval from the Health Research Ethics Committee of Sulianti Saroso Infectious Disease Hospital (Approval No: PP 07.01/D.XXXIX.14/68/2025) and the Ethics Committee of Universitas Esa Unggul (Approval No: 0925-07.159/DPKE-KEP/FINAL-EA/UEU/VII/2025). Participant confidentiality was rigorously upheld throughout the study.

RESULTS

Participant Characteristics

The study involved 198 Healthcare Providers (HCPs) from SSIDH. The demographic profile reveals a workforce that is predominantly female (75.3%). Most respondents fell within the productive age range of 40–49 years (52.0%), followed by those aged 30–39 years (28.8%), indicating a mature and experienced staff. By profession, Nurses constituted the largest group (62.1%), followed by physicians (General, Dentist, and Specialist, 20.7%), highlighting the critical input from frontline caregivers. Educational attainment was high, with the vast majority possessing a Bachelor's/Professional degree (69.7%). Crucially, the sample displayed significant work stability and experience, with 92.4% of HCPs reporting a tenure of more than 5 years. This experienced demographic provides a reliable basis for assessing organizational culture and psychological variables (**Table 1**).

Table 1. Participant Characteristics

Characteristics	Frequency	Percentage
Gender		
Male	49	24.7
Female	149	75.3
Age (years)		
20 – 29	8	4.0
30 – 39	57	28.8
40 – 49	103	52.0
>50	30	15.2
Profession		
Nutritionist	2	1.0
Laboratory Analyst	10	5.1
Pharmacist	9	4.5
Midwife	6	3.0
Physician (General, Dentist, Specialist)	41	20.7
Physiotherapist	2	1.0
Radiographer	5	2.5
Nurse	123	62.1

Characteristics	Frequency	Percentage
Education		
Diploma	52	26.3
Bachelor/Professional	138	69.7
Master's	8	4.0
Length of Service		
<5 years	15	7.6
>5 years	183	92.4
Total	198	100.0

The Measurement Model (Outer Model) was thoroughly evaluated for convergent validity, discriminant validity, and reliability. Convergent validity was examined using outer loadings (>0.70) and average variance extracted (AVE >0.50) (Figure 1), while discriminant validity was assessed through cross-loadings and the Fornell–Larcker criterion. All indicator loadings surpassed the recommended value of 0.70, and each latent construct achieved an AVE well above 0.50 specifically, Patient Safety Culture (Y) = 0.799, Transformational Leadership (X1) = 0.882, Teamwork (X2) = 0.920, and Motivation (Z) = 0.823. According to the Fornell–Larcker criterion, discriminant validity was established as the square root of each construct's AVE (shown on the diagonal) exceeded its correlations with other constructs. Reliability analysis demonstrated excellent internal consistency, with Cronbach's Alpha values ranging from 0.955 to 0.971 and Composite Reliability (CR) values between 0.965 and 0.975 well above the accepted cut-off of 0.70.

The Structural Model was evaluated through the examination of Path Coefficients (T-statistics) and the Coefficient of Determination (R^2). Model fit was carefully analyzed using multiple key indices to confirm the model's alignment with the empirical data. The Standardized Root Mean Square Residual (SRMR) met the acceptable threshold of <0.10. Further, additional fit indices including d-ULS, d-G, and the Normed Fit Index (NFI) were assessed, together with the Goodness of Fit (GoF) index, which yielded a value of 0.635, indicating a strong overall fit. Predictive relevance (Q^2) values were also examined, showing 0.550 for Patient Safety Culture (Y) and 0.240 for Motivation (Z), both reflecting satisfactory predictive capability of the model.

Hypothesis testing for both direct and indirect (mediation) effects was conducted using the bootstrapping procedure, with the level of statistical significance established at $P < 0.05$. The bootstrapping process involved 5,000 resamples to ensure the robustness of the standard errors and T-statistics. The specific mediation type (partial mediation) was determined by examining the significance of the direct as well as the indirect effects where a significant indirect effect combined with a significant direct effect confirms partial mediation.

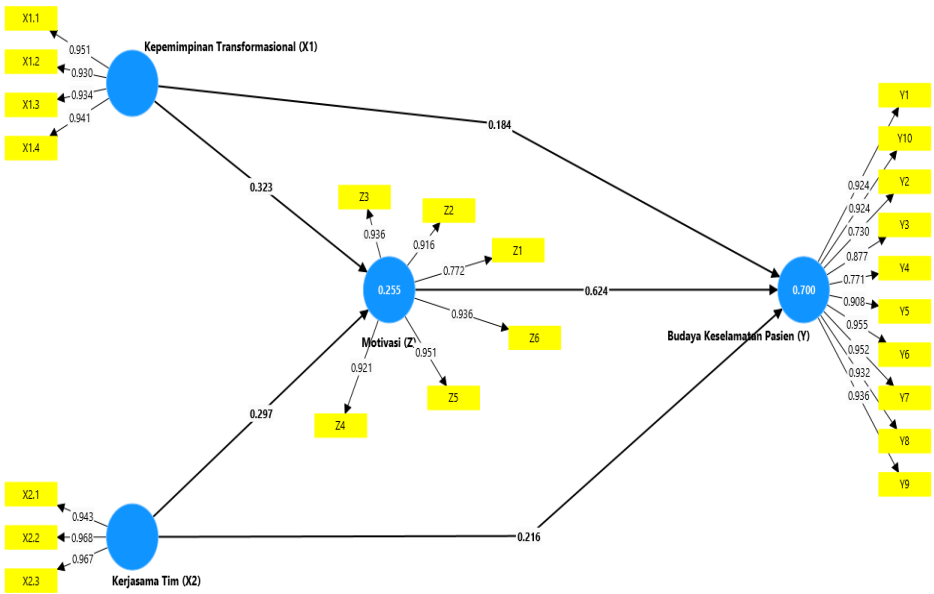

Figure 1. Measurement Model (Outer Model)

Based on the inner model SEM-PLS results in **Figure 2**, it can be interpreted that both Transformational Leadership (X1) and Team Cooperation (X2) have a positive and significant direct influence on the mediating variable (presumed to be Motivation), with path coefficients of 0.184 (significant at t-value = 2.099) and 0.203 (significant at t-value = 2.618), respectively. Furthermore, this mediating variable demonstrates a very strong and significant direct effect on Patient Safety Culture (Y), with a substantial path coefficient of 0.624 (t-value = 5.594). The R-squared (R^2) value of 0.709 for Patient Safety Culture indicates that 70.9% of the variance in patient safety culture is explained by the combined influence of transformational leadership, team cooperation, and the mediating variable (motivation). This strongly supports the role of motivation as a significant mediator in transmitting the indirect effects of transformational leadership and team cooperation to enhance patient safety culture among healthcare professionals**.**

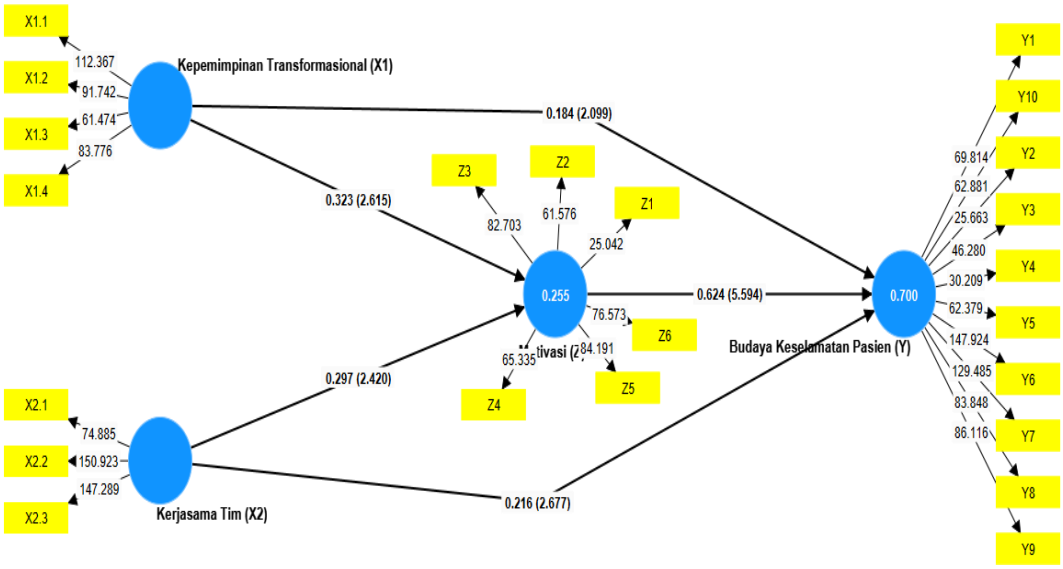

Figure 2. Full SEM-PLS Model with Mediation (Inner Model)

Direct Effects Analysis

The direct effects analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM) revealed several significant relationships supporting the proposed model. Transformational Leadership (X1) demonstrated a positive and statistically significant direct influence on Patient Safety Culture (Y) (β=0.184, p=0.036<0.05), indicating that better leadership directly enhances the safety culture. Similarly, Teamwork (X2) also exerted a positive and significant direct influence on Patient Safety Culture (Y) (β=0.216, p=0.007<0.01). Importantly, Motivation (Z) was found to have the strongest positive direct effect on Patient Safety Culture (Y) among all paths, with a substantial path coefficient (β=0.624, p=0.000). Furthermore, both Transformational Leadership (X1) (β=0.323, p=0.009<0.01) and Teamwork (X2) (β=0.297, p=0.016<0.05) significantly contributed to increasing staff Motivation (Z). These findings establish the foundation for testing the mediating role of motivation, confirming that managerial and collaborative inputs are effective both directly on safety culture and indirectly by boosting staff motivation (**Table 2**).

Table 2. Path Coefficient Results of Influence (direct effect)

Path Coefficient	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Transformational Leadership (X1) -> Patient Safety Culture (Y)	0,184	0,178	0,088	2,099	0,036
Transformational Leadership (X1) -> Motivation (Z)	0,323	0,325	0,123	2,615	0,009
Teamwork (X2) -> Patient Safety Culture (Y)	0,216	0,209	0,081	2,677	0,007
Teamwork (X2) -> Motivation (Z)	0,297	0,296	0,123	2,420	0,016
Motivation (Z) -> Patient Safety Culture (Y)	0,624	0,628	0,112	5,594	0,000

Indirect Effect Analysis

The findings presented in Table 3 indicate that both transformational leadership and teamwork have significant indirect impacts on patient safety culture through motivation. Transformational leadership ($\beta = 0.201$, $p = 0.033$) and teamwork ($\beta = 0.186$, $p = 0.042$) enhance motivation, which subsequently reinforces the development of a patient safety culture. As the direct effects remain significant, motivation serves as a partial mediator in these associations.

Table 3. Path Coefficient Results of Indirect Effect (Mediation Testing)

Path Coefficient	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Transformational Leadership (X1) -> Motivation (Z) -> Patient Safety Culture (Y)	0.201	0.208	0.094	2.137	0.033
Teamwork (X2) -> Motivation (Z) -> Patient Safety Culture (Y)	0.186	0.190	0.091	2.033	0.042

Transformational leadership has a moderate effect on patient safety culture ($f^2 = 0.090$) and also a moderate effect on motivation ($f^2 = 0.125$), indicating its significant role in both enhancing motivation and improving patient safety culture. Likewise, teamwork has a moderate effect on both patient safety culture ($f^2 = 0.125$) and motivation ($f^2 = 0.106$), showing that effective teamwork positively influences staff motivation and safety practices. The strongest effect is found in the relationship between motivation and patient safety culture, with a large effect size ($f^2 = 0.967$), suggesting that motivation plays a highly significant role in promoting a strong patient safety culture (**Table 4**).

Table 4. Effect size (f^2) test results

Variabel	Patient Safety Culture (Y)	Transformational Leadership (X1)	Teamwork (X2)	Motivation (Z)
Patient Safety Culture (Y)				
Transformational Leadership (X1)	0.090			0.125
Teamwork (X2)	0.125			0.106
Motivation (Z)	0.967			

DISCUSSION

The findings suggest that transformational leadership contributes positively to the development of a patient safety culture (β = 0.184, p = 0.036), suggesting that leaders who articulate a clear safety vision and provide individualized support are instrumental in shaping a resilient safety culture. This interpretation aligns with international evidence showing that transformational leadership strengthens safety culture and safety practices by fostering trust, communication, and shared safety priorities among healthcare professionals (31,13). Such leadership not only promotes adherence to safety procedures but also nurtures psychological safety and a 'just culture', conditions that are known to encourage incident reporting and organizational learning in complex care settings (32,12). In a high-risk national infectious disease referral hospital such as SSIDH, the visible commitment of leaders to safety can reduce perceived threat and workload stress, thereby enhancing staff willingness to speak up about hazards and to engage in proactive safety behaviors.

Teamwork was established as a robust positive predictor of patient safety culture (β = 0.216, p = 0.007), indicating that stronger team cooperation is associated with more favorable safety norms and practices among healthcare professionals. This finding is consistent with international evidence that emphasizes teamwork and communication as central dimensions of patient safety culture and as key safeguards against communication breakdowns, a major contributor to adverse events in hospital care (18,20,33). In the context of complex infectious disease care, where tasks are highly interdependent and time-critical, interprofessional teams characterized by mutual respect, shared situational awareness, and clear information exchange provide an essential defense layer against human error, reinforcing the structural importance of teamwork in strengthening patient safety culture.

Crucially, Motivation was identified as the most influential predictor of patient safety culture in the model, indicating that higher motivational levels among healthcare professionals are closely linked with stronger safety norms and behaviors. This substantial effect supports the Self-Determination Theory perspective that motivation functions as a central psychological mechanism through which supportive leadership, teamwork, and work environments are translated into sustained effort and engagement toward safety-related goals (24,25). When healthcare providers experience autonomous motivation grounded in internalized values, a sense of purpose, and perceived competence they are more likely to persist in adhering to complex safety protocols and proactively contribute to error prevention, reinforcing motivation as a core driver of patient safety culture strength.

The study established that Motivation acts as a significant partial mediator in both the Leadership-to-PSC and the Teamwork-to-PSC relationships. This consistent partial mediation offers a critical management mandate: organizational inputs affect PSC not only directly but also indirectly by enhancing staff motivation. Transformational leaders and effective teams succeed not just through structural improvements, but because they inspire and motivate staff, and this resulting internal drive is what ultimately translates into superior safety performance. This structural model contributes uniquely to the literature by simultaneously testing this comprehensive, multi-path mechanism (TL → M → PSC and TC → M → PSC), identifying motivation as the single, critical pathway that must be targeted for sustainable PSC improvement.

In interpreting these findings, this study offers an incremental contribution to existing mediation models in the patient safety literature. Prior research has largely focused on the role of patient safety culture as an intermediary between transformational leadership and safety-related outcomes, without explicitly incorporating healthcare professionals' work motivation as an intermediate psychological mechanism (13,32). By demonstrating that motivation partially mediates the relationships of team cooperation and transformational leadership with patient safety culture in an infectious disease referral hospital in a lower-middle-income country, this study extends current models that are largely derived from general hospital settings in high-income contexts and provides context-specific evidence from Indonesia.

Study Limitation

This study acknowledges four primary limitations. First, the cross-sectional approach involved gathering data at one specific point in time, which allows examination of statistical associations but does not permit causal inference or capture changes in safety culture and motivation over time. Second, data collection relied solely on a self-report questionnaire, making the findings vulnerable to social desirability and common method bias, as respondents may have over-reported positive safety behaviours or leadership perceptions. Third, all participants were recruited from a

single national infectious disease referral hospital, which may limit the generalisability of the findings to other types of hospitals or healthcare systems with different organisational structures and resource constraints. Finally, the study focused on self-reported perceptions rather than objective safety outcomes (such as incident rates or harm indicators), so future research should integrate longitudinal designs, multi-site samples, and administrative safety data to provide a more comprehensive assessment of the proposed model.

CONCLUSION

Based on a comprehensive analysis of the structural model, this study draws nine key conclusions. The descriptive analysis revealed that all core variables transformational leadership, team cooperation, motivation, and patient safety culture were perceived by healthcare providers as being in the "moderate" category. Inferential testing provided robust support for the proposed model. Specifically, it was found that transformational leadership, team cooperation, and motivation collectively and significantly influence patient safety culture when examined simultaneously. Further analysis confirmed that Transformational Leadership, Team Cooperation, and Motivation each exert a positive and significant direct influence on Patient Safety Culture individually. These findings were supported by evidence that both transformational leadership and team cooperation also have a positive and significant influence on motivation. Crucially, the study established the mediating role of Motivation, confirming that it significantly mediates the influence of both transformational leadership on patient safety culture, and team cooperation on patient safety culture. In sum, while the overall safety climate remains moderate, the model demonstrates that motivation serves as the vital psychological pathway through which organizational leadership and teamwork effectively translate into improved patient safety behaviour and culture.

AUTHOR'S CONTRIBUTION STATEMENT

Conceptualization: SR, KRW, J; Methodology including design: SR, KRW, J, RK; Interpretation: SR, KRW, TS, FM; Writing - original Manuscript: SR, FM; Writing – review and editing: SR, TS, FM. All authors approve the manuscript before submission.

CONFLICTS OF INTEREST

The are no conflicts of interests.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The author utilizes Grammarly as a tool for enhancing the quality of written language throughout the manuscript drafting process.

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