

Improving Patient Safety through Nursing Handover Quality in Hospital Inpatient Wards: A PLS-SEM Analysis

*Improving Patient
Safety through
Handover Quality*

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ABSTRACT

Nursing management concept often prioritizes standard operating procedures over the psychological and interpersonal dynamics that are crucial in high-pressure workplaces. However, the problem that generally arises is at the concept execution stage. This study examines the relation of non-structural elements, particularly in patient safety performance, through individual resilience and leadership. With 201 nurses in the hospital purposively being studied and the results being analyzed through the Partial Least Squares Structural Equation Modeling (PLS-SEM), the results found that nurse resilience, safety climate, and leadership are the determinants of reinforcing team coordination ($R^2 = 0.534$) and organizational citizenship behavior ($R^2 = 0.559$). Care coordination ($\beta = 0.332$, $p < 0.001$) and organizational citizenship behavior ($\beta = 0.518$, $p < 0.001$) have significant impacts on handover quality, with OCB showing stronger impacts. The results suggest that the handover quality is the prominent variable that determines the quality of patient safety ($\beta = 0.618$; $p < 0.001$), which accounts for about 38% of the variation. Remuneration based on performance shows strengthening moderating effects ($\beta = 0.111$, $p = 0.022$), serving as an enabler that enhances the influence of care coordination on handover quality.

Keywords: Coordination of Care, Handover Quality, Patient Safety Climate, Patient Safety Performance, Teamwork Efficacy.

INTRODUCTION

Literature on patient safety management demonstrates that well-organized, regular handovers within an enabling work environment have a positive impact on the decrease in safety events and improved care coordination (Wong et al., 2019; Wibrandt & Lippert, 2020; Toren et al., 2022). The role of nurses in hospitals as important human capital in providing quality health services has been known for a long time (Ghosh et al., 2021). Proper hospital ward handovers ensure continuity of care and risk identification, while ineffective information transfer and poor collaboration can contribute to adverse events (Gu & Itoh, 2021).

Hospital management recognizes nursing handover as a critical point of care, as errors frequently cluster during shift transitions and pose major risks to patient safety (Donovan et al., 2020). Evidence shows that around 67% of communication failures occur during handoffs, with common problems including omitted vital signs, medication discrepancies, and missing contingency plans (Starmer et al., 2014; Humphrey et al., 2022). Interruptions are also widespread and strongly linked to incomplete information transfer (Ghosh et al., 2021). Nearly 80% of serious medical errors related to communication breakdowns have been reported during handovers, particularly in hospital wards. In Indonesia, these challenges are intensified by limited resources, high workloads, and inconsistent implementation of standardized procedures, highlighting the importance of strengthening handover practices to improve patient safety (Yetti et al., 2021).

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Although the importance and pitfall of handovers have not been completely disregarded in Indonesia (Siregar & Panjaitan, 2025) the majority of previous studies were inclined to consider its technical or procedural matters, like utilizing assistive equipment, communication patterns, or electronic platforms (Din et al., 2012; Tataei et al., 2023). However not that much on the human and organizational aspects that underlie the quality of the handover itself. Although handover practices are practiced within a dynamic nurse work environment, and high workloads, resource scarcity, and organizational culture concerning communication have a strong effect on the efficiency of the coordination process in inpatient wards (Redley & Waugh, 2018; Chien et al., 2022; Haliq & AlShammari, 2025). This disjuncture becomes even more applicable in the case of hospitals in developing nations, such as Indonesia, which have a lot of structural issues and pressure to work with.

Beyond human capital factors, research in organizational behavior highlights that nurses' personal traits are crucial for maintaining quality care under stressful conditions. Psychological resilience enables nurses to remain adaptive, focused, and professionally functional despite high work pressure and emotional demands (Campbell-Sills & Stein, 2007). Resilient nurses are better able to manage stress, sustain well-being, and recover from burnout, thereby supporting consistent nursing performance (Siregar & Panjaitan, 2025). However, resilience operates within a broader organizational context, where leadership, patient safety climate, and teamwork efficacy play equally important roles. Supportive nursing leadership and a positive safety climate encourage open communication, collaborative learning from errors, and interprofessional cooperation (Brubakk et al., 2021; Hessels et al., 2023). Likewise, strong confidence in team capabilities enhances coordination and communication quality, particularly in complex clinical environments requiring rapid decision-making (Deemer et al., 2022).

Organizational Citizenship Behavior (OCB) refers to voluntary extra-role actions that support organizational effectiveness, reflected in nurses' helpfulness, loyalty, and responsibility in maintaining a supportive work environment (Rizki et al., 2025; Sugiarti, 2025; Yuningsih et al., 2025). Nurses with high OCB are more likely to assist coworkers, share critical information, and ensure effective handovers even under challenging conditions (Shimamura et al., 2021; Fatah et al., 2024). Thus, OCB may function as a key behavioral mechanism linking leadership, safety climate, and teamwork effectiveness to handover quality. In addition, reward systems such as performance-based remuneration can further motivate nurses to maintain high standards of coordination and communication when implemented fairly according to job complexity and risk. Evidence from Indonesian hospitals indicates that clear remuneration policies are positively associated with healthcare workers' job satisfaction and performance, which may ultimately strengthen handover quality and patient safety outcomes (Wahyuhadi et al., 2023). To address that issue, this quantitative survey-based study contributes to the literature by developing a multidimensional conceptual model that incorporates these factors into one analytical model. The research attempts to map both direct and indirect relationships between the variables using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, which explains how a compound of individual, organizational, behavioral, and system domains determines the handover quality toward patient safety in a simultaneous manner.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Effects on Coordination of Care

Nurse resilience refers to nurses' capacity to adapt to work pressure, regulate emotions, and sustain consistent performance in delivering care (Hart et al., 2014; Cooper et al., 2020). In hospital environments characterized by high workload and frequent shift transitions, resilience becomes a crucial personal resource that supports continuity and coordination of care. Resilient nurses are better able to manage stress, maintain effective communication, and ensure that patient information is accurately conveyed across teams. Prior research by Chien et al. (2022) confirms that individual attributes such as resilience

significantly enhance continuity of patient care in dynamic clinical settings. Therefore, higher nurse resiliency is expected to strengthen coordination of care, particularly during handovers and inter-shift collaboration.

Beyond individual factors, organizational and team-level conditions are equally important in promoting effective care coordination (Schwartz et al., 2019). Perceived nursing leadership contributes to a supportive work environment by fostering communication, cooperation, and structured coordination processes among nurses. Strong clinical leadership has been consistently linked to improved care coordination and smoother shift handovers, ensuring seamless transfer of patient information (Wong et al., 2019). Similarly, patient safety climate reflects the extent to which hospitals emphasize open communication, reporting, and interprofessional collaboration. A positive safety climate encourages nurses' commitment to maintaining safe and coordinated care, while reducing the likelihood of errors during transitions. Empirical evidence shows that supportive safety cultures enhance team coordination and minimize risks of miscommunication (Bressan et al., 2020). In addition, teamwork efficacy, nurses' shared belief in their team's ability to work effectively, plays a critical role in care alignment. Teams with high collective self-efficacy engage more actively in information sharing and collaborative decision-making, leading to more efficient service coordination and fewer communication breakdowns (Din et al., 2012).

H1: Nurse resiliency has a positive effect on coordination of care.

H2: Perceived nursing leadership has a positive effect on coordination of care.

H3: Patient safety climate has a positive effect on coordination of care.

H4: Teamwork efficacy has a positive effect on coordination of care.

The Effect on Organizational Citizenship Behavior

Nurse resiliency plays a critical role in fostering Organizational Citizenship Behavior (OCB) within hospital settings. Resilient nurses possess strong intrinsic motivation and psychological adaptability, enabling them to exceed formal job requirements by assisting colleagues, proactively sharing information, and maintaining effective communication during handovers (Hassan & Elsayed, 2025). These discretionary behaviors are particularly important in complex healthcare environments where teamwork, flexibility, and sustained collaboration are essential for service continuity. Empirical evidence confirms that nurses with higher resilience are more likely to engage in extra-role behaviors that enhance team effectiveness and support patient safety outcomes (Bressan et al., 2020). Thus, resiliency provides nurses with the internal resources needed to contribute voluntarily to organizational functioning, especially under high-pressure clinical demands, indicating a positive relationship between resilience and OCB.

Beyond individual capacity, organizational and relational contexts also shape nurses' willingness to demonstrate OCB. Perceived nursing leadership is a key determinant, as effective leaders encourage collaborative cultures and inspire nurses to engage in supportive actions that strengthen team performance and patient safety practices (Toren et al., 2022). Likewise, a positive patient safety climate characterized by open communication, mutual trust, and shared responsibility motivates nurses to go beyond their assigned duties. Research by Gu et al. (2021) shows that supportive safety cultures are directly associated with higher levels of nurse OCB, including voluntary assistance and proactive information exchange. Furthermore, teamwork efficacy reinforces these behaviors, as nurses who believe in their team's collective competence are more inclined to support colleagues and contribute beyond role expectations. High-efficacy teams demonstrate stronger solidarity and greater willingness to make personal contributions toward shared objectives (Redley & Waugh, 2018; Irfana et al., 2023).

H5: Nurse resiliency has a positive effect on organizational citizenship behavior.

H6: Perceived nursing leadership has a positive effect on organizational citizenship behavior.

- H7: Patient safety climate has a positive effect on organizational citizenship behavior.
H8: Teamwork efficacy has a positive effect on organizational citizenship behavior.

The Effect of Coordination of Care and Organizational Citizenship.

Care coordination in nursing refers to the deliberate alignment and integration of patient care activities among all members of the healthcare team to ensure that patients' needs and preferences are met throughout the care process. It involves continuous communication, shared situational awareness, and mutual accountability, which collectively help nurses maintain a common understanding of a patient's condition, treatment plan, and anticipated outcomes. A strong coordination framework supports the accuracy and completeness of information exchanged during shift handovers, which are critical transition points in patient care. Clear and structured handovers reduce the likelihood of missed information, improve consistency of treatment across providers, and ultimately enhance patient safety. Empirical findings indicate that when coordination practices are well established, nurses are better able to organize and communicate complex clinical details, leading to more reliable and safer transfers of responsibility between shifts (Bukoh & Siah, 2020).

Alongside formal coordination mechanisms, Organizational Citizenship Behavior (OCB) plays a significant role in elevating the quality of handovers. OCB refers to discretionary, non-mandated behaviors such as spontaneously assisting coworkers, offering extra information during interactions, and voluntarily engaging in teamwork beyond formal job requirements. Nurses who demonstrate citizenship behaviors contribute to a richer informational environment during handovers by ensuring that relevant observations, concerns, and contextual nuances are shared even when not strictly required by policy. Prior research highlights that such discretionary contributions can bridge communication gaps that otherwise occur in busy clinical settings, enhancing collective understanding and decreasing error risk (Chien et al., 2022). Taken together, effective care coordination practices and high levels of OCB create a culture of shared responsibility and comprehensive communication, leading to more coherent and safer handover practices.

- H9: Coordination of care has a positive effect on handover quality.
H10: Organizational citizenship behavior has a positive effect on the handover quality.

Performance-Based Remuneration as a Moderator Variable

Performance-based remuneration systems are compensation models that provide financial incentives tied to measurable indicators of performance, including quality of care, teamwork, communication practices, and clinical outcomes. In the context of nursing, these systems are designed to encourage adherence to best practices, reinforce accountability, and motivate continuous improvement in daily clinical activities. When implemented equitably, performance-based incentives can strengthen nurses' commitment to high-quality care coordination by acknowledging both the complexity and clinical responsibility associated with effective patient transitions. Rather than simply rewarding volume or task completion, well-structured remuneration frameworks can align compensation with meaningful contributions to patient safety and collaboration, which in turn supports procedural compliance and teamwork across shifts (Toren et al., 2022).

Importantly, performance-based pay not only reinforces formal coordination practices; it can also influence nurses' engagement in Organizational Citizenship Behaviors (OCB). Although OCB is inherently voluntary and not contractually required, research shows that when extra role behaviors such as helping colleagues, sharing detailed patient knowledge, or actively participating in collaborative problem solving are recognized and valued within a reward system, employees are more likely to continue exhibiting these behaviors. Specifically, nurses who perceive that their discretionary contributions are observed and equitably rewarded tend to sustain higher levels of proactive

communication and cooperative behavior during handovers (Bressan et al., 2020). By making the connection between extraoral performance and tangible recognition, remuneration systems can amplify the positive effects of OCB on shift communication and ultimately strengthen the overall quality and safety of patient handovers.

H11: Performance-based remuneration moderates the positive effect of coordination of care on handover quality.

H12: Performance-based remuneration moderates the positive effect of organizational citizenship behavior on handover quality.

The Effect of Handover Quality on Patient Safety Performance

The handover quality is essential in ensuring that nurses receive complete, accurate, and clear information when taking over responsibility for patient care in the next shift. High-quality handovers support continuity of care by reducing misunderstandings, preventing omissions, and ensuring that critical patient details are communicated effectively. As a result, effective handover practices play a key role in minimizing patient safety incidents and strengthening overall safety outcomes within hospital settings. Empirical evidence shows that structured and standardized handover interventions consistently improve communication processes and contribute to safer clinical environments (Wibrandt & Lippert, 2020; Tataei et al., 2023). Therefore, the higher the handover quality, the stronger the foundation for maintaining safe and coordinated patient care.

Moreover, successful handover quality is directly associated with enhanced patient safety performance because the effectiveness of shift-to-shift communication significantly influences the reduction of medical errors (Mardis et al., 2017). When nurses are able to transfer patient information in a systematic and reliable manner, they are better equipped to make appropriate clinical decisions and respond promptly to patient needs. Prior research confirms that improved handover communication contributes to fewer adverse events and higher safety performance by limiting preventable mistakes in care delivery (Gu et al., 2021).

H13: Handover quality has a positive effect on patient safety performance.

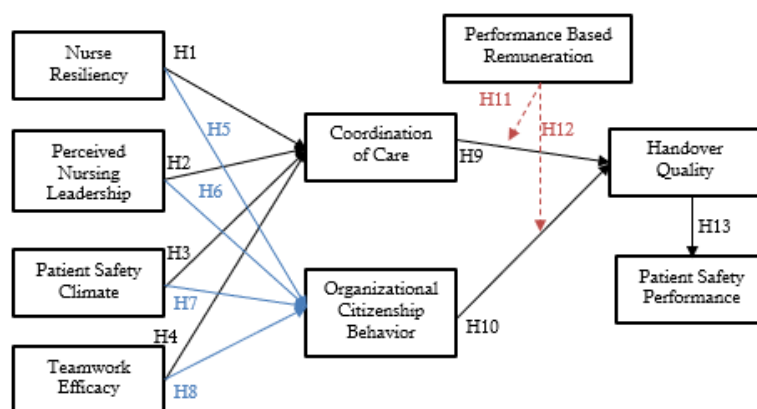


Figure 1. Conceptual Framework

The following Figure 1 explains the aim of this research model, which is to determine the relationship between individual factors, organizational factors, and incentive systems to enhance performance on patient safety in hospitals, especially in the inpatient units. Personally, the major point of concern is nurse resilience. The psychologically resilient nurses can provide more consistent service delivery when faced with a stressful environment, and the coordination of care can be implemented more effectively (Campbell-Sills & Stein, 2007). In addition, Nurse resilience also plays a role in promoting

OCB, as the resilient nurses are also likely to be active in assisting the team even when burdened with a load of work in the ward.

RESEARCH METHODS

This study employed a quantitative survey design with a cross-sectional approach, following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations, in which data were collected at a single point in time to examine relationships among variables (Ghaferi et al., 2021). Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with a two-stage joint modeling procedure (Hair et al., 2021).

The study population consisted of nurses working in the inpatient units of three hospitals. Respondents were selected through purposive sampling based on having at least one year of work experience, direct involvement in the handover process, and willingness to participate. Although power analysis (GPower) indicated a minimum sample requirement of 98, the target was extended to 150–200 participants to ensure more stable model estimation. Data were collected using a structured online questionnaire administered via Google Form, applying a five-point Likert scale (1–5). The instrument was adapted from validated measures in prior studies, modified to fit the inpatient nursing context, and distributed with informed consent procedures to ensure confidentiality and data privacy.

Nurse resilience was measured using indicators adapted from the Connor–Davidson Resilience Scale (CD-RISC) developed by Campbell-Sills and Stein (2007), covering adaptability to change, persistence under workload, stress coping ability, emotional stability in emergencies, and confidence in fulfilling professional nursing roles. Teamwork efficacy was assessed based on the leadership/teamwork self-efficacy Scale by Deemer et al. (2022), including confidence in teamwork, support among colleagues, compliance with senior guidance, self-confidence as a team member, and leadership support in enhancing team performance. Perceived nursing leadership was evaluated using a modified Head Nurse Role Leadership Scale (HNRLS) from Guo et al. (2023), measured through planning ability, staff motivation, role modeling for patient safety, decisiveness, and control of work processes.

Patient safety climate was measured using dimensions from the Safety Attitudes Questionnaire (SAQ) applied by Brubakk et al. (2021), including safety awareness, error reporting, error handling, communication effectiveness, feedback provision, and a learning-from-errors culture. Care coordination indicators used focus on patient follow-up, completeness of medical data, medication review, cross-unit communication, and interprofessional collaboration. Organizational citizenship behavior was assessed based on Shimamura et al. (2021), covering willingness to help colleagues, accountability, focus at work, adherence to organizational rules, and maintaining workplace order. Performance-based remuneration, as a moderating variable, was measured using perceptions of pay suitability relative to case complexity, work risk, urgency, and responsibilities. The handover quality was measured using indicators focusing on the completeness and clarity of information, communication support, continuity of care, and the relevance of information transfer. Patient safety performance was assessed using indicators from the AHRQ HSOPSC 2.0, including teamwork for safety, non-punitive incident reporting, accurate handoffs, management support, and learning responses to errors.

Analysis stages using SmartPLS 4 included testing the outer model, including indicator and construct reliability, convergent and discriminant validity, and the inner model, including the VIF test, bootstrapping with 5,000 resampling, evaluation of R^2 , f^2 , Q^2 , and moderation analysis on the relationship between coordination of care and OCB on handover quality. Additionally, Importance–Performance Map Analysis (IPMA) was conducted in SmartPLS 4 to identify which constructs and indicators had the greatest impact on handover quality while highlighting areas requiring improvement.

RESULTS

Table 1 illustrates the demographic characteristics of the 201 nursing professionals who participated in this study. The proportion of gender is largely feminine as it represents 87.06 percent of the entire sample, a characteristic of the workforce in the nursing sector. The majority of the respondents, in age terms, are in the age group of 35-44 years (46.27), followed by those who are in the age group of 25-34 years (38.81). It means that most of the sample is represented by mature professionals who are in their most fruitful years. As to their professional status, a large majority (69.65) of them are permanent workers, with 30.35% in a contract or temporary job. Moreover, the tenure information has shown a very experienced group, as 47.26 percent of the respondents have over six years of service. Such experience is crucial to the purpose of the study since the nurses of this level are extremely familiar with inpatient ward protocols, handover procedures, and organizational patient safety climate.

Table 1. Respondent Profile

Characteristics	Category	Frequency (n)	Percentage (%)
Gender	Female	175	87.06
	Male	26	12.94
Age	20 - 25 years old	4	1.99
	25 – 34 years old	78	38.81
	35 – 44 years old	93	46.27
	45 – 54 years old	23	11.44
	≥ 55 years old	3	1.49
Marital Status	Married	147	73.13
	Single	54	26.87
Employment Status	Permanent Employee	140	69.65
	Contract / Temporary	61	30.35
Tenure (Length of Service)	< 1 Year	4	1.99
	1 – 3 Years	46	22.89
	4 – 6 Years	56	27.86
	> 6 Years	95	47.26
Total		201	100

Table 2. Validity and Reliability

Variables	Code	Outer Loadings	Mean	CA	Rho_A	Rho_C	AVE
Nurse Resiliency	NR1	0.875	4.162	0.855	0.859	0.912	0.775
	NR2	0.917					
	NR3	0.848					
Team-Work Efficacy	TWE1	0.925	4.080	0.878	0.885	0.925	0.808
	TWE2	0.883					
	TWE3	0.882					
Perceived Nursing Leadership	PNL1	0.761	3.938	0.739	0.742	0.852	0.658
	PNL2	0.865					
	PNL3	0.805					
Patient Safety Climate	PSC1	0.874	4.133	0.846	0.853	0.907	0.764
	PSC2	0.864					
	PSC3	0.884					
Coordination of Care	COC1	0.724	4.130	0.784	0.787	0.860	0.606
	COC2	0.809					
	COC3	0.798					
	COC4	0.782					
Organizational Citizenship Behavior	OCB1	0.818	4.118	0.884	0.885	0.920	0.742
	OCB2	0.866					
	OCB3	0.889					
	OCB4	0.873					
Handover quality	QH1	0.882	4.196	0.907	0.907	0.935	0.780
	QH2	0.844					
	QH3	0.915					
	QH4	0.898					
	PSP1	0.772	3.899	0.745	0.753	0.838	0.565

Variables	Code	Outer Loadings	Mean	CA	Rho_A	Rho_C	AVE
Patient Safety Performance	PSP2	0.757	3.627	0.823	0.826	0.883	0.653
	PSP3	0.708					
	PSP4	0.768					
Performance-Based Remuneration	PBR1	0.812	3.627	0.823	0.826	0.883	0.653
	PBR2	0.833					
	PBR3	0.792					
	PBR4	0.794					

Table 2 contains the list of constructs and indicators that have passed the construct reliability and validity test. The visual explanation of the connection between the variables and the loading of the indicators can be observed further in the outer model in Figure 2.

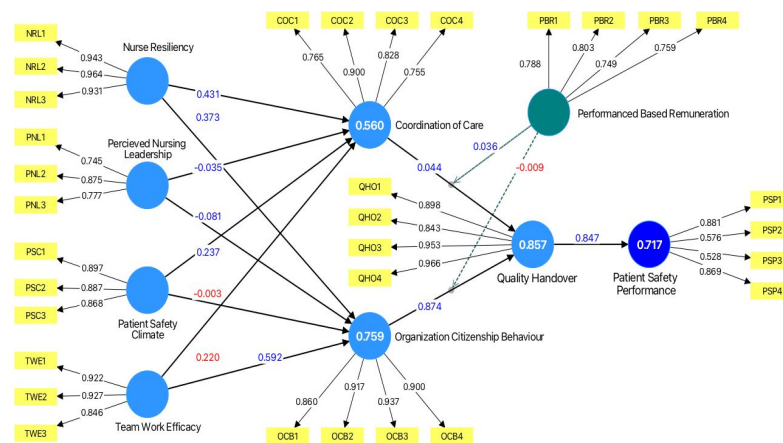


Figure 2. Outer Model

The testing of the measurement model indicated that all the constructs were satisfactory in terms of reliability and validity before structural testing was done. The majority of the indicators used showed high indicator reliability with the outer loadings of over 0.50, and even those with slightly smaller values, such as the COC1 (0.722) and PSP3 (0.708), were found to be well above the acceptable value, hence retained to maintain the content validity of the model. This solid backbone measurement was also followed by the internal consistency reliability, in which Cronbach's Alpha (α), rho_a, and Composite Reliability (rho_c) of all the constructs exceeded the mark of 0.70. Notably, the highest reliability was observed in handover quality ($\alpha = 0.910$; CR = 0.936) and teamwork efficacy ($\alpha = 0.877$; CR = 0.925). These outcomes, along with the Average Variance Extracted (AVE), which is above 0.50, with the highest value being in teamwork efficacy (0.808) and handover quality (0.780), confirm the full establishment of convergent validity.

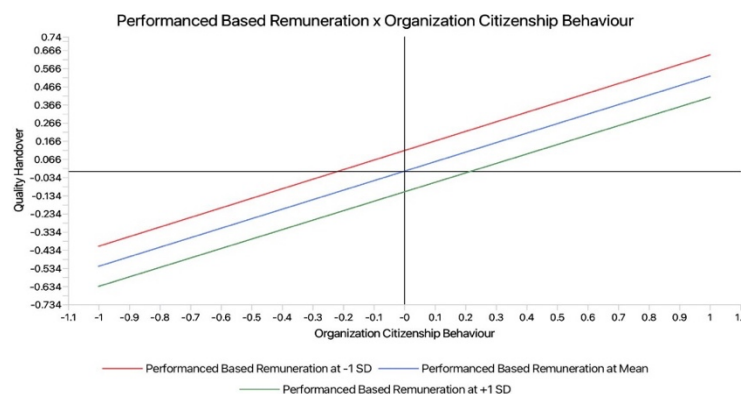


Figure 3. Simple Slope Analysis of PBR as a Moderator

As shown in the simple slope analysis in Figure 3, the model had a significant level of explanatory power as the R^2 values of the main endogenous constructs showed: organizational citizenship behaviour (0.559), handover quality (0.541), and coordination of care (0.534). These values show that these predictors in the model explain over 50 percent of the variation in these essential nurse outcomes. One of the main results of this step was the fact that performance-based remuneration was identified as a significant moderator of the positive effect of coordination of care on handover quality ($\beta = 0.111$, $p = 0.022$). This implies that where nurses feel that performance is strongly related to rewards, the effectiveness of care coordination in improving the handover quality is greatly enhanced.

It is depicted that individual and organizational factors contribute significantly to encouraging collaborative behaviors among nursing staff. Based on Table 3, nurse resiliency was identified to make a substantial positive contribution to coordination of care ($\beta = 0.220$, $p = 0.003$) and OCB ($\beta = 0.244$, $p = 0.008$). On the same note, perceived nursing leadership proved to be a strong predictor that affects coordination of care ($\beta = 0.398$, $p < 0.001$) and OCB ($\beta = 0.279$, $p < 0.001$) significantly.

Table 3. Significance & Coefficients

Hypotheses	Standardized Coefficient	Confidence Interval (5% – 95%)	p-value	Decision	f ²
Nurse Resiliency -> Coordination of Care	0.220	0.091 - 0.355	0.003	Supported	0.052
Nurse Resiliency -> OCB	0.244	0.084 - 0.421	0.008	Supported	0.057
Perceived Nursing Leadership -> Coordination	0.398	0.271 - 0.509	0.000	Supported	0.174
Perceived Nursing Leadership -> OCB	0.279	0.149 - 0.416	0.000	Supported	0.081
Patient Safety Climate -> Coordination	0.168	0.082 - 0.256	0.001	Supported	0.041
Patient Safety Climate -> OCB	-0.008	-0.089 - 0.088	0.441	Not Supported	0.000
Teamwork efficacy -> Coordination	0.091	-0.049 - 0.235	0.144	Not Supported	0.010
Teamwork efficacy -> OCB	0.313	0.112 - 0.493	0.003	Supported	0.106
Coordination of Care -> Quality Handover	0.332	0.224 - 0.447	0.000	Supported	0.175
OCB -> Quality Handover	0.518	0.398 - 0.642	0.000	Supported	0.423
Quality Handover -> Safety Performance	0.618	0.547 - 0.691	0.000	Supported	0.617
PBR x Coordination -> Quality Handover	0.111	0.02 - 0.202	0.022	Supported	0.024
PBR x OCB -> Quality Handover	-0.003	-0.11 - 0.076	0.478	Not Supported	0.000

These results indicate that team synergy is based on supportive leadership and personal psychological resources. Moreover, the patient safety climate had a significant effect on the coordination of care ($b = 0.168$, $p < 0.001$), but it did not have a significant effect on OCB ($\beta = 0.441$). On the other hand, teamwork efficacy was revealed to create a significant support of OCB ($\beta = 0.313$, $p = 0.003$), but the impact of teamwork efficacy on coordination of care was also statistically insignificant ($p = 0.144$). This subtlety shows that voluntary prosocial actions may be more easily driven by inner confidence of a team despite the structured coordination facilitated by the safe climate. More importantly, this study establishes the fact that coordination of care ($\beta = 0.332$, $p < 0.001$) and OCB ($\beta = 0.518$, $p < 0.001$) are crucial antecedents of handover quality. The efficiency of the handover process, in its turn, turned out to be the most relevant motivator of Patient

Safety Performance ($\beta = 0.618, p < 0.001$), and the clinical communication gap is where safety risks are best addressed by means of the handover process.

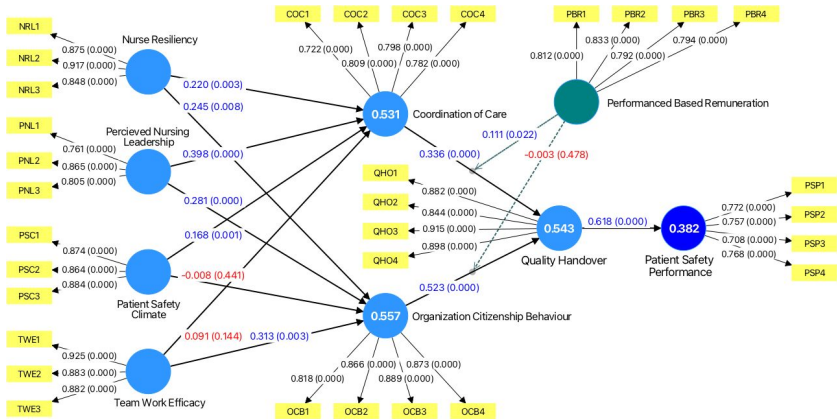


Figure 4. Bootstrapping results showing Path Coefficients and Significance

Based on Figure 4, in terms of the moderating effects of the performance-based remuneration, the interaction effect enhanced the relationship between coordination of care and handover quality ($\beta = 0.111, p = 0.022$). Nevertheless, no significant moderate effect of PBR on the relationship between OCB and handover quality was found ($p = 0.478$). This indicates that financial rewards are effective in sparking organized collaborative actions but less so on the more informal, voluntary citizenship actions in clinical communication environments.

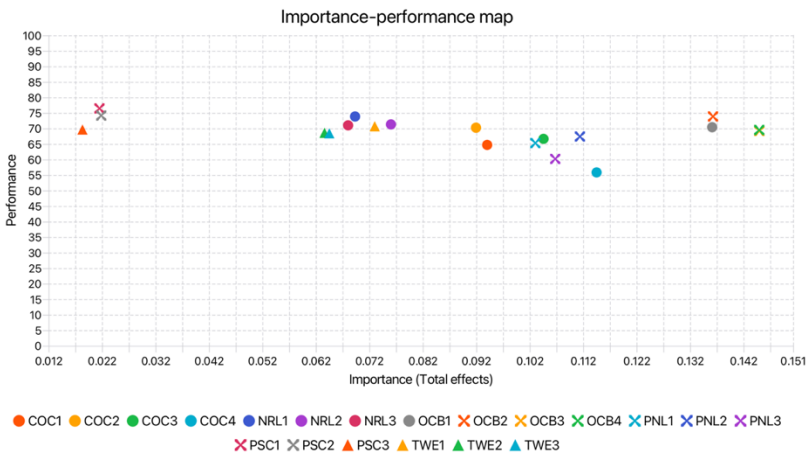


Figure 5. IPMA Map

Table 5 shows the findings of the Importance-Performance Map Analysis (IPMA), which gives very important information on the prioritization of interventions in an organization (Ringle & Sarstedt, 2016). The IPMA findings show that handover quality is the most important end part of the chain among other factors. Nevertheless, considering the antecedent factors, nurse resiliency was the major driving force of the model. It has the best importance score of 0.711, but the performance at this moment is on average 54.94. The moderate performance (54.94) but high importance of nurse resiliency (0.711) indicates that hospitals are supposed to put much emphasis on the development of psychological capital as compared to technical SOPs, as postulated by Labrague (2021), which states resilience as a dynamic process that ensures situational readiness within high-pressure settings.

In addition, the coordination of care construct had shown meaningfulness (0.406) and a performance level of 56.55, which indicated that team activities needed to be

synchronized more. PBR recorded the lowest score of 47.67 on the performance rating. As a manager, this raises a red flag, which implies that existing incentives might not be in line with nursing requirements. Although the direct impact of PBR is low (0.061), its moderating effect, as demonstrated in the structural model, is a strategic lever to lubricate the wheels of care coordination.

The strategy of development based on this map should be largely focused on nurse resiliency and OCB. The two variables are high in importance, although they are yet to achieve their potential. The targeted initiatives, including peer support networks or coping strategies workshops, would have a disproportionately high effect on the general patient safety. This confirms the idea that professional resilience is a multilevel process that needs to be combined at the individual, team, and organizational levels. The emphasis on these softer organizational elements offers a more long-term competitive edge in continuing to offer patient care of high standards as compared to the scenario of technical protocols.

DISCUSSION

This study provides comprehensive insights into the interconnections between individual resilience, organizational factors, and patient safety outcomes, emphasizing the critical role of structured communication in clinical settings. The finding that care coordination and OCB do not automatically translate into high-quality handovers challenges traditional linear models of organizational behavior in healthcare, where positive individual or team behaviors were assumed to directly result in improved outcomes. This aligns with previous research suggesting that personal and organizational inputs require proper structural and system support to influence clinical results effectively (Bukoh & Siah, 2020; Chien et al., 2022). The strong direct effect of handover quality on patient safety performance ($\beta = 0.618$, $p < 0.001$) confirms that accurate, structured, and continuous transfer of patient information is indispensable for achieving desired safety outcomes, consistent with Wibrandt and Lippert (2020) and Tataei et al. (2023), who reported that structured handover interventions consistently improve patient safety in hospital settings.

Interestingly, while both care coordination and OCB significantly influence handover quality, OCB exhibits a stronger effect. This suggests that voluntary and proactive behaviors, such as assisting colleagues, sharing additional information, and ensuring continuity of care, exert a more powerful influence on communication quality than formal coordination alone. This finding aligns with Bressan et al. (2020) and Chien et al. (2022), who highlighted that extra-role behaviors are critical in reducing miscommunication during shift transitions.

The Importance-Performance Map Analysis (IPMA) further highlights strategic implications for healthcare management. Nurse resilience emerged as the most important factor (0.711) but showed only moderate performance (54.94), indicating a critical opportunity for organizational intervention. This underscores the limitations of conventional healthcare management practices, which often emphasize technical processes and equipment over psychological capital development. Resilience is consistent with Conservation of Resources Theory, which posits that psychological resources enable sustained functioning under stress (Campbell-Sills & Stein, 2007). Beyond surviving high-pressure clinical environments, resilient nurses maintain effective care coordination and communication, confirming prior findings that nurse resilience enhances both OCB and coordination of care (Bressan et al., 2020; Chien et al., 2022).

Effective nursing leadership also plays a critical role, with perceived leadership strongly influencing both coordination ($\beta = 0.398$, $p < 0.001$) and OCB ($\beta = 0.279$, $p < 0.001$). These findings support transformational leadership theory, which emphasizes that motivational, inspiring, and supportive leaders create environments where formal coordination and voluntary behaviors thrive (Wong et al., 2019; Toren et al., 2022). Leadership had a stronger effect on formal coordination than OCB, suggesting that leadership directly optimizes structured workflows, while also cultivating conditions for extra-role behaviors to emerge. Transformational leaders establish psychological safety,

enabling nurses to share sensitive patient information freely, question processes, and report concerns, which is essential for the transfer of responsibility, care plans, and situational awareness during handovers (Hartmann et al., 2020; Hillmann & Guenther, 2020).

The study also revealed differential influences of patient safety climate and teamwork efficacy. Safety climate positively impacted coordination ($\beta = 0.168$, $p = 0.001$) but not OCB, whereas teamwork efficacy significantly influenced OCB ($\beta = 0.313$, $p = 0.003$) but not formal coordination. This suggests that structured safety systems drive formal care processes, while collective efficacy fosters voluntary helping behaviors (Redley & Waugh, 2018; Brubakk et al., 2021). Managers should therefore adopt targeted interventions: improving safety climate through clear reporting structures, positive feedback, non-punitive error reporting, and safety training (Kim & Windsor, 2015; Weller et al., 2024).

Performance-based remuneration emerged as a significant moderator of the relationships between coordination, OCB, and handover quality ($\beta = 0.111$, $p = 0.022$). In line with Expectancy Theory, nurses are more motivated when their efforts are recognized and translated into valuable rewards (Toren et al., 2022). However, Self-Determination Theory cautions that poorly designed external rewards can undermine intrinsic motivation if perceived as controlling rather than supportive. The relatively low PBR performance score (47.67) suggests that current remuneration practices may lack transparency, fairness, or alignment with workload, highlighting the need for careful design to reinforce motivation while preserving professional commitment. The pivotal role of handover quality as a predictor of patient safety performance is reinforced by its capacity to explain approximately 38% of the variance in outcomes. These findings echo earlier studies by Wibrandt and Lippert (2020) and Tataei et al. (2023) and support the prioritization of interventions that integrate psychological, organizational, and structural dimensions to maximize patient safety outcomes.

CONCLUSION

This study provides an empirical examination of factors influencing patient safety performance, focusing on nurse resiliency, OCB, and care coordination. The PLS-SEM results indicate that the model explains 55.7% of the variance in OCB, 53.1% in care coordination, and 54.3% in handover quality. Handover quality emerged as the strongest predictor of patient safety performance, highlighting that effective communication during shift transfers directly impacts safety outcomes. Nurse resiliency and perceived nursing leadership were identified as primary drivers of coordination and OCB, with leadership showing a particularly strong influence ($\beta = 0.398$, $p < 0.001$). Performance-based remuneration functioned as a moderator, enhancing the effect of care coordination on handover quality, while IPMA highlighted nurse resiliency and PBR as critical areas needing organizational focus.

These findings have practical implications for hospital management. Strengthening nurse resiliency through targeted programs should be prioritized, alongside investments in transformational leadership development. Improving team efficacy and fostering a positive safety climate can further enhance OCB and care coordination, maximizing the effectiveness of interventions. Enhancing the handover quality should be central to patient safety strategies, and redesigning PBR systems can optimize coordination without undermining intrinsic motivation. Collectively, these integrated approaches demonstrate that combining personal, organizational, and structural support is essential for improving patient safety outcomes.

Despite these insights, the study has limitations. Its cross-sectional design limits causal inference, and the focus on private hospitals may restrict generalizability to public settings. Future research could employ longitudinal or mixed-methods designs to explore the nuanced relationships between incentives, coordination behaviors, and communication effectiveness. Additionally, experimental evaluation of resilience-building and leadership interventions would provide stronger evidence for implementation in healthcare organizations.

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