

Patient Safety Culture and Competence among Nurses: A Multicenter Cross-Sectional Study in Vietnam

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Abstract: Patient safety remains a key issue in developing countries, where limitations in resources and safety systems may compromise the quality of care. Limited evidence exists on nurses' safety culture and competence in Vietnam. This study examined these aspects, their associated factors, and their interrelationship. A cross-sectional survey was conducted from September to December 2024 in three provincial hospitals in central Vietnam. Five hundred ninety-four registered nurses working in inpatient departments of three Level I provincial hospitals in central Vietnam completed two instruments: the Hospital Survey on Patient Safety Culture and the Health Professional Education in Patient Safety Survey. Statistical analyses involved descriptive methods, non-parametric procedures, Spearman's rank correlation, and generalized linear models.

Findings revealed moderately favorable assessments of safety culture and high competence levels. Strong domains included teamwork, continuous learning, feedback on errors, and communication, whereas the lowest-scoring elements related to blame-oriented responses to mistakes, staffing adequacy, and handoff processes. Education level, department, night-shift frequency, and incident-reporting behavior all showed significant associations with both patient safety culture and competence. These results indicate the importance of developing strategies that concurrently enhance organizational culture and individual competence. Supportive leadership, adequate staffing, and continuous professional development may contribute to improvements in patient safety in hospitals. Future research should explore causal pathways and evaluate interventions that strengthen both safety culture and competence.

Keywords: Competence, Culture, Education, Health professionals, Nurses, Patient safety, Vietnam

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Introduction

Ensuring safe patient care has become a global priority and is central to improving the quality of health services. Reports from the World Health Organization (WHO) indicate that millions of safety-related incidents take place worldwide each year, resulting in an estimated 2.6 million deaths that could have been prevented, with the majority occurring in countries with low and middle incomes.¹ These events are often linked to suboptimal organizational systems, limited learning from errors, and inconsistent patient safety competence (PSCp) among healthcare professionals.²

Nurses, as the largest workforce in hospitals, play a pivotal role in ensuring continuous patient care and surveillance. Strengthening both patient safety culture (PSC) at the organizational level and PSCp at the individual level is therefore considered a key strategy to reduce adverse events and improve care outcomes.^{3,4} PSC reflects the overall norms and day-to-day practices within a healthcare organization that shape how staff prioritize safe care in their clinical work. The Hospital Survey on Patient Safety Culture (HSOPSC), developed by the U.S. Agency for Healthcare Research and Quality (AHRQ), is a widely used instrument for assessing organizational aspects of PSC.⁵ In contrast, PSCp represents the set of competencies, including knowledge, technical skills, and attitudes, that support safe patient care, and is most often assessed with the Health Professional Education in Patient Safety Survey (H-PEPSS).⁶

International studies have demonstrated a positive association between PSC and PSCp.^{7,8} In Vietnam, a study using the HSOPSC has identified weaknesses in staffing, communication, and responses to errors.⁹ These issues are particularly evident in Level I provincial hospitals in central Vietnam, where workforce shortages, heavy workloads, limited incident-reporting systems, and insufficient training in risk management remain persistent challenges. Such

constraints have contributed to the underreporting of adverse events and variability in safety practices across clinical departments.^{10,11} Weaknesses in both organizational safety culture and individual safety competence may lead to preventable errors, compromising patient outcomes and overall care quality. Strengthening both organizational and personal dimensions of safety is therefore critical to improving patient outcomes and healthcare quality in this context. In addition, no study has simultaneously applied the HSOPSC and the H-PEPSS to comprehensively assess both PSC at the organizational level and PSCp at the individual level among nurses. Thus, this study intended to fill this gap and to contribute evidence to guide educational interventions and hospital policies aimed at strengthening patient safety at both the organizational and individual levels.

Literature Review and Conceptual Framework

This study employed the Integrated Patient Safety Culture–Competence Framework, which was developed by drawing on established models of patient safety culture and competence.^{7,16} These models suggest that demographic and organizational characteristics—including age, gender, education, years of experience, and unit of practice—can influence both patient safety culture (PSC) and patient safety competence (PSCp).^{7,16} The framework assumes that a stronger organizational safety culture is positively associated with higher safety competence among healthcare providers. This framework is further aligned with the Donabedian Structure–Process–Outcome Model.¹⁷ In this study, *Structure* refers to organizational and demographic characteristics; *Process* represents the implementation of PSC and PSCp; and *Outcome* evaluates how effectively these processes contribute to achieving patient safety goals. Additionally, the framework integrates concepts from Reason’s Swiss

Cheese Model,¹⁸ which illustrates how errors arise when multiple system defenses fail due to latent conditions. Within this study's context, organizational structure and safety culture function as layers of defense that can either prevent or permit safety failures.

PSC describes the shared mindset and customary ways of working in a healthcare organization that influence how individuals and teams prioritize, discuss, and respond to patient-safety issues.⁵ PSC is a foundational element in creating a safe healthcare environment, encompassing the shared values, beliefs, and behaviors that prioritize safety in daily clinical practice. The HSOPSC focuses on key domains of safety culture, including teamwork, openness in communication, adequate staffing, learning from feedback on errors, and attitudes that avoid blaming staff for mistakes.⁵ A strong PSC promotes incident reporting, reduces blame, and fosters continuous improvement.⁶ Leadership and a non-punitive culture are central to strengthening PSC, as they foster transparency, encourage reporting, and support staff learning.⁷

PSCp describes the combination of knowledge, practical skills, and attitudes that healthcare providers need to provide care safely. Previous studies have identified multiple factors influencing PSC and PSCp, including leadership, workload, teamwork, and communication.^{8,12} The H-PEPSS evaluates essential competencies related to patient safety, focusing on how healthcare professionals work together, communicate, manage risks, and respond to safety concerns in practice.⁸ High PSCp enhances collaboration, communication, and proactive risk management, thereby improving outcomes.⁶ Beyond technical skills, PSCp also involves self-confidence and safety attitudes. Nurses who feel more capable and efficacious are generally more willing to report errors and engage in safety initiatives.^{13,14}

Supportive leadership and continuous professional development have been shown to enhance safety competence and reporting behavior.^{8,12} These findings emphasize the interdependence between cultural and competence-based approaches to improving

patient safety, which underpins the rationale for exploring both PSC and PSCp in this study.

International evidence shows a close link between PSC and PSCp: supportive cultures increase confidence, reporting, and error reduction,^{7,12} whereas weak cultures lead to underreporting and unsafe practices.¹⁵ In Vietnam, existing studies have identified weaknesses in PSC, particularly among nurses, but few have integrated both organizational culture and individual competence.¹⁰ Moreover, continuous professional development and leadership support have been recognized as key enablers of PSCp.¹⁵

Study Aims

This study aimed to: 1) describe nurses' perceptions of PSC and PSCp; 2) examine the associations between demographic and organizational characteristics and both PSC and PSCp; and 3) explore the association between PSC and PSCp, which hypothesized that patient safety culture at the organizational level is positively associated with the safety competence of healthcare providers.

Method

Study Design: The study adopted a multicenter cross-sectional design, involving various clinical departments across multiple hospitals. This report follows the STROBE guidelines for reporting cross-sectional studies.¹⁹

Sample and Settings: The study population included registered nurses working in inpatient departments of three Level I provincial general hospitals in central Vietnam, as classified by the Vietnamese Ministry of Health. These hospitals provide comprehensive inpatient and specialized services and were purposively selected to reflect diversity in size, service capacity, and organizational characteristics. All have established nursing and quality management departments actively implementing

patient safety programs, providing representative contexts for examining both organizational and individual factors related to patient safety. Nurses were recruited from various inpatient departments, such as medical, surgical, obstetrics-gynecology, pediatrics, emergency, intensive care, anesthesia, oncology, and other specialty wards, ensuring comprehensive representation of nursing practice contexts related to patient safety. Recruitment was conducted by trained research assistants in collaboration with the nursing department heads at each hospital, and who approached eligible nurses during routine departmental meetings and provided study information and consent forms. Inclusion criteria were: 1) at least six months of clinical experience, 2) direct involvement in patient care, and 3) willingness to participate. Nurses on long-term leave during the study period were excluded. All nurses meeting these criteria were invited to participate in the study by members of the research team.

Sample Size: The minimum number of participants was estimated through Cochran's equation, applying a confidence level of 95%, a precision of 5%, and an assumed proportion of 0.5.²⁰ The initial estimate for an infinite population was $n_0 = 384$; after finite-population correction with $N = 937$ eligible nurses, the minimum required sample was 273. To account for the stratified design and potential clustering within departments, a design effect of 2.0 was applied. With an additional allowance for a 10% non-response rate, the target sample was set at approximately 600 nurses. Accordingly, 600 nurses were invited via stratified random sampling with proportional allocation by hospital and clinical department, and 594 nurses completed the survey, while six did not participate, resulting in a response rate of 99.0% (594/600) and a coverage of 63.4% (594/937) of the eligible nursing population. A post-hoc analysis in G*Power indicated that the final sample size yielded more than 80% power to detect moderate and large effect sizes in correlation, regression, and nonparametric analyses;

thus, the sample was adequate for both descriptive and inferential purposes.²¹

Ethical Considerations: The study complied with ethical regulations for human research and received formal approval from the Ethics Committee of Hue University of Medicine and Pharmacy (Decision No. H2024/108, May 23, 2024). Participation was entirely voluntary, with written consent obtained from all participants, and all data were anonymized and analyzed in aggregate to ensure confidentiality and data integrity. Participants were fully informed that joining the study was a matter of their own choice and that they were free to discontinue participation at any time, without any impact on their employment or performance evaluation. The survey forms did not contain personal identifiers, and all materials were kept in secure storage with access restricted to the principal investigator to maintain privacy and data protection.

Instruments: The instruments consisted of three parts: demographic and occupational characteristics, the HSOPSC, and the H-PEPSS.

Demographics and Work-Related Characteristics: The research team's questionnaire included demographic variables (gender, age, academic background) and job-related characteristics (professional tenure, weekly workload, night-shift patterns, and incident-reporting behavior). Responses included multiple-choice, yes/no, and Likert-type items as appropriate. These variables were analyzed in relation to PSC and PSCp.

The Hospital Survey on Patient Safety Culture (HSOPSC): The HSOPSC (Version 1.0, AHRQ) was originally developed by the U.S. Agency for Healthcare Research and Quality as a tool for evaluating the safety culture perceptions of hospital personnel.⁵ The instrument consists of 42 items across 12 dimensions, including "teamwork within units," "supervisor/manager expectations and actions promoting patient safety," "organizational learning-continuous improvement," "management support for patient safety," "overall perceptions of patient safety," "feedback and

communication about error,” “communication openness,” “frequency of events reported,” “teamwork across units,” “staffing,” “handoffs and transitions,” and “non-punitive response to error.” An example item is: “Staff will freely speak up if they see something that may negatively affect patient care.” All items are scored using a 5-level Likert response format ranging from 1 to 5, where higher values indicate stronger perceptions of safety culture. Items phrased in the negative direction were recoded, and responses of 4 or 5 were considered positive. The Vietnamese version of HSOPSC used in this study was translated and culturally adapted and was officially acknowledged by AHRQ for use in Vietnam.²² The reliability of the HSOPSC toolkit has been examined in several countries, with Cronbach’s alpha values for its 12 domains ranging from 0.51 to 0.84 in Taiwan,²³ 0.68 to 0.86 in Sweden,²⁴ and up to 0.896 in Ethiopia.²⁵ Permission for use was obtained from the AHRQ. Cronbach’s alpha indicated acceptable reliability (0.756).

The Health Professional Education in Patient Safety Survey (H-PEPSS): Originally developed by Ginsburg and colleagues (York University, Canada),⁶ the H-PEPSS measures healthcare professionals’ self-perceived competence in patient safety. Authorization to use the tool was provided by its original creator. The instrument was translated into Vietnamese using Brislin’s back-translation method.²⁶ Content validity was confirmed, with item-level CVI values ranging from 0.80 to 1.00 and a scale-level CVI of 0.90. The tool consists of 23 items grouped into six domains: “teamwork” (six items), “communication” (three items), “managing safety risks” (three items), “human and environmental factors” (three items), “responding to adverse events” (four items), and “safety culture” (four items). An example item is: “I can discuss adverse events openly and supportively.” Responses are captured using a 5-point Likert format (1 to 5), and ratings of 4 or 5 are considered positive. Domain and total scores extended from 1 to 5, with higher values indicating stronger perceived competence.

A pilot test with 30 nurses showed high reliability (Cronbach’s $\alpha = 0.918$). Internal consistency in the main sample was excellent (Cronbach’s $\alpha = 0.943$).

Data Collection: This was conducted from September to December 2024 after obtaining ethical approval and permission from the hospital directors of the participating hospitals. Prior to data collection, all research team members received training on standardized procedures to ensure consistency across sites. After permission was granted, the researchers met with department heads to coordinate participant recruitment. The study purpose, methods, and confidentiality were explained to all eligible nurses, and written informed consent was obtained from each eligible nurse. The researchers personally distributed the questionnaires to participants during departmental meetings. Each participant completed the survey independently within approximately 20 minutes and returned it directly to the researchers upon completion. The research assistants reviewed the completed questionnaires for missing data and recorded the number of valid responses from each hospital to ensure data completeness and quality. All data were stored securely, accessible only to the principal investigator.

Data Analysis: All statistical procedures were performed in SPSS 20.0 (IBM, New York, USA). Categorical data were described using counts and percentage distributions. For numeric data, averages and standard deviations were reported when normality assumptions were met; otherwise, the median and interquartile range were used. The distribution of HSOPSC and H-PEPSS scores was evaluated using graphical methods (histograms and Q-Q plots) and the Shapiro-Wilk test. Both variables were non-normally distributed and were summarized using medians and IQRs. Between-group differences were examined using nonparametric tests, including the Mann-Whitney U test for two groups and the Kruskal-Wallis test for more than two groups. To further analyze the association between PSC and PSCp, generalized linear modeling with a Gamma family and log-link function was employed.

Results

A group of 594 clinical nurses participated in the survey, and most were female (91.1%) and of middle working age (mean 35.0 ± 6.9 years). The largest proportion of nurses worked in internal medicine (29.6%) and emergency–anesthesia–ICU (27.9%), indicating diverse clinical exposure across

departments. More than half held a bachelor's degree or higher (52.5%), and nearly half had more than ten years clinical experience. A substantial proportion reported ≥ 60 working hours per week (37.4%) and ≥ 4 nights' shifts per month (78.5%), indicating high work pressure that may affect the ability to maintain a patient safety culture and practice (**Table 1**).

Table 1. Demographic and occupational profile of study participants

Characteristics	Frequency (n)	Percentage (%)	Mean $\pm$ SD
Gender			
Male	53	8.9	–
Female	541	91.1	
Age (years)			
< 35	325	54.7	35.03 ± 6.96
≥ 35	269	45.3	
Working department			
Internal	176	29.6	–
Surgery	117	19.7	
Obstetrics–Pediatrics–Oncology	70	11.8	
Emergency–Anesthesia & ICU	166	27.9	
Others	65	10.9	
Educational level			
Diploma/Associate degree	282	47.4	–
Bachelor's degree or higher	312	52.5	
Years of clinical experience			
1–5	94	15.8	12.04 ± 6.80
6–10	199	33.5	
11–15	143	24.1	
16–20	85	14.3	
≥ 21	73	12.3	
Years working at current hospital			
< 1	15	2.5	11.62 ± 6.79
1–5	97	16.3	
6–10	186	31.3	
11–15	148	24.9	
16–20	81	13.6	
≥ 21	67	11.3	
Weekly working hours			
< 60	372	62.6	53.47 ± 14.19
≥ 60	222	37.4	
Night shifts per month			
< 4 shifts	128	21.5	5.95 ± 3.28
≥ 4 shifts	466	78.5	

Almost all nurses (99.8%) had received patient safety (PS) training, although only 70.4% had prior experience in reporting medical errors. In the past 12 months, 63.8% did not report any incidents, while 8.9% reported 6–10 incidents. The hospital primarily encouraged incident reporting through annual

performance evaluation awards (49.7%), with fewer incentives such as training opportunities or recognition. Despite this, most nurses rated the patient safety environment within their units as “very good” (72.6%) (Table 2).

Table 2. Work-related characteristics and patient safety

Characteristics	Frequency (n)	Percentage (%)	Mean ± SD
Training in patient safety			
Yes	593	99.8	–
No	1	0.2	
Experience in reporting medical errors			
Yes	418	70.4	–
No	176	29.6	
Number of incidents reported to hospital in last 12 months			
0	379	63.8	1.30 ± 2.48
1–2	117	19.7	
3–5	41	6.9	
6–10	53	8.9	
11–20	4	0.7	
Hospital encourages incident reporting			
Yes	589	99.2	–
No	5	0.8	
Incentive methods			
Year-end performance evaluation	351	49.7	–
Recognition in hospital bulletin	21	3.0	
Salary/allowance increase	48	6.8	
Medals/gifts	8	1.1	
Appointment to Patient Safety Committee	7	1.0	
Priority for patient safety training	170	24.1	
Others	101	14.3	
Departmental patient safety assessment			
Not achieved	0	0	–
Poor	1	0.2	
Acceptable	152	25.6	
Very good	431	72.6	
Excellent	10	1.7	

Both HSOPSC and H-PEPSS total scores were non-normally distributed, thus non-parametric analyses were applied. PSC was measured using the HSOPSC and had an overall median of 3.33 (IQR = 3.23–3.49). High positive response rates were observed in teamwork within units (96.9%),

continuous learning and improvement (93.9%), and feedback about errors (92.0%). In contrast, “non-punitive response to errors” (18.2%) and “handoffs and transitions” (11.3%) had the lowest positive response rates (Table 3).

Table 3. Patient safety culture (HSOPSC) of nurses

Domains	Positive response (%)	Median (Q1–Q3)	Min–Max
Teamwork within units	96.93	4.50 (4.00–4.75)	3–5
Continuous learning & improvement	93.88	4.00 (4.00–4.33)	2.67–5
Staffing	48.61	3.25 (2.75–3.50)	1.75–5
Overall perception of patient safety	47.81	3.00 (2.75–3.50)	1.5–5
Non-punitive response to errors	18.24	2.33 (2.00–3.00)	1–5
Supervisor/manager expectations & actions promoting safety	52.78	3.00 (2.75–3.25)	1.75–5
Feedback & communication about error	92.03	4.00 (4.00–4.33)	2.33–5
Communication openness	47.92	3.33 (3.00–3.67)	1.33–5
Frequency of events reported	70.65	4.00 (3.33–4.00)	1.33–5
Hospital management support for patient safety	69.87	3.67 (3.33–3.67)	2–5
Teamwork across units	55.26	3.00 (3.00–3.50)	1.75–5
Handoffs & transitions	11.28	2.00 (1.75–2.50)	1–5
Overall PSC score (HSOPSC)	57.82	3.33 (3.23–3.49)	2.75–5

Note. HSOPSC = The Hospital Survey on Patient Safety Culture

PSCp was assessed using H-PEPSS, with an overall median of 4.22 (IQR = 4.00–4.48), and all domains exceeded 85% positive response rates.

The highest scores were found in effective communication (97.7%) and risk management (96.5%), while the safety culture domain scored relatively lower (87.5%) (**Table 4**).

Table 4. Nurses' competence in patient safety practice (H-PEPSS)

Domains	Positive response (%)	Median (Q1–Q3)	Min–Max
Teamwork	88.86	4.17 (3.83–4.50)	2.33–5
Effective communication	97.70	4.33 (4.00–5.00)	1.67–5
Risk management	96.46	4.00 (4.00–5.00)	1.67–5
Understanding human & environmental factors	92.37	4.00 (4.00–4.67)	1–5
Recognizing & responding to adverse events	89.48	4.00 (4.00–4.50)	1–5
Safety culture	87.54	4.00 (3.75–4.50)	1–5
Overall H-PEPSS score	91.34	4.22 (4.00–4.48)	3.09–5

Note. H-PEPSS = The Health Professional Education in Patient Safety Survey

Analysis of associations indicated that gender, age, educational level, years of clinical experience, number of night shifts, and prior experience in error reporting were significantly related to PSC and PSCp

scores. Notably, the number of reported incidents in the past 12 months was positively associated with PSCp, suggesting that actual reporting behavior reflects higher competence (**Table 5**).

Table 5. Factors related to patient safety culture and practice competence

Characteristic	HSOPSC	p-value	H-PEPSS	p-value
	Median (Q1–Q3)		Median (Q1–Q3)	
Gender		0.040		0.045
Male	3.47 (3.30–3.58)		4.39 (4.09–4.61)	
Female	3.33 (3.23–3.48)		4.22 (4.00–4.48)	
Age (years)		0.213		0.001
< 35	3.33 (3.22–3.48)		4.13 (3.96–4.48)	
≥ 35	3.33 (3.24–3.50)		4.30 (4.00–4.48)	
Working department		<0.001		0.001
Internal Medicine	3.39 (3.27–3.53)		4.35 (4.04–4.61)	
Surgery	3.27 (3.18–3.48)		4.13 (3.96–4.39)	
Obstetrics–Pediatrics–Oncology	3.27 (3.14–3.36)		4.02 (3.78–4.57)	
Emergency–Anesthesia–ICU	3.35 (3.23–3.54)		4.15 (4.00–4.39)	
Others	3.31 (3.26–3.45)		4.35 (4.00–4.48)	
Educational level		0.004		0.001
Diploma/Associate	3.31 (3.22–3.45)		4.13 (3.96–4.43)	
Bachelor’s degree or higher	3.36 (3.24–3.52)		4.30 (4.00–4.52)	
Years of clinical experience		0.079		0.001
1–5	3.35 (3.24–3.50)		4.17 (3.91–4.39)	
6–10	3.30 (3.18–3.46)		4.13 (3.91–4.43)	
11–15	3.33 (3.24–3.47)		4.26 (4.00–4.52)	
16–20	3.33 (3.25–3.54)		4.30 (4.00–4.48)	
≥ 21	3.35 (3.26–3.50)		4.35 (4.13–4.57)	
Weekly working hours		0.002		0.907
< 60	3.35 (3.25–3.51)		4.22 (4.00–4.48)	
≥ 60	3.31 (3.20–3.47)		4.24 (4.00–4.52)	
Night shifts per month		0.023		< 0.001
< 4	3.38 (3.25–3.54)		4.39 (4.11–4.59)	
≥ 4	3.33 (3.22–3.47)		4.17 (4.00–4.48)	
Experience reporting adverse events				< 0.001
Yes	3.33 (3.23–3.49)	0.685	4.30 (4.00–4.52)	
No	3.34 (3.19–3.50)		4.04 (3.89–4.39)	
Number of events reported in last		0.466		< 0.001
12 months				
0	3.22 (3.33–3.50)		4.13 (3.91–4.41)	
1–2	3.23 (3.31–3.44)		4.26 (4.00–4.52)	
3–5	3.24 (3.33–3.48)		4.39 (4.17–4.61)	
≥ 6	3.25 (3.38–3.52)		4.39 (4.30–4.65)	

Note. HSOPSC = The Hospital Survey on Patient Safety Culture, H-PEPSS = The Health Professional Education in Patient Safety Survey

Generalized linear models (Gamma with log link) revealed reciprocal associations between HSOPSC and H-PEPSS. When HSOPSC was the dependent variable, higher H-PEPSS scores were associated with more favorable PSC. Nurses in internal medicine reported significantly higher HSOPSC scores compared

with those in other departments. When H-PEPSS was the dependent variable, higher HSOPSC scores were associated with stronger PSCp. Lower education level (college vs. university) and reporting ≥ 6 incidents in the last 12 months were significantly associated with lower PSCp (**Table 6**).

Table 6. Generalized Linear Models (Gamma with log link) examining predictors of patient safety culture (HSOPSC) and patient safety competence (H-PEPSS)

Variable	HSOPSC			p-value	H-PEPSS			p-value
	B	Exp(B) (95% CI)			B	Exp(B) (95% CI)		
Gender (Male vs. Female)	0.020	1.020 (0.995–1.046)	0.121	0.011	1.011 (0.987–1.036)	0.356		
Age (<30 vs. ≥ 30)	0.015	1.015 (0.985–1.046)	0.315	0.009	1.009 (0.980–1.038)	0.557		
Department Internal Medicine vs. other departments	0.02	1.027 (1.011–1.045)	0.001	0.003	1.003 (0.981–1.024)	0.813		
Emergency–Anesthesia– ICU vs. other departments	0.014	1.014 (0.999–1.030)	0.076	0.009	0.991 (0.969–1.013)	0.406		
Education College vs. University	0.004	0.996 (0.984–1.008)	0.513	0.018	0.982 (0.969–0.996)	0.010		
Work experience	–	–	> 0.05	–	–	> 0.05		
Work shifts Day vs. Shift	–	–	> 0.05	0.012	1.012 (0.996–1.029)	0.150		
Incident reporting 0 vs. ≥ 6	–	–	> 0.05	0.042	0.959 (0.940–0.978)	< 0.001		
H-PEPSS (Continuous)	0.051	1.052 (1.031–1.073)	< 0.001	–	–	–		
HSOPSC (Continuous)	–	–	–	0.089	1.093 (1.065–1.122)	< 0.001		

Note. Models included the following independent variables: gender, age group, department, education level, work experience, work shifts, incident reporting, and H-PEPSS (for HSOPSC model) or HSOPSC (for H-PEPSS model). Variables with no significant association are shown with “–”.

In summary, the findings highlight a bidirectional association between patient safety culture and competencies, with only specific factors, such as department, education, and incident reporting frequency, showing significant associations.

Discussion

This study provides a comprehensive assessment PSC and PSCp among clinical nurses in a hospital

setting, revealing several noteworthy patterns, specifically, variations across safety domains, associations with demographic and organizational characteristics, and the interrelationship between PSC and PSCp. In the context of three Level I provincial hospitals in central Vietnam, where staffing shortages, high workloads, and a limited reporting culture remain common challenges, 11 nurses reported moderate to high levels of PSC and high PSCp. These findings are consistent with prior studies in similar hospital settings in both high- and

middle-income countries, where teamwork, continuous learning, and feedback mechanisms were often rated positively, while “non-punitive response to error” and “handoffs/transitions” remained weaker aspects of the safety culture.^{1,2}

Status of PSC and PSCp

Nurses in this study reported generally favorable perceptions of PSC and PSCp. The highest-scoring areas included “teamwork within units,” “organizational learning and continuous improvement,” “feedback about errors,” and “communication openness.” In contrast, lower ratings were noted for “non-punitive response to errors,” “staffing,” and “handoffs and transitions.” These results are consistent with evidence from Vietnam. For example, teamwork (93.7%) and supervisor expectations (85.0%) were perceived as strengths, whereas staffing (52.9%) and non-punitive response (57.6%) remain areas for improvement.¹⁰ Such findings indicate that workforce shortages and blame culture are persistent challenges in Vietnamese public hospitals. Internationally, studies in Iran⁸ and Thailand²⁷ similarly highlighted staffing and punitive approaches as weaknesses, suggesting common barriers in many low- and middle-income health systems. Comparable findings were also reported in Indonesia²⁸ and recent regional evidence from Thailand and Indonesia,²⁹ where inadequate staffing, high workload, and blame culture were associated with underreporting and adverse events. These results underscore common barriers in many low- and middle-income health systems. By contrast, evidence from Saudi Arabia showed considerably higher positive responses for non-punitive responses, reflecting the effectiveness of well-established error-reporting systems that encourage staff participation without fear of blame.⁴ Similar findings were also reported in Japan and Korea, where supportive leadership and mature incident-reporting mechanisms have been shown to strengthen safety culture and enhance nurses’ patient safety competence.^{30,31} According to the Swiss Cheese Model, “holes” such as staff shortages or punitive

culture may allow multiple defensive layers to be breached, thereby increasing the likelihood of adverse events.¹⁸ Likewise, the Donabedian Model highlights that organizational “structure” – including staffing policies, leadership culture, and system support – directly influences safety “processes” and ultimately determines patient safety “outcomes.”¹⁷

Factors associated with PSC and PSCp

This study also identified several individual and organizational characteristics associated with PSC and PSCp, including gender, age, educational level, years of experience, night-shift frequency, and experience with error reporting. Male nurses, those with bachelor’s degrees or higher, those with more years of practice, and those with greater experience in reporting incidents generally scored higher on both PSC and PSCp. These results are consistent with previous study showing that education, professional experience, and organizational support are positively related to safety competence and culture.³² In Indonesia, trained staff achieved higher PSC scores,³³ while in Oman, leadership support was identified as a strong predictor of PSC.³⁴ In the United States, leadership behavior has also been emphasized as a determinant of both safety culture and burnout prevention among healthcare staff.¹⁵ Conversely, heavy workload, frequent night shifts, and psychological strain such as burnout have been associated with lower patient safety competence and less favorable safety attitudes.³⁵ A recent study in Vietnam similarly found that nurse fatigue and high patient-to-nurse ratios contributed to decreased safety awareness and underreporting of incidents.²⁷ These associations can be explained by self-efficacy theory: more educated and experienced staff are generally more confident in recognizing and managing risks, which enhances their competence.^{13,14} Furthermore, leadership theory suggests that leaders play a crucial role in shaping reporting behavior; punitive cultures discourage staff from applying their skills, while supportive leadership encourages proactive participation in safety improvement.¹⁵

Correlation between PSC and PSCp

A central finding of this study is the reciprocal relationship between PSC and PSCp. A stronger organizational safety culture was associated with higher safety competence among nurses, and, conversely, competent nurses helped reinforce a culture of safety. This finding emphasizes that patient safety depends not only on system-level policies but also on the active engagement of frontline staff. Consistent with previous international evidence, supportive PSC environments encourage error reporting, continuous learning, and reduction of adverse events.^{8,27} Conversely, in punitive or hierarchical environments, even well-trained nurses may hesitate to report errors or apply safety knowledge effectively.³⁶ A systematic review also emphasized that clinical competence facilitates the translation of safety policies into practice at the frontline, thus reinforcing PSC.¹²

This reciprocal relationship can be interpreted through the Donabedian Model, where PSC reflects organizational-level processes, while PSCp represents individual-level processes. Together, they shape patient safety outcomes.¹⁷ Similarly, the Swiss Cheese Model explains that reinforcing both organizational (PSC) and individual (PSCp) “layers of defense” substantially reduces the risk of adverse events. If either layer weakens – for instance, due to a blame culture at the system level or lack of confidence at the individual level, adverse events may still occur.¹⁸ In the context of Vietnam’s provincial hospitals, where staffing shortages, limited incident-reporting systems, and hierarchical communication structures persist,²⁷ these findings highlight the urgent need to strengthen both organizational culture and individual competence simultaneously. The most important and novel contribution of this study is the demonstration of the two-way nature of the PSC–PSCp relationship in the Vietnamese context, a phenomenon that has rarely been explored. This contribution suggests that building a strong safety culture alone is insufficient without simultaneously enhancing individual competence; likewise, personal

competence is difficult to sustain in an unsupportive organizational environment. To improve patient safety, an integrated strategy is required: fostering an organizational culture that encourages error reporting and learning while strengthening nurses’ competence and confidence. This dual approach creates a positive reinforcing cycle, where organizational support empowers staff, and competent staff reinforce safety culture, ultimately optimizing care quality and minimizing adverse events.

Limitations and Future Research

Directions

Some constraints should be acknowledged. First, because the design was cross-sectional, causal relationships cannot be established. Secondly, relying on self-administered questionnaires can lead to inaccuracies arising from memory lapses and participants’ tendency to respond in socially favorable ways. Third, the research was carried out in three provincial hospitals in central Vietnam, which may limit the extent to which the findings apply to other contexts. Even with these constraints, having a large sample and using validated instruments adds confidence in the robustness of the findings.

Future research would benefit from longitudinal or interventional approaches to better clarify causal mechanisms linking safety culture and competence. Evaluating the impact of safety education programs, leadership interventions, and digital reporting systems could provide practical insights to sustain improvements in both PSC and PSCp.

Conclusions and Implications for Nursing Practice

This study demonstrated that nurses reported moderate PSC and high PSCp with teamwork, continuous learning, and communication as strengths,

while non-punitive response to errors and handoffs remained weak areas. Several demographic and occupational factors, including education, experience, and incident reporting, were significantly associated with both PSC and PSCp. Importantly, the study revealed a bidirectional relationship between PSC and PSCp, emphasizing that organizational culture and individual competence reinforce one another in promoting patient safety.

For nursing practice, these findings suggest the need for an integrated strategy to improve patient safety. At the organizational level, hospital leaders should foster a supportive and non-punitive safety culture, encourage error reporting, and address staffing issues. At the individual level, ongoing education and training programs are essential to strengthen nurses' competence, confidence, and proactive engagement in safety practices. Nursing educators and managers should collaborate to design curricula and professional development initiatives that integrate both organizational culture and individual competence. By implementing such dual approaches, hospitals can create a reinforcing cycle of support and competence that optimizes patient safety.

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Conflict of Interest

The authors state that they have no competing interests.

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วัฒนธรรมความปลอดภัยของผู้ป่วยและสมรรถนะของพยาบาล : การศึกษาแบบภาคตัดขวางหลายศูนย์ในเวียดนาม

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บทคัดย่อ : ความปลอดภัยของผู้ป่วยยังคงเป็นประเด็นสำคัญในประเทศที่กำลังพัฒนา ซึ่งข้อจำกัดด้านทรัพยากรและระบบความปลอดภัยอาจส่งผลกระทบต่อคุณภาพการดูแล หลักฐานเกี่ยวกับวัฒนธรรมความปลอดภัยและสมรรถนะของพยาบาลมีจำกัดในเวียดนาม การวิจัยนี้จึงศึกษาวัฒนธรรมความปลอดภัยของผู้ป่วยและสมรรถนะของพยาบาล ปัจจัยที่เกี่ยวข้อง และความสัมพันธ์ระหว่างตัวแปรต่าง ๆ เหล่านี้ การสำรวจแบบภาคตัดขวางดำเนินการตั้งแต่เดือนกันยายนถึงธันวาคม พ.ศ. 2567 ในโรงพยาบาลระดับจังหวัด 3 แห่งในภาคกลางของเวียดนาม พยาบาลวิชาชีพที่ขึ้นทะเบียนจำนวน 594 คนที่ทำงานในแผนกผู้ป่วยในของโรงพยาบาลระดับจังหวัดระดับ 1 จำนวน 3 แห่งในภาคกลางของเวียดนามได้กรอกแบบสอบถาม 2 ชุด ได้แก่ แบบสำรวจวัฒนธรรมความปลอดภัยของผู้ป่วยในโรงพยาบาล และแบบสำรวจการศึกษาสำหรับบุคลากรทางการแพทย์ด้านความปลอดภัยของผู้ป่วย การวิเคราะห์ทางสถิติใช้วิธีการเชิงพรรณนา สถิตินอนพารามิเตอร์ สัมประสิทธิ์สหสัมพันธ์ลำดับของสเปียร์แมน และแบบจำลองเชิงเส้นทั่วไป

ผลการวิจัยพบว่ามีการประเมินวัฒนธรรมความปลอดภัยในระดับปานกลางและมีระดับสมรรถนะระดับสูง ด้านที่เป็นจุดแข็ง ได้แก่ การทำงานเป็นทีม การเรียนรู้อย่างต่อเนื่อง การให้ข้อเสนอแนะเกี่ยวกับข้อผิดพลาด และการสื่อสาร ในขณะที่องค์ประกอบที่ได้คะแนนต่ำที่สุด ได้แก่ การตอบสนองต่อข้อผิดพลาดที่มุ่งเน้นการตำหนิ ความเพียงพอของบุคลากร และกระบวนการส่งต่อข้อมูล ระดับการศึกษา แผนกงาน ความถี่ในการทำงานกะกลางคืน และพฤติกรรมการรายงานเหตุการณ์ ล้วนมีความสัมพันธ์อย่างมีนัยสำคัญกับทั้งวัฒนธรรมความปลอดภัยของผู้ป่วยและสมรรถนะ ผลลัพธ์เหล่านี้ชี้ให้เห็นถึงความสำคัญของการพัฒนากลยุทธ์ที่ช่วยเสริมสร้างวัฒนธรรมองค์กรและสมรรถนะของแต่ละบุคคลไปพร้อมๆ กัน การเป็นผู้นำที่ให้การสนับสนุน การจัดหาบุคลากรที่เพียงพอ และการพัฒนาวิชาชีพอย่างต่อเนื่อง อาจส่งผลให้ความปลอดภัยของผู้ป่วยในโรงพยาบาลดีขึ้น การวิจัยในอนาคตควรศึกษาเส้นทางเชิงสาเหตุและประเมินโครงการช่วยเหลือที่เสริมสร้างทั้งวัฒนธรรมความปลอดภัยและสมรรถนะ

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