

The Antecedents of Patient Safety Competency; A Systematic Review

Alahmadi Abdulhadi Mohammednasser M^{1*}, Nurul Azmir², Farra Aidah Jumuddin³

¹School of Medicine, Lincoln University College, Malaysia, a.hadi-2@hotmail.com

²School of Medicine, Lincoln University College, Malaysia, dr.nurulazmir@lincoln.edu.my

³School of Medicine, Lincoln University College, Malaysia, farraaidah@lincoln.edu.my

*Corresponding Author's E-mail: a.hadi-2@hotmail.com

Abstract: *The increasing emphasis on safe, high-quality healthcare has made patient safety competency a core requirement for nursing practice and healthcare education. Patient safety competency refers to the knowledge, attitudes, skills, communication behaviors, teamwork abilities, and error-management practices required to prevent avoidable harm and respond effectively to adverse events. Although this competency is widely recognized as essential, its antecedents remain dispersed across educational, clinical, organizational, and individual contexts. Therefore, this systematic review aimed to identify, categorize, and synthesize the antecedents of patient safety competency among nurses, nursing students, and healthcare professionals. A systematic review approach guided by PRISMA 2020 was used to identify and screen relevant studies. Studies focusing on patient safety competency, its determinants, predictors, or related outcomes were included. Data were extracted, organized using a literature review matrix, and synthesized narratively and thematically. A total of 30 studies were included. The findings revealed that patient safety competency is shaped by educational, individual, clinical, organizational, and communication-related antecedents. Key antecedents included patient safety education, curriculum integration, simulation, e-learning, case discussion, adverse event analysis, knowledge, attitudes, self-efficacy, clinical competence, professionalism, systems thinking, compassion competence, experience, safety culture, leadership, teamwork, psychological safety, speaking up, organizational support, and error reporting. The review concludes that patient safety competency is multidimensional, requiring integrated education, clinical learning, leadership support, teamwork, psychological safety, and nonpunitive reporting cultures.*

Keywords: Patient safety competency; patient safety culture; nursing education; teamwork; systematic review.

1. Introduction

Patient safety remains a major priority in healthcare because preventable harm, adverse events, medication errors, communication failures, and unsafe clinical practices continue to threaten the quality and reliability of care. Nurses are central to patient safety because they provide continuous bedside care, monitor patient conditions, coordinate with multidisciplinary teams, implement clinical procedures, and respond to early signs of deterioration. Consequently, patient safety is not only an institutional goal but also a professional competency needed both for nurses and nursing students and addressed in the education, clinical practice, teamwork and organizational support. Patient safety

competency involves the knowledge of patient safety, as well as attitudes, skills and role in communicating with others, teamwork fluidity in running errands, proactivity in correcting your own errors when they occur not only for yourself, but also diagnosing other opportunities of error when you witness them. However, recent evidence suggests the competency of nurses and nursing students to provide safe patient care remains inconsistent, with nurses reporting moderate competency levels and both nurses and students identifying weaknesses in teamwork and responding to adverse events (Wang et al., 2026). It was also confirmed that the patient safety competency domain consists of several parts which are knowledge, attitudes, skills, communication as well as teamwork and error related competencies through a scoping review of measurement instruments (Mortensen et al., 2022).

Educational preparation is one of the most important antecedents of patient safety competency. Nursing students and nurses require structured learning experiences that connect patient safety theory with clinical application. Formal patient safety education, curriculum integration, simulation-based learning, e-learning, interprofessional education, case discussion, and clinical exposure can strengthen the ability to recognize risks, communicate concerns, and respond appropriately to safety problems. Therefore, interactive methods like simulation exercises and virtual education have been found to be effective in improving nursing students' knowledge, attitude and competence despite the fact that patient safety diffusion training programs had positive formative contributions on patients (Park & Yeom, 2025). In addition, patient safety competency also was higher among nursing students with more favorable attitudes toward teamwork, increased exposure to health care acquisition topics in their curriculum, and high awareness of open disclosure (Ahn, 2025). Integrated curriculum design is especially important because patient safety should be addressed across both theoretical and practical nursing courses rather than presented as isolated content (Ji et al., 2021). Dedicated patient safety courses, evidence-based learning, case discussion, and adverse event analysis during internships have also been associated with higher competency among undergraduate nursing interns (Xu et al., 2025).

Organizational and clinical practice factors are also essential because patient safety competency develops within real healthcare environments. Clinical nurse competence has been positively linked with patient safety culture, suggesting that competent nurses contribute to stronger safety perceptions and safer care environments (Zaitoun et al., 2023). Patient safety competency has also been associated with the occurrence and reporting of adverse events, indicating that stronger competency may support safer practice and better reporting behavior (Kakemam et al., 2024). Patient safety culture and patient safety competency have been associated with adverse events such as medication errors, pressure ulcers, falls, and restraint use (Hafezi et al., 2022). Teamwork, psychological safety, leadership, and error management climate are particularly important because nurses must feel able to ask questions, speak up, report incidents, and participate in safety improvement without fear of blame. Team structure, leadership, psychological safety, and experience in patient safety activities were identified as predictors of patient safety competency among emergency nurses (Habibi Soola et al., 2022). Teamwork and psychological safety were also significant positive predictors of patient safety competency among emergency department nurses (Tasbihi et al., 2025).

However, the antecedents of patient safety competency remain fragmented across populations, settings and study designs in light of a growing body of research. There was a range of study groups such as nurses, nursing students, nursing interns, newly recruited nurses, emergency nurses and psychiatric nurses as well other healthcare professionals and investigated factors including education, simulation, teamwork psychological safety patient safety culture professionalism burnout compassion competence adverse event reporting organizational support. Professionalism and systems thinking have been shown to directly influence patient safety competency, indicating the importance of both professional responsibility and system-level understanding in safe care (Kakemam et al., 2022). For

newly hired nurses, education level, night-shift frequency, safety training, participation in patient safety projects (PSP), transition shock and perceived organizational support have been defined as predictors (Zhang et al., 2026). Thus, the objective of this systematic review is to find, classify and summarize the potential antecedents influencing patient safety competency in nurses, nursing students and health care professionals. This review organizes the evidence regarding educational, individual, clinical, organizational and communication-related antecedents to support nursing educators, healthcare managers and policymakers in designing targeted strategies to enhance patient safety competency as a means of reducing preventable patient harm.

2. Methodology

This study adopted a systematic review design to identify, evaluate, and synthesize the antecedents of patient safety competency among nurses, nursing students, and healthcare professionals. A systematic review approach was appropriate because the literature on patient safety competency is distributed across different populations, settings, countries, and methodological designs. The review focused on studies that examined patient safety competency directly or investigated factors associated with its development, such as education, training, teamwork, psychological safety, patient safety culture, organizational support, adverse event reporting, and clinical competence. The PRISMA 2020 logic was followed to allow reproducibility in the identification, screening, eligibility examination and study inclusion processes. This methodology is in line with recent reviews on competence in patient safety that synthesized current evidence of the levels of competency, measurement instruments, and educational interventions using systematic, scoping or at least meta-analytic methods (Wang et al., 2026). The systematic review design was also appropriate since a previous related reviews has highlighted the necessity of organizing evidence on nursing competence, patient safety culture, and patient safety-related outcomes in an organized manner (Zaitoun et al., 2023).

A systematic search strategy was developed based on the Patient Safety Competency Framework to review studies investigating patient safety competency and its antecedent variables. The search was carried out in five significant databases: PubMed, Scopus, Web of Science, CINAHL, ScienceDirect and Google Scholar. The search terms were developed around the main concepts of the review, including “patient safety competency,” “patient safety competence,” “nurses,” “nursing students,” “antecedents,” “determinants,” “predictors,” “patient safety culture,” “patient safety education,” “teamwork,” “psychological safety,” “adverse events,” and “error reporting.” Boolean operators were used to combine these terms and improve search precision. The search focused on for peer-reviewed studies investigating the patient safety competency of existing nurses, nursing students, nursing interns, newly recruited nurses, emergency nurses, psychiatric nurses and healthcare professionals. Studies were eligible if they considered patient safety competency as a main construct, or explored factors clearly linked with patient safety competency. The similar search strategies have been conducted in previous reviews on patient safety education programs and patient safety competency instruments (Park & Yeom, 2025). Measurement-focused evidence was also considered relevant because patient safety competency instruments commonly include knowledge, attitudes, skills, communication, teamwork, and error-related domains (Mortensen et al., 2022).

The inclusion criteria covered peer-reviewed empirical studies, systematic reviews, meta-analyses, scoping reviews, and review protocols that were directly related to patient safety competency or its antecedents. Studies were eligible for inclusion if they investigated nurses, nursing students, nursing interns, newly recruited nurses, emergency nurses and psychiatric nurses or other healthcare professionals with at least one antecedent or associated factor. Factors considered were education and

training, curriculum exposure, simulation, e-learning, clinical experience, teamwork, communication, psychological safety or patient safety culture or organizational support in terms of leadership, adverse event reporting, burnout, professionalism, systems thinking, or compassion competence. Studies were excluded if they were not related to patient safety competency, did not focus on healthcare professionals or students, lacked a clear relationship with patient safety outcomes, or were editorials, commentaries, opinion pieces, or non-peer-reviewed documents. The final set of included studies was then organized in a literature review matrix to show which concepts were explicitly addressed in each study. This matrix-based synthesis was useful because the selected studies varied in design, including cross-sectional studies, quasi-experimental studies, meta-analyses, systematic reviews, scoping reviews, and structural equation modeling studies. The diversity of study designs reflects the broad nature of patient safety competency research and supports the need for thematic synthesis (Park et al., 2024).

Data were extracted using a structured form that captured the author, year, study design, population, setting, patient safety competency focus, antecedents examined, and key findings. The extracted evidence was then synthesized narratively and thematically rather than statistically, because the included studies differed in methods, instruments, populations, and outcomes. The synthesis grouped antecedents into major categories, including educational antecedents, individual antecedents, clinical practice antecedents, organizational antecedents, communication and teamwork antecedents, and safety outcome-related factors. Educational antecedents included patient safety courses, curriculum integration, simulation, e-learning, and clinical learning activities. Organizational antecedents included patient safety culture, leadership, work environment, management support, staffing, and organizational support. Communication-related antecedents included teamwork, speaking up, psychological safety, handoff quality, and error reporting. Several included studies supported this thematic approach because patient safety competency was linked with teamwork, psychological safety, patient safety culture, and adverse events in clinical practice (Habibi Soola et al., 2022). Similar evidence also showed that education level, safety training, patient safety projects, transition shock, and perceived organizational support may predict patient safety competency among newly recruited nurses (Zhang et al., 2026).

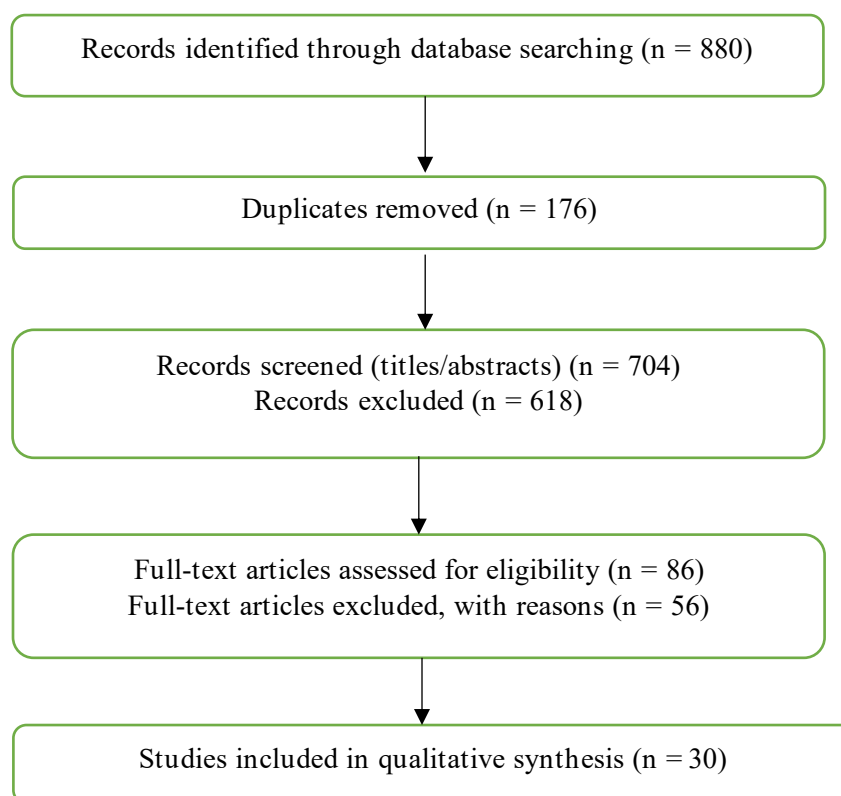


Figure 1. PRISMA 2020 Flow Diagram

3. Results

3.1 Study Selection and Characteristics

The systematic review included 30 studies that examined patient safety competency and its related antecedents or outcomes among nurses, nursing students, nursing interns, newly recruited nurses, emergency nurses, psychiatric nurses, and healthcare professionals. The included evidence consisted of various research designs including systematic reviews, meta-analyses, scoping reviews, cross-sectional studies, quasi-experimental studies as well as structural equation modeling (SEM) studies, latent profile analyses and review protocols. The range of methods also demonstrates the multiple approaches underpinning patient safety competency research across educational and clinical contexts. Numerous studies concentrated on competency measurement and synthesis such as a meta-analysis of patient safety competency among nurses and nursing students (Wang et al., 2026). Other investigations were focused on measurement tools, clinical nurse competencies, patient safety culture or educational interventions (Mortensen et al., 2022). Some studies emphasized on specific antecedents such as teamwork, psychological safety, safety culture, organizational support, burnout, compassion competence and professionalism, systems thinking, simulation, e-learning and adverse event reporting. In general, the included studies offered an appropriate evidence base for identifying main antecedents of patient safety competency and corresponding outcomes in relation with higher or lower competency levels.

The characteristics of the included studies showed that patient safety competency was most frequently examined among nursing students and clinical nurses. Several studies investigated educational factors, including patient safety courses, curriculum integration, simulation-based learning, e-

learning, evidence-based learning, and case discussion. Additional studies also focused on wider clinical and organizational factors encompassing patient safety culture, teamwork, psychological safety, leadership, work experience, error management climate, transition shock, organization support as well as workload-related factors. Studies adopted diverse measures, such as, the Patient Safety Competency Self-Evaluation tool, Health Professional Education in Patient Safety Survey, patient safety culture instruments, teamwork scales, psychological safety scale and adverse event reporting. This variability reflects the multidimensional nature of patient safety competency and that multiple factors explain its antecedents. Instead, the evidence suggests that competency develops through the interaction between individual readiness, formal education, clinical experience, communication behaviors, organizational climate, and safety-related systems.

Table 1. Literature Review Matrix

No.	Author(s) & Year	Patient Safety Competency	Patient Safety Culture	Education / Training	Simulation / E-Learning	Knowledge / Attitude	Self-Efficacy / Confidence	Clinical Competence / Experience	Teamwork / Communication	Psychological Safety / Speaking Up	Adverse Events / Error Reporting	Organizational / Work Environment
1	Wang et al. (2026)	✓		✓					✓		✓	
2	Zaitoun et al. (2023)	✓	✓			✓		✓			✓	✓
3	Mortensen et al. (2022)	✓				✓			✓		✓	
4	Kakemam et al. (2024)	✓		✓		✓					✓	✓
5	Ahn (2025)	✓		✓		✓			✓		✓	
6	Park & Yeom (2025)	✓		✓	✓	✓						
7	Park et al. (2024)	✓						✓				✓
8	Choi & Kim (2024)	✓	✓	✓								
9	Habibi Soola et al. (2022)	✓		✓				✓	✓	✓		✓
10	Hafezi et al. (2022)	✓	✓						✓	✓	✓	✓
11	Kalsoom et al. (2023)	✓		✓				✓	✓			✓
12	Ozata & Dinc (2025)	✓		✓	✓		✓	✓				
13	Danasu et al. (2025)	✓	✓	✓		✓			✓		✓	✓
14	Torkaman et al. (2022)	✓		✓						✓		
15	Jung et al. (2023)	✓		✓	✓	✓	✓		✓			
16	Xu et al. (2025)	✓		✓				✓			✓	
17	Tai et al. (2024)	✓						✓		✓	✓	✓

No.	Author(s) & Year	Patient Safety Competency	Patient Safety Culture	Education / Training	Simulation / E-Learning	Knowledge / Attitude	Self-Efficacy / Confidence	Clinical Competence / Experience	Teamwork / Communication	Psychological Safety / Speaking Up	Adverse Events / Error Reporting	Organizational / Work Environment
18	Ji et al. (2021)	✓		✓		✓		✓	✓			
19	Boloré et al. (2023)	✓		✓	✓				✓			✓
20	Tasbihi et al. (2025)	✓						✓	✓	✓		✓
21	Setoodeh et al. (2025)	✓		✓		✓			✓		✓	
22	Kakemam et al. (2022)	✓		✓				✓				✓
23	Zhang et al. (2026)	✓		✓				✓				✓
24	Ma et al. (2025)	✓		✓							✓	✓
25	Binh et al. (2026)	✓	✓	✓					✓		✓	✓
26	Hoffmann et al. (2022)		✓					✓	✓	✓	✓	✓
27	Lusianah et al. (2025)	✓		✓				✓	✓		✓	
28	Liu et al. (2022)	✓	✓	✓							✓	
29	Sepp (2024)	✓		✓		✓		✓	✓		✓	
30	Camacho-Rodriguez et al. (2022)		✓	✓					✓		✓	✓

3.2 Antecedents of Patient Safety Competency

The reviewed studies showed that educational preparation was one of the most consistent antecedents of patient safety competency. Educational interventions such as education in patient safety, curriculum integration, simulation-based training, e-learning, Inter-professional learning, case discussion, evidence-based learning and adverse event analysis were often associated with the development of stronger competencies. Finally, patient safety education programs reflect a positive effect on nursing students' knowledge, attitudes and competency which are increased especially by the use of organized and interactive learning strategies (Park & Yeom, 2025). According to Jung et al (2023) simulation-based training not only increased patient safety competency, but also improved knowledge, skills, communication self-efficacy, and teamwork for newly graduating intensive care unit nurses. The authors concluded that high-fidelity simulation and e-learning were useful tools for improving nursing students' self-efficacy beliefs in patient safety: enhancing confidence in their ability to implement safety principles through technology-supported methods and scenario-based learning (Ozata & Dinc, 2025). Curriculum integration was another critical factor, because topics specific to patient safety should be interspersed throughout theoretical and practical nursing courses, rather than taught independently (Ji et al., 2021). Dedicated patient safety course, learning of evidence-based nursing, case discussions and adverse event analysis were linked to higher patient safety competency among undergraduate nursing interns (Xu et Al. 2025).

The findings also showed that patient safety competency is influenced by individual, clinical, organizational, and communication-related antecedents. Individual and clinical factors included knowledge, attitudes, clinical competence, professional development, critical thinking, legal and ethical practice, interpersonal relationships, leadership ability, professionalism, systems thinking, compassion competence, and clinical experience. Nurse competence was positively associated with international patient safety goals, particularly through clinical care, teaching and coaching, critical thinking, professional development, legal and ethical practice, interpersonal relationships, and leadership (Kalsoom et al., 2023). Professionalism and systems thinking directly influenced patient safety competency, showing that nurses need both professional responsibility and system-level understanding to manage patient safety risks (Kakemam et al., 2022). Organizational and communication related factors were: patient safety culture, management support, work environment, organizational support (support in the workplace), teamwork, psychological safety, speaking up climate and error management climate. Patient safety competency of emergency nurses: the influencing factors (Habibi Soola et al., 2022) Team structure, leadership, psychological safety and experience in patient safety activity predicted. Teamwork and psychological safety were also strong positive predictors of emergency department nurse's patient safety competence (Tasbihi et al., 2025). The data show that patient safety competence emerges from the interplay of education, developmental level (ie, the maturity of the healthcare professional), clinical experience, teamwork and leadership systems in which individuals operate, and supportive organizational structures.

3.3 Outcomes Associated with Patient Safety Competency

The reviewed studies showed that patient safety competency was associated with several safety-related outcomes, especially adverse events, error reporting, patient safety activities, safety behaviors, and patient safety culture. Nurses with higher patient safety competency were more likely to report adverse events, while stronger knowledge and attitude scores were associated with reduced occurrence of adverse events (Kakemam et al., 2024). The organizational patient safety culture and workloads competency at the hospital level were also associated with medication errors, pressure ulcers, falls, and restraint use (Hafezi et al., 2022). The results suggested that mindfulness meditation effectively improved patient safety culture and doctors' patient safety competency, while benefits were related to a lower incidence of intervention group adverse events (Liu et al., 2022). These results suggest that patient safety competency may lead to safer clinical work and improved recognition, prevention and reporting of patient safety problems.

Patient safety competency was also related to safety behaviors and patient safety activities. In cancer hospital nurses, patient safety competency partially mediated the relationship between burnout profiles and nurse safety behaviors, indicating that competency may protect safety behaviors even when nurses experience work-related strain (Ma et al., 2025). Caring behavior significantly influenced patient safety activities, although patient safety competency did not significantly moderate this relationship in the tested model (Lusianah et al., 2025). Patient safety competency was also connected to safety management activity, communication self-efficacy, and teamwork after simulation-based training among newly graduated nurses (Jung et al., 2023). These findings show that patient safety competency is not only an educational outcome but also a practical mechanism linked to safer actions, communication, reporting, and patient-centered safety activities in clinical settings.

The outcomes associated with patient safety competency also extended to patient safety culture, quality of care, and professional readiness. Clinical nurse competence correlated positively with patient safety culture, supporting the viewpoint that individual competences and organizational safety

climate influence each other (Zaitoun et al 2023). The presence of six domains (communication, leadership, teamwork, error reporting, continuous improvement and organizational learning) was essential to build patient safety culture in Latin American hospitals contexts because they were related to the sustenance of safe care environments (Camacho-Rodriguez et al., 2022). Training in patient safety were emphasized by nursing students as central to realizing future competence, particularly the integration of interdisciplinary work, reporting of errors and practical training into early curriculum (Sepp, 2024). Overall, patient safety competency demonstrates a significant correlation with both individual-level outcomes-knowledge, confidence, safety behaviors and reporting -and organizational-level constructs-safety culture, communication quality, teamwork and adverse event prevention.

4. Discussion

4.1 Interplay of Educational, Individual, Clinical, and Organizational Antecedents

This systematic review shows that patient safety competency is influenced by several interacting educational, individual, clinical and organizational antecedents, not just one isolated factor. Competency based in educational preparation gives the knowledge, attitudes and skills needed for patient safety as abstract ideas but these things may not become real according to the determination of the availability of students or nurses to take practices into clinical practice. The findings also indicated that patient safety education programs enhanced nursing students' knowledge, attitudes, and competency when structured and interactive approaches were performed (Park & Yeom, 2025). Research findings: Simulation-based training developed competency, knowledge, skills and self-efficacy in communication and teamwork among novice ICU nurses (Jung et al., 2023).

Individual and clinical antecedents also play an important role in transforming patient safety education into practical competence. The reviewed studies showed that clinical competence, professional development, critical thinking, legal and ethical practice, interpersonal relationships, leadership ability, professionalism, systems thinking, compassion competence, and clinical experience were associated with patient safety competency. Nurse competence was positively associated with international patient safety goals, showing that broader professional competence supports safety-related outcomes (Kalsoom et al., 2023). Professionalism and systems thinking directly influenced patient safety competency, suggesting that safe nursing practice requires both personal accountability and the ability to understand safety problems as system-related events rather than only individual mistakes (Kakemam et al., 2022). Compassion competence was also linked with patient safety competency among psychiatric nurses, indicating that relational sensitivity and communication may support safer care in specialized settings (Setoodeh et al., 2025). Thus, individual readiness and clinical maturity strengthen the effect of formal education on patient safety competency.

Organizational and communication-related antecedents further shape whether patient safety competency can be expressed in practice. Even when nurses possess knowledge and skills, unsafe work environments, weak leadership, fear of blame, poor teamwork, or lack of psychological safety may prevent them from speaking up, reporting incidents, or participating in safety improvement. Patient safety culture was positively related to clinical nurse competence, showing that individual competence and organizational safety climate are closely connected (Zaitoun et al., 2023). Team structure, leadership team, and psychological safety and previous experience in the patient safety activity predicted emergency nurses' perceived competency to ensure safe patient care (Habibi Soola et al., 2022). Team work and psychological safety were also predictors of patient safety competence for emergency nurses (Tasbihi et al., 2025). Yet nursing students often did not speak up for fear of

backlash, the unpredictability in response and diagnosis led them to feel it was futile enough to be unbothered with, and central clinical culture hierarchies (Hoffmann et al., 2022).

4.2 Policy, Practical, Educational, and Theoretical Implications

The findings have important policy implications for healthcare systems and educational institutions. Patient safety competency should be treated as a core requirement in nursing education, clinical training, continuing professional development, and hospital quality improvement programs. Policies should require the integration of patient safety content into undergraduate nursing curricula, internship programs, orientation for newly recruited nurses, and ongoing professional training. Integrated curriculum design is important because patient safety topics should appear across theoretical and practical courses rather than as isolated lectures (Ji et al., 2021). Dedicated patient safety courses, evidence-based learning, case discussions, and adverse event analysis were associated with higher competency among undergraduate nursing interns (Xu et al., 2025). For healthcare organizations, policies should also support nonpunitive incident reporting, psychological safety, leadership development, and regular assessment of patient safety culture. Patient safety culture and competence were associated with education level, department, night-shift frequency, and incident-reporting behavior among nurses in Vietnam (Binh et al., 2026).

At the practical level, healthcare managers should design interventions that address both individual competency and workplace conditions. However, the most nurses will arise from their training is if they work under environments of blame, poor communication, excessive workload, weak feedback and inadequate leadership support. Patient safety competency was related to adverse events occurrence and reporting, indicating that strategies aimed at improving patient safety competency may also lead to better prevention and reporting behavior (Kakemam et al., 2024). Patient safety culture and competency were also associated with medication errors, pressure ulcers, falls, and restraint use, highlighting the practical importance of strengthening safety competence in routine clinical care (Hafezi et al., 2022). Managers should therefore combine education with supervision, mentorship, teamwork training, feedback systems, and safety rounds. Newly recruited nurses may need additional support because education level, safety training, patient safety-related projects, transition shock, night-shift frequency, and perceived organizational support were predictors of patient safety competency (Zhang et al., 2026).

The educational implications are also significant. Nursing schools should use active and practice-based learning strategies, including simulation, e-learning, case-based discussion, reflective learning, adverse event analysis, interprofessional learning, and open disclosure training. These findings highlight that when simulation focuses on realistic clinical contexts, both face-to-face and technology-enhanced methods may be equally effective forms of instruction in terms of improving self-efficacy among nursing students regarding patient safety (Ozata & Dinc, 2025). In addition, patient safety education had also a beneficial effect in the patient safety competencies of undergraduate nursing students on time (Torkaman et al., 2022). In theory, the results support a multidimensional view of patient safety competency to include knowledge, attitudes, skills, teamwork, communication and error-related behaviors. Instruments used to measure patient safety competency commonly include domains such as knowledge, skills, attitudes, communication, teamwork, and errors, which confirms the multidimensional nature of the concept (Mortensen et al., 2022). This suggests that future theoretical models should connect individual competence with organizational culture, safety behavior, and system-level risk management.

4.3 Comparison with Existing Reviews, Limitations, and Future Research

The findings of this review align with previous reviews which show that education, clinical competencies, safety culture, and measurement are playing a role in the patient safety competency. The current review draws the same conclusion that patient safety competence of nurses and nursing students continues to be inconsistent, with often poor performance in teamwork and adverse event management (Wang et al., 2026). It also aligns with evidence indicating that the competence of clinical nurses is positively related to the patient safety culture (Zaitoun et al., 2023). Furthermore, the review aligns with evidence from scope reviews suggesting that patient safety competency instruments are mainly limited to measuring knowledge and attitude, skills communication, teamwork dimension and error-reducing dimensions (Mortensen et al., 2022). Yet, this review expands on previous research by categorizing the antecedents of patient safety competency and thus identifying perhaps unique features in terms of education, individual, clinical, organizational and communication surrounding their context. The relevance of newer concepts e.g. psychological safety, systems thinking, compassion competence, transition shock and burnout and organizational support are also indicated.

This review has several limitations. First, the included studies varied in design, population, setting, country, measurement tool, and outcome focus, which limited the possibility of quantitative synthesis. Second, many studies used cross-sectional designs, making it difficult to establish causal relationships between antecedents and patient safety competency. Third, the use of self-reported measures in some studies may increase risk for response bias and overestimation of competency. Fourth, certain incorporated studies investigated nursing students whereas others looked at clinical nurses or emergency nurses or psychiatric nurse or new hired nurses or mixed healthcare professionals, hindering comparability between populations. Fifth, various instruments were used to assess patient safety competency and Mortensen et al. (2022) previously published evidence highlights that sensitivity and responsiveness are infrequently evaluated by currently available tools. Given these limitations, findings should be interpreted as a thematic synthesis of current evidence rather than definitive causal evidence.

Longitudinal, experimental and mixed methods designs are crucial to establish how patient safety competency develops over time and to investigate the effects of interventions at discrete training points in relation to clinical behaviour and patient outcomes. But more research is needed to determine if education, simulation, psychological safety initiatives, leadership programs and organizational support strategies generate sustainable change in competence in patient safety. Further research deficiencies should also focus on advancing knowledge on underrepresented populations, including nurses who are newly qualified, psychiatric nurses, emergency nurses and nursing in low-resource settings. The understanding of the role of burnout needs to be further researched as patient safety competency mediated the linkage between burnout profiles and nurse safety behavior (Ma et al., 2025). Research should also examine the relationship of patient safety competency with core patient level outcomes, such as adverse events reduction and reporting quality, communication quality, and patient safety behaviors. Caring behavior had an effect on patient safety activities, but the moderating role of patient safety competency was not statistically significant indicating that mediation and moderation models require further testing (Lusianah et al., 2025). Thus, future studies should go beyond description and build better causal models that may help explain how antecedents link to competency in safety behavior and patient outcomes.

5. Conclusion

This systematic review concluded that patient safety competency is shaped by multiple interconnected antecedents rather than by one isolated factor. The reviewed evidence showed that educational preparation, curriculum integration, simulation-based learning, e-learning, clinical exposure, teamwork, psychological safety, patient safety culture, leadership, organizational support, professional competence, and adverse event reporting all contribute to the development of patient safety competency. Education refers to the core knowledge, attitudes and skills that make up safety competencies, whereas clinical and organizational environments determine whether nurses and students can achieve high levels of performance in practice related to patient safety. Thus, patient safety competency is best conceived as a multidimensional professional competence that requires both individual preparedness and an environment of system-level support. Study results also show that the need to improve patient safety competency is best met by a coordinated effort from nursing schools, healthcare institutions, clinical leaders and policymakers. An approach to overcome these barriers in nursing education programs would be to incorporate patient safety into theoretical and practical courses, implement active learning strategies that address the clinic where students feel well-prepared and expose them to clinical situations where safety concerns are present. Healthcare organizations need to invest in enhancing teamwork, communication, psychological safety, leadership support, nonpunitive reporting and continuous professional development. Future studies must extend beyond cross-sectional self-report investigations and evaluate the degree to which targeted interventions impact on patient safety outcomes especially competency, safety performance, event reporting rates and clinical outcomes over longitudinal periods. Overall, strengthening patient safety competency is essential for improving safe practice, reducing preventable harm, and promoting a stronger culture of patient safety in healthcare settings.

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