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Patient Safety Behavior Among Nurses and Its Related Factors in Intensive Care Units: A Scoping Review

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Abstract

Objective: This review explores the patient safety behaviors demonstrated by the Intensive Care Unit's nurse and the various factors that influence these behaviors.

Material and Methods: This review is based on Arksey and O'Malley's framework and utilizes PRISMA-ScR to provide a clear and transparent report. Article searches were conducted without time limits through the EBSCO, PubMed, Scopus, Taylor and Francis databases, and the Google Scholar search engine. A thematic analysis was performed to discern the primary findings within the literature.

Results: Nine studies analyzed in this review have identified several factors influencing the patient safety behavior of ICU nurses. These factors are categorized into six groups: demographics, individual factors, education and training, colleague relationships, environment, and patient condition. Each factor's significance is indicated by a p-value. The level of good behavior is still relatively low ranging from 30% to 42.8%.

Conclusion: Knowledge, motivation, work experience, educational qualifications, and safety climate are factors that influence behavior. Further research is recommended to explore the levels of knowledge, motivation, and safety climate among ICU nurses. By identifying these factors, nurses can develop targeted programs to improve their practices and enhance patient safety.

Keywords: Related Factor; Behavior; Patient Safety; Intensive Care Unit

Introduction

Patient safety is a structured framework of activities that fosters a culture, processes, procedures, behaviors, technology, and environment in health services that consistently and sustainably mitigate risks, preventable harms, the likelihood of errors, and the impact when harm occurs (1). Failure to uphold patient safety is the primary cause of injury and preventable harm to patients (2). It is a grave matter that leads to prolonged hospital stays and either temporary or permanent disability (3).

Nurses and the healthcare system are particularly concerned about patient safety since it seeks to minimize errors, injuries, and patient fatalities (4). Nurses are in the best position to take the initiative to lessen the adverse effects on patients since they have access to the information, knowledge, skills, environment, equipment, time, and support they need to effectively carry out their duties, collaborate for safety, and maintain safety procedures (5,6). Therefore, critical care nurses have a major responsibility in improving patient safety within the healthcare system (2).

There are several problems related to incidents due to failure to maintain patient safety, such as medication

errors, Hospital-Acquired Infections (HAI), unsafe surgical procedures, diagnostic errors, patient falls, pressure sores, patient identification errors, unsafe blood transfusions, and venous thromboembolisms (1). According to the World Health Organization (WHO) data, unsafe services cause over three million fatalities a year, contributing to a global health burden. This problem frequently arises in low- to middle-income countries, with four of 100 patients dying due to unsafe care (7). This indicates that patient safety incidents that result in injury or even death to patients continue to occur.

The Intensive Care Unit (ICU) is among the most intricate and high-paced areas within a hospital, offering advanced medical care to patients in critical condition (8). Nevertheless, patients in the ICU are at greater risk of experiencing hospital safety problems than those in other areas (9,10). Therefore, patient safety in the ICU must be a top priority to deliver high-quality intensive care (8). Meanwhile, there are various challenges in providing services in critical settings, including adverse treatment outcomes, mishaps, and medical errors (11). Long working hours, heavy patient loads, understaffing, and burnout all contribute to the high error rates in an ICU setting (12). The resulting impact creates major losses for individuals and society, such as the length of treatment and increased treatment costs (7).

Numerous factors influence patient safety incidents in the ICU. Advanced equipment and new treatment methods, critically ill patients in unstable conditions, and the heavy workload of nurses negatively impact patient safety, with nurses' fatigue, high patient loads, and staffing shortages all contributing to high error rates in the ICU (8). In addition, the ICU is an area where incidents that could threaten patient safety occur due to the numerous actions required by nurses (13). Considering these risk factors for patient safety incidents in the ICU, adverse event prevention is crucial. Changes in nurses' patient safety practices and behaviors can help avoid losses during ICU care, which have become a major concern for healthcare organizations worldwide (7,14,15).

Several previous studies in ICU have shown that knowledge and motivation can have a positive impact on nurses' behavior in implementing patient safety (16,17). However, while numerous studies have identified factors that influence nurses' patient safety behavior, other studies indicate that knowledge and motivation do not significantly affect this behavior (18). This uncertainty makes it impossible to compare the variables impacting the ICU nurses' patient safety behavior.

There is a notable lack of thorough investigation in the existing literature regarding the factors that influence patient safety behavior among ICU nurses, urgently necessitating a systematic scoping review that assesses this issue. This review aims to identify and outline gaps in the existing literature while emphasizing factors that require additional investigation. Furthermore, it intends to pinpoint the most effective strategies that can be adopted by nurses and policymakers to enhance patient safety and decrease the frequency of safety incidents. Ultimately, the outcomes of this scoping review will aid in the development of a more thorough and evidence-based framework for delivering care services in the ICU.

Materials and Methods

Study Design

This study is a scoping review that follows the comprehensive methodological framework by Arksey and O'Malley (2005), whose techniques can incorporate various research designs (19). This design encompasses a broader conceptual framework, allowing for the explanation of a variety of relevant research findings. The scoping study framework comprises five essential stages: 1) formulating research questions, 2) identifying pertinent research findings, 3) selecting relevant studies, 4) mapping the data, and 5) compiling, summarizing, and reporting the results (20). The guiding question for the literature search was: "What are the factors associated with the patient safety behavior of nurses in intensive care units?"

Search Strategy

The literature search was conducted from May to July 2024 using the EBSCOhost databases (Medline Ultimate, Scopus, PubMed, Taylor and Francis) and one search engine (Google Scholar). The search strategy used a combination of Medical Subject Headings (MeSH) and relevant keywords for factors influencing patient safety behavior of nurses in the ICU with English language keywords such as factor OR nurse OR nurses OR nursing staff AND behavior OR practice AND patient safety AND intensive care unit OR ICU OR critical care. The Boolean operators "AND" and "OR" were utilized to truncate or expand search results from various word forms. The search also employed the “related articles” feature via Google Scholar and self-searched the reference lists of included articles to broaden the search and identify additional relevant studies.

Inclusion and Exclusion Criteria

The inclusion criteria for this review adhered to the Population, Concept, and Context (PCC) framework as a guideline for setting clear and meaningful objectives (21).

Population (P) :
Nurse

Concept (C) :
Patient Safety Behavior

Context (C) :
Intensive Care Unit

The inclusion criteria for this study comprised primary research articles published in English, specifically focusing on nurses working in intensive care units and addressing patient safety behavior. Since the goal of this review was to comprehensively identify the factors influencing nurses' patient safety behavior, the search did not restrict the publication year to facilitate more effective generalization of the study results.

Data Extraction

The tabulation method was utilized to manually gather data associated with the study findings and other related aspects (author, year, location, design, sample age, and behavioral categories). Data analysis was conducted using a qualitative descriptive approach, employing content analysis methods to describe and summarize various themes that emerge from research results that are relevant to the research objectives. The findings obtained were presented in a comprehensive and structured narrative form, reflecting the results of the literature compiled in this scoping review. Each finding was analyzed and explained based on factors related to patient safety behavior and the level of ICU nurses’ patient safety behavior, which were classified into six categories.

Data Analysis

The full texts of the collected articles were read carefully, and descriptive analysis methods were used. After reviewing, an in-depth analysis was conducted, and the articles were organized into a manual table. A description of the scoping review results was prepared for comparison with previous studies. Various interventions were identified, categorized by similarity, and discussed. Data analysis was independently performed by three field experts. Any disagreements were resolved through discussion, involving the third author if necessary.

Results

A total of 7,974 articles were identified in the initial search, which was reduced to 7,531 after removing duplicates. The screening process based on titles and abstracts yielded 129 articles, which were further evaluated through full-text analysis. Ultimately, nine articles were included in this scoping review, as illustrated in the PRISMA diagram below (See Figure 1).

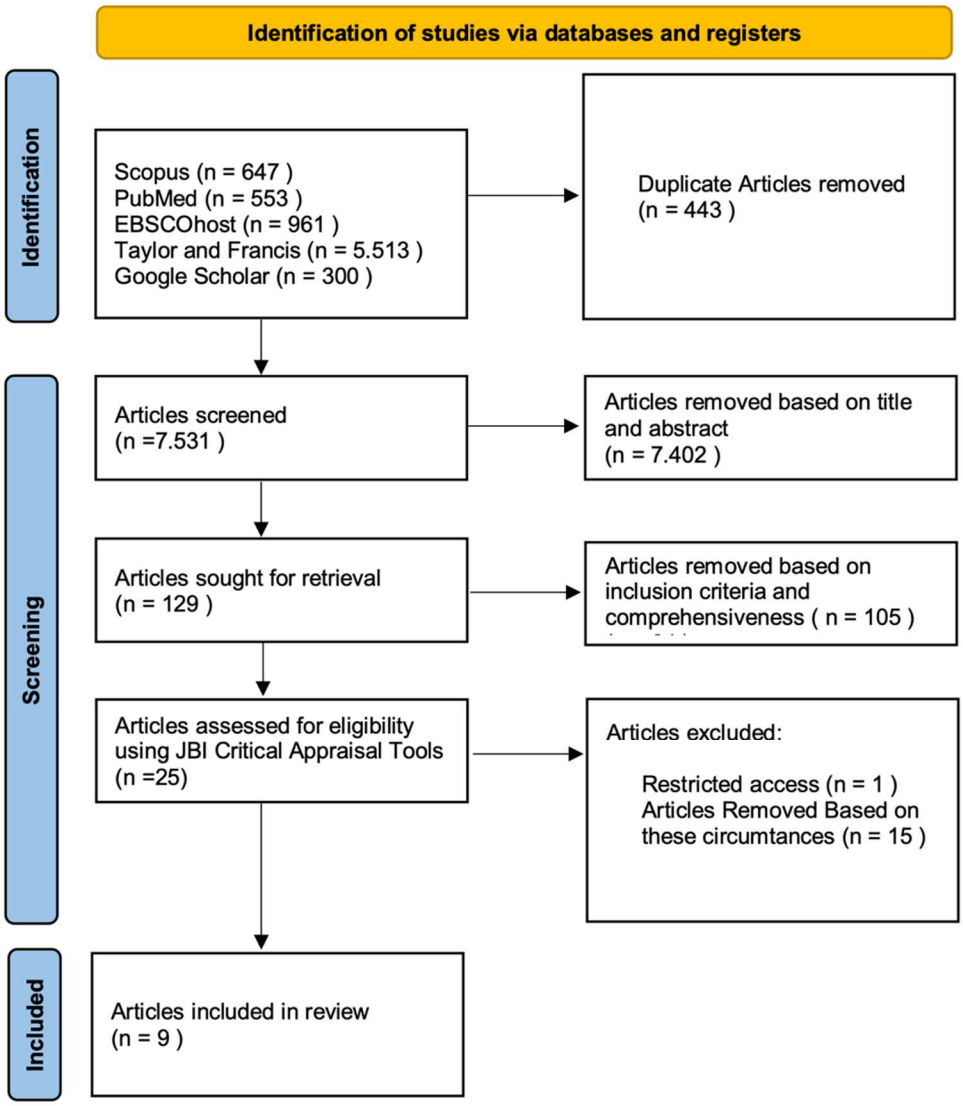

Figure 1. PRISMA Flow Diagram

Study Characteristics

This review identified nine articles from Egypt, Indonesia, the USA, Korea, and Italy, all of which applied cross-sectional designs, with characteristics as seen in Table 1. Seven out of the nine articles used samples from the ICU setting (18,22–26), whereas the other two studies had large samples not only from the ICU but also from the critical care room and emergency department (16,27). Furthermore, four articles demonstrated that ICU nurses still had a low level of patient safety behavior, with a value of 30–42.8% (22–25), while two articles showed that nurses' patient safety behavior was in the good category (26,27).

Table 1. Study Characteristics

Author & Year	Design	Country	Samples			Findings		JBI (%)
			Settings	Size	Age (Mean±SD)	Level of Behavior	Predictors of behavior	
-22	Cross-sectional design	Egypt	ICU	100 nurses	28.35 ± 5.99	Adequate (36%) Inadequate (64%)	Age Occupation (Nurses/Head Nurse) Qualifications of education Years of experience Marital status Attend training courses about patient safety	87.5
-23	Cross-sectional design	Egypt	ICU	50 nurses	20-30 years -75%	Satisfactory performance (30%)	Gender Age Qualifications of education	100

						Unsatisfactory performance (70%)	Years of experience	
							Training courses	
-24	Cross-sectional design	Egypt	ICU	255 nurses	27.34+2.92	Good behavior (32.5%) Fair behavior -51.80% Poor behavior -15.70%	Last handover experience Relations with outgoing nurses Nurses' feelings about their work in general Safety climate unit Work environment	100
-18	Cross-sectional design	Indonesia	ICU	26 nurses	N/A	N/A	Knowledge Attitude Motivation	75
-25	Cross-sectional design	Egypt	ICU	56 nurses	Less than 30 (67.9%)	Incompetent -57.15% Competent -42.85%	Gender Age Marital status Qualifications of education	100

							Years of experience Job title	
-26	Cross-sectional design	USA	ICU	361 nurses	47.3 + 8.8	Safe patient handling behavior (4.85 + 0.53)	Age Symptoms of injury Safety climate Physical workload Job strains Social support Rewards Overcommitment Risk perception of self	100
-27	Cross-sectional design	Indonesia	ED and ICU	63 nurses	N/A	Good (85.7%)	Perceived benefits Perception of barriers Action cues	75
-16	Cross-sectional design	Korea	Critical care	1,053 nurses	20–29 years old	N/A	Patient safety knowledge Patient safety motivation	100

							Safety climate	
-17	Cross-sectional design	Italy	ICU	123 nurses	37.6 years (±9.2)	N/A	Age Gender Years of work experience Knowledge Attitudes	75

1.

Abbreviations: ICU, Intensive Care Unit; ED, Emergency Department; N/A, Not Available; USA, the United States of America

2. Nurse's Patient Safety Behavior

3. Among the reviewed studies, five articles assessed the level of patient safety behavior among ICU nurses using questionnaires, four of which reported that the proportion of nurses demonstrating good patient safety behavior remained relatively low, ranging from 30% to 42.85% (22–25). Conversely, the rate of patient safety behavior among ICU nurses considered incompetent was notably high, ranging between 57.15% and 70%. Studies that did not use questionnaires as a tool to measure the patient safety behavior of ICU nurses often relied merely on direct observation and did not provide specific numerical values, making direct comparisons challenging.

Table 2 Categories of factors related to patient safety behavior

Categories	Subcategories	Significant		Not Significant	
		p-value	References	p-value	References
Demographics	Marital status	0.018	(22)		
		0.03	(25)		
	Gender	0.015	(23)	0.4	(25)
		<0.05	(17)		
	Age	0.03	(25)	0.146	(22)
		<0.05	(17)	0.910	(23)
				>0.05	(26)

Categories	Subcategories	Significant		Not Significant	
		p-value	References	p-value	References
	Job title	0.03	(25)		
	Occupation	0.005	(22)		
	Years of experience	<0.001	(23,25)		
		0.009	(22)		
		<0.05	(17)		
Individual	Perception	0.009	(26)		
		<0.05	(27)		
	Motivation	<0.001	(16)	0.147	(18)
	Attitude	0.006	(18)		
		<0.05	(17)		
	Overcommitment	<0.001	(26)		
	Knowledge	<0.001	(16)	0.082	(18)
		<0.05	(17)		
Education and Training	Qualifications of education	<0.001	(23,25)		
		0.019	(22)		
	Training courses	0.016	(23)	0.755	(22)
Relationships with Colleagues	Last handover experience	<0.001	(24)		
	Relations with outgoing nurses	<0.001	(24)		

Categories	Subcategories	Significant		Not Significant	
		p-value	References	p-value	References
	Nurses' feelings about their work in general	0.010	(24)		
Environmental	Safety climate	<0.001	(16,24,26)		
	Social support	<0.001	(26)		
	Physical workload and job strain	<0.01	(26)		
	Rewards			>0.05	(26)
	Work environment			0.920	(24)
Patient Condition	Symptoms of injury			0.544	(26)

Factors Associated with Nurse's Patient Safety Behavior

From the nine articles identified, various interconnected factors influencing nurses' patient safety behavior were classified into six main categories as detailed in Table 2. Each factor was assessed for significance, defined by a p-value<0.05. Understanding these factors is crucial for creating strategies to enhance nurses' patient safety behavior in the ICU.

Demographics Category

Factors influencing ICU nurses' patient safety behavior include demographics that shape their approach to safety protocols. Key demographic elements, such as age, gender, marital status, job title, occupation, and experience, contribute to varying levels of safety awareness and adherence. Evidence from two studies indicates that age significantly affects patient safety behavior, with older or more experienced nurses often showing greater vigilance and responsibility (17,25). However, in contrast, three other studies reveal that age does not have a statistically significant effect on safety behavior, indicating that factors beyond age, such as training, environment, or personal attitudes, may play a more dominant role in influencing safety practices (22,23,26).

Individual Category

Various personal elements, such as perception, motivation, attitude, over-commitment, and knowledge, are recognized to have an impact on ICU nurses' patient safety behavior, with motivation and knowledge being identified as significant factors by two studies (16,17). However, these findings are not supported by a similar study in Indonesia, which found no significant connection between these factors and patient safety behavior (18). Such discrepancy highlights the potential influence of cultural or contextual differences on safety

practices in healthcare settings.

Education and Training Category

Two studies have considered educational qualifications and training courses essential factors that influence the patient safety behavior of ICU nurses (23,25). These studies suggest that a higher level of education and specialized training can enhance nurses' ability to maintain patient safety standards. However, another study reported contrasting findings that training courses do not have a significant influence on nurses' patient safety behaviors; instead, other factors may play a more critical role in shaping these behaviors (22).

Relationship with Colleagues Category

ICU nurses' patient safety behavior is significantly influenced by a number of factors, including their most recent handover experience, the quality of their relationships with outgoing nurses, and their overall attitudes toward their profession (24). Despite being the subject of only one study, this factor has a great impact on the patient safety behavior of ICU nurses, indicating that relationships with colleagues can significantly improve nurses' patient safety behavior.

Environmental Category

In the environmental category, factors such as safety climate, social support, physical workload, and job strain are significant contributors to the patient safety behavior of ICU nurses (16,24,25). Meanwhile, rewards and the broader work environment have been determined to have no significant effect on patient safety behavior. This suggests that intrinsic motivators and immediate working conditions may play a more substantial role in shaping nurses' safety practices (24,25).

Patient Condition Category

Despite being the sole factor identified in this review within the patient condition category, symptoms of injury do not significantly influence ICU nurses' patient safety behavior (26). The presence of this factor alone may not strongly affect how nurses engage with safety protocols.

Discussion

This review aims to identify significant findings, map research gaps, and highlight areas that require further investigation. From the nine analyzed articles, factors that influence ICU nurses' patient safety behavior can be grouped into six categories. These factors were also assessed for their significance based on p-values, and the level of ICU nurses' patient safety behavior was examined through questionnaires and observations.

Level of Patient Safety Behavior of Nurses in the ICU

Five of the nine identified articles examined the level of ICU nurses' patient safety behavior through questionnaires, four of which stated that the percentage of ICU nurses having good patient safety behavior is relatively low, reaching only 30–42.85% (22–25). This indicates that a significant number of ICU nurses may not be consistently adhering to patient safety protocols (28). The burden of patient care is exacerbated by poor behavior in the healthcare work environment, which increases medication errors, treatment delays, patient falls, and high mortality rates (29). These findings highlight the urgent need for targeted interventions and improved training programs to enhance ICU nurses' patient safety behavior and reduce preventable harm in critical care settings.

Demographic Characteristics Influence Patient Safety Behavior of Nurses in the ICU

Demographic factors, such as age, gender, marital status, job title, and length of experience, influence patient safety behavior among ICU nurses. Greater vigilance and responsibility in ensuring patient safety have been linked to higher adherence to safety protocols by older nurses or those with more work experience (30). However, these results are not always consistent since other studies have found no significant effect between age and patient safety behavior, suggesting that other factors, such as training, work culture, and system support, may have a greater influence (31). This discrepancy indicates that patient safety behavior depends

on both demographic factors and external supportive elements (32).

Individual Impact on Patient Safety Behavior of Nurses in the ICU

Individual factors, such as perception, motivation, attitude, over-commitment, and knowledge, play an essential role in influencing ICU nurses' patient safety behavior (17,18,26,27), with motivation and knowledge being specifically mentioned as significant factors that can improve nurses' compliance with safety protocols (33). However, these findings are not always consistent across cultural contexts as several studies found no significant correlation between both factors and safety behavior. This may be due to differences in work culture, training systems, or organizational support available in nurses' work environment (34). These variations imply that while motivation and knowledge can influence safety behavior, their impact may be influenced by local context, thus necessitating the use of culturally and contextually appropriate interventions to effectively promote safety behavior across settings (35).

Education and Training Improve Patient Safety Behavior of Nurses in the ICU

In the education and training category, educational qualification is the most significant factor in the patient safety behavior of ICU nurses (22,23,25). The higher the education a nurse has, the more conscious they are of the need for patient safety behavior. Good education and training for nurses is extremely needed to increase their awareness of patient safety and satisfaction (36). This is crucial as an effort to educate nurses since knowledge also plays a major role in influencing the patient safety behavior of nurses in the ICU (16). With a better understanding of safety procedures, medication management, and critical response, nurses are better equipped to implement effective safety practices, reduce the risk of errors, and ensure safer patient care (37).

Relationships with Colleagues Enhance Patient Safety Behavior of Nurses in the ICU

Good collaborative relationships with colleagues are critical in promoting safety behaviors in the ICU, particularly during handover when trust and effective communication are essential to ensure continuity of patient care. According to prior studies, the last handover experience will create good communication and strengthen teamwork, eventually improving patient safety (38). Effective communication among healthcare professionals is vital to ensure seamless coordination and the provision of safe, high-quality care in the ICU (39). These aspects can affect how effectively critical information is communicated during transitions, the level of teamwork and support within the unit, and the overall morale of the nursing staff, all of which contribute to maintaining high standards of patient safety (40).

Environment Supports Patient Safety Behavior of Nurses in the ICU

The work environment, including safety climate, social support, and physical load, has a significant influence on nurses' safety behavior in the ICU. A positive safety climate, where nurses feel protected and encouraged to report incidents, promotes adherence to safety protocols (16,24,26). In addition, social support from coworkers and superiors fosters feelings of caring and cooperation, enabling nurses to carry out their duties more safely even under high pressure (41). High physical load, on the other hand, can be challenging as the exhausting physical demands can impair concentration and increase the risk of errors (42). Intrinsic motivators, such as direct support from coworkers and a supportive work environment, play a greater role in maintaining patient safety behavior than external factors such as rewards (43).

Patient Condition Determines ICU Nurse's Safety Behavior

Patient condition, specifically symptoms of injury, is not a significant factor that affects nurses' safety behavior in the ICU. This implies that although patient conditions may require extra attention, nurses' adherence to safety protocols is not directly impacted by injuries or specific clinical conditions. Regardless of a patient's condition, ICU nurses are often trained to uphold high safety standards; they follow safety procedures as part of their daily routine (44). Furthermore, perceived risk is a significant factor that can influence a person's behavior; this can be raised by having good knowledge and self-confidence (45,46).

Despite patients' critical conditions, the presence of injury symptoms alone may not strongly influence how nurses engage with safety protocols. This emphasizes the necessity of considering other factors in evaluating patient safety practices.

Factors Requiring Further Investigations

This review identifies several factors that influence ICU nurses' patient safety behavior, indicating that knowledge is a key element. In addition, nurses' motivation encourages learning more to improve their patient safety behaviors. To achieve this, safety climate plays a crucial role since it fosters both knowledge and motivation (47,48). However, prior studies have reported that knowledge and motivation do not significantly influence ICU nurses' patient safety behavior (18). Therefore, to improve patient safety behavior in the ICU, it is vital to assess the safety climate and nurses' knowledge and motivation to pinpoint areas that require training.

Study Limitations

One of the limitations of this review is that the data classification from the scoping review results is predicated on the authors' assumptions since several included articles do not explicitly classify elements into specific categories. This may lead to bias in the categorization of data. Furthermore, this scoping review does not examine the factors that most influence patient safety behavior in the ICU, thus being unable to interpret the results of quantitative analysis from the included articles. However, this scoping review has attempted to determine the significant and insignificant factors by measuring their p-values.

Conclusions

The percentage of nurses having good patient safety behavior remains low (30–42.8%). Key factors that affect nurses' patient safety behavior include knowledge, motivation, work experience, educational qualifications, and safety climate, all of which are crucial for health workers, especially nurses, to assess and improve nursing services and reduce patient safety incidents. Further studies are recommended to examine ICU nurses' knowledge, motivation, and safety climate. Nurses are expected to be able to develop targeted programs to enhance practices and patient safety by identifying these contributing factors and current issues.

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Conflict of Interests

The authors have declared no conflicts of interest.

Author Contributions

A D A: Conceptualization, writing – original draft, formal analysis, writing – review and editing. A P P, R M: Conceptualization, writing – original draft, writing – review. All authors have read and approved the published version of the manuscript.

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