

Enhancing patient safety culture and examining adverse events in intensive care units: a comparative analysis

Abstract

Background and Purpose: The global emphasis on fostering a patient safety culture is a priority for many countries, including those in the Middle East. Hospitals worldwide are dedicated to enhancing the quality of patient care and safety, with an increasing recognition by hospital management of the role played by a robust patient safety culture. This study compares intensive care nurses' perceptions of patient safety culture and adverse events.

Method: A comparative study was conducted in the intensive care units (ICUs) of four private and teaching hospitals utilizing The Hospital Survey on Patient Safety Culture (HSOPSC)-two in Riyadh and two in Cairo. Nonprobability sampling was employed across all registered nurses working in ICUs.

Results: The study revealed that the highest percentage of errors occurred in patients' acquired infections (61.5%), while the lowest percentage was associated with patients' falls (7.8%). The strengths of the composites were continuous organizational learning improvement (85.9%) and management support for patient safety (81.4%). Areas for improvement were identified in composites such as handoffs and transitions (40.3%) and teamwork across units (49.5%). Notably, nurses in Cairo hospitals reported a higher frequency of adverse events compared to their counterparts in Riyadh hospitals.

Implications for practice: The views of nurses working in both cities emphasized the importance of organizational learning to achieve ongoing improvement, teamwork within specific units, and managerial backing for ensuring patient safety. Moreover, the research emphasized the necessity for additional improvements in collaboration between different units, as well as in the processes of handoffs and transitions.

Keywords: adverse events, intensive care nurses, patient safety, Egypt, Saudi Arabia

Volume 10 Issue 2 - 2024

Hasnaa Saleh,^{1,2} Hanadi Hamadi,³ Ali Alhaiti,¹ Nazik Zakari¹

¹Department of Nursing, College of applied Sciences, AlMararefa University, Saudi Arabia

²Faculty of Nursing Fayoum University, Egypt

³Department of Health Administration, Brooks College of Health, University of North Florida, USA

Correspondence: Hanadi Hamadi, Department of Health Administration, Brooks College of Health, University of North Florida, 1 UNF Drive, Jacksonville, FL 32224, United States, Tel 902-620-5314, Fax 904-620-1035, Email h.hamad@unf.edu

Received: April 02, 2024 | **Published:** April 15, 2024

Introduction

Patient safety stands as a pervasive and critical global health concern, with a sobering statistic revealing a one in three hundred chance of harm to a patient during healthcare processes. Enhance patient safety has become a central focus for nursing staff and health professionals worldwide.¹ Within healthcare systems, the cultivation of a robust patient safety culture is recognized as indispensable. The escalating incidence of adverse events demands heightened attention and meticulous assessment, positioning patient safety as a mandatory priority in healthcare delivery and underscoring the formidable challenge in improving healthcare quality.² Adverse events, characterized as unintended complications or injuries with the potential to result in prolonged hospital stays, disability, or even death, serve as pivotal indicators of patient care quality.³ Intensive care units (ICUs) also known as critical care units (CCUs) experience high levels of adverse events, exerting a detrimental impact on patient outcomes.⁴

Nurses, in particular, ensure the safety of patient care. The establishment of continuous 24-hour nurse-patient contact and the encouragement for nurses to freely express thoughts and report adverse events—stemming from system flaws or human factors—without fear of reprisals are crucial elements within hospitals fostering desirable safety cultures. For organizations aspiring to fortify their safety culture, a thorough examination of its current status becomes imperative to identify areas requiring additional attention.⁵ The pursuit of enhanced patient safety is a shared goal. In the Arab world, cultivating a patient safety culture necessitates the

promotion of strategies involving all stakeholders, including health professionals responsible for medical education and policymakers.⁶ This collaborative approach underscores the multifaceted nature of patient safety culture enhancement, involving diverse parties committed to fostering a safer healthcare environment.

Literature review

Ensuring patient safety in ICUs is paramount to mitigating mortality and morbidity resulting from medical errors. The occurrence of patient problems and adverse events is notably reduced when a robust patient safety culture is in place. In the intensive care ward, health professionals exhibited an unfavorable attitude toward patient safety, scoring low in six safety domains.⁷ Consequently, it is characterized as a culture wherein nurses acknowledge their mistakes and are encouraged to address them.^{8,9} As per the World Health Organization Patient Safety (PS) is defined as the prevention of avoidable harm to a patient throughout the entire healthcare delivery process, aiming to minimize the risk of unnecessary harm. Although the notion of safety in patient care, rooted in the Hippocratic oath, has been acknowledged for centuries, the extent of the issue gained substantial recognition in the 1990s. This recognition followed numerous reports in the USA, where medical errors were identified as the third leading cause of mortality, trailing only heart disease and cancer.¹⁰ Since then, there has been a heightened global awareness, emphasizing the establishment of a safety culture in all healthcare facilities¹¹ a trend similarly observed in Arab World countries. Both the developed and developing worlds share the objective of enhancing patient safety. Developing nations are propelled by a joint universal

proposal from WHO and the World Alliance for Patient Safety (WAPS) to establish an intensive effort for evaluating the extent of the issue. Research indicates that no involved hospitals achieved a reference point score of 50% through the “Patient Safety Friendly Hospital Initiative standards”.¹² An in-depth examination of the patient safety culture in Arab nations emphasizes the significance of cultivating an environment that prioritizes patient safety. It is crucial to grasp the elements and factors shaping this culture, and concurrently, evaluating the safety culture becomes imperative. This process is essential for formulating dedicated strategies aimed at delivering the highest level of safety in patient care.¹³

Complications in healthcare provision remain critical factors impacting both morbidity and mortality, underscoring the imperative role of delivering high-quality and secure healthcare services globally.¹⁴ Research suggests that a failure to improve the culture of patient safety can result in an uptick in missed nursing care instances and adverse patient outcomes.¹⁵ Additionally, a compromised patient safety culture puts nurses at risk of heightened job-related stress, ultimately adversely affecting healthcare outcomes for patients.¹⁶ There is a concerning rise in the frequency of adverse events connected to healthcare, despite multiple attempts to educate healthcare personnel about patient safety. An overall patient safety score of 46% was found in an Ethiopian study on patient safety, which revealed a weak safety culture.¹⁷ Positive attitudes about patient safety are associated with a higher likelihood of patient safety-promoting behaviors among healthcare workers.¹⁸ One in seven patients admitted to hospitals experienced harm, and a noteworthy 59.3% of these instances were found to have been preventable, according to a survey conducted using the Global Trigger Tool.¹⁹ This exacerbates the difficult conditions marked by a lack of personnel and supplies, which further contributes to worse than ideal patient outcomes.

Distinct viewpoints on patient safety are evident among Arabic-speaking Gulf nations, encompassing Jordan, Qatar, Kuwait, Oman, and Bahrain.²⁰ Varied perspectives on the aspects needing improvement in patient safety culture (PSC) are observable across different Arab hospital settings. In Egypt, multiple studies emphasize the necessity to augment PSC among healthcare providers. A descriptive study revealed a prevailing insufficiency in patient safety culture across most domains, identifying seven areas of weakness, each with an average percent positive score below 50.0%.²¹ Another research investigation in Fayoum highlighted an overall deficiency in patient safety within the region’s public hospitals, reflected in a total patient safety score of 46.56%. Scores exhibited diversity across dimensions, with organizational learning and continuous improvement showing the highest mean composite score at 65.36%, while communication recorded the lowest reported score at 17.9%.²² Similarly, a study in Alexandria University’s Intensive Care Unit (ICU) identified a total score of 37.3%. Scores varied across dimensions, with teamwork within units registering the highest average percentage positive score at 63.5%, while non-punitive response to errors registered the lowest at 12.0%.²³

Clear disparities exist in the comprehension of patient safety culture among various Gulf nations. The Kingdom of Saudi Arabia (KSA) stands out with a robust national medicine policy significantly shaping its future development. This policy underscores institutional connectivity, cost-effective procurement, enhanced prescribing practices, securing a reliable supply of high-quality medicines.²⁴ It is crucial to gain a comprehensive understanding of the real-life dynamics surrounding different facets of patient safety culture within the community. Additionally, the evaluation of patient safety

culture plays a pivotal role in identifying areas for enhancement and gaining insights into evolving practices over time.²⁵ Patient safety culture in healthcare is typically influenced by myriad factors within the healthcare organization, playing a pivotal role in averting and mitigating errors.²⁶ Healthcare organizations should emphasize the importance of scrutinizing patient safety culture, offering indispensable insights into the safety-related awareness of their staff. Assessing safety culture awareness is paramount for policymakers striving to instill a workplace culture that encourages staff to report errors, adverse events, near misses, or incidents. This process aids in comprehending the types and extent of staff errors that may lead to patient harm, thereby extracting valuable lessons to bolster patient safety and elevate the quality of patient care.

In this study, our objective was to assess staff nurses’ awareness of the concept of patient safety culture in the ICU and determine adverse events occurring during the delivery of patient care in the ICU. Furthermore, we aimed to compare adverse events faced by nurses working in hospitals’ ICUs in Cairo, Egypt, and hospitals’ ICUs in Riyadh, Kingdom of Saudi Arabia during the delivery of patient care in the ICUs. The study addressed three main questions: (1) How did nurses perceive the concept of patient safety culture in the ICU?; (2) What adverse events did nurses experience during the delivery of patient care in the ICU?; and (3) Were there any differences between ICUs in hospitals in Cairo (Egypt) and Riyadh (Kingdom of Saudi Arabia) concerning the adverse events encountered by nurses during the provision of patient care in ICUs?

Methods and materials

This study employed a descriptive comparative design and was conducted in ICUs at four hospitals. Two of these hospitals were teaching hospitals: one in Riyadh, Saudi Arabia (THR1), and the other in Cairo, Middle East (THC2). The third was a private hospital in Riyadh (PHR3), and the fourth was a private hospital in Cairo (PHC4). The study sample consisted of nurses working in critical care units across all four hospitals (n=179 nurses). The sample size (n) was determined using the formula: $n = N \times P(1 - P) / \left((N - 1) \times (d^2 \div z^2) + p(1 - p) \right)$

where N is the population size, d is the error rate set at 0.05, z is the standard score corresponding to the significance level of 0.95 (equal to 1.96), and p is the availability of the property, set at 0.50. Non-probability sampling was utilized, including all registered nursing staff in ICUs who were available and willing to participate in the study, resulting in a total of 179 nurses. The study encompassed nurses with direct patient care responsibilities in the ICU, including nursing managers, supervisors, coordinators, or educators, regardless of their employment type (part-time, full-time, or contract). Nursing staff not working in ICUs were excluded.

Instrument

In this study, researchers employed the widely recognized Agency for Healthcare Research and Quality (AHRQ) tool, a well-established instrument utilized in previous research spanning various countries, particularly focusing on patient safety issues, nurse errors, and event reporting. Specifically, the researchers utilized the Hospital Survey on Patient Safety Culture (HSOPSC), developed by AHRQ, to evaluate the opinions of hospital staff regarding the patient safety culture within their respective healthcare institutions. The HSOPSC, first introduced in 2004, encompasses 42 elements aggregated into 12 composite measures. Participants were also requested to provide an overall assessment of the safety culture within their work unit. The survey encompassed background information, including participants’

years of experience in the hospital, years of experience in the unit, their position within the hospital, total working hours per week, direct or indirect patient contact, and years in their current specialty.²⁷

Ethical statement

The researcher secured approval from AlMaarefa University’s Institutional Review Board (IRB) with the reference number 182/03. This approval was granted after the submission of the study proposal and before initiating the study or commencing data collection. Additionally, the researcher obtained approval from the hospital administration. Furthermore, a survey cover letter, positioned as the first page of the questionnaire, outlines key aspects of the study. This includes the study’s purpose, instructions for completing the questionnaire, details on how collected data will be stored, and assurance of participant privacy. Notably, the questionnaire omits any personal identifiers, such as the participant’s name. The act of completing the questionnaire serves as the participant’s consent to engage in the study.

Response rate

To ensure a high response rate, the survey instrument was administered in paper format, with researchers in each hospital providing an explanation of the study objectives and potential impacts to the participants. The completed questionnaires were solicited to be returned within a 10-15 minute timeframe. Participants utilized a five-point Likert scale (ranging from strongly agree to strongly disagree) or frequency scale (ranging from always to never) to rate each item. The researcher meticulously reviewed the responses, ensuring that all questions were adequately answered.

Statistical approach

Regression analysis was employed to examine the relationship between the overall patient safety score and areas of strength and improvement, while the ANOVA test was used to compare nurses’ views across the four hospitals. Before data collection, ethical approval was obtained from each hospital’s management, and participation in the survey was voluntary. The survey included a cover letter outlining the study’s aims, anticipated completion time, questionnaire composition, statements regarding anonymity and confidentiality, and information on how participants could seek additional clarification.

Results

Table 1 illustrates differences in the staff demographics and workload across the four hospitals. In THR1, 81.8% of the staff members have one to ten years of experience, whereas only 22.7% fall

into this category in THC2. Among nurses in private hospitals, 56.5% in Riyadh and 51% in Cairo have one to ten years of experience. Regarding weekly workload, 56% of THR1 staff work 60 to 99 hours per week, in contrast to THC2 nurses, of whom 93% work 20 to 59 hours per week. However, in PHR3 and PHC4, the workload is distributed differently, with 72% and 65%, respectively, working 20 to 59 hours per week. Registered nurses consist of the majority of staff in all four hospitals, ranging from 50% to 98%. There is a nearly absent presence of nursing managers across all four hospitals. Additionally, it is typical for the majority of nursing staff in all hospitals to have direct interaction with their patients.

Table 2 outlines the strength areas and those requiring enhancement across all 12 domains of safety culture, based on positive ratings exceeding 75% and those below 50%, respectively. Strengths include organizational learning and continuous improvement (85.9%), management support for patient safety (81.4%), and teamwork within units (78.7%). On the other hand, areas identified for improvement include handoffs and transitions (40.3%) and teamwork across units (49.5%). Table 3 presents the mean staff perceptions of patient safety culture domains across the four hospitals. A statistically significant difference ($p < 0.001$) was observed among respondents concerning the composite of manager/supervisor expectations and actions supporting patient safety. Table 4 delineates the relationship between the overall patient safety score, areas of strength, and areas for improvement. The findings reveal a significant difference at a P-value less than 0.05 for management support only. This shows that for every unit increase in management support, patient safety score increases by 0.242 units. As for areas for improvement, the findings reveal a significant difference with a P-value of less than 0.05 for handoffs and transitions. Table 5 displays the number of adverse events reported by ICU staff across all hospitals. Patient acquired infections accounted for the highest percentage of errors (61.5%), while the lowest percentage of errors was attributed to patient falls (7.8%). The presented table provides a comparative analysis of patient safety measures across four hospitals. Examining the Medication errors category, there is a notable difference among the hospitals, as indicated by the F-test and its associated p-value (F-test = 4.012, p-value = 0.009*). This significant p-value suggests that the observed variations in Medication errors are not likely due to random chance, highlighting a need for further investigation into the specific factors contributing to these differences. In contrast, other patient safety categories, including Patient’s fall, Patient’s acquired infection, Patient’s acquired bed ulcer, Documentation errors, and Unsafe injection, do not show statistically significant differences among the four hospitals, as evidenced by p-values above 0.05. These findings suggest that, in these specific areas, the hospitals may have similar performance levels.

Table 1 Participant descriptive statistics (n=179)

	THR1		THC2		PHR3		PHC4	
	No	%	No	%	No	%	No	%
Worked years in this hospital								
< 1 year	3	6.8	3	6.8	1	2.2	5	11.1
1-10 years	36	81.8	10	22.7	26	56.5	23	51.1
11-20 years	5	11.4	15	34.1	12	26	8	17.8
> 20	0	0	16	36.4	7	15.2	9	20
Worked years in this unit								
< 1 year	2	4.5	2	4.5	1	2.2	3	6.7
1-10 years	40	90.9	15	34.1	29	63.1	29	64.5
11-20 years	2	4.5	17	38.6	9	19.6	10	22.2
> 20	0	0	10	22.7	7	15.2	3	6.7

Table 2 Continued...

	THR1		THC2		PHR3		PHC4	
	No	%	No	%	No	%	No	%
Working hours per week								
< 20 hours	0	0	1	2.3	0	0	1	2.2
20-59	19	43.2	41	93.2	33	71.7	29	64.4
60-79	22	50	1	2.3	9	19.6	15	33.3
80-99	3	6.8	1	2.3	4	8.7	0	0
Position in this hospital								
Registered nurse	43	97.7	41	93.2	23	50	25	55.6
Physician	0	0	2	4.5	21	45.7	20	44.4
Nurse practitioner	0	0	1	2.3	1	2.2	0	0
Nurse manger	1	2.3	0	0	1	2.2	0	0
Direct interaction with patients								
Yes	43	97.7	43	97.7	44	95.7	100	100
No	1	2.3	1	2.3	2	4.3	0	0
Worked years in current specialty								
< 1 year	2	4.5	2	4.5	2	4.3	2	4.4
1-10 years	37	84.1	8	18.1	24	52.2	24	53.3
11-20 years	5	11.4	18	40.9	12	26.1	11	24.5
> 20	0	0	16	36.4	8	17.4	8	17.8

Table 2 Participant perceptions about patient safety culture domains, (n=179)

	Strongly agree/ agree	Neither	Strongly disagree/ disagree
	%	%	%
Patient safety culture domains			
Teamwork within units	78.7	11.3	4.7
Supervisor/manager expectations & actions supporting patient safety	57.5	21.6	21.6
Organizational learning -continuous improvement	85.9	11.2	5
Management support for patient safety	81.4	29	21.8
Overall perceptions of patient safety	50.4	18.3	31.3
Feedback & communication about error	61.4	27	11.6
Communication openness	53.3	29.2	17.5
Frequency of events reported	74.9	14.7	10.4
Teamwork across units	49.5	29.1	22.8
Staffing	70.1	16.2	17.2
Handoffs & transitions	40.3	30.7	28.3
Nonpunitive response to errors	50.6	25.7	23.6

Table 3 Comparison of means participant perceptions of patient safety culture domains across the four hospitals

Patient safety culture domains	THR1	THC2	PHR3	PHC4	F-test	p-value
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
Communication openness	10.05 (1.569)	9.7 (2.064)	9.85 (1.66)	9.91 (1.964)	0.265	0.85
Feedback and communication about error	11.86 (1.651)	10.95 (2.588)	11.87 (2.455)	11.04 (1.821)	2.397	0.07
Frequency of events reported	12.23 (2.551)	12.64 (3.005)	12.65 (2.685)	11.91 (2.991)	0.721	0.541
Handoffs and transitions	11.07 (3.33)	11.23 (3.395)	10.67 (3.634)	11.53 (2.928)	0.524	0.666
Management support for patient safety	11.07 (1.704)	10.66 (2.533)	10.93 (2.516)	10.82 (1.709)	0.285	0.836
No punitive response to error	8.36 (1.48)	7.27 (2.061)	7.83 (2.047)	7.87 (1.632)	2.628	0.052
Organizational learning—continuous improvement	12.05 (1.555)	12.89 (1.351)	12.63 (1.236)	12.29 (1.701)	2.808	0.041*
Overall perceptions of patient safety	12.61 (1.967)	13.91 (2.735)	13.35 (2.35)	13.2 (2.599)	2.112	0.1
Staffing	9.09 (1.537)	8.18 (1.674)	8.72 (1.858)	8.62 (1.419)	2.308	0.078
Manager/supervisor expectations and actions supporting patient safety	13.05 (2.487)	15.93 (3.128)	14.65 (3.1)	14.4 (3.179)	6.893	0.000**
Teamwork across units	13.5 (2.063)	12.61 (2.048)	13.33 (2.291)	12.73 (1.776)	1.999	0.116
Teamwork within units	15.59 (2.106)	16.25 (2.553)	16.43 (2.455)	15.47 (2.16)	1.905	0.131

Notes: Saudi Arabia Riyadh city (THR1) Hospitals; Middle East Cairo City (THC2), private hospital in Riyadh (PHR3) and private hospital in Cairo (PHC4); Standard deviation (SD); *p <0.05; **p<0.01.

Table 4 Linear regression of the relationship between patient safety and area of strengths

	Unstandardized coefficients		Standardized coefficients		
	B	Std. error	Beta	t	Sig.
Model 1: Areas of strength					
Organizational learning	0.118	0.107	0.095	1.097	0.274
Management support	0.242	0.118	0.188	2.049	0.042
Teamwork within the Unit	0.04	0.09	0.038	0.443	0.658
Model 2: Areas for improvement					
Handoffs and transitions	-0.227	0.102	-0.179	-2.228	<0.027
Teamwork across the unit	-0.008	0.086	-0.008	-0.098	<0.922

Table 5 Frequency and percent of adverse events reported by participants in the ICUs across all hospitals

	Frequency (%)	Frequency (%)	Frequency (%)
	Medication errors	Patient's fall	Patient's acquired infection
No event reports	127 (70.9%)	165 (92.2%)	69 (38.5%)
1 to 2 event reports	42 (23.5%)	12 (6.7%)	88 (49.2%)
3 to 5 event reports	10 (5.6%)	2 (1.1%)	22 (12.3%)
6 to 10 event reports	0 (0%)	0 (0%)	0 (0%)
11 to 20 event reports	0 (0%)	0 (0%)	0 (0%)
Total	52 (29%)	14 (7.8%)	110 (61.5%)
	Patient's acquired bed ulcer	Documentation errors	Unsafe injection
No event reports	120 (67%)	108 (60.3%)	155 (86.6%)
1 to 2 event reports	45 (25.1%)	61 (34.1%)	20 (11.2%)
3 to 5 event reports	12 (6.7%)	6 (3.4%)	2 (1.1%)
6 to 10 event reports	2 (1.1%)	4 (2.2%)	0 (0%)
11 to 20 event reports	0 (0%)	0 (0%)	2 (1.1%)
Total	57 (32.9%)	71 (39.7%)	24 (13.4%)

Table 6 Adverse events means comparison among hospitals

	THR1	THC2	PHR3	PHC4	F-test	p-value
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
Medication errors	1.55 (0.697)	1.14 (0.347)	1.3 (0.553)	1.4 (0.618)	4.012	0.009*
Patient's fall	1.11 (0.387)	1.07 (0.255)	1.07 (0.25)	1.11 (0.383)	0.296	0.828
Patient's acquired infection	1.77 (0.642)	1.7 (0.701)	1.76 (0.639)	1.71 (0.695)	0.118	0.949
Patient's acquired bed ulcer	1.34 (0.608)	1.5 (0.731)	1.41 (0.617)	1.42 (0.723)	0.413	0.744
Documentation errors	1.64 (0.718)	1.3 (0.594)	1.43 (0.544)	1.53 (0.786)	2.092	0.103
Unsafe injection	1.11 (0.387)	1.25 (0.686)	1.17 (0.643)	1.18 (0.442)	0.445	0.721

Notes: Saudi Arabia Riyadh city (THR1) Hospitals; Middle East Cairo City (THC2), private hospital in Riyadh (PHR3) and private hospital in Cairo (PHC4); Standard deviation (SD); *p <0.05; **p<0.01.

Discussion

The primary objectives of this study were to assess staff nurses' awareness of patient safety culture in the ICU, identify adverse events during patient care delivery, and compare ICUs in Cairo, Egypt, with those in Riyadh, KSA concerning adverse events. The findings revealed that 86% of participants strongly agreed or agreed about continuous improvement in organizational learning, aligning with previous research where 87% expressed similar views. Notably, after an intervention, openness to communication increased, consistent with Sundberg et al.²⁸ findings on improved communication following specialized training. The significance of interprofessional education in enhancing healthcare team interaction and patient safety is evident. Evidence suggests that this approach fosters skills crucial for safe healthcare practices, such as effective communication, active listening, commenting, courteousness, and timeliness. Educational programs for doctors and nurses in critical care units can reduce medication errors²⁹ and studies like Irajpour et al.³⁰ support the benefits of interprofessional education on drug safety programs. In terms of

teamwork, only 4.7% of participants disagreed, contrasting with report of 58% agreement. Interestingly, the study identified a highly significant difference in the expectations of managers/supervisors and activities supporting patient safety, differing from findings. Strength areas in composites included organizational learning, continuous improvement, management support, and teamwork within units. This may be attributed to a well-established national patient safety policy, emphasizing institutional interconnection, cost-effective procurement, quality care, and healthcare industry growth.³¹ While the overall patient safety grade was excellent, areas requiring improvement included handoffs, transitions, and teamwork across units. Consistent with previous studies, a lower patient safety culture is linked to increased errors and adverse events, with Kang et al.³ study in Korea highlighting patient falls as the most frequent events. Efforts to improve safety culture should focus on strengthening teamwork perceptions and psychological safety among employees, leading to better reporting of medical errors.³² Continuous assessment of patient safety culture and its correlation with adverse events is vital for ongoing learning. Human factors, especially communication,

play a crucial role, and improvements in teamwork, handoffs, and communication openness are necessary for an overall enhancement in patient safety culture.³³

Conclusion

The study aimed to explore nursing staff perceptions regarding the cultural components of patient safety, with identified strengths including teamwork within units, management support for patient safety, organizational learning, and continuous improvement. Notable areas for improvement comprised teamwork across units, handoffs, and transitions. A comparative analysis between the Intensive Care Units (ICUs) in Cairo (Egypt) and Riyadh (Kingdom of Saudi Arabia) revealed a lower frequency of adverse events reported by staff in Riyadh hospitals compared to those in Cairo hospitals.

International implications for practice

The research focused on assessing Critical Care nurses' perceptions of patient safety and adverse events in ICUs, aiming to pinpoint existing gaps in nurses' awareness concerning patient safety in ICUs across both locations. This study serves as a valuable reference for international healthcare providers, managers, policymakers, and future researchers. The findings of the study have several international implications for practice in the field of patient safety and healthcare quality. Hospitals worldwide should prioritize and adopt practices that foster continuous organizational learning and improvement. The study emphasizes the positive impact of a culture that values learning from incidents and actively seeks opportunities for improvement.

Furthermore, the study underscores the importance of strong management support for patient safety. Healthcare leaders globally should recognize their critical role in shaping a culture that prioritizes patient safety. Leadership practices that actively support and promote patient safety initiatives are essential. The identified need for improvement in handoffs and transitions has global relevance. Healthcare institutions worldwide should prioritize standardized communication practices during patient handoffs and transitions to ensure the continuity and safety of care. The call for improvement in teamwork across units highlights the importance of interdisciplinary collaboration. Healthcare systems internationally should focus on strategies that enhance teamwork and communication between different units and specialties. The study suggests the positive impact of interprofessional education on teamwork and patient safety. Healthcare education globally should incorporate interprofessional training programs to equip healthcare professionals with essential skills for safe practices. Lastly, the study's findings offer insights that can inform and guide international efforts to enhance patient safety culture and healthcare quality. The identified strengths and areas for improvement, along with the city-specific differences, provide a foundation for developing targeted strategies and initiatives on a global scale. Continuous learning, leadership commitment, standardized practices, and collaborative efforts are key elements in advancing patient safety practices internationally.

Acknowledgments

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

References

1. World Health Organization. WHO patient safety curriculum guide. 2012.

2. Sanchez JA, Barach P, Johnson JK, et al. *Surgical patient care*. Springer International Publishing: 2017:683–694.
3. Kang JH, Kim CW, Lee SY. Nurse-perceived patient adverse events and nursing practice environment. *J Prev Med Public Health*. 2014;47(5):273–280.
4. Nilsson L, Pihl A, Tågsjö M, et al. Adverse events are common on the intensive care unit: results from a structured record review. *Acta Anaesthesiol Scand*. 2012;56(8):959–965.
5. Vaismoradi M, Tella S, A Logan, et al. Nurses' adherence to patient safety principles: a systematic review. *Int J Environ Res Public Health*. 2020;17(6):2028.
6. Donaldson L, Philip P. Patient safety: a global priority. *Bull World Health Organ*. 2004;82(12):892.
7. Al Malki, Endacott R, Innes K. Health professional perspectives of patient safety issues in intensive care units in Saudi Arabia. *J Nurs Manage*. 2018;26(2):209–218.
8. Alswat K, Abdalla RAM, Titi MA, et al. Improving patient safety culture in Saudi Arabia (2012–2015): trending, improvement and benchmarking. *BMC Health Serv Res*. 2017;17(1):516.
9. Elmontsri M, Almashrafi A, Banarsee R, et al. Status of patient safety culture in Arab countries: a systematic review. *BMJ Open*. 2017;7(2):013487.
10. Brennan TA, Leape LL, Laird NM, et al. Incidence of adverse events and negligence in hospitalized patients: results of the Harvard Medical Practice Study I. *N Engl J Med*. 1991;324(6):370–376.
11. Kakemam E, Gharaee H, Rajabi MR, et al. Nurses' perception of patient safety culture and its relationship with adverse events: a national questionnaire survey in Iran. *BMC Nurs*. 2021;20(1):1–10.
12. Aboul FA, Ismail N, Elarab H, et al. Assessment of patient safety culture among health-care providers at a teaching hospital in Cairo, Egypt. *East Mediterr Health J*. 2012;18(4):372–377.
13. Aljaffary A, Al Yaqoub, Al Madani, et al. Patient safety culture in a teaching hospital in Eastern Province of Saudi Arabia: assessment and opportunities for improvement. *Risk Manage Healthc Policy*. 2021;14:3783–3795.
14. Gizaw A, Lema T, Debancho W, et al. Intention to stay in nursing profession and its predictors among nurses working in Jimma Zone Public Hospitals, South West Ethiopia. *J Nurs Care*. 2017;7(1):1–8.
15. Mugheed K, Bayraktar N. Patient safety attitudes among critical care nurses: a case study in North Cyprus. *Int J Health Plann Manage*. 2020;35(4):910–921.
16. Rainbow JG, Drake DA, Steege LM. Nurse health, work environment, presenteeism and patient safety. *West J Nurs Res*. 2020;42(5):332–339.
17. Mekonnen AB, McLachlan AJ, Brien JE, et al. Hospital survey on patient safety culture in Ethiopian public hospitals: a cross-sectional study. *Safety in Health*. 2017;3(1):1–11.
18. Neal A, Griffin MA. A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *J Appl Psychol*. 2006;91(4):946.
19. Najjar S, Hamdan M, Euwema MC, et al. The Global trigger tool shows that one out of seven patients suffers harm in Palestinian hospitals: challenges for launching a strategic safety plan. *Int J Qual Health Care*. 2013;25(6):640–647.
20. Wilson RM, Michel P, Olsen S, et al. Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital. *BMJ*. 2012;344.
21. Ali HM, Abdul AAM, Darwish EAF, et al. Assessment of patient safety culture among the staff of the University hospital for gynecology and obstetrics in Alexandria, Egypt. *J Egypt Public Health Assoc*. 2022;97(1):20.

22. Sherbiny NA, Ibrahim EH, Abdel WWY. Assessment of patient safety culture among paramedical personnel at general and district hospitals, Fayoum Governorate, Egypt. *J Egypt Public Health Assoc.* 2020;95(1):1–8.
23. Foda ESI, Ibrahim AG, Ali AMM, et al. Assessment of patient safety culture perception among healthcare workers in intensive care units of Alexandria main university Hospital, Egypt. *Alex J Med.* 2020;56(1):173–180.
24. Alahmadi HA. Assessment of patient safety culture in Saudi Arabian hospitals. *Qual Saf Health Care.* 2010;19(5):e17.
25. El-Jardali F, Sheikh F, Garcia NA, et al. Patient safety culture in a large teaching hospital in Riyadh: baseline assessment, comparative analysis and opportunities for improvement. *BMC Health Serv Res.* 2014;14:122.
26. Zakari N. Attitude of academic ambulatory nurses toward patient safety culture in Saudi Arabia. *Life Sci J.* 2011;8(3):230–237.
27. Blegen MA, Gearhart S, Brien R, et al. AHRQ's hospital survey on patient safety culture: psychometric analyses. *J Patient Saf.* 2009;5(3):139–144.
28. Sundberg F, Fridh I, Lindahl B, et al. Associations between healthcare environment design and adverse events in intensive care unit. *Nurs Crit Care.* 2021;26(2):86–93.
29. Farzi S, Moladoost A, Bahrami M, et al. Patient safety culture in intensive care units from the perspective of nurses: a cross-sectional study. *Iran J Nurs Midwifery Res.* 2017;22(5):372–376.
30. Irajpour A, Farzi S, Saghaei M, et al. Effect of interprofessional education of medication safety program on the medication error of physicians and nurses in the intensive care units. *J Educ Health Promot.* 2019;8:196.
31. Mahrous MS. Patient safety culture as a quality indicator for a safe health system: Experience from Almadinah Almunawwarah, KSA. *J Taibah Univ Med Sci.* 2018;13(4):377–383.
32. Aljabari S, Kadhim Z. Common barriers to reporting medical errors. *Scientific World Journal.* 2021:6494889.
33. Binkheder S, Alaska YA, Albaharnah A, et al. The relationships between patient safety culture and sentinel events among hospitals in Saudi Arabia: a national descriptive study. *BMC Health Serv Res.* 2023;23(1):1–15.