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Challenges and Knowledge of Nurses Regarding Triage Systems in Emergency Departments

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ABSTRACT

Background: The term "triage" is derived from the French word meaning "to sort" and refers to the act of prioritising patients in emergency care based on the seriousness of the illness or injury presented; it is how one would classify patients according to the urgency of need in order to provide resource allocation and make priorities. The skills and competencies of triage nurses are very important to ensure that high-quality care is provided and that operations within the emergency departments are effective. This study aimed to evaluate nurses' knowledge of triage systems in emergency departments (EDs) and identify the challenges associated with their implementation. **Methods:** A descriptive correlational study was conducted using a non-probability sample of 230 nurses from governmental hospitals. A structured questionnaire was developed and validated to collect data. The questionnaire consisted of three parts: demographic information; 13 items assessing triage knowledge scored on a binary scale; and 13 items evaluating challenges to triage implementation. **Results:** 68.7% of nurses reported prior training in triage systems. Overall, nurses demonstrated moderate knowledge of triage. Challenges to implementing triage systems were rated high. There is a significant correlation between nurses' knowledge and their age. **Conclusion:** Nurses in EDs have moderate knowledge of triage systems; about 50% of them have good knowledge, but there are significant barriers to effective implementation. The study points out the dire need for targeted training programmes and systemic improvements. Policymakers and healthcare leaders need to decrease these barriers to enhance triage efficiency and ensure optimum delivery of emergency care to the patients.

Keywords: Emergency; Challenge; Knowledge of Nurses; Triage Systems

INTRODUCTION

Triage is an important phase in emergency care that involves the listing of patients based on the urgency of their health conditions to facilitate an effective treatment. The method is important in dealing with the rising demand for emergency health care services, which are often challenged by issues of patient congestion and a shortage of resources (Adhikari *et al.*, 2024). Triage systems have evolved to reduce mortality, improve patient flow, and optimise resource allocation, making them a staple in modern emergency departments (EDs) (Wolf *et al*., 2025). The effective use of triage systems depends on an integrated approach comprising the knowledge, skills, and decision-making capacities of emergency nurses (Al Dhefeeri *et al*., 2024). The roles of emergency nurses in triage are dynamic and challenging, requiring fast and accurate clinical assessments in stressful environments.

Research has shown that the ability of nurses to perform triage is significantly associated with patient outcomes and also with the overall functioning of emergency departments (Oh & Jung, 2024). However, the actual implementation of triage always faces various challenges (Khaleghi *et al*., 2022). Among such challenges are inadequate training, limited resources, and heterogeneity in nursing staff experience levels. These barriers must be addressed to ensure patients receive appropriate care in the timely manner required by their medical condition (Fekonja *et al*., 2023). At a global level, the introduction of triage systems has been accompanied by efforts to standardise practice and to enhance education for nurses (Gorick, McGee & Smith, 2025; Van Hecke *et al*., 2025). While high-income countries have made significant advances in the introduction of complex triage frameworks, many low-and middle-income countries face continued

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challenges in implementing such systems (Wolf *et al*., 2025). These challenges are often compounded by factors such as high patient-to-nurse ratios, insufficient infrastructure, and a lack of continuing education opportunities for health professionals (Chen *et al*., 2022). The present study explores the relationship between nursing knowledge and challenges faced in implementing triage systems within emergency departments.

Previous studies have focused primarily on individual aspects of triage, such as training and system architecture, with less attention paid to the interconnection between knowledge gaps and barriers to implementation. This gap in the current literature calls for a comprehensive analysis that treats both aspects as interrelated variables influencing the performance of triage systems (Seo, Lee & Jang, 2024). Nurse knowledge in triage includes principles, categories, and clinical applications. The ability to triage a patient requires knowledge of assessment tools, the ability to prioritise care based on severity, and the ability to communicate effectively with multidisciplinary teams. The main principles involve quick assessment and categorising patients into levels such as red (immediate care), yellow (delayed care), green (minor injuries), and black (deceased). These categories help healthcare teams allocate resources efficiently in emergencies or mass casualty events. Tools such as the Simple Triage and Rapid Treatment (START) system and the Emergency Severity Index (ESI) assist nurses in classifying patients based on the severity of their conditions, ensuring timely interventions. In clinical settings, triage is crucial for nurses to make rapid decisions regarding patient care, especially in emergency departments or during disasters. Nurses utilise various assessment tools, such as vital sign measurements and severity scales, to determine a patient's priority level (Bazyar *et al*., 2020). Effective communication with multidisciplinary teams is key to ensuring coordinated care. Nurses must relay critical information quickly to other healthcare providers to ensure that patients receive the appropriate care based on their triage classification. This collaboration improves patient outcomes and reduces delays in treatment. Evidence has shown that structured training programs can enhance nurses' competencies; however, the sustainability of these improvements often depends on the availability of ongoing support and resources (Bahlibi *et al*., 2022).

On the other hand, the challenges in implementation expose systemic and organizational issues that impede the consistent execution of triage protocols (Yi, Baik & Baek, 2025). Contributory factors to this problem are inadequate staffing, lack of access to current guidelines, and weak monitoring and evaluation systems (Bijani & Khaleghi, 2019). All these challenges require a concerted effort by a group of policymakers, healthcare managers, and frontline personnel.

Significance of the Study

The importance of this study is marked by its potential for informing practice in order to improve triage methods within EDs. By identifying the relationship between nurse knowledge and challenges in implementation, the findings can guide the development of tailored training programmes, resource allocation strategies, and policy frameworks. This study has also contributed to the broader discourse in healthcare quality improvement by emphasizing the role of evidence-based approaches in addressing systemic inefficiencies (Anaraki *et al*., 2024). A key objective of this study is to determine how demographic factors such as age, education level, and years of experience relate to nurse knowledge and to the facilitation or hindrance of overcoming implementation barriers. Understanding these relationships can help in the design of interventions that are both context-specific and scalable. For example, novice nurses would benefit by being included in mentorship programmes, while the veteran staff would have to undertake refresher courses to be updated on the new triage guidelines that keep evolving (Elgazzar, 2021).

Through an exploration of the relationship between knowledge and the challenges associated with implementation, this study provides important perspectives on how healthcare systems can adapt their operations in response to changing demands and constraints. Such perspectives are particularly important in the face of global health crises, where the capacity of emergency departments to act effectively is often tested. Moreover, the inclusion of evidence from diverse contexts increases the credibility and applicability of this research. Comparative studies of triage methods in different health care systems can highlight best practices and enable the spread of knowledge to settings with similar challenges. It follows principles of global health equity—that all patients receive appropriate and timely emergency care regardless of their geopolitical situation (Çelik, Mollaoğlu & Hastaoğlu, 2025; Seda, 2020).

The aim of this research is to connect the theoretical framework with practical applications in the implementation of triage. By offering concrete recommendations based on empirical data, this study aims to give nurses and healthcare institutions the opportunity to overcome obstacles in a quest to improve the quality of care offered at the emergency departments. The findings are expected to be of considerable interest to a wide audience, including clinicians, educators, researchers, and policymakers, and will encourage a collective commitment to improving outcomes in emergency care. In summary, this study addresses a gap in the current literature by examining the twofold nature of nursing knowledge and the challenges associated with implementation within triage systems. Its findings have the potential to drive meaningful change in emergency care practices, contributing to the broader goal of achieving excellence in healthcare delivery.

METHODOLOGY

Design: A descriptive correlational study design was chosen as it aligns with the objectives of evaluating the relationship between nurses' knowledge and implementation challenges regarding triage systems.

Sample and Setting: A non-probability representative sample of 230 nurses working in governmental hospitals was selected. The sample size was determined based on a power analysis to ensure adequate representation of the population. Participants were recruited from emergency departments across Al-Najaf Al-Ashraf, Iraq (governmental hospitals). The unique cultural and social dynamics within Iraqi healthcare settings, such as high patient-to-nurse ratios and resource limitations, play a critical role in shaping nurses' experiences and challenges in implementing triage systems."

Instrument: The structured questionnaire employed in this research was developed from literature and expert panel comments to ensure content validity. The content validity of the study instruments is determined by the panel of six) experts, who had more than five years' experience in their field to investigate the content of the nursing intervention. The panel of experts was composed of four faculty members from the College of Nursing, University of Kufa; one faculty member from the College of Medicine, University of Kufa; and one representative from the Ministry of Health. Moreover, the mean of experience years for the expert panel is 18.2 years. Those experts were asked to review the instrument for content, clarity, relevancy, and adequacy; some items were excluded, and others were added after a face-to-face discussion with each expert, and after the instrument was considered valid after taking all the comments and recommendations into consideration. 100% of experts agreed upon the final draft. The knowledge domain was based on Bloom's Taxonomy as a model for cognitive understanding of triage systems. Similar questionnaire-based studies have also been employed in recent nursing research evaluating triage competencies and system issues (Bahre *et al*., 2024; Zagalioti *et al*., 2025).

The questionnaire was pre-tested on a pilot sample of 20 nurses to ensure clarity and relevance. Feedback from the pilot study informed revisions to enhance question comprehensibility and alignment with the study objectives. The study employed a structured questionnaire consisting of three sections:

Demographics: Collecting data on age, gender, education level, years of experience, and training sessions.

Knowledge Assessment: Thirteen questions assessing triage knowledge, scored as 2 for correct answers and 1 for incorrect. The study is grounded in Bloom's Taxonomy, which categorises knowledge into hierarchical levels, providing a framework for assessing the depth of nurses' understanding of triage processes.

Challenges: A 5-point Likert scale to evaluate challenges affecting triage implementation, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The questionnaire was reviewed by a panel of experts in nursing and emergency care to ensure content validity. Reliability was tested using Cronbach's Alpha, achieving a score of 0.85, indicating high internal consistency.

Data Collection

Data were collected between October 30, 2023, and May 2, 2024, using face-to-face structured interviews.

Participants provided informed consent, and interviews were conducted in a private setting to ensure confidentiality. To minimise respondent bias, participants were assured of anonymity, and the interview setting was made private to encourage honest responses. Additionally, efforts were made to include nurses with diverse levels of experience and backgrounds.

Data Analysis

The data was analysed using SPSS (version 26). Descriptive statistics (means, standard deviations) were calculated to summarise demographic and questionnaire data. Inferential tests (Pearson correlation, chi-square) were employed to examine relationships between variables. Fisher's exact test (use when the frequency of any categories is less than five).

Ethical Consideration

The research obtained ethical exemption from the Ministry of Higher Education and Scientific Research University of Warith AI-Anbiyaa College of Nursing Ethical Approval Committee, Indonesia, with reference number 210 on 25th August 2023.

RESULTS

Table 1: Distribution of Nurses by their Socio Demographic Characteristics

Variables	Categories	Frequency	Percentage (%)
Age	<= 20.00	9	3.9
	21.00 - 25.00	128	55.7
	26.00 - 30.00	81	35.2
	31.00 - 35.00	7	3.0
	36.00 - 40.00	5	2.2
	Mean+ SD	25.09	3.31
Gender	Male	115	50.0
	Female	115	50.0
	Total	230	100.0
Level of Education	Secondary School	53	23.0
	Diploma	116	50.4
	Graduated	61	26.5
	Total	230	100.0
Year of experience in Emergency	1 year	79	34.3
	2-5 years	136	59.1
	6-11 years	5	2.2
	12-17 years	2	0.9
	18 and more	8	3.5
	Total	230	100.0
Training Course	Yes	158	68.7
	No	72	31.3
	Total	230	100.0

Table 1 reveals that half of the study sample are (50%) males and within the age group (21-25) years old (55.7%); (50.4%) of the study nurses had a diploma level of education, and (59.1%) had (2-5) years of experience. In relation to the training courses, the results also indicated that 68.7% of nurses reported that they received training about the implementation of the triage system in the emergency department.

Table 2: Statistical and Final Assessment for Nurses' Knowledge Concerning Triage in Emergency Department

Sl No	Knowledge Questions	Resp.	F.	%	MS	SD	RS	Asses.
1	Triage is	False	78	33.9	1.66	0.47	83	Pass
		True	152	66.1				
2	Classification of patients is based on	False	87	37.8	1.62	0.49	81	Pass
		True	143	62.2				
3	How many levels of triage	False	153	66.5	1.33	0.47	67	Fail
		True	77	33.5				
4	One of the levels of sorting is	False	119	51.7	1.48	0.50	74	Fail
		True	111	48.3				
5	Criteria of resuscitation is	False	119	51.7	1.48	0.50	74	Fail
		True	111	48.3				
6	Criteria of emergent is	False	93	40.4	1.60	0.49	80	Pass
		True	137	59.6				
7	Criteria of urgent is	False	113	49.1	1.51	0.50	75	Pass
		True	117	50.9				
8	Criteria of less urgent is	False	109	47.4	1.53	0.50	76	Pass
		True	121	52.6				
9	Criteria of non-urgent is	False	119	51.7	1.48	0.50	74	Fail
		True	111	48.3				
10	For the sorting process you must first evaluate	False	140	60.9	1.39	0.49	70	Fail
		True	90	39.1				
11	Goals of triage is	False	136	59.1	1.41	0.49	70	Fail
		True	94	40.9				
12	Factor can effect on triage of patient	False	135	58.7	1.41	0.49	71	Fail
		True	95	41.3				
13	Advantages of Triage are	False	105	45.7	1.54	0.50	77	Pass
		True	125	54.3				
14	Overall, Knowledge	Pass	128	55.7	1.50	0.18	75	Good
		Fail	102	44.3				
		Total	230	100.0				

MS= mean of the score, SD = standard deviation, F. = Frequency, % = Percentage, R.S. =Relative sufficiency, assess = Assessment, Fail = MS less than (1.5), Pass = MS equal or more than (1.5).

Table 2 indicates that among the nurses working in the emergency department, approximately half demonstrated a good level of knowledge (55.7) regarding triage.

Table 3: Statistical and Final Assessment for Challenges Affecting the Implementation of Triage in Emergency Department

Sl No	Challenges Questions	Resp.	F.	%	MS	SD	Asses.
1	I think that there are major challenges and obstacles that will face the implementation of the triage system at paediatric emergency department	Strongly Disagree	15	6.5	3.63	1.20	High
		Disagree	36	15.7			
		Neutral	24	10.4			
		Agree	99	43.0			
		Strongly Agree	56	24.3			
2	The working environment is appropriate and suitable for the possibility of the triage system implementation.	Strongly Disagree	24	10.4	3.32	1.14	High
		Disagree	24	10.4			
		Neutral	65	28.3			
		Agree	88	38.3			
		Strongly Agree	29	12.6			
3	The decision -makers motivated to implement the triage system	Strongly Disagree	9	3.9	3.53	1.12	High
		Disagree	35	15.2			
		Neutral	64	27.8			
		Agree	70	30.4			
		Strongly Agree	52	22.6			

4	The nursing staff currently in my department is sufficient to implement the triage system	Strongly Disagree	29	12.6	3.44	1.30	High
		Disagree	26	11.3			
		Neutral	43	18.7			
		Agree	79	34.3			
		Strongly Agree	53	23.0			
5	The nursing staff has the real motivation to apply the triage system	Strongly Disagree	6	2.6	3.69	1.06	High
		Disagree	27	11.7			
		Neutral	58	25.2			
		Agree	81	35.2			
		Strongly Agree	58	25.2			
6	Cases overcrowding is one of the obstacles to the implementation of the triage system	Strongly Disagree	14	6.1	3.77	1.22	High
		Disagree	30	13.0			
		Neutral	29	12.6			
		Agree	78	33.9			
		Strongly Agree	79	34.3			
7	I think the public has enough idea about how the triage system works	Strongly Disagree	35	15.2	3.17	1.22	High
		Disagree	32	13.9			
		Neutral	40	17.4			
		Agree	106	46.1			
		Strongly Agree	17	7.4			
8	There is a strong desire among the public to implement the triage system	Strongly Disagree	21	9.1	3.36	1.08	High
		Disagree	26	11.3			
		Neutral	51	22.2			
		Agree	113	49.1			
		Strongly Agree	19	8.3			
9	The department has material resources that allow the triage system to be easily implemented	Strongly Disagree	9	3.9	3.60	1.11	High
		Disagree	27	11.7			
		Neutral	69	30.0			
		Agree	66	28.7			
		Strongly Agree	59	25.7			
10	Human security controls are available that can control any mess in the triage hall and contribute to the time limitations of the triage system	Strongly Disagree	13	5.7	3.73	1.11	High
		Disagree	20	8.7			
		Neutral	42	18.3			
		Agree	95	41.3			
		Strongly Agree	60	26.1			
11	Triage room contain adjustment banners that guide people and help to understand triage working method	Strongly Disagree	40	17.4	3.35	1.34	High
		Disagree	20	8.7			
		Neutral	28	12.2			
		Agree	104	45.2			
		Strongly Agree	38	16.5			

12	There is a sufficient time for nurses to implement triage at emergency	Strongly Disagree	11	4.8	3.77	1.03	High
		Disagree	14	6.1			
		Neutral	47	20.4			
		Agree	103	44.8			
		Strongly Agree	55	23.9			
13	Work load at emergency impedes triage implementation	Strongly Disagree	45	19.6	3.48	1.40	High
		Disagree	8	3.5			
		Neutral	22	9.6			
		Agree	102	44.3			
		Strongly Agree	53	23.0			
	Overall Challenges				3.53	0.47	**High Challenges**

MS = mean of the score, SD = standard deviation, F = frequency, % = percentage, assess = assessment, High = Cut off more than (2.66).

Table 3 reveals the subjects' response regarding overall challenges affecting the implementation of triage in the emergency department: the majority of them have a high level of challenges.

Table 4: Correlation between Overall Nurse's Knowledge, Demographic Data and Challenges Affecting the Implementation of Triage in the Emergency Department

	Challenges	
	C.C.	***P*-value**
Knowledge	0.13	0.048 S
Age	-0.19	0.004 S
Gender	-0.006	0.923 NS
Year of experience	-0.065	0.327 NS
Level of Education	0.059	0.37 NS
Training Course	0.006	0.928 NS

C.C. = Correlation Coefficient, S = Significant, NS = non-significant

Table 4 demonstrates that there is significant correlation between the challenges and the nurse's knowledge and age at *p*-value (0.048, 0.004), respectively. However, there is a non-significant correlation which observed between challenges and gender, years of experience, level of education and training sessions at *p*-values of 0.923, 0.723, 0.370 and 0.006, respectively.

Table 5: Relationship between Overall Nurse's Knowledge and Age

Variable	**Categories**	**Statistics**	**Knowledge**		**F.E.T.**	***P*-value**
			Poor	**Good**		
Age	<= 20.00	*F.*	8	1	6.1467	0.194 NS
		%	88.9%	11.1%		
	21.00 - 25.00	*F.*	74	54		
		%	57.8%	42.2%		
	26.00 - 30.00	*F.*	40	41		
		%	49.4%	50.6%		
	31.00 - 35.00	*F.*	4	3		
		%	57.1%	42.9%		
	36.00 - 40.00	*F.*	2	3		
		%	40.0%	60.0%		

F.E.T. = Fisher's exact test (use when the frequency of any categories is less than five)

Table 5 shows that there is no significant relationship between total nurse's knowledge and age at *p*-value (0.194).

Table 6: Relationship between Overall Nurse's Knowledge and Gender

Variable	**Categories**	**Statistics**	**Knowledge**		**Chi-square**	***df***	***P* - value**
			Poor	**Good**			
Gender	Male	*F.*	66	49	0.282	1	0.595 NS
		%	57.4%	42.6%			
	Female	*F.*	62	53			
		%	53.9%	46.1%			

Table 6 shows that there is no significant relationship between total nurse's knowledge and gender at *p*-value (0.595).

Table 7: Relationship between Overall Nurse's Knowledge and Level of Education

Variable	Categories	Statistics	Knowledge		Chi-square	*P*-value
			Poor	Good		
Level of Education	Secondary School	*F.*	40	13	12.084	0.002 S.
		%	75.5%	24.5%		
	Diploma	*F.*	61	55		
		%	52.6%	47.4%		
	Graduated	*F.*	27	34		
		%	44.3%	55.7%		

Table 7 illustrates that there is a significant correlation between total nurse's knowledge and level of education at *p*-value (0.002).

Table 8: Relationship between Overall Nurse's Knowledge and Year of Experience in Emergency

Variable	Categories	Statistics	Knowledge		F.E.T.	*P*-value
			Poor	Good		
Year of experience in emergency	1 year	*F.*	43	36	4.367	0.287 NS
		%	54.4%	45.6%		
	2-5 years	*F.*	80	56		
		%	58.8%	41.2%		
	6-11 years	*F.*	2	3		
		%	40.0%	60.0%		
	12-17 years	*F.*	0	2		
		%	0.0%	100.0%		
	18 and more	*F.*	3	5		
		%	37.5%	62.5%		

Table 8 shows that there is no significant relationship between total nurse's knowledge and years of experience in emergencies at *p*-value (0.287).

Table 9: Relationship between Overall Nurse's Knowledge and Training Course

Variable	Categories	Statistics	Knowledge		*Chi-square*	*df*	*P-value*
			Poor	Good			
Training Course	Yes	*F.*	100	58	11.933	1	0.0005 S
		%	63.3%	36.7%			
	No	*F.*	28	44			
		%	38.9%	61.1%			

Table 9 shows that there is a significant relationship between total nurse's knowledge and training session at *p*-value (0.0005).

DISCUSSION

Nurses' Knowledge of Triage Systems: The results of this study reveal that the majority of nurses in emergency departments possess moderate to excellent knowledge regarding triage systems, with approximately 55.7% demonstrating satisfactory understanding. This aligns with findings by Yadav and Thakur (2022), who reported that structured educational interventions significantly enhance nursing knowledge in emergency care. The moderate level of knowledge can be attributed to prior training programmes, as indicated by 68.7% of participants acknowledging previous exposure to triage education. However, gaps were identified in specific areas such as the classification of patients and criteria for resuscitation. These findings highlight the need for targeted training modules that address critical knowledge

deficiencies. Previous studies support this observation. Malak, Al-Faqeer, and Yehia (2022) emphasised that comprehensive training tailored to triage protocols improves clinical judgement and decision-making among nurses (Phukubye, Mbombi, & Mothiba, 2021). noted that emergency nurses equipped with robust triage knowledge are better prepared to manage patient priorities effectively. While the current study indicates an overall excellent understanding of triage among nurses, it underscores the necessity of continual professional development to sustain and enhance these competencies. A more in-depth look reveals that the learning process in triage is not only dependent on formal education but also, to a significant extent, on experiential learning and mentorship. For example, nurses who frequently confront critical situations may develop practical insights that complement their theoretical knowledge.

Challenges in Implementing of Triage System: The research identified significant barriers that impede effective triage system deployment. Among the major challenges were resource limitations, insufficient numbers of staff, and lack of support from decision-makers. These findings are in line with the conclusions of Bahlibi *et al*. (2022), which highlighted resource constraints as one major barrier to implementing triage in emergency departments. Besides, systemic inefficiencies—like overcrowding and the lack of an appropriate infrastructure—aggravate these challenges, as stated by Hammad *et al.* (2017). It also revealed that public awareness of triage systems is low and that such ignorance contributes to implementation difficulties. These findings are supported by previous observations made by Seda (2020), which indicate that the public's misperceptions of triage worsen the workload burden experienced by emergency nurses. Such challenges demand a multi-level approach in place, including raising public education on triage and increasing resource allocation in emergency departments. A closer look at the challenges reveals a potential gap between existing policies and their implementation in reality. While triage guidelines may be put on paper, their practical application is hindered by operational inefficiencies. Overcrowded emergency departments not only delay patient care but also put undue stress on nursing staff, leading to burnout and a lower adherence to triage guidelines.

Correlation Between Knowledge and Challenges: A significant correlation was found between nurses' knowledge levels and the challenges of triage systems implementation. This finding was also mentioned by Kaakinen *et al*. (2016), who reported that nurses with good training and understanding of triage protocols meet fewer barriers in clinical practice. On the other hand, insufficient knowledge can lead to inadequacies and errors, further complicating the implementation process. The results show that a higher degree of knowledge helps nurses better navigate systemic barriers. For example, nurses with a solid understanding of triage principles are better able to prioritise care and efficiently utilise the limited availability of resources, as highlighted by Malak, Al-Faqeer and Yehia (2022) and Abbas, Mustafa and Abozaid (2023). Additionally, studies by Eaid Elgazzar (2021) and Phukubye, Mbombi and Mothiba (2021) emphasise that empowering nurses through education moderate's implementation challenges, leading to improved patients' outcomes. An interesting insight from this study is the role of continuous education in mitigating challenges. Nurses who had attended recent training sessions reported fewer challenges, suggesting that ongoing professional development acts as a buffer against systemic inefficiencies. However, the result raises questions about the accessibility and frequency of such training programmes, particularly in regions with limited resources. Policymakers must consider scaling up training initiatives to ensure sustained improvements in triage implementation. "Triage", a term originating from the French word meaning "to sort", refers to the process of prioritising patients in emergency care based on the severity of their medical conditions. This finding aligns with Abdul-Hussein and Mustafa (2024), who observed similar trends in Iraqi emergency departments. The table also highlights specific areas of weakness, such as resuscitation criteria, which require immediate attention in future training programmes. The challenges table underscores resource limitations and systemic inefficiencies as primary barriers. These findings are supported by Bahlibi *et al*. (2022), who identified similar obstacles in low-resource settings. The table's data suggest that addressing these challenges through policy reforms and resource allocation can significantly enhance the efficacy of triage systems. The table demonstrates a significant relationship between nurses' knowledge and the challenges they face. This observation is consistent with studies by Malak, Al-Faqeer and Yehia (2022) and Abbas Mustafa and Abozaid (2023), which highlight the role of education in overcoming systemic barriers. These findings highlight the

need to combine targeted educational initiatives with organizational reforms, such as improved staffing and resource allocation, to enhance the sustainability of triage system implementation. Finally, this deeper analysis reaffirms the critical role of nursing knowledge and systemic support in the effective implementation of triage systems. While challenges persist, targeted interventions, informed by empirical evidence and contextual understanding, hold the potential to transform emergency care practices. By addressing both individual and systemic barriers, healthcare systems can achieve more equitable and efficient patient outcomes.

Broader Theoretical Contributions: This study provides a framework for future research to further explore these relationships by its demonstration of dynamic interplay between knowledge, systemic challenges, and demographic variables.

Limitation

The generalisability of this study is hindered by the fact that it employed a non-probability sampling method, which may have an implication on the applicability of the results. Moreover, the study was carried out in a single geographic location (Al-Najaf Al-Ashraf, Iraq) that may restrict its applicability to other environments. Furthermore, the use of self-reporting may also yield response bias regardless of the confidentiality assurance measures that were implemented. Future research must adopt a multicentre design and include qualitative methods to further explore the problems associated with the implementation of triage.

CONCLUSION

The study results show that emergency department nurses have moderate knowledge of triage, with about half of them demonstrating adequate knowledge. However, most need more training to improve their competence. The principal impediments to the implementation of triage systems are staff shortages, lack of support from decision-makers, and low public awareness. From this study it is seen that knowledge and age are significantly associated with perceived barriers to implementation, while demographic factors such as level of education and training show strong associations with knowledge of triage. Future research could focus on investigating the long-term effects of training programmes on triage knowledge and practice. While short-term improvements are often visible immediately after training, it is equally important to examine whether these gains are sustained over extended periods and how they influence actual decision-making in high-pressure clinical settings. Such studies will provide deeper insights into the durability of training interventions and their overall impact on patient outcomes.

Another promising area for future inquiry lies in conducting comparative studies across different regions to identify best practices in triage implementation. Since healthcare systems vary significantly in terms of resources, policies, and cultural factors, comparative analysis can highlight which strategies are most effective and adaptable. This evidence would not only strengthen global standards of triage but also provide region-specific recommendations tailored to diverse healthcare environments.

Finally, exploring the integration of technological innovations, such as digital triage tools and artificial intelligence–based decision support systems, represents a crucial avenue for future work. These tools can help address systemic challenges such as staff shortages, inconsistent application of protocols, and delays in patient care. Research into the feasibility, effectiveness, and ethical considerations of such technologies could pave the way for more efficient and equitable triage practices worldwide.

Conflict of Interest

The authors declare that they have no competing interests.

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