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NURSES' KNOWLEDGE OF TRIAGE PROTOCOLS IN TERTIARY CARE EMERGENCY SETTINGS

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Abstract

Background: Triage, derived from the French word "trier" meaning to sort, is vital for optimizing patient outcomes in emergency departments. Effective triage by registered nurses (RNs) can be hindered by factors such as overcrowding, training gaps, and limited experience. Objective: This study aimed to assess the triage knowledge of RNs in tertiary care hospital emergency departments, examining factors like education and experience, and suggesting improvements for emergency decision-making. Methodology: A descriptive cross-sectional study was conducted with 72 nurses holding diplomas or degrees, selected via convenience sampling. Data were collected using a structured questionnaire and analyzed with descriptive statistics. Results: Most nurses (68.1%) held basic nursing degrees, and 75% had 0–5 years of experience. While 59.7% attended seminars, practical training was limited. Significant knowledge gaps were noted: only 41.7% correctly identified the black triage color for deceased patients, and 66.7% recognized red for immediate priority. Additionally, 34.7% were unclear about triage nurses' responsibilities. Conclusion: Although emergency nurses have a foundational understanding of triage, critical gaps in knowledge and role clarity persist, potentially compromising triage effectiveness. Enhancing education and defining roles are essential to improve emergency care quality and timeliness.

INTRODUCTION

The medical term "triage" comes from the French word "trier," which means to separate, sort, or select **(Minhas 2018)**. In the medical context, triage refers to the process of determining which patients require immediate attention based on the severity of their illness or injury. This critical practice is one of the foundational elements of decision-making in emergency departments (EDs) and plays an essential role in managing patient care (Reisi, Saberipour et al. 2018)**.** One essential feature of the healthcare delivery system is the emergency room. Frontline healthcare personnel at emergency departments (EDs) treat patients who come with acute, life-threatening diseases (Rayan, Hussni Al-Ghabeesh et al. 2022). The efficiency of triage is pivotal in ensuring that healthcare resources are allocated according to the urgency of patient needs, especially during periods of high demand, such as during disasters, pandemics, or other public health emergencies (Farcas, Ko et al. 2021). The main obstacle for emergency department (ED) services is to ensure quality remains high even with the significant number of patients admitted to the ED at any given time, while also tailoring treatment to meet the specific needs of each individual patient (Al-Kalaldeh, Al-Bdour et al. 2022).

The Emergency Severity Triage (EST) system is a commonly used method to assess patients' acuity

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levels. It categorizes patients into three color-coded groups following an initial evaluation of vital functions such as airway, breathing, circulation, and disability. Patients requiring immediate intervention are classified under the red category, while those who need attention within a time frame of 10 minutes to an hour are assigned the orange color, often representing conditions like serious bleeding. Yellow is used for cases such as mild bleeding or mild hypoxia, signifying less urgent conditions **(Worth 2017).** Emergency departments worldwide face similar challenges, with patient numbers driven by both the hospital's clinical services and the population it serves. As EDs handle large volumes of patients, the overwhelming influx of critical cases can lead to delays in treatment, affecting the quality of care. These delays are particularly evident in overcrowded EDs, where patients with life-threatening conditions may not receive timely attention (Duko, Geja et al. 2019).

There are numerous elements influencing triage decision-making that might result in mistakes that should be examined as well. Some of these elements consist of ED crowding levels, ED nurse shortages, patient anxiety levels, family member presence, and nurses' individual factors. We must identify the factors that most significantly affect patient care because triage can be impacted by so many external factors. To effectively help nurses manage interruptions, the impact of interpretation on the triage process necessitates a thorough analysis and assessment to develop interventions (Johnson and Alhaj-Ali 2017). However, the system for training emergency nurses is still inadequate in light of the growing demand for emergency treatment. Previous research has shown that the emergency room has been unable to implement triage due to a lack of data, nursing staff, and motivation to provide patient care (Faheim, Ahmed et al. 2019). In many instances, the inadequate understanding of triage protocols among nurses underscores the need for ongoing education and retraining to improve their competency in emergency care (Reisi, Saberipour et al. 2018). Emergencies—ranging from accidents to other life-threatening conditions—require swift intervention to save lives. As patients arrive at the emergency room with varying degrees of severity, a well-structured triage system is essential for prioritizing care. This system ensures that patients with the most urgent needs receive immediate attention, helping to optimize patient outcomes and the overall efficiency of the ED (Sutriningsih, Wahyuni et al. 2020).

LITERATURE REVIEW

Triage plays a critical role in clinical risk management, especially when clinical demand exceeds the available healthcare resources. It involves prioritizing patients based on the severity of their conditions, ensuring that the most urgent cases receive the necessary treatment promptly. This strategy aims to maximize the efficiency of care delivery, ensuring that the largest number of patients receives appropriate clinical treatment in the shortest possible time (Bijani, Torabizadeh et al. 2018). Research has shown that a lack of an effective triage system can severely hinder the functioning of emergency departments (EDs). Without a functional triage unit to prioritize patients, EDs face extended waiting times and patients may remain in the emergency room for longer periods, which can significantly delay care (Robinson 2013). This delay is particularly evident in settings where there is overcrowding or insufficient staffing, both of which are common in many healthcare environments. Several factors can influence triage decision-making, often leading to errors or inefficiencies. Key elements such as the level of ED crowding, the shortage of triage nurses, patient anxiety, family presence, and even the individual circumstances of nurses themselves can all impact triage outcomes. As triage decisions are influenced by a variety of external factors, it is essential to identify which variables have the greatest impact on patient care. By understanding these elements, it becomes possible to develop targeted interventions that can help nurses manage disruptions and improve the triage process (Johnson and Alhaj-Ali 2017).

Furthermore, the study emphasizes the importance of education and training in enhancing triage knowledge among nurses. The study found no direct correlation between a nurse's educational background and their ability to accurately perform triage, suggesting that simply increasing educational attainment does not necessarily lead to better triage performance. However, higher levels of education

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and training do improve skill acquisition and competence in emergency situations. Nurses who are well-versed in the urgency, severity, and potential outcomes of various conditions are more likely to make prompt and accurate triage decisions. Ongoing professional development and continual education are therefore crucial to improving nurses' abilities to handle emergency situations effectively (Kerie, Tilahun et al. 2018). The triage nurse needs to become accomplished at rapid assessment; this involves quick decision making and suitable delegation of tasks. Long conversations with patients should be avoided as should exhaustive history taking. Clinical observations such as temperature/pulse, etc. need to be delegated if they are not required to establish priority as they are too time consuming (Varley, Warren et al. 2016).

Emergency Triage promulgates a system that delivers a teachable, auditable method of assigning clinical priority in emergency settings. It is not designed to judge whether patients are appropriately in the emergency setting, but to ensure that those who need care receive it appropriately quickly. Furthermore, triage is a critical component of ED practice; affecting patient safety and access to emergency care **(Association).** Collaborative observational assessment of triage competency has been increasingly suggested as an adjunct to didactic instruction. Some examples of observational assessment include real-time feedback by preceptors or charge nurses, or triage simulation experiences. Online courses and online case studies have also emerged as valid educational alternatives with which to evaluate triage competency (Jordi, Grossmann et al. 2015). The primary objective of triage in the ED is to ensure that patients receive care according to the urgency of their clinical condition. Effective triage guarantees that treatment is both appropriate and timely, reducing patient waiting times and contributing to the overall quality of care. An understanding of time constraints associated with various cases allows nurses to minimize waiting times, which can be an indicator of high-quality care and improved ED efficiency **(Lampi, Junker et al. 2018)** This can be clarified by the reasons that sufficient understanding of time constrains for various cases will minimize patient waiting duration and it may serve as a sign of high-quality care and improved efficiency by the ED nurses. Finally, the ED nurses require ongoing training on the triage scales, particularly the CTAS, which is an internationally utilized tool with great reliability and validity **(Ebrahimi, Mirhaghi et al. 2016).** Regarding the advantages of triage, the findings of the current study also showed that the majority of ED nurses in both hospitals answered correctly about the benefits of triage nurses. Mohammad backs up these findings (Mohammed 2017)**.** Even though the study's results showed that emergency department nurses had a fair level of triage knowledge, there were still gaps in their understanding. Given these findings, it is crucial to develop formal, unit-based triage training programs that will help build and enhance emergency nurses' training expertise in EDs. ((Eaid Elgazzar 2021).

METHODOLOGY:

A cross -sectional descriptive study design was used in this study to assess nurse' knowledge regarding triage protocols among nurses of tertiary care hospitals. Between January 2025 to April 2025, the study was conducted at Shahida Islam Teaching Hospital, Lodhran, Bahawal Victoria Hospital, Bahawalpur, and Sheikh Zayed Hospital, Rahim Yar Khan. Participants were chosen through a convenient sampling technique, which enabled the researchers to include individuals who were readily available and willing to participate. Using a sample convenient technique, a total of 72 nurses with degree or diploma were selected as participants. Yamene's formula was used to determine the sample size, taking into account a 95% confidence level, a 5% margin of error, and an expected population of 88 nurses.

Permanent diploma and degree holders met the inclusion requirements, whereas those employed contract or temporarily at the hospital emergency were excluded. A structured closed ended questionnaire was used to collect data. Prior to data collection, each participant gave their informed consent to ensure anonymity and confidentiality. The primary focus of the study was on the nurses' level of triage knowledge, which served as the dependent variable. After data collection, data were entered into a spreadsheet and analyzes using

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Statistical Package for Social Sciences (SPSS) version 27.0. Descriptive statistics, including frequencies, percentages, tables and figures, were used to present the demographic information and knowledge level of the participants. This approach provided a clear overview of the current state of triage understanding among nurses in the selected hospital setting.

RESULT:

Result of Demographic characteristics of the population:

The group of participants is mainly youthful, with 66. 7% being 25 years old or younger, and 25% between the ages of 26 and 30, highlighting a significant presence of early-career professionals. A mere 8. 3% are over the age of 30, reflecting limited involvement from older demographics. Concerning education, the majority of participants (68. 1%) possess either a BSN or Post RN, while 30. 6% have obtained a nursing diploma. A tiny portion (1. 4%) hold an MSN, indicating minimal participation from those with advanced nursing qualifications.

In relation to professional experience, 75% of participants possess 0–5 years, demonstrating a predominantly novice workforce. 19. 4% have 6–10 years, 4. 2% have 11–15 years, and only 1. 4% have 16–20 years of experience. Within clinical practice areas, 45. 8% are employed in the Emergency Department, followed by General Medicine (23. 6%), ICU (18. 1%), and Cardiac Emergency (12. 5%). Regarding training, the most frequently attended form was seminars (59. 7%), followed by long courses (23. 6%) and workshops (16. 7%), indicating a range of engagement in various types of professional development activities.

Table 1.1 Demographic Characteristics of the population

Characteristics	categories	n=72	Percentage
Gender	Male	18	25%
	Female	54	75%
Age	25 year or below	48	66.7%
	26 year-30 year	18	25%
	31-35 year	6	8.3%
Qualification	Nursing Diploma	22	30.6%
	BSN or Post Rn	49	68.1%
	MSN	1	1.4%
Experience	0-5 year	54	75%
	6-10 year	14	19.4%
	11-15 year	3	4.2%
	16-20 year	1	1.4%
Area of Practice	Emergency department	33	46%
	Intensive care unit	13	18%
	General Medicine	17	24%
	Cardiac emergency	9	12%
Training	Seminar	43	59.7%
	Long Courses	17	23.6%
	Workshop	12	16.7%

Result of Knowledge of Nurses Regarding Codes:

Participants demonstrated differing degrees of accuracy in decision-making regarding triage. In a critical trauma situation (head injury, bleeding, hypotension), 73. 6% accurately assigned Red, although some underestimated the seriousness or misassessed the patient's condition. When inquiring about the color signifying immediate priority, 66. 7% accurately selected Red, but 33. 3% exhibited confusion by choosing other categories. In a case involving a deceased

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or irretrievable patient, merely 41. 7% correctly recognized the Black category, while the remainder incorrectly chose colors designated for patients who could be treated, highlighting a lack of understanding regarding end-of-life triage classification. For a situation with numerous penetrating head injuries accompanied by signs of shock, 59. 7% accurately selected Red, yet 40. 3% misclassified it—some significantly underestimating the urgency. In a closed fracture situation, only 38. 9% identified the correct Yellow category. A significant number chose Green (34. 7%), underestimating the seriousness, while some even selected Red (15. 3%) or Black (11. 1%), indicating both overestimation and misunderstanding.

Table 2: Knowledge of nurses regarding codes

Question	Red	Yellow	Green	Black
You received a patient with Road traffic accident having head injury B.P 60\30 mmHg and having bleeding from head in which category you will put the patient?	73.6%	153%	8.3%	2.8%
Which of the following color coding describe the immediate priority?	66.7%	22.2%	9.7%	1.4%
A person has no chance for survive or dead body in which category you will put him?	19.4%	19.4%	19.4%	41.7%
According to triage, how would you label the patient who has multiple penetrating head injury with symptoms of shock and gasping?	59.7%	15.3%	16.7%	8.3%
A patient with close fracture and vitally stable in which category you will put him?	15.3%	38.9%	34.7%	11.1%

Result of Knowledge of Nurses Regarding Triage Management:

Overall, while participants showed good foundational knowledge in some areas, there remain notable gaps in understanding triage roles, emergency decision-making, and safety protocolseless, 31. 9% either misinterpreted or were uncertain about these vital safety measures. In evaluating emergency response actions: • 68. 1% accurately answered the scenario concerning a victim unable to follow a simple command, while 31. 9% exhibited gaps in basic assessment knowledge. • 66. 7% correctly identified the necessity for surgical intervention in instances of severe bleeding, whereas 33. 4% were either mistaken or uncertain regarding appropriate management. • 75% accurately responded to an unresponsive victim scenario, reflecting strong knowledge in basic life support, yet 25% displayed confusion about subsequent steps. In summary, while participants demonstrated solid foundational knowledge in certain areas, there are still significant gaps in comprehending triage roles, emergency decision-making, and safety protocols.

Table 3: Knowledge of nurses regarding triage management

Question	Correct	Incorrect	Other
The principles of triage management?	86.1%	12.5%	1.4%
Who is responsible for the management of triage?	54.2%	34.7%	11.1%
What is precaution is necessary during triage duty?	68.1%	16.7%	15.3%
A victim fails to follow a simple command what do you do next?	68.1%	22.2%	9.7%
How to control heavy bleeding of victims?	66.7%	16.7%	16.7%
A victim appears quiet still when get to them. You shake the victim and shout but he do not respond. What do you do next?	75%	15.3%	9.7%

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DISCUSSION

The goal of the current study was to assess nurses' knowledge of triage management, emphasizing their comprehension of patient classification and important triage concepts. The majority of participants showed moderate understanding, according to our findings, with 60.7% properly recognizing a case in the GREEN category and 73.6% accurately diagnosing a critically injured trauma patient as RED. The findings of (Pouraghaei, Tabrizi et al. 2017) who found that the majority of nurses had average knowledge of triage, are in line with these results, which indicate a fair level of conceptual comprehension. In contrast, the previous study by (Ali, Sultan et al. 2024) also discovered that the majority of nurses were in the good knowledge category (45.2%), followed by average (30.65%) and excellent (12.56%). This finding supports our literature review's conclusion that, despite triage's crucial role in emergency care, triage knowledge is frequently lacking ((Iserson and Moskop 2007). But the details reveal important distinctions. Only 54.2% of our participants correctly identified triage nurses as being in charge of managing triage, despite the original article's finding that 80.3% of nurses could do so. This notable disparity could be explained by differences in training programs or institutional procedures between contexts. Furthermore, the previous study highlighted improved performance in scenario-based triage categorization, with 80.9% of nurses correctly classifying a patient with severe trauma and hypotension. In contrast, our study found that only 25.7% of nurses were accurate in identifying the correct response for a deceased patient scenario (BLACK category) (Ali, Sultan et al. 2024). In line with observations by (Mirhaghi, Heydari et al. 2015), these findings point to a knowledge deficit regarding the extremes of triage categorization—dead and non-urgent—and imply that more complicated or infrequently encountered categories are frequently misinterpreted. The study also revealed knowledge gaps regarding the responsibilities of triage nurses. While 54.2% of participants correctly identified triage nurses as being responsible for patient prioritization, a significant portion (34.7%) misidentified the roles involved in triage management. The literature also supports the idea that educational background and continuous training directly impact knowledge levels, as demonstrated by the fact that our participants had somewhat greater academic degrees and experience to triage systems. In order to increase nurses' triage accuracy and decision-making, the previous study and our results agree that frequent triage training, hands-on simulations, and ongoing education are essential.

Conclusion:

The study's conclusions highlight how crucial it is to improve nurses' triage education in order to close the gaps in triage decision making. Significant gaps in the appropriate assessment of critical patient were found, despite the fact that the majority of the nurse showed a basic comprehension of triage method. Clarifying the duties and responsibilities of triage nurses and implementing more interactive, hands-on training programs are crucial for improving triage outcomes. In order to guarantees that nurses are prepared to make prompt and correct triage judgement high pressure situations, the study emphasize the necessity of continual professional development.

Recommendation:

The findings of the study underscore the necessity for more engaging and comprehensive training programs, especially those emphasizing real-time decision-making in emergency department. While 59.7% of nurses have attended seminars, only 23.6% have participated in extended courses, and 16.7% in workshops. Implementing more practical and immersive training methods would better equip nurses to handle the demands of triage decisions.

Strength of the study:

The study's strength lies in its ability to pinpoint specific knowledge gaps in triage decision-making, particularly among early-career nurses. By emphasizing the misclassification rates in critical situations, the study highlights the necessity for enhanced training and education in emergency settings. Furthermore, the data on training involvement showed that 59.7% of nurses had attended seminars, indicating a foundational interest in professional development.

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Limitation of the study:

A limitation of this research is the minimal involvement of nurses possessing advanced qualifications, with merely 1.4% holding a Master's degree in Nursing. This underrepresentation may influence the applicability of the results, as nurses with higher education might provide distinct insights into triage management.

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