Volume 4, Issue 4, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

EXPLORING NURSES' AWARENESS AND IMPLEMENTATION OF THE TRIAGE SYSTEM

Maria Khalid[*1], Hooria Nazir[2], Iram Pervaiz Gill[3], Madiha Mukhtar[4]

*[*1,2,3]Post RN BSN, School of Nursing, The University of Lahore, Lahore, Pakistan*
[4]Nursing Instructor/MSN Scholar, The University of Lahore, Lahore, Pakistan

[*1]mariakhalid5058@gmail.com

DOI: https://doi.org/10.5281/zenodo.19814239

Keywords
Triage, Nurses, Awareness, Implementation, Emergency Care

Article History
Received: 04 March 2026
Accepted: 11 April 2026
Published: 27 April 2026

Copyright @Author

Corresponding Author: *
Maria Khalid

Abstract

Background: *Triage is a critical process in emergency care that ensures prioritization of patients based on clinical urgency; however, gaps in nurses' awareness and implementation may affect patient outcomes.*

Objective: *To assess nurses' awareness and implementation of the triage system at a tertiary care hospital in Punjab, Pakistan.*

Materials and Methods: *A descriptive cross-sectional study was conducted among 204 nurses using purposive sampling. Data were collected through a structured questionnaire and analyzed using SPSS v25.*

Results: *The mean knowledge score was 6.56±2.31, with 46.1% demonstrating high knowledge and 48.0% moderate knowledge. The mean practice score was 9.98±2.10, with 40.2% showing high and 48.0% moderate practice levels. Misconceptions were noted, including incorrect understanding of AVPU (68.7%) and triage timing (87.1%).*

Conclusion: *Nurses exhibited adequate knowledge and moderate-to-good triage practices; however, gaps between knowledge and implementation highlight the need for continuous training.*

1. Introduction

Triage is a systematic and essential process in healthcare that prioritizes patients based on the severity of their condition to ensure timely and effective medical intervention. It plays a central role in emergency medicine by enabling healthcare professionals to allocate limited resources efficiently and focus on critically ill patients first (Zachariasse et al., 2019). The triage process involves rapid patient assessment and categorization, guided by structured protocols that reduce subjectivity and enhance decision-making consistency. It is widely applied across emergency departments, disaster response settings, and mass casualty incidents, reflecting its importance in diverse healthcare environments (Austin et al., 2024; Da'Costa et al., 2025).

Beyond emergency departments, triage is equally critical in disaster management, pre-hospital care, and military medicine, where large patient inflows demand efficient prioritization strategies (Masbi et al., 2024). Nurses serve as the frontline providers in triage systems, often being the first point of patient contact, and their clinical judgment directly influences patient outcomes (Fekonja et al., 2024). Effective triage requires rapid evaluation of symptoms, vital signs, and patient conditions, supported by evidence-based guidelines and institutional protocols (Gorick et al., 2024; Oh & Jung, 2024). However, clinical

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

judgment may vary due to experience, stress, and cognitive biases, making standardized training and ethical considerations vital in ensuring fairness and accuracy in patient prioritization (Llamzon & Matney, 2025).

Despite its structured framework, triage implementation faces several challenges that can compromise patient safety and efficiency. Variations in training, high patient volumes, and limited resources often lead to inconsistencies and decision fatigue among healthcare providers (Porto, 2024; Hamdi & Al Thobaity, 2023). Additionally, delays in diagnostic support and overcrowded emergency settings further complicate triage decisions (Gebrael et al., 2023). The integration of advanced technologies, such as electronic triage systems and artificial intelligence, has improved accuracy and workflow efficiency, although their effectiveness depends on proper infrastructure and training (Milton et al., 2022; Sexton et al., 2022). Strengthening interprofessional collaboration and adopting patient-centered approaches are essential for enhancing triage outcomes and ensuring optimal healthcare delivery.

2. Literature review

Several studies emphasize the importance of disaster preparedness and its direct link with triage competency. Winarti et al. (2023) found moderate to high confidence among nurses, though technical skills remained inadequate, while Azizpour et al. (2022) reported low overall preparedness, with trained nurses performing significantly better in triage decision-making. Similarly, Su et al. (2022) identified core competencies such as triage, communication, and first aid but highlighted major gaps in practical training. These findings collectively underscore the need for structured education, simulation-based training, and institutional support to enhance nurses' preparedness for emergency and disaster situations.

Training interventions have also shown significant improvements in clinical reasoning and confidence among nurses and students. Kalanlar et al. (2024) demonstrated that simulation-based triage training enhances decision-making and emotional resilience, while Mulyadi et al. (2022) highlighted nurses' adaptability during the COVID-19 pandemic despite challenges such as infection risks and communication barriers. Additionally, Gholami et al. (2023) reported improvements in nursing performance following educational programs, although patient outcomes remained unchanged, suggesting that training alone may not be sufficient without structured protocols and decision-support systems. Similarly, Leblanc et al. (2022) found that targeted educational interventions improved nurses' confidence and ability to identify critical conditions such as sepsis.

The accuracy and reliability of triage decisions are influenced by both system-level interventions and individual clinical judgment. Zaboli et al. (2023) demonstrated that real-time audits significantly reduce triage errors and improve consistency, while Kalanlar and Akkaya emphasized the role of holistic reasoning and situational awareness in decision-making. Nurses often rely on a combination of protocols, experience, and intuition, particularly in high-pressure environments characterized by overcrowding and limited resources. These findings suggest that flexible triage systems that integrate structured guidelines with professional judgment are essential for improving accuracy and patient safety.

Public awareness and systemic challenges also play a critical role in triage effectiveness. Studies by Abuljadail et al. (2024) and Ahayalimudin et al. (2024) reveal that while general awareness of triage exists, misconceptions remain widespread, leading to inefficient use of emergency services. Additionally, Suamchaiyaphum et al. (2024) and Wolf et al. (2024) highlight operational challenges such as increased administrative tasks, staff shortages, and decision fatigue, which negatively impact triage efficiency. These studies emphasize the need for improved public education, streamlined workflows, and greater involvement of nurses in designing triage systems to enhance overall emergency department performance and patient outcomes.

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

3. Materials and Methods

3.1 Study Design
This study adopted a descriptive cross-sectional survey design to assess nurses' awareness and implementation of the triage system. The design is appropriate as it captures the existing level of knowledge and practices at a single point in time without manipulation of variables.

3.2 Study Setting
The research was conducted at Sahiwal Teaching Hospital, Punjab, Pakistan, a tertiary care facility providing emergency, outpatient, and inpatient services to a large population, making it a suitable setting for evaluating triage practices.

3.3 Study Population
The target population comprised registered nurses working in various departments of the hospital who are directly or indirectly involved in patient assessment and triage-related activities.

3.4 Variables of the Study
The study included:

Demographic variables: age, gender, marital status, department, and work experience.

Independent variable: awareness (knowledge) of the triage system.

Dependent variable: implementation practices of the triage system.

3.5 Operational Definitions
Triage Knowledge refers to nurses' ability to understand and correctly apply triage principles and protocols, measured through an 11-item scale. Scores were categorized as low (0–4), moderate (5–8), and high (9–11).
Triage Practice denotes the actual implementation of triage procedures in clinical settings, assessed using a 14-item scale. Scores were classified as low (0–6), moderate (7–10), and high (11–14). Higher scores indicate better performance in both domains.

3.6 Sampling Technique and Sample Size
A purposive sampling technique was employed to select nurses involved in triage-related duties. The sample size was calculated using Cochran's formula with a 95% confidence level, 5% margin of error, and assumed prevalence (p = 0.5). The initial sample size (n_0 = 384) was adjusted for a finite population (N = 430), resulting in a final sample size of 204 participants.

3.7 Inclusion and Exclusion Criteria
Inclusion Criteria:
- Registered nurses working at the study site
- Age between 25–35 years
- Both male and female nurses
- Minimum of 3 months clinical experience

Exclusion Criteria:
- Nurses on extended leave during data collection
- Nursing students, interns, and administrative staff

3.8 Research Instrument
Data were collected using a structured questionnaire consisting of two sections:
Knowledge (11 items): covering triage principles, international models, early warning scores, and nurse roles.
Practice (14 items): focusing on triage procedures, vital signs assessment, prioritization, waiting times, and legal considerations.

3.9 Validity and Reliability
The instrument demonstrated good internal consistency with a Cronbach's alpha of 0.83 (Leblanc et al., 2022). Content validity was ensured through expert review and validation processes.

3.10 Data Collection Procedure
Approval was obtained from hospital administration prior to data collection. Eligible participants were selected based on inclusion criteria, and informed consent was obtained. Questionnaires were distributed during duty hours, with approximately 15 minutes allocated for completion. Completed forms were collected

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

immediately to ensure data reliability and minimize external influence.

3.11 Data Analysis Plan

Data were entered, cleaned, and analyzed using IBM SPSS Version 25. Descriptive statistics were applied to summarize demographic characteristics, knowledge levels, and practice patterns in line with the study objectives.

3.12 Study Duration

The study was conducted from February 2025 to June 2025, including phases of ethical approval, data collection, analysis, and report writing.

3.13 Ethical Considerations

Ethical approval was obtained from the Departmental Research Committee (DRC), Lahore School of Nursing, University of Lahore. Participation was voluntary, with written informed consent obtained from all respondents. Confidentiality and anonymity were strictly maintained, and participants had the right to withdraw at any stage without any consequences.

4. Results

Table 1. Demographic Characteristics of the Respondents

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE (%)
Gender	Male	64	31.4%
	Female	140	68.6%
Age Group	25–29 years	116	56.9%
	30–35 years	88	43.1%
Marital Status	Married	138	67.6%
	Unmarried	66	32.4%
Department	Emergency	70	34.3%
	ICU	48	23.5%
	Medical/Surgical Ward	86	42.2%
Work Experience	3–5 years	102	50.0%
	More than 5 years	102	50.0%

Most respondents were female (68.6%), with males comprising 31.4%. The majority were aged 25–29 years (56.9%), followed by 30–35 years (43.1%). Most participants were married (67.6%), while 32.4% were unmarried.

By department, 42.2% worked in medical/surgical wards, 34.3% in the emergency department, and 23.5% in the ICU. Work experience was evenly distributed, with 50% having 3–5 years and 50% having more than 5 years of experience.

Table 2. Descriptive Statistics for Triage Knowledge Score

Statistic	Value
Maximum Score	11
Mean Score	6.56
Standard Deviation	2.31
Observed Range	6 – 11

The mean score of 6.56 out of 11 indicates a generally high level of awareness among nurses regarding triage principles. The relatively small standard deviation (2.31) shows that the responses were moderately consistent.

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

Table 3. Levels of Triage Knowledge among Nurses

Knowledge Level	Score Range	Frequency	Percentage (%)
Low	0–4	12	5.9%
Moderate	5–8	98	48.0%
High	9–11	94	46.1%

Nearly half (46.1%) of the nurses exhibited a high level of triage knowledge, while another 48.0% fell within the moderate range. Only a small proportion (5.9%) demonstrated low knowledge, reflecting effective training or exposure to triage concepts.

Table 4.4 Selected Knowledge Items and Response Percentages

Knowledge Statement	% Agree
Triage prioritizes patients based on severity of condition	98.6%
Early Warning Signs are crucial in triage	92.5%
"P" in AVPU stands for Pulse *(Incorrect response)*	68.7%
Triage decisions should not be based on social status	87.8%
Nurses are responsible for applying triage protocols	84.3%

Most participants correctly recognized the foundational concepts of triage such as prioritization and warning signs. However, there was a critical misconception among 68.7% regarding the AVPU acronym, which could impact emergency assessment accuracy.

Table 5. Descriptive Statistics for Triage Practice Score

Statistic	Value
Maximum Score	14
Mean Score	9.98
Standard Deviation	2.10
Observed Range	5 – 14

The mean score of 9.98 indicates that nurses generally exhibit good triage practices. However, the score is lower than the knowledge means, suggesting a gap between awareness and practical implementation.

Table 6. Levels of Triage Practice among Nurses

Practice Level	Score Range	Frequency	Percentage (%)
Low	0–6	24	11.8%

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

Moderate	7–10	98	48.0%
High	11–14	82	40.2%

Only 11.8% of nurses were found to have low triage practice levels, while the majority (88.2%) exhibited moderate to high practice. This suggests good adherence to triage systems, albeit with room for improvement.

Table 7. Selected Triage Practice Items and Response Percentages

Practice Statement	% Agree
Delays in triage negatively impact patient outcomes	93.2%
Green-coded patients should wait ≤1 hour *(Incorrect; actual standard is ≤2 hours)*	87.1%
Delaying triage is unlawful and professionally unacceptable	81.6%
Only professional nurses should perform triage	60.5%
Triage protocols need to be regularly updated	76.0%

High agreement with the importance of prompt triage indicates strong awareness of its clinical significance. However, incorrect perceptions about green-coded patient waiting times (87.1% agreeing with the wrong timeframe) reveal significant practice gaps.

5. Discussion, Conclusion and Recommendations

The findings indicate that the nursing workforce is predominantly young and female, with balanced professional experience and representation across departments, ensuring diverse clinical exposure to triage situations. Overall, nurses demonstrated high awareness and moderate-to-strong implementation of triage systems. The majority correctly understood the purpose of triage, reflecting consistency with existing literature; however, specific gaps were identified in clinical details such as the AVPU scale and standard timing for color-coded prioritization. While practice levels were generally satisfactory, certain misconceptions—particularly regarding triage timelines and role limitations—highlight a disconnect between theoretical knowledge and standardized clinical application.

In conclusion, nurses at Sahiwal Teaching Hospital possess adequate knowledge and reasonably effective triage practices, confirming that awareness levels are relatively high. Nevertheless, inconsistencies in applying clinical protocols and gaps in specific assessment tools suggest that knowledge is not always translated into optimal practice. This gap underscores the need for continuous professional development and structured reinforcement of evidence-based triage guidelines to enhance accuracy, efficiency, and patient outcomes in emergency care settings.

Despite providing valuable insights, the study is limited by the use of purposive sampling and self-reported data, which may affect generalizability and introduce response bias. To address the identified gaps, it is recommended to implement regular training programs, simulation-based drills, and standardized triage protocols across departments. Additionally, promoting interdisciplinary collaboration and integrating validated assessment tools into routine practice can improve efficiency. Future research should adopt comparative and qualitative approaches to explore systemic barriers and broaden understanding of triage effectiveness from both

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

provider and patient perspectives.

REFERENCES

Abuljadail, S., Alhussain, H., Alhamaid, Y. A., Altaha, M., Alhulayyil, M., Alfayez, R., & Alhashim, A. (2024). Public Awareness of Triage Systems and Waiting Times During Emergency Department Visits in the Eastern Province, Saudi Arabia. *Cureus*. https://doi.org/10.7759/cureus.51988

Ahayalimudin, N., Alais, N. A. Z., Abdul Rahman, N. 'Inayati, & Mohamed Akhlak, S. (2024). Public Awareness of Triage System in Emergency and Trauma Department: A Literature Review. *INTERNATIONAL JOURNAL OF CARE SCHOLARS*, *7*(1), 85–101.
https://doi.org/10.31436/ijcs.v7i1.355

Austin, E. E., Cheek, C., Richardson, L., Testa, L., Dominello, A., Long, J. C., Carrigan, A., Ellis, L. A., Norman, A., Murphy, M., Smith, K., Gillies, D., & Clay-Williams, R. (2024). Improving emergency department care for adults presenting with mental illness: a systematic review of strategies and their impact on outcomes, experience, and performance. In *Frontiers in Psychiatry* (Vol. 15). Frontiers Media SA. https://doi.org/10.3389/fpsyt.2024.1368129

Azizpour, I., Mehri, S., & Soola, A. H. (2022). Disaster preparedness knowledge and its relationship with triage decision-making among hospital and pre-hospital emergency nurses
- Ardabil, Iran. *BMC Health Services Research*, *22*(1). https://doi.org/10.1186/s12913-022-08311-9

Da'Costa, A., Teke, J., Origbo, J. E., Osonuga, A., Egbon, E., & Olawade, D. B. (2025). AI-driven triage in emergency departments: A review of benefits, challenges, and future
directions. *International Journal of Medical Informatics*, *197*. https://doi.org/10.1016/j.ijmedinf.2025.105838

Fekonja, Z., Kmetec, S., Fekonja, U., Reljić, N. M., Pajnkihar, M., & Strnad, M. (2024a). Emergency triage nurses' perceptions of caring behaviors and the safety of the patient during triage encounters: a grounded theory study. *BMC Nursing*, *23*(1). https://doi.org/10.1186/s12912-024-02122-5

Fekonja, Z., Kmetec, S., Fekonja, U., Reljić, N. M., Pajnkihar, M., & Strnad, M. (2024b). Emergency triage nurses' perceptions of caring behaviors and the safety of the patient during triage encounters: a grounded theory study. *BMC Nursing*, *23*(1). https://doi.org/10.1186/s12912-024-02122-5

Gebrael, G., Sahu, K. K., Chigarira, B., Tripathi, N., Mathew Thomas, V., Sayegh, N., Maughan,
B. L., Agarwal, N., Swami, U., & Li, H. (2023). Enhancing Triage Efficiency and Accuracy in Emergency Rooms for Patients with Metastatic Prostate Cancer: A Retrospective Analysis of Artificial Intelligence-Assisted Triage Using ChatGPT 4.0. *Cancers*, *15*(14). https://doi.org/10.3390/cancers15143717

Gholami, M., Fayazi, M., Hosseinabadi, R., Anbari, K., & Saki, M. (2023). Effect of triage training on nurses' practice and triage outcomes of patients with acute coronary syndrome. *International Emergency Nursing*, *68*. https://doi.org/10.1016/j.ienj.2023.101288

Gorick, H., McGee, M., & Smith, T. (2024). Understanding the demographics, training experiences and decision-making practices of UK triage nurses. *Emergency Nurse*, *32*(3), 1–9. https://doi.org/10.7748/en.2024.e2202

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Hamdi, A., & Al Thobaity, A. (2023). Enhancing Disaster Triage Competencies through Simulation-Based Training: An Interventional Study among Undergraduate Nursing Students. *Sustainability (Switzerland)*, *15*(21). https://doi.org/10.3390/su152115513

Kalanlar, B., & Akkaya, G. (2024). Nursing student's experiences of Role-Play Scenario-Based Disaster Triage (START) training: Qualitative research. *Nurse Education Today*, *141*. https://doi.org/10.1016/j.nedt.2024.106307

Leblanc, P., Kabbe, A., & Letvak, S. (2022). Nurses' Knowledge Regarding Nursing Surveillance of the Septic Patient. *Clinical Nurse Specialist*, *36*(6), 309–316. https://doi.org/10.1097/NUR.0000000000000704

Llamzon, J., & Matney, S. (n.d.). *Strategic Synergy: The Dyadic Relationship of Executive Nurse and Physician in Service Line Management Within Complex Health Systems*. www.nurseleader.com

Masbi, M., Tavakoli, N., & Dowlati, M. (2024). Challenges of providing of special care services in hospitals during emergencies and disasters: a scoping review. *BMC Emergency Medicine*, *24*(1). https://doi.org/10.1186/s12873-024-01160-1

Milton, J., Erichsen Andersson, A., Åberg, N. D., Gillespie, B. M., & Oxelmark, L. (2022). Healthcare professionals' perceptions of interprofessional teamwork in the emergency department: a critical incident study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, *30*(1). https://doi.org/10.1186/s13049-022-01034-0

Mulyadi, M., Dedi, B., Hou, W. L., Huang, I. C., & Lee, B. O. (2022). Nurses' experiences of emergency department triage during the COVID-19 pandemic in Indonesia. *Journal of Nursing Scholarship*, *54*(1), 15–23. https://doi.org/10.1111/jnu.12709

Oh, W. O., & Jung, M. J. (2024). Triage—clinical reasoning on emergency nursing competency: a multiple linear mediation effect. *BMC Nursing*, *23*(1). https://doi.org/10.1186/s12912-024-01919-8

Porto, B. M. (2024). Improving triage performance in emergency departments using machine learning and natural language processing: a systematic review. In *BMC Emergency Medicine* (Vol. 24, Issue 1). BioMed Central Ltd. https://doi.org/10.1186/s12873-024-01135-2

Sexton, V., Dale, J., Bryce, C., Barry, J., Sellers, E., & Atherton, H. (2022). Service use, clinical outcomes and user experience associated with urgent care services that use telephone-based digital triage: A systematic review. In *BMJ Open* (Vol. 12, Issue 1). BMJ Publishing Group. https://doi.org/10.1136/bmjopen-2021-051569

Su, Y., Wu, X. V., Ogawa, N., Yuki, M., Hu, Y., & Yang, Y. (2022). Nursing skills required across natural and man-made disasters: A scoping review. In *Journal of Advanced Nursing* (Vol. 78, Issue 10, pp. 3141–3158). John Wiley and Sons Inc. https://doi.org/10.1111/jan.15337

Suamchaiyaphum, K., Jones, A. R., & Markaki, A. (2024). Triage Accuracy of Emergency Nurses: An Evidence-Based Review. *Journal of Emergency Nursing*, *50*(1), 44–54. https://doi.org/10.1016/j.jen.2023.10.001

Winarti, W., & Gracia, N. (2023). Exploring Nurses' Perceptions of Disaster Preparedness Competencies. *Nurse Media Journal of Nursing*, *13*(2), 236–245. https://doi.org/10.14710/nmjn.v13i2.51936

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Wolf, L., Delao, A., Clark, P., Mizerek, E., & Moon, M. D. (2024). The effect of mandatory triage questions on triage processes: a qualitative exploratory study. *Journal of Emergency Nursing*, *50*(1), 84–94. https://doi.org/10.1016/j.jen.2023.06.011

Zaboli, A., Sibilio, S., Magnarelli, G., Rella, E., Fanni Canelles, M., Pfeifer, N., Brigo, F., & Turcato, G. (2023). Daily triage audit can improve nurses' triage stratification: A pre–post study. *Journal of Advanced Nursing*, *79*(2), 605–615. https://doi.org/10.1111/jan.15521

Zachariasse, J. M., Van Der Hagen, V., Seiger, N., Mackway-Jones, K., Van Veen, M., & Moll,

H. A. (2019). Performance of triage systems in emergency care: A systematic review and meta-analysis. In *BMJ Open* (Vol. 9, Issue 5). BMJ Publishing Group. https://doi.org/10.1136/bmjopen-2018-026471