



The Correlation Between Nurses' Knowledge of Triage and the Accuracy of Triage Level Interpretation in the Emergency Department

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Abstract

Background/Aim: Knowledge about triage has been identified as one of the factors influencing patient outcomes in the emergency room. Nurses' knowledge regarding triage is necessary in order to work effectively in managing patients, as swift and accurate actions depend on the nurses' acquired knowledge. The aim of this research was to determine the correlation between nurses' knowledge of triage and the accuracy of triage-level interpretation.

Methods: The data from 145 nurses were collected by using a questionnaire sheet for the triage knowledge variable and an observation sheet for the variable of accuracy in triage level interpretation. This research was conducted in May-June 2023 at Tugurejo Regional General Hospital, KRMT Wongsonegoro Regional General Hospital and Dr Kariadi General Hospital. The independent variable in this study was nurses' knowledge and the dependent variable was the accuracy of triage level interpretation. The statistical analysis included descriptive statistics and bivariate analysis using the Chi-square test for comparison between groups.

Results: Based on the results of the bivariate analysis, nurses' knowledge has a correlation with the accuracy of triage-level interpretation with a p-value of < 0.001.

Conclusion: There is a correlation between nurses' knowledge of triage and the accuracy of triage-level interpretation.

Key words: Emergency department; Triage knowledge; Accuracy of triage level interpretation.

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Introduction

The emergency department (ED) is the initial department when a patient enters a hospital to receive medical care for emergency conditions. Emergency condition refers to a situation in which a patients require immediate assistance to save their life. Upon arrival at ED, patients are sorted and prioritised to receive care based on the issues they are facing during the triage process.^{1,2}

According to the data, it was reported that patients visits to ED have been consistently increasing each year, with an approximate 30 % rise compared to all emergency units worldwide.³ Based on the data, patients visits to EDs in Indonesia reached 4.402.205 in 2017. The data further indicates that patients visits to EDs in Central Java amounted to 1.990.104 in 2018.⁴ Knowl-

edge of triage has been identified as one of the factors influencing patients outcomes in the ED. ED nurses require in-depth knowledge and clinical expertise to effectively manage patients and handle various situations, such as overcrowded, proficiently.⁵

Nurses' knowledge regarding triage is essential for managing as many patients as possible within a short timeframe in ED, as swift and accurate actions depend on the nurses' acquired knowledge. Adequate triage knowledge equips nurses to effectively apply their expertise in their professional practice, thereby impacting the quality of patients' lives and satisfying the families' needs.^{6,7}

The aim of this research was to determine the correlation between nurses' knowledge of triage and the accuracy of triage-level interpretation.

Methods

The research site was at Tugurejo Hospital, KRMT Wongsonegoro Hospital and Dr Kariadi Hospital. The study as performed from May to June 2023.

The sample covered by this study included 145 nurses in the ED at Government Hospitals in Semarang. Nurses included in the criteria had at least one year of experience in the emergency room and have received previous triage training.

The data taken included: age, sex, length of work (in years), education, nurses' knowledge of triage and the accuracy of triage level interpretation. The research was conducted on the correlation between nurses' knowledge of triage and the accuracy of triage level interpretation.

The statistical analysis included descriptive statistics, bivariate analysis using the Chi-square test for comparison between groups. Data obtained were analysed using the IBM SPSS Version 24 program. The level of statistical significance was set at $p < 0.05$.

Ethical consideration

This study was approved by Health Research Ethics Committee RSUP Dr Kariadi Semarang (No 1451/EC/KEPK-RSDK/2023).

Results

A descriptive analysis was conducted to obtain an overview of the independent and dependent variables. The respondents were mostly (53.1 %) female, the average age of nurses was 34.3 ± 5.6 , the youngest being 21 years old and the oldest being 53 years old, the majority of nurses (61.4 %) had completed a diploma degree in nursing and mostly (44.1 %) had a work experience of 1-5 years.

Table 1: Descriptive analysis data of nurses' knowledge of triage and the accuracy of triage level interpretation

Triage categories [n (%)]	Nurses' knowledge of triage		
	Good	Sufficient	Inadequate
Under triage	13 (9.0)	5 (3.4)	21 (14.5)
Accurate triage	90 (62.1)	7 (4.8)	2 (1.4)
Over triage	1 (0.7)	3 (2.1)	3 (2.1)
Total	104 (71.7)	15 (2.2)	26 (17.9)

Table 2: The relationship between nurses' knowledge and accuracy of triage level interpretation

Triage categories	Nurses' knowledge of triage						Total	p-value
	Good		Sufficient		Inadequate			
	n	%	n	%	n	%	n	%
Under triage	13	9.0	15	3.4	21	14.5	39	26.9
Accurate triage	90	62.1	7	4.8	2	1.4	99	68.3
Over triage	1	0.7	3	2.1	3	2.1	7	4.8
Total	104	71.7	15	10.3	26	17.9	145	100.0

There was correlation between nurses' knowledge of triage and the accuracy of triage level interpretation (Chi-squared test, $p < 0.001$) (Table 2).

Discussion

Based on the results of this research, the majority of nurses possessed a good level of knowledge, accounting for 71.8 %, indicating that there were still nurses with sufficient and insufficient knowledge, comprising 28.2 %. Knowledge is influenced by various factors, including age. Age impacts an individual's comprehension and cognitive abilities. As age increases, an individual's understanding and thought processes develop, leading to an enhancement in the acquired knowledge.^{8,9} In this research, nurses with a good level of knowledge were most prevalent in the early adulthood age group, specifically between 21 and 35 years, comprising 44.8 % of the total. As an individual's age increases, their manner

of thinking and working matures, consequently exerting a greater influence on the accumulation of knowledge regarding triage and experience in effectively and accurately managing patients.⁹

Based on this research, the obtained average tenure of the respondents' work was 7.7 years, with a minimum work period of 1 year and a maximum of 30 years. An individual's length of service significantly influences their knowledge.¹⁰ The more experience an individual accumulates, the greater their understanding of the matter will become.¹¹ This indicates that the longer the tenure, the higher the level of cognitive maturity an individual possesses, thereby leading to an increase in the acquired knowledge.¹²⁻¹⁴ Based on this research, the majority of nurses in interpreting triage levels fall within the appropriate triage category, accounting for 68.3 %. The results of this research also indicate that there are still nurses with triage level application falling within the under triage and over triage categories, amounting to 31.7 %. This is influenced by the knowledge and the often-occurring patient congestion in the ED, which results in inadequate triage determinations.

A strong knowledge base yields proficient action. Adequate nurse knowledge about triage enhances their skills in implementing triage, subsequently influencing the effectiveness of care delivery.^{15, 16} Knowledge also serves as the foundation in the process of implementing triage.¹⁷ Knowledge is a dominant factor that supports decision-making in establishing patient triage priorities.^{18, 19} Based on this research, it is evident that there is a correlation between nurses' level of knowledge about triage and the accuracy of triage level interpretation in the Emergency Department of the Government Hospitals in Semarang. Nurses with a good level of knowledge fall within the appropriate triage category, accounting for 62.1 %. This indicates that the better the nurses' knowledge level, the more accurate their triage level interpretations tend to be.

The results of this research are in line with previous research that has proposed that knowledge has a significant influence on the implementation of triage.¹⁹ The knowledge of ED nurses about triage greatly aids them in identifying emergency cases, which not only has a positive impact on the quality of care but also can prevent an increase in mortality and disability.^{20, 21} Other research results also indicate that a significant relationship exists between the level of knowledge and the application of triage in ED. The results reveal that as one's knowledge level improves, their ability

to carry out triage also improves. Conversely, a lower level of knowledge corresponds to a reduced ability in implementing triage.²² Possessing knowledge about triage is crucial for a triage nurse as it provides an understanding of a patient's condition.^{23, 24}

Nurses' knowledge and experience regarding the accuracy of triage in the ED constitute specialised skills that ED nurses must possess.²⁵⁻²⁷ Adequate nursing knowledge holds a significant correlation with the implementation of triage. Knowledge within the nursing realm is of paramount importance, particularly for the nurses themselves. With sufficient knowledge about triage, it is expected that nurses will be able to conduct triage accurately and precisely in the future.²⁶

Based on this research, the majority of nurses exhibit a satisfactory level of knowledge, although there are still nurses with moderate and insufficient knowledge. Another result of this research also indicates that there are still ED nurses categorised under both under triage and over triage. The consequences of inadequate knowledge and inaccuracies in triage determination by an ED nurse can indeed pose serious and perilous implications for patient safety. Moreover, it can also have an impact on the quality of care provided. It is crucial for ED nurses to continually enhance their triage knowledge and skills through advanced education, training and on-the-job experiences, ultimately yielding favourable outcomes for both patients and the care rendered.

Conclusion

A high level of nurses' knowledge is correlated with the accuracy of interpreting triage levels in the ED. The results of this research are expected to serve as a reference for enhancing knowledge about triage and improving abilities related to the implementation of triage.

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Conflict of interest

None.

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References

- Brevik HS, Hufthammer KO, Hernes ME, Bjørneklett R, Brattebø G. Implementing a new emergency medical triage tool in one health region in Norway: some lessons learned. *BMJ open Qual* 2022 Jun 23;11(2):e001730. doi: 10.1136/bmjopen-2021-001730.
- Wolf LA, Delao AM. Establishing research priorities for the emergency severity index using a Modified Delphi Approach. *J Emerg Nurs* 2021 Sep 30;47(1):50-7.
- Purwadi H, Bredan K, McCloud C, Pranata S. The SALT and START triage systems for classifying patient acuity level: a systematic review. *Nurse Media J Nurs* 2021;11(3):413-27.
- Mulyadi M, Dedi B, Hou W, Huang I, Lee B. Nurses' experiences of emergency department triage during the COVID-19 pandemic in Indonesia. *J Nurs Scholarsh* 2021 Sep 30;54(1):15-23.
- Atmaja HK, Pranata S, Augustin K, Luthfia E. Accessibility of e-EWSS versus Manual EWSS for Detecting the emergency condition among patients with Coronavirus Disease 2019: a survey research on register nurse in Indonesia. *Open Access Maced J Med Sci* 2022;10(G):286-9.
- Schmieding ML, Kopka M, Schmidt K, Schulz-Niethammer S, Balzer F, Feufel MA. Triage accuracy of symptom checker apps: 5-year follow-up evaluation. *J Med Internet Res* 2022 Jun 23;24(5):e31810. doi: 10.2196/31810.
- Kim K, Oh B. Prehospital triage in emergency medical services system: A scoping review. *Int Emerg Nurs* 2023 Jun 23;69:101293. doi: 10.1016/j.ienj.2023.101293.
- Jiang D, Chen T, Yuan X, Shen Y, Huang Z. Predictive value of the Trauma Rating Index in Age, Glasgow Coma Scale, Respiratory rate and Systolic blood pressure score (TRIAGES) and Revised Trauma Score (RTS) for the short-term mortality of patients with isolated traumatic brain injury: A retrospect. *Am J Emerg Med* 2023 Sep 30;71:175-81.
- McCormick T, Haukoos J, Hopkins E, Trent S, Adelgais K, Cohen M, et al. Adding age-adjusted shock index to the American College of Surgeons' trauma team activation criteria to predict severe injury in children. *J Trauma Acute Care Surg* 2022 Sep 30;94(2):295-303.
- Soesanto E, Yanto A, Irani N, Pranata S, Rejeki S, Sasmito P. Job satisfaction among primary health care nurses. *Int J Public Heal Sci* 2022;11(4):1416-23.
- Pranata S, Wu SFV, Wang TJT, Liang SY, Bistara DN, Chuang YH, et al. A pilot test for implementing precision healthcare programme in patients with diabetes in Indonesia. *Scr Med* 2023;54(1):61-7.
- Mirhaghi A. Comments on "Triage knowledge and practice and associated factors among emergency department nurses". *SAGE Open Nurs*. 2023 Feb 23;9:23779608231160475. doi: 10.1177/23779608231160475.
- Malak MZ, Mohammad Al-Faqeer N, Bashir Yehia D. Knowledge, skills, and practices of triage among emergency nurses in Jordan. *Int Emerg Nurs* 2022 Sep 30;65:101219. doi: 10.1016/j.ienj.2022.101219.
- Bahlili TT, Tesfamariam EH, Andemeskel YM, Weldegiorgis GG. Effect of triage training on the knowledge application and practice improvement among the practicing nurses of the emergency departments of the National Referral Hospitals, 2018; a pre-post study in Asmara, Eritrea. *BMC Emerg Med* 2022 Sep 30;22(1):190. doi: 10.1186/s12873-022-00755-w.
- Phukubye TA, Mbombi MO, Mothiba TM. Strategies to enhance knowledge and practical skills of triage amongst nurses working in the emergency departments of rural hospitals in South Africa. *Int J Environ Res Public Health* 2021 Sep 30;18(9):4471. doi: 10.3390/ijerph18094471.
- Ghazanfar O, Fares S, Mubarak AH, Hubloue I. Assessment of knowledge retention in military personnel after training courses in sieve triage using different simulated scenarios. *Cureus* 2022 Sep 30;14(3):e23484. doi: 10.7759/cureus.23484.
- Butler K, Anderson N, Jull A. Evaluating the effects of triage education on triage accuracy within the emergency department: An integrative review. *Int Emerg Nurs* 2023 Sep 30;70:101322. doi: 10.1016/j.ienj.2023.101322.
- Chan SL, Lee JW, Ong MEH, Siddiqui FJ, Graves N, Ho AFW, et al. Implementation of prediction models in the emergency department from an implementation science perspective—Determinants, outcomes and real-world impact: A scoping review protocol. *PLoS One* 2022 Sep 30;17(5):e0267965. doi: 10.1371/journal.pone.0267965.
- AlShatarat M, Rayan A, Eshah NF, Baqeaq MH, Jaber MJ, AlBashtawy M. Triage knowledge and practice and associated factors among emergency department nurses. *SAGE Open Nurs* 2022 Sep 30;8:23779608221130588. doi: 10.1177/23779608221130588.
- Tang OY, Marqués CG, Ndebwanimana V, Uwamahoro C, Uwamahoro D, Lipsman ZW, et al. Performance of prognostication scores for mortality in injured patients in Rwanda. *West J Emerg Med Integr Emerg Care* 2021 Sep 30;22(2):435-44.
- Ageron FX, Porteaud J, Evain JN, Millet A, Greze J, Vallot C, et al. Effect of under triage on early mortality after major pediatric trauma: a registry-based propensity score matching analysis. *World J Emerg Surg* 2021 Sep 30;16(1):1. doi: 10.1186/s13017-020-00345-w.
- Liu Y, Lyu X, Yang B, Fang Z, Hu D, Shi L, et al. Early triage of critically ill adult patients with mushroom poisoning: machine learning approach. *JMIR Form Res* 2023 Jun 23;7:e44666. doi: 10.2196/44666.
- Yang J, Wan X, Yu P, Li X. Factors affecting the triage decision-making ability of emergency nurses in Northern China: A multi-center descriptive survey. *Int Emerg Nurs* 2023 Sep 30;67:101264. doi: 10.1016/j.ienj.2023.101264.
- Awwad K, Ng YG, Lee K, Lim PY, Rawajbeh B. Advanced Trauma Life Support/Advanced Trauma Care for Nurses: A systematic review concerning the knowledge and skills of emergency nurse related to trauma triage in a community. *Int Emerg Nurs* 2021 Sep 30;56:100994. doi: 10.1016/j.ienj.2021.100994.
- Campbell D, Feters L, Getzinger J, Perko A, Slater S. A clinical nurse specialist-driven project to improve emergency department triage accuracy. *Clin Nurse Spec* 2022 Jun 23;36(1):45-51.
- Smith J, Filmalter C, Masenge A, Heyns T. The accuracy of nurse-led triage of adult patients in the emergency centre of urban private hospitals. *African J Emerg Med* 2022 Sep 30;12(2):112-6.
- Zaboli A, Sibilio S, Magnarelli G, Rella E, Canelles MF, Pfeifer N, et al. Daily triage audit can improve nurses' triage stratification: A pre-post study. *J Adv Nurs* 2022 Sep 30;79(2):605-15.