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A Cross-Sectional Study on Emergency Department Nurses' Knowledge, Practices and Factors Affecting About Triage

Acil Servis Hemşirelerinin Triyaja İlişkin Bilgileri, Uygulamaları ve Etkileyen Faktörler Üzerine Kesitsel Bir Çalışma

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ABSTRACT

Objective: The study aimed to evaluate the knowledge and practices of emergency nurses working in adult emergency departments of two public hospitals serving as tertiary care in the same city and the factors associated with them.

Materials and Methods: This cross-sectional and descriptive study was conducted with 82 emergency service nurses. The research data were obtained with a three-part questionnaire form consisting of questions about some personal characteristics of emergency nurses, the theoretical knowledge of nurses about triage and their practices about triage.

Results: Nurses' triage knowledge and triage application scores were above the average score. Additionally, emergency nurses' theoretical knowledge about triage score averages was higher than their practice score averages. However, it was noteworthy that there was a lack of information and incorrect practices on some subjects of triage. There was no significant difference in the nurses' gender, educational level triage training status and their triage knowledge and practices ($p > 0.05$). 78.0% of the nurses stated that they practiced triage in the emergency department, but 42.7% of them did not consider themselves sufficient in triage, and 59.8% stated that patient density was the most important factor in ensuring effective triage.

Conclusions: Emergency department nurses have deficiencies in triage knowledge and practice and deficiencies in transforming their knowledge into practice. According to the results of the study, it is recommended that professional education should be improved, and information should be updated with continuous in-service training in order to prevent knowledge deficiencies and incorrect triage practices in emergency nursing.

Keywords: Emergency department, nurse, triage

ÖZ

Amaç: Çalışma, acil servis hemşirelerinin triyaj hakkındaki bilgi ve uygulamaları ile bunlarla ilişkili faktörleri değerlendirmeyi amaçlamaktadır.

Materyal ve Metot: Araştırma 82 acil servis hemşiresi ile kesitsel ve tanımlayıcı özellikte yapılmıştır. Araştırma verileri, acil servis hemşirelerinin bazı kişisel özellikleri ve hemşirelerin triyaj hakkında teorik bilgileri ile triyaj hakkında uygulamalarını sorgulayan sorulardan oluşan üç bölümden oluşan anket formu ile elde edilmiştir. İstatistiksel analiz, SPSS 22.0 paket programında, tanımlayıcı istatistikler, Mann Whitney U Testi ve Kruskal-Wallis Testi kullanılarak yapılmıştır.

Bulgular: Hemşirelerin triyaj bilgi ve triyaj uygulama puanları ortalama puanın üstünde bulundu. Ayrıca, acil hemşirelerinin triyaj hakkında teorik bilgi puan ortalamaları, uygulama puan ortalamalarına göre daha yüksekti. Ancak triyajın bazı konuları hakkında bilgi eksikliği ve yanlış uygulamalarının olduğu dikkati çekiciydi. Hemşirelerin cinsiyet, eğitim durumu ve triyaj eğitimi alma durumu ile triyaj bilgi ve uygulamalarında anlamlı bir farklılık yoktu ($p>0,05$). Hemşirelerin %78,0'i acilde triyaj uyguladıklarını ancak %42,7'si triyaj konusunda kendini yeterli görmediğini ve %59,8'i hasta yoğunluğunun etkin triyajın sağlanmasında en önemli faktör olduğunu ifade etti.

Sonuç: Acil servis hemşirelerinin triyaj bilgisi ve uygulamasına ilişkin bilgi eksiklikleri ve bilgilerinin pratiğe dönüştürülmesinde eksiklikleri bulunmaktadır. Çalışma sonuçlarına göre, acil hemşireliğinde bilgi eksikliklerini ve yanlış triyaj uygulamalarını önlemede mesleki eğitimin geliştirilmesini ve sürekli hizmetiçi eğitimlerle bilgilerin güncellenmesi önerilmektedir.

Anahtar kelimeler: Acil servis, hemşire, triyaj

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INTRODUCTION

Emergency services are the most important component of health service delivery. Nurses working in emergency departments are frontline healthcare personnel who take care of patients who present to emergency departments in acute and life-threatening situations.[1] The knowledge and practices of emergency department nurses play an important role in providing quality nursing care in emergency departments, maintaining the quality of care and personalising the treatment according to the needs of each patient.

One of the critical roles of emergency nurses is triage. Triage is a process that consists of timely and accurate identification of patients requiring emergency treatment and separating those who can wait among patients.[2] Due to the clinical nature of the emergency department, nurses are expected to have the skills, knowledge and qualifications that allow them to meet the high demands and expectations of patient care in this area.[3] Despite the availability of existing, validated scales to improve the accuracy of triage of patients presenting to the ED, research suggests that accurate identification of patients and appropriate resource allocation remains a significant challenge for ED nurses.[4] Although the scales used to determine the level of triage are helpful, the process is dynamic and requires considerable patient-centred judgement. At this stage, the decision-making skills and critical thinking capacity of emergency department nurses, who have to make quick decisions about patient care under limited information, a tense environment and time pressure, play an important role.[5] In studies conducted in the literature on the knowledge and skill levels of nurses working in the emergency department regarding triage, it was found that they did not have sufficient knowledge about triage and could not categorise patients into appropriate triage categories.[6,7]

Lack of knowledge and practice of triage among emergency department nurses is a problem not only in Türkiye but also in developing countries.[6,7] In Türkiye, there is a lack of research data on how well emergency department nurses apply the triage knowledge gained during their undergraduate education to their practices in the emergency department, as well as the factors that influence their triage practices.[8-10]

This study aimed to evaluate triage knowledge, practices and related factors among emergency department nurses working in Türkiye. The results of the study will contribute to the literature in finding ways to develop and improve the triage knowledge and practices of emergency department nurses and to fill the gap in the transformation of knowledge into practice.

MATERIALS AND METHODS

Ethics Committee Approval: The study was conducted in accordance with the Declaration of Helsinki. Official permission was obtained from Sivas Cumhuriyet University Non-Interventional Clinical Research Ethics Committee (Decision no: 2023-03/12 Date: 22.03.2023). The study adhered to the ethical guidelines of the Declaration of Helsinki. The nurses participating in the study were informed that they could leave the study at any time and that the confidentiality of their information would be protected.

Design: The research was cross-sectional and descriptive. The study was conducted in two public hospitals providing emergency services as tertiary care between January and April 2023. For emergency department triage, color codes defined as red (very urgent), yellow (urgent), and green (non-urgent) are used in the communiqué published by the Ministry of Health in the official gazette.[11] The research sample was planned to include all personnel who volunteered to participate in the study in a way to reach the minimum number of personnel to be reached from a total of 120 nurses working in the adult emergency departments of two public hospitals, one of which was a state hospital and the other a university hospital, serving in the same city between January and April 2023. For this purpose, n=80 was determined using the sample calculation formula with a certain population. When the sample calculation was made separately for each institution using the stratified sampling method, it was targeted to reach at least 30 nurses from the emergency department of the university hospital and at least 50 nurses from the emergency department of the state hospital. During data collection, a total of 82 nurses volunteered to participate in the study. In addition, the G*Power (Version 3.1.9.6) program was used to calculate the power of the sample. In the study, reliability was taken as 95%, effect level as 0.50 and power was found to be 90% with a sample of 82 people. The data collection forms were delivered to the nurses whose consent was obtained by the researcher and given 1 month, following which the questionnaire forms were collected. Participants were informed about the subject, aim and objective of the study and their right to participate and/or withdraw from the study if they wished to exercise this right without any victimisation. Participants received all information before signing a consent form. Questionnaires were only given to those who agreed by signing informed consent.

Data Collection Tools: A questionnaire form consisting of three parts and questions inquiring about the nurses' theoretical knowledge about triage and their triage practices, which was prepared based on

some personal characteristics of the nurses and the literature, was used to collect the research data.[3,7,9] In the first part of the questionnaire, demographic characteristics of emergency nurses; in the second part, their level of knowledge about triage; in the third part, questions evaluating how much of their knowledge about triage they reflect to practice. The questions in the second and third parts of the questionnaire form were answered as "Agree" or "Disagree". Participants were given 1 point for each correct answer and 0 points for each incorrect answer. Total scores ranged from "0 to 15" for "triage knowledge" and "0 to 10" for "triage practice", with an increase in total scores indicating better triage knowledge or practice. Prior to the calculation of the total score, the reverse statements were reverse-coded. Content validity analysis was conducted utilizing the Davis technique for the questionnaire form prepared in accordance with the literature.[13] The internal consistency of the study questions was assessed using Cronbach's Alpha coefficient (α=0.80).

Statistical Analysis: Statistical analysis was conducted using the SPSS 22.0 package program. Knowledge scores were calculated by taking the mean. Number and percentage distributions of the descriptive characteristics of the nurses were given. The data in the descriptive characteristics of the nurses were compared with the mean knowledge scores. As a result of the Normality test, the Mann-Whitney U Test was used for variables for which a normal distribution was not possible in groups of two. The Kruskal-Wallis Test was used for variables for which a normal distribution was not possible in groups of more than two. Post hoc analysis (Tamhane's T2 since the data were not normally distributed) was used to determine the difference between the groups in terms of mean scores. The results were evaluated at a confidence interval of 95% and a significance level of $p<0.05$.

RESULTS

A total of 82 emergency department nurses participated in the study. Of the participants, 78.0% received triage training; 42.7% did not consider themselves adequate in triage, the reasons for not considering themselves adequate in triage; 57.2% stated that triage training was not given during vocational training, 20.0% stated that triage practice was not important in the institution where they worked and 22.8% stated that they did not trust themselves in triage practice. The most important factor affecting the effectiveness of triage in emergency departments was expressed as patient density by 59.8%. (Table 1).

Table 1. Distribution of nurses' descriptive characteristics and triage practices.

Characteristics		Data
Age, Mean±SD		27.2±4.2
Gender, n (%)	Female	54 (65.9)
	Male	28 (34.1)
Education level, n (%)	High school	22 (26.8)
	Associate's Degree	14 (17.1)
	Bachelor's degree	46 (56.1)
Duration of work in the emergency department, n (%)	1-5 years	54 (65.8)
	6-10 years	20 (24.4)
	11-15 years	8 (9.8)
Triage practice status, n(%)	Yes	64 (78.0)
	No	18 (22.0)
Knowing the name of the procedure/scale used for triage in the emergency department, n(%)	Know	24 (29.3)
	Unknown	58 (70.7)
Status of receiving training on triage, n(%)	Yes	64 (78.0)
	No	18 (22.0)
Type of training, n(%)	In-service training	58 (90.6)
	Congress/symposium/seminar/ course	6 (9.4)
Self-sufficiency in triage, n(%)	Yes	47 (57.3)
	No	35 (42.7)
Reason for not feeling competent in triage, n(%) **(n:35)**	Lack of triage training in undergraduate education	20 (57.2)
	Failure to apply triage in the hospital	7 (20.0)
	Lack of self-confidence in triage	8 (22.8)
Factors affecting effective triage in the emergency department, n(%)	Patient density in the emergency department	49 (59.8)
	Lack of technical and medical equipment	10 (12.2)
	Lack of triage knowledge	16 (19.5)
	Lack of communication within the team	7 (8.5)

The mean total triage knowledge score of emergency nurses in the study was 10.5±1.5. It was determined that the participants had the highest level of agreement with the statements about triage related to the determination of the priority of triage according to the patient's medical need (98.8%) and the correct colour coding defined for triage (95.1%). The participants (67.1%) answered the expression 'AVPU' incorrectly. Additionally, nurses had a high rate of incorrect responses (81.7%) regarding the situations in which triage can be applied in inpatient wards (Table 2).

The total triage practice score of the participants was 6.01 (SD=1.3). The participants largely agreed that longer waiting times could negatively influence patient outcomes (86.6%) and that reducing waiting times would alleviate overcrowding and enhance patient satisfaction (82.9%). A total of 67.1% of nurses agreed with the statement that patients coded as green should wait for one hour or less. Additionally, 62.2% concurred that patients coded in yellow should receive intervention within ten minutes at the latest. However, these responses are incorrect. The appropriate examination and observation times for patients coded in green should not exceed two hours, while those for patients coded in yellow should not exceed one hour (Table 3).

Table 2. Emergency nurses' knowledge about triage.

Knowledge about Triage	**Agree**	**Disagree**
Triage is the prioritisation of the patient according to medical care needs, n (%)	81 (98.8)	1 (1.2)
The aim of triage is to identify the patients who cannot wait and to ensure that they are intervened as soon as possible, n (%)	76 (92.7)	6 (7.3)
In triage, one of the degrees of urgency classification systems, such as binary, triadic, quadruple, quadruple and quintuple, is used to prioritise treatment, n (%)	69 (84.1)	13 (15.9)
In our country, according to the communiqué of the Ministry of Health, colour coding is used in triage, defined as red (very urgent), yellow (urgent), green (non-urgent) and black (dying), n (%)	78 (95.1)	4 (4.9)
In triage, patients are evaluated according to their order of arrival at the hospital, n (%)	21 (25.6)	61 (74.4)
Stable patients admitted to the hospital as outpatients should be directed to the red area, n (%)	10 (12.2)	72 (87.8)
Patients coded green during triage should be treated first, n (%)	16 (19.5)	66 (80.5)
If an urgent finding is detected in the first step, the patient's vital signs are taken first, n (%)	62 (75.6)	20 (24.4)
Individuals with potentially life-threatening illnesses (e.g. chest pain not compatible with cardiac history and conscious individuals with moderate head trauma) are directed to the yellow area, n (%)	57 (69.5)	25 (30.5)
Patients admitted to the triage area should be assessed at regular intervals, as the patient's condition may change from one area to another, n (%)	57 (69.5)	25 (30.5)
The nurse can triage by making independent judgement, n (%)	49 (59.8)	33 (40.2)
The condition of a patient in the red area can return to the green area without intervention, n (%)	11 (13.4)	71 (86.6)
In inpatient wards, triage is only applied in case of insufficient personnel and medical equipment. n (%)	15 (18.3)	67 (81.7)
Patients with high social status, such as senior people and politicians, should be considered as very urgent, even if triaged as green, n (%)	18 (22.0)	64 (78.0)
AVPU is the abbreviation of "Alert", "Verbal", "Pulse" and "Unresponsive", n (%)	55 (67.1)	27 (32.9)
Total Triage Knowledge Score, Mean±SD	10.5±1.5	

Table 3. Emergency nurses' practices on triage.

Practices about Triage	**Agree**	**Disagree**
Triage should only be carried out by professional nurses, n (%)	40 (48.8)	42 (51.2)
The first evaluation of the patient arriving at the hospital starts with taking vital signs, n (%)	67 (81.7)	15 (18.3)
Determining the patient's triage code is the last step in the triage process, n (%)	63 (76.8)	19 (23.2)
Triage reduces the waiting time of patients in the emergency department, n (%)	67 (81.7)	15 (18.3)
Waiting time should not be taken into account when providing emergency care, n (%)	25 (30.5)	57 (69.5)
Patients coded yellow in triage should be intervened within 10 minutes at the latest, n (%)	51 (62.2)	31 (37.8)
Patients coded green in triage must wait 1 hour or less, n (%)	55 (67.1)	27 (32.9)
Delays in waiting time may adversely affect the patient's condition, n (%)	71 (86.6)	11 (13.4)
Short waiting times in emergency departments reduce overcrowding and increase patient satisfaction, , n (%)	68 (82.9)	14 (17.1)
It is illegal to delay triage of patients in emergency departments, n (%)	31 (37.8)	51 (62.2)
Total Triage Practice Score, Mean±SD	**6.01 ±1.3**	

When the score differences were tested according to the groups, no significant difference was found between the mean triage knowledge and practice score and gender, educational status and triage training status ($p > 0.05$). Only a significant difference was found between the duration of working in the emergency department and the mean triage practice score ($P<0.05$). It was detected that the mean triage practice score of those working between 1-5 years in the emergency department was higher than those working 6-10 years (Post hoc- Tamhane's T2) (Table 4).

Table 4. Comparison of sociodemographic characteristics of nurses and total triage knowledge and practice score means.

Sociodemographic Characteristics	Average Triage Knowledge Score p-value	Average Triage Practice Score p-value
Gender	0.36[a]	0.26[a]
Education level	0.74[b]	0.18[b]
Duration of work in the emergency department	0.67[b]	0.03[b]
Status of receiving training on triage	0.47[a]	0.49[a]

[a]: Mann Whitney U Test was used; [b]: Kruskal-Wallis H Test was used.

DISCUSSION AND CONCLUSION

Determining the priority and performing triage practices effectively is quite essential in emergency department units where patient load and appointments cannot be planned. In the 'Communiqué on the Implementation Procedures and Principles of Emergency Services in Inpatient Healthcare Facilities" published by the Ministry of Health in Türkiye in 2022, "triage can be performed by physicians or health personnel trained for triage".[11] In this study, it is observed that the majority of the people performing triage in emergency departments are nurses. It is very important for nurses to have up-to-date knowledge and skills about triage in order to perform triage practices systematically in emergency services.[12]

It was determined that the majority of the nurses participating in the study received in-service training on triage. Still, almost half of them did not consider themselves sufficient in triage, and the reasons for this were "lack of training on triage during vocational training" and "lack of self-confidence" with high rates. Although knowledge is the key factor affecting the accuracy of triage decisions, it is stated that nurses should also have advanced identification, good communication and organisational skills, emergency department experience and triage experience in order to assume triage responsibility.[9,14] It is stated in the literature that training and orientation programs will be effective in increasing the reliability and effectiveness of nurses' roles related to triage and preventing errors.[15,16] The fact that nearly half (42.7%) of the emergency department nurses in this present study did not consider their knowledge and skills on triage to be sufficient revealed that this issue should be prioritized in in-service training and that triage knowledge and practices should be adequately included in the curriculum during their academic education. Bahre et al. determined that the triage knowledge and skill levels of nurses working in the emergency department were low, similar to our study.[17]

In the study, it was stated that the most important factors affecting the effective triage of emergency department nurses were the patient load in the emergency department and the lack of triage knowledge. In the study by Soola et al., inadequate triage knowledge was shown to be the most important factor affecting effective triage.[10] Education is the most important factor in improving nurses' triage decision -making skills and accuracy. Therefore, nursing educators and hospital administrators should address this important issue, and well-designed triage training should be provided to improve triage nurses' judgement and decision-making in the future.

It was determined that the knowledge and practice scores of the nurses participating in the study about triage were above the average score. However, it is noteworthy that the knowledge scores of emergency nurses about triage were higher than the practice scores. On the other hand, although the practice scores of the nurses were above the average, a lack of knowledge was observed in some items related to knowledge (e.g., the abbreviation 'AVPU' and the questions 'in which cases triage will be applied in inpatient services' were answered incorrectly at a high rate) and practice (the waiting time for examination and observation of patients coded as yellow and green was answered incorrectly). Although it was stated that triage was performed at a high rate in the emergency departments where the study was conducted, the lack of knowledge about the waiting times of the patients according to the colour codes, the 'AVPU' scale used to evaluate the level of consciousness and the situations in which triage will be

applied in inpatient services shows that emergency nurses need more theoretical and practical education and training to improve their triage knowledge.

The highest participation of the nurses participating in the study regarding triage knowledge was seen in the statements related to the definition and purpose of triage and the colour coding used in triage in our country. In studies conducted in the literature, it was observed that the rate of nurses answering the questions about the 'definition', 'purpose' and 'colour coding system' of triage correctly was high, similar to our study. [16,18]

In the study, it was determined that gender, educational status, and having received training on triage did not make a difference in the triage knowledge and practices of the nurses, and only concerning the working time in the emergency department; it was detected that the mean triage practice score of nurses with a working time between 1-5 years was higher than those with a working time between 6-10 years. In fact, it has been suggested that the triage performance of nurses has historically been related only to the triage experience of nurses. Still, studies and reviews show that this is not the case. Tamari et al.[19] and Hussein et al.[20] revealed in their studies that less experienced nurses may be more successful. Our study supports this situation.[19,20] This may be due to the fact that most of the sample consisted of nurses who have been working in the emergency department for 1-5 years, in addition to the fact that less experienced nurses experience anxiety and fear of taking responsibility during triage. Experienced nurses are often more confident in their triage skills, sometimes even overconfident; therefore, they may be more likely to perform inadequate triage.

In conclusion, emergency departments are very chaotic environments due to the urgency and seriousness of the conditions of the patients admitted. In such an environment, in order for emergency nurses to triage effectively, their knowledge and practices related to triage should be at an acceptable level. The issue of nurses' competence in triage is a multifactorial process. Various strategies can be proposed to optimise the competence of triage-related nursing practice, including supervision and feedback, training, reminder systems, simulation and artificial intelligence-supported electronic decision support tools. In this study, it was determined that the triage knowledge score of emergency nurses was higher than the practice score. However, the results of the study also revealed the existence of knowledge gaps and deficiencies in nurses' triage practice, which can be increased through capacity building of the staff. Therefore, the study recommends the development of vocational education and training to prevent knowledge gaps and incorrect triage practices in emergency nursing and that hospital administrators should establish frameworks that mandate the updating of knowledge and skills about triage among emergency nurses through in-service vocational training. Limitations of the study include the fact that it was conducted only in two public hospitals located in a single city centre and cannot be generalised to other hospitals outside the district and province and that there may be bias in the responses since no attempt was made to measure behavioural components that may affect the actual triage practice skills of the participants.

Ethics Committee Approval: The study was conducted in accordance with the Declaration of Helsinki. Official permission was obtained from Sivas Cumhuriyet University Non-Interventional Clinical Research Ethics Committee (Date: 22.03.2023, decision no: 2023-03/12). The study adhered to the ethical guidelines of the Declaration of Helsinki. The nurses participating in the study were informed that they could leave the study at any time and that the confidentiality of their information would be protected.

Conflict of Interest: No conflict of interest was declared by the authors.

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