

Selected paper of 5th International Congress of Nursing (ICON-2021), AAB University, Pristina, Kosovo.24-26 September,2021 (ONLINE CONFERENCE)

Triage knowledge levels of nurses in Turkey: A study in state hospitals in Samsun

Aziz Aslanoglu*, Faculty of Health Sciences, Cyprus International University, North Cyprus.

dr_abed.azeaz_1990@hotmail.com <https://orcid.org/0000-0002-3122-4299>

Mustafa Ayyildiz, Department of Physiology, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey.

mayyildiz@omu.edu.tr <https://orcid.org/0000-0002-6594-3080>

Suggested Citation:

Aslanoglu, A. & Ayyildiz, M. (2021). Triage knowledge levels of nurses in Turkey: A study in state hospitals in Samsun. *New Trends and Issues Proceedings on Advances in Pure and Applied Sciences*. [Online]. 0(13), 150–161. Available from: www.propass.eu

Received from September 30,2021; revised from November 30,2021; accepted from December 12.2021.

Selection and peer review under responsibility of Prof. Dr. Dogan Ibrahim, Near East University, Cyprus.

©2021 Birlesik Dunya Yenilik Arastirma ve Yayıncılık Merkezi. All rights reserved.

Abstract

Today, triage is most commonly practiced in emergency departments due to the increase in the number of patients admitted to the emergency services. Nurses who will take part in triage stated that they should receive special education on this subject, be equipped with knowledge, skills, behaviour, critical thinking, fast and correct decision-making abilities and have professional characteristics. This research was carried out as a cross-sectional study between 27/09/2019 and 10/12/2022 in order to determine the triage knowledge levels of nurses working in Turkey (a study conducted in state hospitals in Samsun) and the factors affecting this situation. The population of the study consists of 324 nurses in total; some of them work in the emergency services of 16 hospitals; the research was completed with the participation of 300 nurses. Data are presented as percentage and median (min–max). The level of significance has been taken as $p < 0.05$. In the research, it has been determined that 64.7% ($n = 194$) of them were female and 65.0% ($n = 195$) have a bachelor's degree. The majority of nurses (84.0%, $n = 252$) stated that they received triage training during their vocational training. On the other hand, in this research, the majority of nurses were asked 'Do you think that the training you received after graduation benefited your clinical practice?' and 43.0% ($n = 86$) reported 'sometimes' applied, while 36.5% ($n = 73$) reported that it was 'yes' applied. The research findings show that the nurses' triage knowledge was moderate and that vocational and postgraduate training affected their triage knowledge. It is recommended that institutional managers implement regular and continuous in-service training programmes for health personnel, nurses and support their participation in certification programmes to improve their triage knowledge.

Keywords: Triage, nursing, knowledge levels.

* ADDRESS FOR CORRESPONDENCE: **Aziz Aslanoglu**, Faculty of Health Sciences, Cyprus International University, North Cyprus.
E-mail address: dr_abed.azeaz_1990@hotmail.com

1. Introduction

The word triage has been derived from the French verb ‘Trier’ which means to select and distinguish. Triage may extend up to the time when critically ill soldiers in a war are separated from those who are able to return to the front [1]. Recently, the principles supporting triage are fairness and efficiency concepts. ‘Justice’ stated that patients in need of emergency care should receive the necessary care quickly, and ‘efficiency’ means that the level and quality of care should be appropriate to the patient’s condition [2]. Triage allows the patient to be in the right place and to receive care at the right level and also making the most appropriate assessment to meet the patient’s medical needs and allocating the treatment area for the patient [3]. The concept of triage was first introduced in the 1950s, when the density of patients demanding emergency treatment in the United States emergency departments increased. Most of these patients were referred to the emergency department for non-urgent reasons, and it was no longer possible to see the patient as soon as they arrived to the hospital [4]. Triage continues to be used in hospital emergency services, in disaster situations (mass accidents and bomb explosions) and in the army [5]. In cases where the resources provided are not sufficient due to various reasons in our country as it is all over the world, triage is classified into many groups such as inpatient triage (intensive care, surgical clinic, outpatient clinic etc.), incidence triage (accident, fire, landslide etc.), military triage (war), telephone triage (referral services), ambulance triage and obstetric triage [6]. Today, triage is most commonly practiced in emergency departments. The necessity of an effective triage system for the emergency patient to receive appropriate healthcare in a short time is unquestionably accepted and it is emphasised that the nurse has an important role in performing the triage correctly. It is stated that nurses who will be taking charge in triage should receive special training in this regard, be equipped with knowledge, skills, behaviour, critical thinking, fast and correct decision-making abilities and have professional characteristics [7]. The highest level of triage knowledge in the areas of responsibility of nurses with such skills is one of the key elements of supervision in the emergency department. If this supervision is not done at a standard level, the clinical care outcomes of the patients and the effectiveness of the emergency services are jeopardised. Performance of this control at a standard level affects positively the quality of patient care provided in emergency services and contributes to increasing the patient’s chance of survival [8].

Obviously, nurses’ triage knowledge and skill greatly impact their functional effectiveness in the emergency department because making the right decision can provide a value saving on time devoted to each patient. Besides, and more importantly, many lives depend on the immediate action of healthcare professionals. In addition, accurate and timely decisions taken by an experienced nurse ensure that emergency resources are distributed fairly to patients. The importance of an appropriate allocation of resources emerges during times of crisis and large-scale referral to the emergency department [9], [10].

In the literature, surprisingly, some studies have shown that nurses’ knowledge is not sufficient in terms of triage and that many nurses do not have the necessary skills. Although there are few studies on this subject, it was stated in 2005 that the knowledge and performance of triage nurses was low in Kerman University of Medical Sciences hospitals [11], [12]. In another study, it was determined that the knowledge of triage nurses in the hospitals of Sistani Baluchistan was not at an appropriate level [11], [12]. In another study, it was stated that 42% of nurses in Australia did not receive triage training and 14% were not yet ready enough to undertake this responsibility, although they participated in triage training [9].

In another study, it was revealed that the triage knowledge of 76 nurses working in a training and research hospital in the Turkish Republic of Northern Cyprus was mid-level. In addition, this study also shows that the level of knowledge of nurses who received triage training and frequently applied triage in their unit was higher than those who did not receive this training and did not practice triage frequently [13]. Our study evaluates the triage knowledge and performance of nurses. Knowing the

level of knowledge of triage nurses, we will be able to make the right decision with purpose of allocating appropriate resources to enrich the quality of the emergency department.

2. Tools and method

This study is based on data collected from 324 nurses employed in the emergency departments of 16 hospitals affiliated to Samsun Public Hospitals Association (Samsun Alaçam State Hospital, Samsun Asarcık District State Hospital, Samsun Ayvacık State Hospital, Samsun Bafra State Hospital, Samsun Çarşamba State Hospital, Samsun KHB Health Sciences University Training and Research Hospital, Samsun Gazi State Hospital, Samsun Havza State Hospital, Samsun Gynaecology and Paediatrics Hospital, Samsun Kavak State Hospital, Samsun Ladik State Hospital, Samsun Salipazarı State Hospital, Samsun Terme State Hospital, Samsun Vezirköprü State Hospital and Samsun 19 Mayıs District State Hospital) and Ondokuz Mayıs University Health Application and Research Centre between 27/09/2019 and 10/12/2022. The study started after permission from the Clinical Research Ethics Committee of Ondokuz Mayıs University was taken (B.30.2.ODM.0.20.08/95-471). In order to collect the data, written informed consent was obtained from the managers of the hospitals where the study would be conducted and from the university hospital management and from the nurses included in the study. As a sample, it was tried to reach the whole population, who were not on maternity, annual/excused leave at the time of the study and who accepted to participate in the research voluntarily. A special sample has not been selected in the study. 300 nurses (92.59%) participated in the study.

The data were collected with the 'Data Collection Form' created by the researchers in line with the literature. Data were collected through the information form to determine the sociodemographic and triage knowledge levels of the nurses and by using the questions about their knowledge level regarding triage. After the nurses participating in the study were informed about the study and their informed consent was obtained, the introductory information form and the scale were applied to the nurses. The approximate data collection time was 10–15 minutes per person. It was stated to the nurses that the decision whether or not to participate in the study is entirely on their own initiative and that their names would not be written on the questionnaire, and that the data collected from this study would only be used within the scope of the study.

Nurses' introductory information form prepared by the researcher in line with the literature consists of three parts. In the first part, there are 12 questions determining the individual characteristics of nurses (age, gender, education level, marital status, unit of employment, working type, working status, how many years have you been working as a nurse, how many hours do you work in a week, did you prefer to work in the emergency department and are you satisfied with working in the emergency department). In the second part, there are 14 questions determining the level of their knowledge about triage (their information about triage after vocational education and graduation, whether they find the information sufficient or not and their opinions on triage practices). In the third part, there are 18 questions evaluating their level of knowledge about triage and, consequently, there are a total of 44 questions in the questionnaire. Participants should make a choice by grading their opinions on the item as disagree (1), undecided (2) and agree (3).

The questions in the third part of the questionnaire were submitted to the opinion of three clinical academicians, who have at least a doctorate degree in their own field, in order to determine the content validity. Questions was scored as '1 = Question is not appropriate', '2 = Question should be slightly revised', '3 = Question should be reviewed seriously' and '4 = Question is appropriate'. After the feedback, the statements were prepared by the researchers in line with the expert suggestions and the content validity index (CVI) was calculated by using the Davis technique. The CVI was found to be 0.83, which means appropriate content validity (18). In addition, the internal consistency of the questions in the study was evaluated by Cronbach's alpha coefficient ($\alpha = 0.72$).

While the nurses got 1 point for each correct answer given to 18 case questions related to the triage directed to them, they got 0 points for their incorrect answers and they could not receive any point for ‘undecided’ answers. In this way, the minimum score is 0 and the maximum score is 18 that they can receive. The average triage knowledge point of the nurses who answered the questions ($n = 300$) was obtained as 10.2. The lowest score received is 0. Those who received 0 points gave the answer in the form of ‘undecided’ to all questions. The highest point was obtained as 17.

3. Statistical analysis

Statistical analysis of the data regarding the evaluation of the triage knowledge level of the nurses included in the study was carried out using IBM SPSS V23. Conformity to the normal distribution was examined by Kolmogorov–Smirnov and Shapiro–Wilk tests. Mann–Whitney U test and Kruskal–Wallis test were used to compare data that did not show normal distribution. The relationship between the variables was examined by Spearman’s correlation analysis. Data that did not show normal distribution were given as median (minimum–maximum). Chi-square test was used to compare categorical data. Categorical data are presented as frequency (percentage). Significance level was taken as $p < 0.050$.

4. Results

Table 1. Sociodemographic and professional characteristics of nurses working in Samsun public hospitals’ emergency departments

	Frequency (n)	Per cent (%)
Gender		
Female	194	64.7
Male	106	35.3
Marital status		
Married	162	54.0
Single	138	46.0
Educational level		
Health vocational high school	11	3.7
Associate degree	58	19.3
Bachelor’s Degree	195	65.0
Master’s Degree	30	10.0
Doctoral	6	2.0
Type of employment		
Continuously during the day	40	13.3
Shift	250	83.3
Other (please specify)	10	3.3
The unit you work in		
Adult Emergency Department	219	73.0
Paediatric Emergency Department	81	27.0
Your employment status		
Permanent staff	201	67.0
Contract employee	99	33.0
Did you choose to work in the emergency department?		
Yes	163	54.3
No	137	45.7
Are you satisfied with working in the emergency department?		
Yes	198	66.0
No	102	34.0

64.7% of the nurses are female and 35.3% are male; 54% of the nurses are married. 65% of the nurses had a bachelor’s degree, 19.3% had an associate degree, 10% had a master’s degree, 3.7% graduated from health vocational high school and 2% has a doctoral degree. 83.3% of the nurses work in shifts and 13.3% of them work continuously during the day. 73% of the nurses work in the adult emergency department and 27% work in the paediatric emergency service. 67% of the nurses are permanent staff and 33% are contract employee. While 54.3% of the nurses prefer in person to work in the emergency department, 66% of them are satisfied with working in the emergency department (Table 1).

Table 2. Distribution of educational characteristics related to triage of nurses working in Samsun public hospitals’ emergency departments

	Frequency (n)	Per cent (%)
Who is responsible for triage?		
Doctor	100	33.3
Emergency medical technician/Paramedic	103	34.3
Nurse	97	32.3
Is triage among the duties of the emergency nurse?		
Yes	203	67.7
No	97	32.3
Your work experience in the triage system		
Yes	203	67.7
No	97	32.3
Did you receive any training on triage during your vocational training?		
Yes	252	84.0
No	48	16.0
If your answer is yes;		
As a semester course	82	32.5
As a subject in the course	142	56.3
Other (Congress, symposium, seminar, online course etc.)	28	11.1
Do you find the training you have received sufficient?		
Yes	82	32.5
No	67	26.6
Partially	103	40.9
Did you receive any training on triage after your graduation?		
Yes	200	66.7
No	100	33.3
If yes, where did you get this training?		
By participating in the in-service training programme	126	63.0
By participating in the certification programme	36	18.0
By participating congresses, symposiums, seminars, courses, etc.	38	19.0
If your answer is yes, do you find the training you have received sufficient?		
Yes	65	32.5
No	43	21.5
Partially	92	46.0
Do you think the training you have received has become useful for your clinical practice?		
Yes	73	36.5
No	41	20.5
Sometime	86	43.0

84% of the nurses received training on triage during their vocational training. 56.3% of the trainees received training as a subject in the course, 32.5% of them received as a semester course and 11.1% of them received through other options. 32.5% of the nurses find the training sufficient. 66.7% of the nurses received training on triage after graduation. 63% of the trainees received training by participating in the in-service training programme. 32.5% of the people who received this training found it sufficient and 36.5% of them thought that the training they received became useful for them in clinical practice (Table 2).

Table 3. Triage knowledge point descriptive statistics

Mean	Standard deviation	Median	Minimum	Maximum
10.02	4.33	11.00	0	17.00

While nurses got 1 point for each correct answer to the 18 case questions about triage directed to them, they received 0 points for their incorrect answers, and they could not receive any point for 'undecided' answer. In this way, the minimum score they can get is 0 and the maximum score is 18. The average triage knowledge score of the nurses who answered the questions ($n = 300$) was 10.2. The lowest score received is 0. Those who scored 0 gave the answer in the form as undecided to all questions. The highest score was obtained as 17 (Table 3).

Table 4. Distribution of nurses' responses to questions about triage information ($n = 300$)

Questions	Correct Answer		Incorrect Answer	
	<i>n</i>	%	<i>n</i>	%
1- Triage is the determination of the priority of the patient according to the medical care needs and it is a system that ensures the use of resources in health institutions at the right place and time.(c)	223	74.3	77	25.7
2- The purpose of triage is to determine the priorities of the patients who apply to the hospital, to identify those who cannot wait and to ensure that the patient is intervened as soon as possible. (c)	225	75.0	75	25.0
3- In triage, patients are evaluated according to their arrival order to the emergency department.(i)	126	42.0	174	58.0
4-In triage, one of the urgency degree classification systems such as double, triple, quadruple and quintuple is used to determine the priority in treatment. (c)	144	48.0	156	52.0
5-Only doctors can do triage. (i)	169	56.3	131	43.7
6-ABC (airway patency, respiration, circulation) control should be performed in the first evaluation of the patient who comes to the hospital. (c)	184	61.3	116	38.7
7-Triage is performed only when the patient first arrives at the hospital. (i)	127	42.3	173	57.7
8- In triage practice, the nurse can make triage by making an independent decision. (c)	144	48.0	156	52.0
9- In inpatient services, triage is applied only when there is a shortage of personnel and medical equipment. (c)	61	20.3	239	79.7
10-There is a green area, a yellow area and a red area in the triage. After the patients are evaluated, they are directed to these areas in a suitable way. (c)	195	65.0	105	35.0
11-The stable patient, who is admitted to the hospital as an outpatient and has a simple health problem, should be directed to the red area. (i)	198	66.0	102	34.0
12-Patients with stable vital signs and mild wounds and abrasions can be shown as an example to the patients in the red area. (i)	211	70.3	89	29.7
13-Patients, who potentially threaten the life, are directed to the	61	20.3	239	79.7

yellow area. (c)

14- Conscious patients, who suffer from chest pain inconsistent with cardiac history and who has moderate level head trauma, can be shown as an example to the patients in the yellow area (c)	164	54.7	136	45.3
15-Patients, who threaten the life and require a very rapid evaluation and emergency intervention, should be taken to the green area immediately.(i)	213	71.0	87	29.0
16- Unconscious patients, who has cardiac arrest, respiratory arrest and who use excessive drug, can be shown as an example to the patients in the green area (i)	210	70.0	90	30.0
17-Patients taken to the triage area should be evaluated at regular intervals because the patient's condition may change from one area to another. (c)	168	56.0	132	44.0
18-The condition of a patient in the red area can return to the green area without intervention.(i)	182	60.7	118	39.3

C = Correct; I = Incorrect.

According to the questionnaire created to evaluate the knowledge level of nurses about triage, the questions related to ‘definition of triage’ (question 1), ‘purpose’ (question 2) and ‘implementation of triage’ (questions 12 and 16) were given the most correct answers. The nurses gave the most wrong answers to the questions related to titled ‘Triage in the services with beds is applied only when there is a shortage of personnel and medical equipment’ (question 9) and ‘patients who threaten the life and require rapid evaluation and urgent intervention, should be taken to the green area immediately’ (question 15) (Table 4).

Table 5. Comparison of the triage knowledge point according to the demographic characteristics of the nurses

	Median ± standard deviation	Median (min–max.)	Test ist.	p
Gender				
Female	10.1 ± 4.2	11 (0–17)	U = 10.029	0.724
Male	9.8 ± 4.5	11 (0–17)		
Marital status				
Married	10 ± 4.4	11 (0–17)	U = 11,399	0.767
Single	10.1 ± 4.3	11 (0–16)		
Educational level				
Health vocational high school	10.7 ± 4.9	13 (0–15)	$\chi^2 = 3.667$	0.453
Associate degree	10.7 ± 4.3	11.5 (0–17)		
Bachelor’s degree	9.8 ± 4.3	11 (0–17)		
Master’s degree	10 ± 4.4	12 (2–16)		
Doctoral	8.2 ± 3.8	7 (5–15)		
Type of employment				
Continuously during the day	9.4 ± 4.3	9.5 (2–15)	$\chi^2 = 2.526$	0.283
Shift	10 ± 4.4	11 (0–17)		
Other (please specify)	12 ± 2.9	12.5 (5–15)		
The unit you work in				
Adult Emergency Department	10.8 ± 4.1	12 (0–17)	U = 5,432.5	<0.001
Paediatric Emergency Depart.	7.8 ± 4.3	7 (0–17)		
Your employment status				

Permanent staff	9.7 ± 4.4	10 (0–17)	U = 11.346	0.047
Contract employee	10.7 ± 4.2	12 (0–16)		
Did you choose to work in the emergency department?			U = 9,508.5	0.026
Yes	10.5 ± 4.2	12 (0–17)		
No	9.4 ± 4.4	9 (0–16)		
Are you satisfied with working in the emergency department?			U = 7,361	<0.001
Yes	10.7 ± 4.1	12 (0–17)		
No	8.7 ± 4.4	7.5 (0–17)		

U: Mann–Whitney U test statistics, χ^2 : Kruskal–Wallis test statistics.

Triage knowledge points differ according to the department where the person works ($p < 0.001$). While the median triage knowledge point is 12 in adult emergency department employees, it has been obtained as 7 in paediatric department employees. Triage knowledge points differ according to employment status ($p = 0.047$). While the median triage knowledge point is 10 for permanent staff employees, it has been obtained as 12 for contract employees. The triage knowledge points differ according to the employment preference in the emergency department ($p = 0.026$). While the triage knowledge point is 12 for nurses who preferred to work in the emergency department themselves, it has been obtained as 9 for those who did not choose to work in the emergency department. Triage knowledge points differ according to satisfaction with working in the emergency department ($p < 0.001$). While the triage knowledge point is 12 for nurses who were satisfied with working in the emergency department, it has been obtained as 7.5 for those who were not satisfied with working in the emergency department (Table 5).

Table 6. Comparison of triage knowledge points according to the educational characteristics of nurses regarding triage

	Median ± standard deviation	Median (min–max.)	Test ist.	p
Who is responsible for triage?			$\chi^2 = 14.410$	0.001
Doctor	10.7 ± 4	11.5 (0–17) ^b		
Emergency medical technician/Paramedic Nurse	8.7 ± 4.4	7 (0–16) ^a		
Is triage among the duties of the emergency nurse?			U = 7,254	<0.001
Yes	10.6 ± 4.2	12 (1–17)		
No	8.8 ± 4.3	9 (0–16)		
Your work experience in the triage system			U = 9,700	0.835
Yes	10 ± 4.5	11 (0–17)		
No	10.1 ± 4	11 (0–16)		
Did you receive any training on triage during your vocational training?			U = 6,284	0.667
Yes	9.9 ± 4.5	11 (0–17)		
No	10.4 ± 3.6	11 (0–16)		
If your answer is yes;			$\chi^2 = 12.052$	0.002
As a semester course	8.7 ± 4.4	7 (2–16) ^a		
As a subject in the course	10.3 ± 4.4	11 (0–17) ^b		
Other (Congress, symposium, seminar, online course etc.)	11.6 ± 3.8	12.5 (0–17) ^b		
Do you find the training you have received				

sufficient?				
Yes	12.8 ± 3.5	14 (3–17) ^a	$\chi^2 = 54.519$	<0.001
No	9.3 ± 4.4	11 (0–16) ^b		
Partially	8.1 ± 4.1	7 (1–17) ^b		
Did you receive any training on triage after your graduation?				
Yes	10 ± 4.5	11 (0–17)	$U = 10,016$	0.981
No	10.1 ± 3.9	11 (0–16)		
If yes, where did you get this training?				
By participating in the in-service training programme	11.2 ± 4.3	13 (0–17) ^a	$\chi^2 = 28.096$	<0.001
By participating in the certification programme	7.7 ± 4.3	7 (0–16) ^b		
By participating congresses, symposiums, seminars, courses, etc.	7.6 ± 4.1	7 (2–16) ^b		
If your answer is yes, do you find the training you have received sufficient?				
Yes	12.8 ± 3.6	14 (2–17) ^a	$\chi^2 = 45.911$	<0.001
No	7.8 ± 4.6	7 (0–15) ^b		
Partially	8.8 ± 4.1	8 (1–17) ^b		
Do you think the training you have received has become useful for your clinical practice?				
Yes	12.8 ± 3.8	14 (0–17) ^a	$\chi^2 = 50.971$	<0.001
No	8.3 ± 4	7 (3–16) ^b		
Sometime	8.3 ± 4.2	7 (0–15) ^b		

U: Mann–Whitney *U* test statistics, χ^2 : Kruskal–Wallis test statistics, ^{a,b}: There is no difference between groups with the same letter.

Triage knowledge points show a difference according to the question on who is responsible for triage and according to opinion about whether triage takes place among the duties of emergency department nurses or not and according to the place of education of the people who received training towards triage during triage knowledge point vocational training and in the event that the people, who received training for triage during vocational training, find the training sufficient and according to the training place of persons receiving education for triage after triage information point graduation and in the event that the people, who received training for triage after triage information point graduation, find the training sufficient and in the event that the people who received education think that education becomes useful in clinical practice (Table 6).

5. Discussion

The units where triage is most frequently applied are undoubtedly the emergency departments of the hospitals. It is seen that studies focusing on the triage knowledge levels of nurses are frequently conducted in emergency departments. In addition, triage can also be applied in inpatient services and outpatient clinics of the hospital in case of shortage of healthcare workers and materials [7], [14]. In this context, unlike previous studies, in this study, the triage level of interest of nurses working in the emergency departments of 16 hospitals affiliated to Samsun Public Hospitals Association has been evaluated. According to primary studies, it has been shown that the triage knowledge of nurses is not sufficient.

This decline in the healthcare system has been reported in Australia [9], Sweden [15] and China [16]. For example, in Iran, in a similar study it has been found that there is no well-trained triage nurses in many hospitals. Some studies have reported that the nurses in different provinces of Iran have insufficient triage knowledge and skills. It has been determined that failure to provide sufficient information and special courses for nurses is the reason for this [17]. However, according to the findings of our study, the average point of the knowledge level of the nurses about triage was found to be 'moderate'. For example, Fathoni et al. [18] found that their triage skills were at 'moderate level'. In Haghigh et al.'s [19] study in which they investigated the triage knowledge of nurses from different fields, it was found that 36 nurses (51.4%) had low triage knowledge and 31 nurses (44.3%) had moderate triage knowledge. According to the findings of this study, it has been determined that nurses answered the questions about 'definition of triage', 'purpose of triage', 'who is responsible for of triage', 'in the first evaluation', 'colour coding system', 'evaluation very quickly' and 'evaluation at regular intervals' in a correct way at the highest rate.

The study carried out by Bal and Gurkan [13], in 2018, has reported that 98.7% of the nurses answered the definition of triage correctly, 94.7% answered the purpose correctly and 88.1% answered the triage colour coding system correctly and according to them the reason for the correct answers is that the majority of the sample consists of nurses with bachelor's degree and they had received triage training during their vocational training (78.9%) and after graduation (32.9%). In another study, Sungur et al. [14] and Goransson et al. [15] stated that 35.3% of the nurses answered the definition of triage correctly, 11.8% answered the purpose of triage correctly, 5.9% answered the primary criteria to be considered in the patient to be applied triage and the triage colour coding system correctly and also reported that the most correct answers have been given by nurses with bachelor's degree.

Unlike previous studies, in this study, it has been determined that the reason for this is that the majority of the sample consists of nurses with a bachelor's degree (65.0%) and that they had received triage training during their vocational training (84.0%) and after graduation (66.7%) and that the rate of those who preferred to work in the emergency room (54.3%) was high and they were satisfied with working in the emergency department (66.0%).

In a study that supports our research findings, Durmaz et al. [20] reached the conclusion concluded that the triage education of nurses should start as from the undergraduate level and it should be supported with in-service training during the emergency department process. On the other hand, Fathoni et al. [18] and Haghigh et al. [19] also reported that there is a positive and significant relationship between nurses' triage knowledge, skills, education and working time. In a study, it was found that the knowledge level of the nurses, who did not receive training and did not practice triage in the units where they work, was lower than the nurses who received triage training and actively applied triage [7], [14].

According to the findings of this study, it has been determined that nurses answered incorrectly at the highest rate the following questions: 'evaluating the patients in triage according to the arrival order to the emergency department', 'using one of the urgency classification systems in triage', 'making triage only when the patient comes to the hospital first', 'the capacity of the nurse to make triage by making independent decisions in triage practice', 'applying triage in inpatient wards only when there is a shortage of personnel and medical equipment' and 'directing the patients, whose lives are potentially threatened, to the yellow area'. Nurses (32.3%) did not receive triage responsibility and postgraduation triage training (33.3%), and accordingly this may also have affected the result. Despite our research findings, Bal and Gurkan [13] reported that nurses had a higher rate in the subjects such as 'order according to arrival, classification of urgency degree and independent decision-making' in triage. On the other hand, Kerie et al. [21] reported that there is a significant positive correlation between triage skill and triage knowledge, education and education level. In the studies, it has been also shown that nurses, who receive and apply adequate training in triage, have more work

experience and have a high level of education and make faster and more accurate decisions. This information reveals the importance of education, knowledge, experience and regular practice of triage.

In the literature, it has been shown that the rate of nurses receiving triage training is low [7], [13], [14], [17], [19], [20], [21]. This situation suggests that the importance of triage education is ignored and/or disrupted by the administrators and it also shows the importance of its renewal continuously to provide the continuity of information.

6. Conclusion

The findings of the study show that the triage knowledge of the nurses is moderate. According to the results of our study, the level of triage knowledge of the nurses, who have a high level of education and received triage training after graduation and prefer to work in the emergency department and are satisfied with working, is high. However, further research is required on this subject.

References

- [1] S. Seyedhosseini-Davarani et al., "Validity of triage performed by nurses educated by train-of-trainer workshop participants; a cross-sectional study for assessment of cascade training system," *Adv. J. Emergency Med.*, vol. 4, no. 1, p. e2, 2020.
- [2] M. Aljohani, "Emergency department triage in Saudi Arabia: Towards a standardised national triage system," Ph.D. dissertation, Monash Univ., Melbourne, VIC, Australia, 2011.
- [3] J. Considine, S. A. LeVasseur, and E. Villanueva, "The Australasian triage scale: Examining emergency department nurses' performance using computer and paper scenarios," *Ann. Emergency Med.*, vol. 44, no. 5, pp. 516–523, Nov. 2004.
- [4] L. Duran et al., *Acil Hemsireligi İlkeleri ve Uygulamasi*. Ankara, Turkey: Palma Yayilari, 2009, pp. 59–72.
- [5] K. V. Iserson and J. C. Moskop, "Triage in medicine, Part I: Concept, history, and types," *Ann. Emergency Med.*, vol. 49, no. 3, pp. 275–281, Mar. 2007.
- [6] S. A. S. Ali et al., "Knowledge of triage among nurses in emergency units," *Biomedica*, vol. 29, no. 4, pp. 240–243, 2013.
- [7] D. Oztekin, N. Akyolcu, and S. Çelik, "Acil birimlerde 'triyaj' kimler tarafından ve nasıl uygulanıyor?" vol. 14, no. 57, pp. 1–13, 2006.
- [8] A. M. Kelly and D. Richardson, "Training for the role of triage in Australasia," *Emergency Med.*, vol. 13, no. 2, pp. 230–232, 2001.
- [9] M. Fry and G. Burr, "Current triage practice and influences affecting clinical decision-making in emergency departments in NSW, Australia," *Accident Emergency Nursing*, vol. 9, no. 4, pp. 227–234, 2001.
- [10] K. Innes, V. Plummer, and J. Considine, "Triage nurses perceptions of their educational preparation for the triage role," *Australas. Emergency Nursing J.*, vol. 10, no. 4, pp. 205–206, Nov. 2007.
- [11] H. Rahmati et al., "Effects of triage education on knowledge, practice and qualitative index of emergency room staff: A quasi-interventional study," *Bull. Emergency Trauma*, vol. 1, no. 2, p. 69, 2013.
- [12] S. S. Faheim et al., "Effect of triage education on nurses' performance in diverse emergency departments," *Evidence-Based Nursing Res.*, vol. 1, no. 2, p. 11, Jun. 2019.
- [13] S. Bal and A. Gurkan, "Bir universite hastanesinde çalışan hemsirelerin triyaj bilgilerinin ve etkileyen faktorlerin değerlendirilmesi," *Gazi Sağlık Bilimleri Dergisi*, vol. 3, no. 1, pp. 1–12, 2018.
- [14] E. Sungur et al., "Acil servis hemsireleri arasında triyaj bilgi düzeyinin değerlendirilmesi," *JOPP Derg*, vol. 1, no. 1, pp. 14–18, 2009.
- [15] K. E. Goransson, A. Ehrenberg, and M. Ehnfors, "Triage in emergency departments: National survey," *J. Clin. Nursing*, vol. 14, no. 9, pp. 1067–1074, 2005.

- [16] G. X. Lin et al., “Implementation of a pediatric emergency triage system in Xiamen, China,” *Chin. Med. J.*, vol. 129, no. 20, p. 2416, 2016.
- [17] A. Sherafat et al., “Evaluation of emergency nurses' knowledge and performance about hospital triage,” *J. Pharmaceutical Res. Int.*, pp. 1–7, May 2019.
- [18] M. Fathoni, H. Sangchan, and P. Songwathana, “Relationships between triage knowledge, training, working experiences and triage skills among emergency nurses in East Java, Indonesia,” *Nurse Media J. Nursing*, vol. 3, no. 1, pp. 511–525, 2013.
- [19] S. Haghghi et al., “A survey on knowledge level of the nurses about hospital triage,” *J. Nursing Educ.*, vol. 5, no. 6, pp. 46–52, Feb. 2017, doi: 10.21859/jne-05067.
- [20] H. Durmaz and S. P. Cebeci, “Acil serviste gorev yapan saglik profesyonellerinin Triyaj Tutumlari,” *Anatolian J. Emergency Med.*, vol. 4, no. 2, pp. 72–78, .
- [21] S. Kerie, A. Tilahun, and A. Mandesh, “Triage skill and associated factors among emergency nurses in Addis Ababa, Ethiopia 2017: A cross-sectional study,” *BMC Res. Notes*, vol. 11, no. 1, pp. 1–6, 2018.