



# The Comparative Study on Pediatric Triage Decision-Making Power in Nurses and Nursing Students: A Cross Sectional Study

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## Abstract

**Background:** Triage nurses are the first people in the emergency department providing care to patients. Their knowledge is very important in efficient triage. According to the few studies on the factors affecting triage, the current study aimed at investigating the nurses and nursing students' knowledge about the triage of children.

**Objectives:** Accordingly, the current study aimed at determining the level of knowledge of nursing students and nurses about pediatric triage and the impact of knowledge on the triage performance, in Guilan University of Medical Sciences, Iran.

**Methods:** The current descriptive, cross sectional study was conducted on 88 nurses and 88 nursing students selected through a census sampling from a selected hospital. The data were collected over one month in 2017, by means of a researcher-made questionnaire that included: Demographic characteristics (age, gender, degree, etc.) and knowledge level of staff. The validity of the questionnaire was determined by content validity and its reliability was measured by a test-retest method. After transferring the data into SPSS, statistical analysis was performed by descriptive and inferential statistical tests such as the Wilcoxon and Kruskal-Wallis. The level of significance was  $P < 0.05$ .

**Results:** A total of 176 questionnaires were completed. A review of the responses given in the knowledge section revealed that 94.3% of the nurses and students were within the weak range. There was no significant relationship between demographic characteristics and triage knowledge in nurses and nursing students ( $P > 0.05$ ).

**Conclusions:** According to the current study results, knowledge of nurses and nursing students should be reinforced to better accomplish patient's triage. Since emergency nurses are among the most important staff in providing the prioritizing triage, therefore, nursing education programs should include triage courses that retain mastery in this scope.

**Keywords:** Knowledge, Triage, Nursing Students, Nurse, Hospital

## 1. Background

Triage is a continuous decision making cycle that determines the needs of persons for medical attention when entering an emergency ward (1). It is defined as prioritizing patients to provide services according to the injury severity and provide the appropriate treatment in the shortest time (2-9). In the emergency department, triage classifies and prioritizes patients' needs based on the type and acuity of the disease or injury (10).

The purpose of triage is to identify a process of injury or illness and prevent or minimize potential detrimental effects through rapid assessment and decision-making. The goal of an effective triage system is to provide appropriate and rapid therapies for life-threatening conditions and ensure that all patients receive emergency check-ups based

on the severity of their clinical conditions (9). Correct triage and prioritizing of the patients are essential skills in nursing care, and sickness, and illness severity of the patient doubles the importance of this process (11-13).

Nurses are the first people in the triage department that take care of patients. Knowledge and experience of the emergency nurses are highly valuable in the appropriate decision-making (14-16). Triage nurses should be able to make appropriate decisions in a relatively short time, usually in a unknown and emotional situation (10). Nurses are one of the most important health care provider groups for children (17-23). Studies revealed several barriers to accurate triage, specially for children (24). In pediatric triage, identification of critically ill children, assigning an appropriate triage level, and suitable care is very essential (25).

Prediction and rapid identification of potential in-

juries are components of the assessment stage in the nursing process. This assessment includes a set of information about the patient's main complaint and clinical examination. Therefore, the decision-making in triage is a complicated and hard process, since it is usually made under uncertain conditions using incomplete and vague information provided by patients in limited time (26-29). Triage nurses should detect useful keys to perform triage and make decisions based on these keys using available information (30).

According to the studies, there are many factors pertained to the triage decision-making of nurses such as training courses, nurses' workload, and continuous interruptions of their work related to crowd, appropriate use of visual keys, personal experience of nurses, social setting and nurses' work environments, communication, feedback, leadership and teamwork in the unit, and personal traits and personality, which affect the process and potential outcomes of triage (31). Based on studies pertaining to triage decision-making and its effective factors, it is determined that correct triage requires a high level of recognition and metacognitive processes such as knowledge, skill, experience, readiness, and mastery. In general, appropriate decision-making for the triage of patients is attributed to the skill, knowledge, excellence, and performance of nurses and that it can lead to the improvement of therapeutic outcomes such as patient health conditions, duration of hospital stay, patient satisfaction, and general quality of triage system (26, 32-36). The current study was conducted due to the few studies on the knowledge about children's triage.

## 2. Objectives

The current study aimed at investigating the knowledge of nurses and nursing students regarding triage in children and the impact of knowledge on the triage performance.

## 3. Methods

The study population consisted of nurses working in different departments of the selected hospital for children, including emergency, internal, infectious diseases, neonatal, and oncology as well as nursing students were in the 7th or 8th semester. They were selected by a census sampling method, since nurses in other departments of hospital assisted the emergency department when crowding. Therefore, all the nurses participated in the current study.

Inclusion criteria for nurses were nursing degree (Bachelor of Science) and at least one year of work experience in clinical settings. Inclusion criterion for nursing students was studying in the 7th or 8th semester.

In the current study, a researcher-made questionnaire was used to assess the knowledge of nurses and nursing students about pediatric triage on the basis of a review of internal and external studies (37). To create the questionnaire, Canadian five-level triage tool and other tools used in Iran were reviewed (37-39). To assess the validity and reliability of the questionnaire, a panel of faculty members commented on its items and the content validity ratio (CVR) was calculated. Then, the content validity index (CVI) was calculated, which was appropriate. To test the reliability of the questionnaire, a test-retest method was used ( $r = 0.9$ ). The questionnaire had two parts: The first part consisted of demographic information (13 items for nurses and 14 for students). The second part comprised 15 items to assess the knowledge of nurses and nursing students about performing hospital triage (correct, wrong, and I do not know). Since there was not enough information about the method of scoring in the related articles, a linear transformation scoring method was employed. For each item, the correct answer had 1 point, while an incorrect answer had the score of 0 (right, wrong, do not know) (40).

In the current study, 176 questionnaires were distributed among the nurses and nursing students. The questionnaires were completed from September to October 2017 by qualified nurses and nursing students. The researchers distributed questionnaires among the nurses at the end of their shifts and among the students after completion of their classes. Completion of questionnaire took about 20 minutes. The whole sampling took one month to complete. After collecting data, information was transferred into the SPSS version 16. Descriptive statistics (i.e., standard deviation, mean, the minimum, and the maximum) were used to measure demographic characteristics. To investigate the correlation of some of the personal characteristics of the nurses and students with their level of knowledge, the Wilcoxon and Kruskal-Wallis tests were used. In the current study, the significance level of the tests was set to  $P < 0.05$ .

To consider the ethical principles, the researchers initially obtained permission from the Deputy of Research and Technology of Guilan University of Medical Sciences and hospital matron; then described the research objectives to nurses and students. All the participants also signed informed consent forms. Participation in the study was completely voluntary and optional. All

the participants were assured about the confidentiality of information obtained and their characteristics. The current study was approved by the Ethics Committee of Guilan University of Medical Sciences (ethical code: IR.GUMS.REC.1396.276).

#### 4. Results

All the nurses participating in the current study were female. The results of the demographic information of the nursing students and nurses are presented in Tables 1 and 2 in accordance to their level of knowledge. Comparison of the results of nurses and nursing students' level of knowledge is presented in Table 3. The results of the level of knowledge of nurses and nursing students showed that 94.3% of the respondents were in the weak range. Chi-square test showed no significant relationship in the knowledge level between the two groups ( $P = 0.193$ ).

#### 5. Discussion

The current study was conducted on the role of Nurses and Nursing Research in health conditions (21, 41, 42). The participants' knowledge was assessed by quantitative methods. The study results showed that most of the nurses and nursing students did not have enough knowledge. In another study, Goransson et al. reported the average nurse's knowledge for triage 57.7% (39). The study conducted by Mirhaghi and Roudbari in Zahedan, Iran, with a similar goal found that 39.4% of the responses of the subjects were correct. In the current study, 22% of the respondents did not have any familiarity with the topic of triage (37). In the study by Dadashzadeh et al. 38.2% of the participants did not pass a special training course in triage (43). In the current study, during the statistical analysis of data, a significant relationship was observed between the lack of familiarity with the hospital triage and providing correct answers to the questionnaire; this calls for more education and holding specialized courses on triage. The study by Haghdoost et al. entitled "determining the effect of teaching triage on knowledge, attitude, and practice of nurses working in the emergency department", in Rasht found that the average score of knowledge on the triage was 16.25 before training, which increased to 30.25 after intensive training (44). A study by Hammad et al. found a huge difference in the training, skills, and experience of members on the triage staff in a hospital in China; this requires integrated training for personnel (45). The results of the study by Ponsiglioni et al. revealed that a lot of factors

such as training course and nurses' knowledge, nurses' workload and continuous interruptions of their work due to the crowd, appropriate use of visual keys, personal experience of nurses, social setting, and nurses' work environments, communication, feedback, leadership and teamwork of the unit, personal traits and personality, which affect the process and potential outcomes of triage, can affect nurses' triage decision-making power (31). In contrast, according to a study by Martin et al. the amount of triage experience did not contribute to accuracy of triage in emergency departments (46). A further study by Fry and Burr in Australia found that although 57% of the participants had a graduate degree in nursing and received other trainings about emergency, trauma, critical care, and acute care, they did not have enough knowledge about triage (28). In 2007, Considine et al. also argued that knowledge had an important and efficient role in nurses' decision-making for triage (9). But, in the study by Taheri et al. there was a high correlation between the clinical experience in the emergency department and the level of knowledge about triage (47). Mirhaghi and Roudbari did not find any significant relationship between work experience and triage knowledge (37). A study by Chen et al. found that the level of knowledge and triage training for staff, work experience, triage level, and hospital grade were effective factors of triage (48). The current study did not find a significant relationship between work experience and other demographic characteristics of the subjects with the score obtained from the questionnaire. Considering the traumatic damage and the importance of triage management in nurses, it is necessary to intervene in this regard (42, 49, 50).

##### 5.1. Conclusions

The current study showed that the knowledge of nurses and nursing students was lower than the average level. The study found that more than half of the nurses and nursing students did not get a good score in terms of knowledge level. The awareness level of nurses involved in triage of patients was important and, therefore, properly training of human resources and adequate triage equipment are recommended in the emergency departments. Since performing triage is one of the main tasks of nurses and its related knowledge is first taught to nursing students at the university and then at clinics, nurses should retrain on healthcare practices and critical thinking in the form of short-term courses. An inexperienced nurse should not be convinced that his/her level of experience is the only guarantee of competence in triage. But, based

**Table 1.** Association of Demographic Characteristics of Nursing Students with Triage Knowledge

Demographic Characteristics	F	Mean $\pm$ SD	P value	Statistical Test
<b>Gender</b>			0.12	Mann-Whitney U
Male	43	48.66 $\pm$ 6.34		
Female	45	40.52 $\pm$ 6.78		
<b>Working experience during education</b>			0.6	Mann-Whitney U
Yes	27	42.59 $\pm$ 6.35		
No	61	45.34 $\pm$ 6.21		
<b>Working experience in hospital, mn</b>			0.65	Kruskal-Wallis
< 6	42	46.33 $\pm$ 6.34		
7-12	45	42.48 $\pm$ 6.12		
13-24	1	58.50 $\pm$ 7.34		
<b>Education level</b>			0.7	Kruskal-Wallis
Bachelor of science in nursing	64	43.87 $\pm$ 6.39		
Master of science in nursing	24	46.19 $\pm$ 6.87		
<b>Triage training methods</b>			0.2	Kruskal-Wallis
No training	56	48.71 $\pm$ 6.98		
Workshop	16	38.72 $\pm$ 6.44		
Books or magazines	9	34.94 $\pm$ 6.78		
University courses	7	36.29 $\pm$ 5.34		
<b>Have triage experience</b>			0.71	Mann-Whitney U
Yes	9	10.2 $\pm$ 3.23		
No	79	89.8 $\pm$ 7.56		

on the evidence from the current study, nurses with clinical experience and triage knowledge can be assured about their effective role in improving the quality of triage in the emergency departments. The results of the current study should be considered in the policy making and compiling triage guidelines and continuous training in hospitals.

### 5.2. Limitations

The first limitation of the study was that the knowledge levels of the nurses and students were evaluated in different situations on the basis of the ethical considerations. The evaluation was performed on paper instead of the real environment. The results of the current study were obtained only from one children's hospital in Guilan province, Iran, and the number of samples was limited. But, since the current study was the first one of its kind, it could obtain good knowledge about appropriate interventions for health policymakers.

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### Footnotes

**Conflict of Interests:** Authors declared no conflict of interest.

**Ethical Considerations:** To consider ethical principles in the current study, the researchers initially obtained permission from the Deputy of Research and Technology of Guilan University of Medical Sciences and hospital matron, then described the research objectives to nurses and students and written informed consent was obtained from the interested ones. Participation in the study was completely voluntary and optional. All the participants were assured that the information obtained and

**Table 2.** Association of Demographic Characteristics of Nurses with Triage Knowledge

Demographic Variables	F	Mean ± SD	P Value	Statistical Test
<b>Gender</b>			0.72	Mann-Whitney U
Male	43	100.43 ± 14.32		
Female	33	84.64 ± 7.23		
<b>Have triage experience</b>			0.46	Mann-Whitney U
Yes	46	42.64 ± 6.53		
No	49	46.54 ± 6.38		
<b>Hospital shifts</b>			0.37	Kruskal-Wallis
Day shift	12	48.21 ± 6.33		
Evening shift	3	25.67 ± 3.78		
Night shift	73	44.66 ± 6.67		
<b>Clinical experience, mn</b>			0.61	Kruskal-Wallis
< 6	1	53.2 ± 7.23		
7 - 12	4	32.88 ± 5.12		
13 - 24	42	33.2 ± 5.01		
> 24	64	29.47 ± 4.22		
<b>Education level</b>			0.7	Kruskal-Wallis
Bachelor of science in nursing	64	43.87 ± 6.55		
Master of science in nursing	24	46.19 ± 6.21		
<b>Participation in continuing education</b>			0.97	Mann-Whitney U
Yes	42	44.39 ± 6.34		
No	46	44.60 ± 6.56		
<b>Frequency of participation in continuing education</b>			0.31	Kruskal-Wallis
Once	4	48.88 ± 6.78		
Twice	37	39.72 ± 5.67		
Thrice	47	47.89 ± 4.59		
<b>Triage experience, y</b>			0.8	Kruskal-Wallis
No experience	42	47.27 ± 4.33		
< 1	28	42.21 ± 4.23		
1 - 4	12	41.79 ± 4.77		
5 - 9	6	41.17 ± 4.01		

**Table 3.** Comparison of the Level of Triage Knowledge Between Nursing Students and Nurses<sup>a</sup>

Group	Triage Knowledge Level		Intragroup		Intergroup	
	Inadequate	Moderately Adequate	P Value	F	P Value	F
Nursing students	41 ± 12.2	85 ± 7.86	0.007 <sup>b</sup>	123.45	0.12	102.34
Nurses	43 ± 12.6	87 ± 7.88	0.006 <sup>b</sup>	116.05		

<sup>a</sup>Values are expressed as mean ± SD.

<sup>b</sup>Repeated measures ANOVA.

their characteristics would be kept completely confidential. The current study was approved by the Ethics Committee of Guilan University of Medical Sciences (ethical code: IR.GUMS.REC.1396.276).

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