Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

# Relationship between Nurses' Knowledge, Practice and Accuracy of the Patients' Triage Acuity Level in the Emergency Department

Heba A. Al-Metyazidy[1], Karima Ahmed Elsayed[2], Sheren M. Diab[3]

[1,3]Lecturers of Critical Care Nursing, Faculty of Nursing, Tanta University, Egypt

[2]Assist prof of Nursing Service Administration, Faculty of Nursing, Tanta University, Egypt

**Corresponding Authors:** Heba A. Al-Metyazidy (roka_omarali@yahoo.com)

***Abstract:*** **As a result of the continuous increase in the number of patients admitted to the emergency department and lack of medical facilities, it is necessary to enhance patients' triage to provide a high quality of care. Aim: This study aimed to assess the relationship between the nurse's knowledge, practice, and accuracy of the patient's triage acuity level in the emergency department. Method: A descriptive correlational study design was used in the present study. This study was conducted in the emergency department at Al-Menshawy General Hospitals, Tanta, Egypt. Subjects included all nurses (46) working in the emergency department and all patients (138) admitted to the emergency department during the period of study. Three tools were utilized for data collection; nurses' Structured Interview, an observational checklist regarding triage nurses' practice and patients' assessment sheet. Results: The results of the present study illustrate that the majority of nurses had poor total knowledge mean scores. All nurses had unsatisfactory total practice mean scores. It was observed that more than two thirds of triage nurse to rank the patients as under-triage (17.40%) and over-triage category (56.50% and 50.0%) during the first and second observations respectively and more than half of them sort the patients as under-triage (32.60%) and over-triage category (26.10%) during the third observation. Conclusion: Nurses' poor knowledge and unsatisfactory practice total mean scores increase the emergency patients risk for triage acuity level errors which lead to serious patient problems. The majority of these errors were over-triage rather than the under-triage category level. It can be recommended that, the triage nurses should receive continuing education and demonstrate knowledge application into practice to rank the patient's triage acuity level successfully. Also, The hospital leadership should increase the number of highly qualified nurses in the emergency department because it was noticed that the total knowledge and practice mean scores increased with high qualifications.**

***Keywords:*** **Nurses Knowledge, Practice, Triage acuity level, Emergency department.**

## 1. INTRODUCTION

The emergency department (ED) is one of the most significant components of the health care delivery system[(1)]. Overcrowding in the ED with a large number of patients is an increasing global problem[(2)]. This overcrowding affecting the quality of care decreases patient satisfaction and lowered the morale of medical and nursing staff[(3)]. Therefore, triage is the most effective strategy in this place [(4)]. Triage is implemented in the ED to sort the patient's problem according to the care provided and the time of arrival to the ED. Lack of nurses knowledge and practice regarding triage lead to faults in triage categorizations and produce an opportunity for increasing patients morbidity and mortality[(5,6)].

Studies have found that around 50% -80% of patients admitted to ED for non-urgent reasons, leading to excessive costs and multiple adverse consequences [(7,8)]. Prioritizing emergency patients throughout and wait time is an essential system in ED at Al-Menshawy General Hospital. Therefore, the Emergency Severity Index (ESI) system was used to estimate

patients' triage acuity levels, which is used by emergency nurses to prioritize patients care and allocate the resources [9]. This system ensures that emergency intervention is introduced in response to patients' clinical need rather than the time of arrival [10].

Moreover, triage acuity levels greatly depend on nurse's subjective assessment which makes the emergency patients risk for triage category errors [6,9]. For this reason, the correct assessment of patient urgency is critical and it can be developed through enhancing nurses' knowledge and practice. The triage decisions are divided into three triage outcomes; correct, under-triage and over-triage. Under-triage category; if the urgency is categorized too low, it means serious clinical condition[s] [10]. Over-triage category; if the urgency is categorized too high, scare resources are wasted [11].

It is important to estimate the knowledge and practice of nurses working in ED and associated factors such as hospital overcrowding, high triage errors, insufficient staffing, high turnover in ED, poor working environment, challenging in emergency patients priorities, prolonged time to triage the patients. Improvement in emergency nurses' knowledge and practice and minimizing the associated factors is a key aspect of nurses' success in the management of emergency situations, sorting the patients and confirming the quality of care [12, 13].

### 1.1 Significance of the study

Triage knowledge and practice among nurses are two of the key elements of the supervision in the emergency department. If these two elements are not carried out at the standard of care level; the outcomes of clinical care of patients and the efficiency of the emergency department get compromised [6,14]. Applying triage systems has been proven to improve management and outcomes for patients as well as decrease the loss of resources in the emergency department. Egypt is a developing country faced by high demand for health care services, during which sometimes the situation is classified as critical, making it necessary to assess the current nurses' knowledge and practice regarding triage. A triage nurse is a new description at Al-Menshawy General Hospital so, to maintain the quality, safety, and efficacy of nursing care in ED, triage knowledge and practice should be assessed periodically for all nurses who practice this high-risk skill.

### 1.2 Aim of the study

The present study aimed to identify the relationship between nurses' knowledge, practice, and accuracy of the patient's triage acuity level in the emergency department.

### 1.3 Research questions:

1. What is the level of total knowledge and practice scores among triage nurses working?

2. What are the relationships between nurses' knowledge, practice, and accuracy of the patient's triage acuity level in the emergency department?

## 2. SUBJECTS AND METHOD

### 2.1 Research design

The descriptive correlational study design was used in the present study.

### 2.2 Study Setting

The study was done in the emergency department at Al-Menshawy General Hospitals, Tanta, Egypt. The emergency units composed of 5 rooms straight forward as follows:

The first room called the examination room; the nurse was responsible for the patient's initial assessment such as visual cues, chief complaint, measuring patient's' vital signs and level of consciousness then tagged the patient through ID bracelet.

The second room; the nurse delivered immediate life-saving intervention for patients' suffered from trauma or medical problems.

In the third room; the nurse delivered the emergent care for patients with cardiac problems.

The last unit; delivered the emergent care for patients' suffered from respiratory problems.

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

**2.3 Subjects:**

The studied subjects composed all nurses work in ED and patients' admitted to the ED during the study period as follows:

a. All nurses (46) working in the emergency department at Al-Menshawy General Hospitals were included to achieve the aim of the present study.

**Nurses' inclusion criteria were:** Nurses of both sex and provide direct patient care for emergency patients regardless of their years of experience.

b. All patients (138) admitted to the emergency department at Al-Menshawy General Hospitals were included.

**2.4 Tools of the study**

Three tools were utilized to collect data as follows:

**Tool (I):** Nurses' Structured Interview:

This tool was created by the researcher after strong works of literature reviewed [15-18] on triage in the emergency department to assess nurse's knowledge regarding triage. It composed of two parts as follows:

*Part one: nurses' bio-sociodemographic and professional data*; which included; nurse's code, age, sex, marital status, qualifications, total years of experience, years of experience as a triage nurse and emergency training program.

*Part two: Nurse's knowledge assessment sheet*:

It was used to assess triage knowledge among nurses in the emergency department as follows:

1. Knowledge regarding triage; such as definition, goal, methods triage decision-maker and factors that affecting triage process

2. Knowledge concerning triage categories; such as times allowed for an immediate, emergency, urgent and non-urgent triage category

3. Knowledge about triage assessment steps; such as patient visual assessment, critical signs, and symptoms, chief complaint, focused assessment, acuity determination, and reassessment.

*Scoring system:* All questions were closed type. Questions were scored on two levels Likert scale as the correct answer was scored (1) and an incorrect answer was scored (0). The total scoring system of nurses' knowledge was 14. The higher score means higher knowledge level. They were calculated and classified as: < 60% were considered as poor, ≥ 60%-75% were considered as fair and > 75% reflected as good

**Tool (II):** An observational checklist regarding triage nurses' practice

It consisted of two parts as follows:

*Part one: Nurse's practice regarding triage*; this part was created by the researcher after reviewed the relevant literature[19-21] to examine triage nurse practice in the emergency department. It consisted of a checklist; the steps of the total checklist were 16.

*Scoring system:* The researcher reported the level of nurses' practice on a 2-point Likert scale; implemented step considered as (1) and did not implement step considered as (0). The total score of the triage practice checklist was 16. The higher scores mean higher triage practice levels. They were calculated and classified as: scores <70 % were reflected as unsatisfactory triage practice level and scores > 70% were measured as satisfactory practice levels.

*Part two: The Emergency Severity Index (ESI) triage acuity level checklist;* this part was validated in the United States emergency departments and The Emergency Severity Index (version 4) was adopted by Gilboy et al in (2011)[22] to assess and categorize the patient according to triage acuity level in emergency department. It consisted of 5 decision points during which the triage nurse asked questions. The first two decision points indicated for patients' need immediate life-saving intervention, unstable patients categorized as ESI level 1 and patients with potential complications categorized as ESI level 2. The remaining decision points from ESI level 3 to 5 referred to vital signs measurement and the number of expected diagnostic and treatment resources needed.

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

*Scoring system:* The researcher reported the ESI level on a 3-point Likert scale; 3= low triage acuity level, 2= moderate triage acuity level and 1= high triage acuity level. The higher scores mean lower ESI triage acuity level. They were calculated and classified as: 46- 92 were considered as high triage acuity level, scores 93-183were considered as moderate triage acuity level and scores184-230 were considered as low triage acuity level.

Then, the researcher reported the ESI level on a 3-point Likert scale; 3= Correct triage category, 2= Overtriage category and 1= under the category.

**Tool (III):** Patients' assessment sheet

It was created by the researcher after strong literature to assess patients' admitted to the emergency department. It composed of two parts as follows:

*Part one: Patient sociodemographic data;* which included; patient's age, sex and causes admission to ED.

*Part two: Patients' comorbidities and vital signs assessment* [23,24]*;* which included patients vital signs such as body temperature, blood pressure, heart rate, respiratory rate, oxygen saturation, and Glasgow coma scale and patients comorbidities such as, heart, respiratory, kidney and gastrointestinal diseases, cancer and diabetes mellitus.

**2.5 Methods**

1. Official permission to conduct the present study was attained from the manager and the head nurse of the emergency department at Al-Menshawy General Hospitals before conducting the study.

**2.6. Ethical consideration:**

a. The studied nurses' and patients' oral consent to participate during this study was obtained.

b. The studied nurses' and patients' informed that they had the right to withdraw from this study at any time they need.

c. The researchers were confident that the confidentiality of each nurse and patient was attained through coding their data.

3. All tools of the study were created by the researchers dependent on valuable literature and used for data collection except tool II part two (The Emergency Severity Index checklist) was adapted by Gilboy et al (2011)[22].

4. The tool I of data collection was translated into the Arabic language because the study subjects had different levels of education.

5. All tools were tested for content validity by 5 panels of experts within the field of Nursing Service Administration and Critical Care Nursing Specialists, Faculty of Nursing, Tanta University, and Medical Biostatistics, Faculty of Medicine, Tanta University and modifications were done consequently.

6. All tools of the current study were tested for reliability and Cronbach alpha was used. It was 0.81 for tool I, 0.84 for tool II and 0.86 for tool III which represent high reliable tools.

7. A pilot study was carried out on 5 triage nurses in order to evaluate the clarity and applicability of the different items of the study tools. Modifications on tools were done and the 5 triage nurses were excluded from the study sample.

8. Each nurse was assessed regarding bio-sociodemographic and professional data and the level of their knowledge (tool I). Gathering data of tool I needed about 20-30 minutes to be answered. The researchers were available in the emergency department for any explanations and tick each questionnaire after the completion, to be sure that there was no missed question.

9. The researchers observed the nurses' implementation to the applied patient care checklist (tool II) during three different shifts until all developed checklist was completed and each nurse's accomplished step was documented in the checklist as implemented or did not implement. The nurse's performed action covered the 14 steps included in the checklist.

10. The researchers observed the nurses' category to triage acuity level for each patient three times during three different days using ESI triage level (tool II part two) until all nurses completed three patient categorizations, then the ESI triage level and nurse's category was recorded in ESI scale from 1 to 5. After the researchers observed the nurse's category, they

return to categorize the nurses triage acuity level as correct, over and undertriage category during three times of observations.

11. Each patient was assessed regarding baseline sociodemographic, comorbidities and vital signs assessment (using tool III) to sort and record each patient ESI scale and triage acuity level

Data were evaluated to determine the relationships between nurses' knowledge, practice, and accuracy of the patient's triage acuity level in the emergency department at Al-Menshawy General Hospital.

**2.7. Data collection**

Each studied subject who agreed to participate in the present study has been interviewed and observed by the researchers.

During data collection, the nurses reported their satisfaction toward the wording of questionnaires.

The date was collected through three different shifts according to Tanta Main University Hospital to ensure the accuracy of data.

Data for this study was conducted over a period of five months from the middle of August 2018 until the end of January 2019.

**2.8. Statistical analysis:**

The collected data were prepared, formulated and statistically analyzed using SPSS software statistical computer package version 23. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, the comparison was done using Chi-square test ($\chi 2$). A significance was adopted at $P<0.05$ for the explanation of the results of tests of significance (*).

## 3. RESULTS

**Table (1): Percentage distribution of the studied nurses according to their socio-demographic characteristics and emergency training program**

| Variables | The studied nurses (n=46) | |
|---|---|---|
| | n | % |
| **Age in years** | | |
| - 20-30 | 15 | 32.6 |
| - 31-40 | 23 | 50.0 |
| - 41-50 | 5 | 10.9 |
| - 51-60 | 3 | 6.5 |
| **Range** | **(24-56)** | |
| **Mean±SD** | **34.59±7.126** | |
| **Sex** | | |
| - Male | 0 | 0.00 |
| - Female | 46 | 100.0 |
| **Qualifications** | | |
| - Diploma | 5 | 10.9 |
| - Associated degree | 30 | 65.2 |
| - Bachelor degree | 11 | 23.9 |
| **Total working experiences** | | |
| - < one year | 1 | 2.2 |
| - 1 - < 5years | 3 | 6.5 |
| - 5 - <10 years | 1 | 2.2 |
| - ≥ 10 years | 41 | 89.1 |

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

| | | |
|---|---|---|
| **Working experiences in the emergency department** | | |
| - < one year | 1 | 2.2 |
| - 1 - < 5years | 8 | 17.4 |
| - 5 - <10 years | 1 | 2.2 |
| - ≥ 10 years | 36 | 78.3 |
| **# Emergency training program** | | |
| - Cardiopulmonary resuscitation | 46 | 100.0 |
| - Basic life support | 7 | 15.2 |
| - Triage | 46 | 100.0 |

Postgraduate program and advanced life support and trauma life support training program= 0

#More than one answer was choice

Table (1) reveals the percentage distribution of the studied nurses according to their socio-demographic characteristics and emergency training program. It can be seen that half (50.0%) of the studied nurses were in the age group of 31-40 years old, while, the lowest percentages (6.5%) of studied nurses were in the age group of 51-60 years old.

As regards to qualifications; it was found that more than two thirds (65.2%) of studied nurses had associated degree, while nearly a quarter (23.9%) of studied nurses had a bachelor degree.

In relation to working experiences in the emergency department; it was observed that more than three quarters (78.8%) of studied nurses had ≥ 10 years of experience as a triage nurse, while only 2.2% of studied nurses had < one year and 5 - <10 years.

As regards to an emergency training program; it was observed that all of the studied nurses (100.0%) received both of cardiopulmonary resuscitation and triage training program, while only 15.2% received basic life support training program.

**Table (2): Percentage distribution of the studied nurses according to their total knowledge mean score regarding triage, triage categories, and triage assessment steps**

| knowledge mean score | The studied nurses (n=46) | | | | | |
|---|---|---|---|---|---|---|
| | knowledge regarding triage | | knowledge concerning triage categories | | knowledge about triage assessment steps | |
| | n | % | n | % | n | % |
| - **Poor** | 6 | 13.0 | 8 | 17.4 | 1 | 2.2 |
| - **Fair** | 40 | 87.0 | 38 | 82.6 | 45 | 97.8 |
| **Range** | (0-4) | | (0-4) | | (0 - 4) | |
| **Mean±SD** | 1.74 ± 1.084 | | 2.17 ± 0.950 | | 1.83 ± 1.102 | |
| $\chi^2$ | 32.696 | | 46.348 | | 14.000 | |
| **p** | 0.001* | | 0.001* | | 0.007* | |

Good knowledge = 0 *Significant p < 0.05

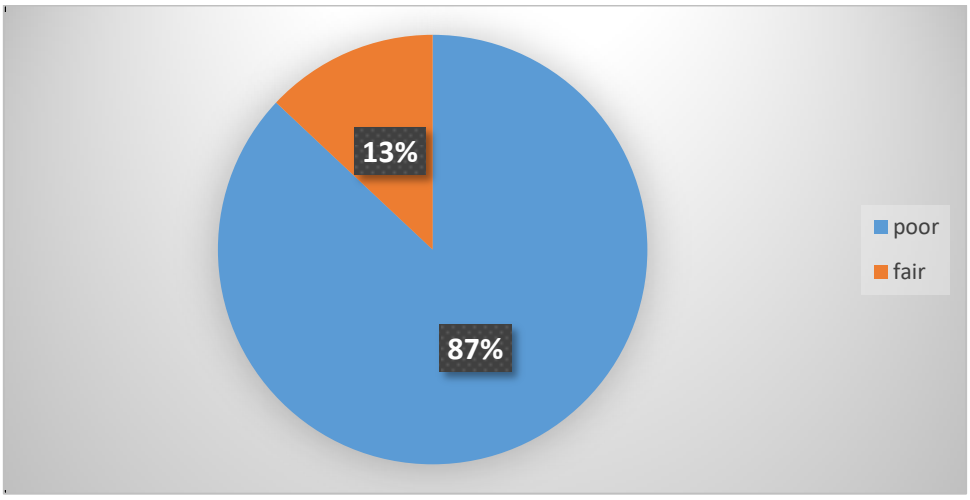
Table (2) shows percentage distribution of the studied nurses according to their total knowledge mean score regarding triage, triage categories and triage assessment steps The results revealed that the majority of studied nurses (87.0%, 82.6% and 97.8%) had fair knowledge mean score regarding triage, triage categories and knowledge about triage assessment steps respectively, while the minority of studied nurses (13.0%, 17.4%, and 2.2%) had poor knowledge mean score regarding triage, triage categories and triage assessment steps respectively.

It can be seen that there were statistically significant differences among the studied nurses in relation to their knowledge mean score regarding triage, triage categories and triage assessment steps $p < 0.05$.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com




Good knowledge = 0

**Figure (1): Distribution of the studied nurses according to their total knowledge mean score regarding triage**

This figure showed that the majority of studied nurses (87.0%) had poor total knowledge mean score, while the minority of studied nurses (13.0%) had fair total knowledge mean score

**Table (3): Percentage distribution of the studied nurse's regarding total practice mean score**

| Total practice mean score | The studied nurses (n=46) | | |
|---|---|---|---|
| | n | % | $\chi^2$ P |
| Unsatisfactory triage practice | 46 | 100.0 | **14.174 0.048*** |
| **Range** | **(1-8)** | | |
| **Mean±SD** | **4.89 ± 1.898** | | |

Satisfactory triage practice = 0 *Significant P < 0.05

Table (3) illustrates the percentage distribution of the studied nurse's regarding total practice mean score. It can be seen that all of the studied nurses (100.0%) had an unsatisfactory total practice mean score. Also, there was a significant difference among the studied nurses in relation to their total practice mean score p < 0.05**.**

**Table (4): Percentage distribution of the total studied patients regarding baseline characteristics and vital signs**

| Baseline characteristics and vital signs | The studied patients n =138 | |
|---|---|---|
| | n | % |
| **Age:** | | |
| - 18–years | 11 | 8.0 |
| - 30– years | 44 | 31.9 |
| - 50– years | 58 | 42.0 |
| - ≥ 70 years | 25 | 18.1 |
| **Sex:** | | |
| - Male | 77 | 55.8 |
| - Female | 61 | 44.2 |

| | | |
|---|---|---|
| **Causes of patients admission to emergency department:** | | |
| - Trauma cause | 47 | 34.1 |
| - Non -Trauma | 91 | 65.9 |
| **Patient's vital signs:** | | |
| **Respiratory rate(c/m):** | | |
| - > 35 or < 8 | | |
| - 31- 35 | 38 | 27.5 |
| - 26- 30 | 6 | 4.3 |
| - 8- 25 | 88 | 63.9 |
| | 6 | 4.3 |
| **Blood pressure (mmHg):** | | |
| - <80 | 30 | 21.8 |
| - 80- 89 | 14 | 10.1 |
| - ≥90 | 94 | 68.1 |
| **Heart** rate (b/m): | | |
| - >130 | 33 | 23.9 |
| - 121-130 or < 40 | 40 | 29.1 |
| - 111- 120 or 40- 49 | 3 | 2.1 |
| - 50- 110 | 62 | 44.9 |
| **Temperature (°C):** | | |
| - > 40 or < 32 | | |
| - 38.1- 40 or 32-34 | 3 | 2.1 |
| - 34.1- 38 | 40 | 29.0 |
| | 95 | 68.9 |
| **Oxygen saturation (SPO2) (%):** | | |
| - <80 | | |
| - 80- 89 | 30 | 21.7 |
| - 90- 94 | 14 | 10.1 |
| - 95- 100 | 41 | 29.7 |
| | 53 | 38.5 |
| **Glasgow coma scale:** | | |
| - <8 | 37 | 26.8 |
| - 9- 12 | 10 | 7.3 |
| - ≥13 | 91 | 65.9 |
| **VAS pain score (%):** | | |
| - Mild (0–3) | 70 | 50.7 |
| - Moderate (4–7) | 24 | 17.4 |
| - Severe (8–10) | 44 | 31.9 |

Table (4) shows the percentage distribution of the total studied patients regarding baseline characteristics and vital signs. It can be seen that more than two-fifth (42.0%) of studied patients were in the age group of 50 to less than 70 years old, while, the lowest percentages (8.0%) of studied patients were in the age group of 18 to less than 30 years old.

Regarding causes of patients admitted to the emergency department; This result showed that the most common cause of admission to ED (65.9%, 68.1%, ) among the studied patients was a nontraumatic while, the least common cause (34.1%) was trauma.

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

In relation to vital signs, it was noticed that more than half (63.9%, 68.1%, 68.8%, 65.9% and 50.7%) of studied patients had respiratory rate 26- 30 c/m, blood pressure ≥90 mmHg, temperature 34.1- 38 $^{o}$ c, Glasgow coma scale ≥13, mild VAS pain score respectively while, only (4.3%, 4.3%, 10.1%, 2.1%, 2.1%, 10.1%, 7.3% and 17.1%) of studied patients had respiratory rate 31- 35 and 8-25c/m, blood pressure 80-89 mmHg, heart rate 111- 120 or 40- 49 b/m, temperature > 40 or < 32 $^{o}$ c, SPO2 80-89%, Glasgow coma scale ≥13, moderate VAS pain score respectively.

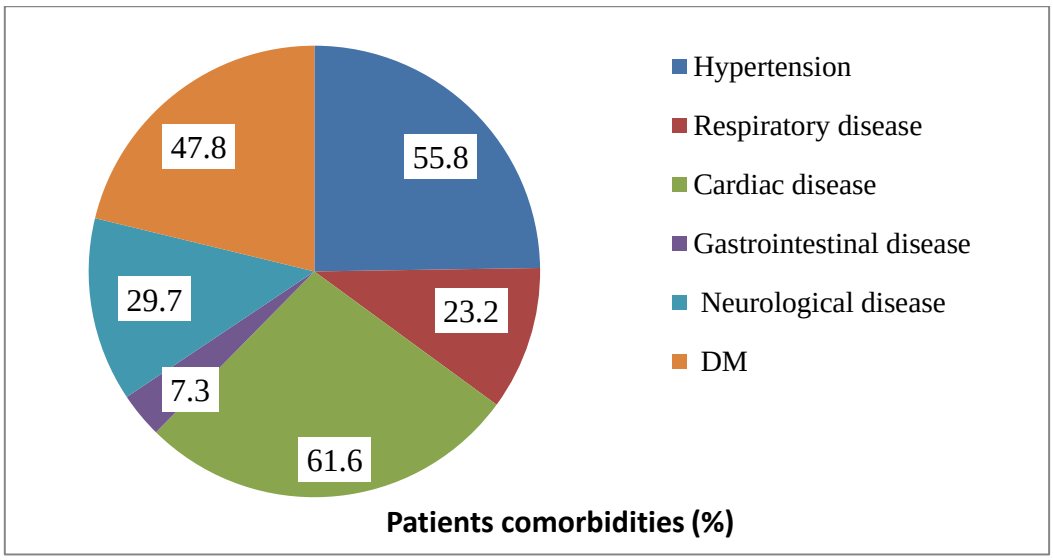



**Figure (2): Distribution of the total studied patients according to comorbidities**

This figure revealed that the most common comorbidity (61.6%) among the studied patients was cardiac diseases while the least common comorbidity (7.3%) among them was gastrointestinal diseases.

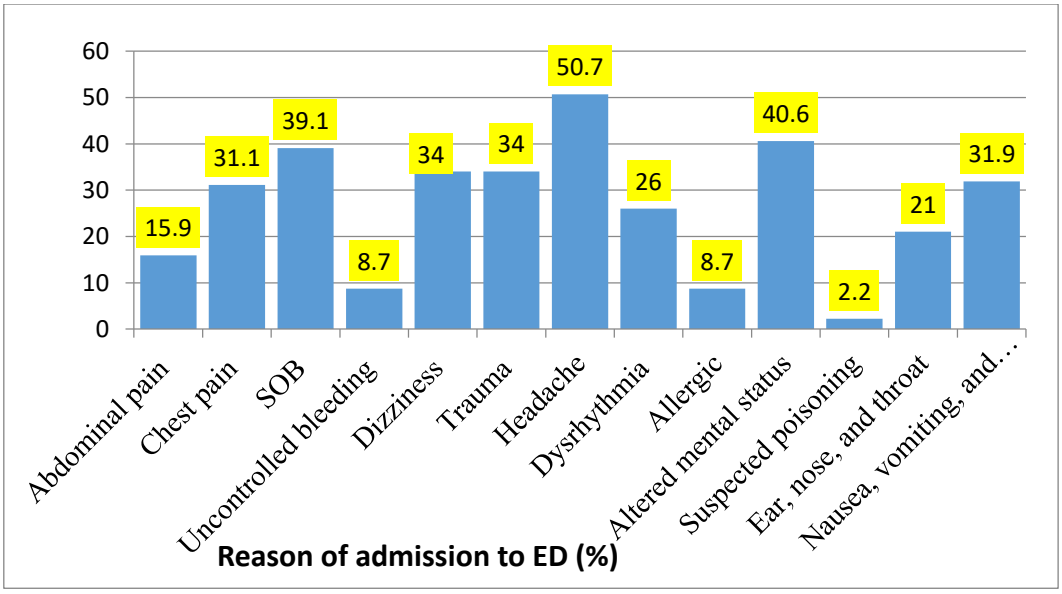



**Figure (3): Distribution of the total studied patients regarding the reason for admission to the emergency department during studied nurses observations**

This figure illustrated that the most common reason for admission to the emergency department (50.7%) among the studied patients was cardiac diseases while the least common reason for admission to the emergency department (2.2%) among them was suspected poisoning.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

**Table (5): Distribution of studied patients regarding emergency severity index triage acuity level by the studied nurses during the first, second and third observation**

| Patient's ESI triage acuity level | The studied patient (Total n=138) | | | | | |
|---|---|---|---|---|---|---|
| | 1st ESI score observation n=46 | | 2nd ESI score observation n=46 | | 3rd ESI score observation n=46 | |
| | n | % | N | % | n | % |
| **- High triage acuity level** | **30** | **65.2** | **20** | **43.5** | **15** | **32.6** |
| Level 1 | 13 | 28.3 | 8 | 17.4 | 7 | 15.2 |
| Level 2 | 17 | 36.9 | 12 | 26.1 | 8 | 17.4 |
| **- Moderate triage acuity level** Level 3 | **16** | **34.8** | **18** | **39.1** | **19** | **41.3** |
| **- Low triage acuity level** | | | **8** | 17.4 | **12** | **26.1** |
| Level 4 | | | 5 | 10.9 | 9 | 19.6 |
| Level 5 | | | 3 | 6.5 | 3 | 6.5 |
| **Range** | **(46-138)** | | **(46-230)** | | **(46-230)** | |
| **Mean±SD** | **96.00 ± 38.579** | | **185.00 ± 36.678** | | **189.00 ± 39.468** | |

Low triage acuity level= 0 during the 1st ESI score observation

Table (5) shows the distribution of studied patients regarding the emergency severity index triage acuity level by the studied nurses during the first, second and third observation. It can be noticed that more than two thirds (65.2%) of the studied subjects categorized patients as a high triage acuity level during the1st ESI score observation, while 43.5% and 32.6% were recorded as a high triage acuity level during the 2nd and 3rd ESI score observations respective

Regarding moderate triage acuity level; This result revealed that more than one third (34.8%, 39.1%, and 41.3%)) of the studied subjects recorded patients as a moderate triage acuity level during the1st, 2nd and 3rd ESI score observations respectively.

Regarding low triage acuity level; It was observed that none of the studied subjects categorized patients as a low triage acuity level during the1st ESI score observation, while 17.4% and 26.1% were recorded as a low triage acuity level during the 2nd and 3rd ESI score observations respectively.

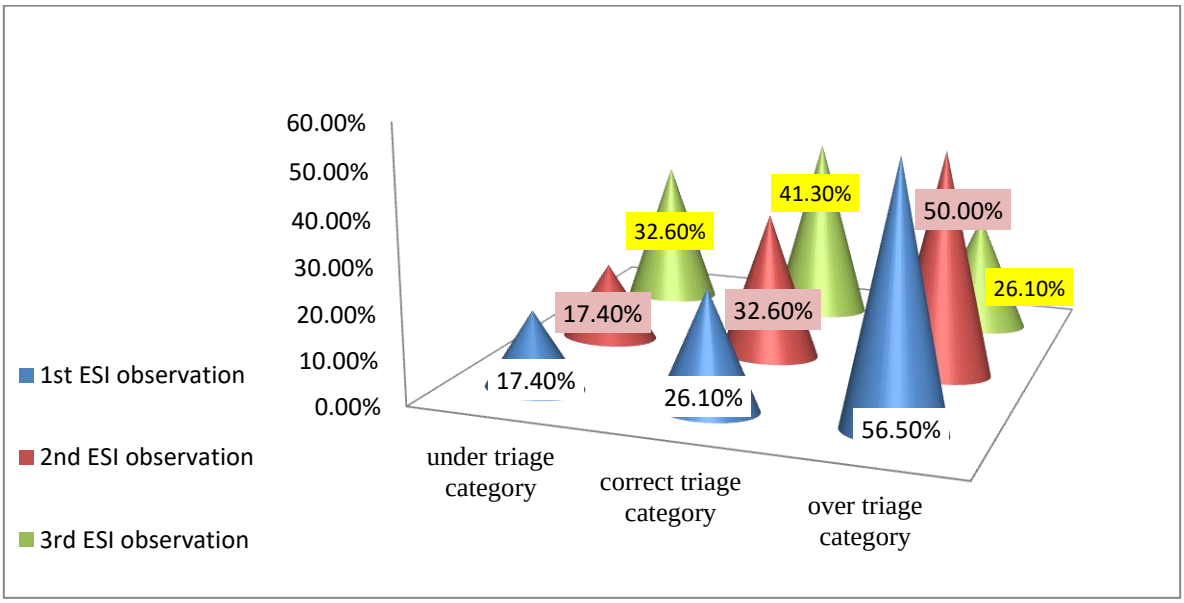



**Figure (4): Distribution of the studied nurses according to over, correct and undertriage category during the first, second and third emergency severity index assessment**

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

This figure showed that less than one fifth (17.40%) of the studied nurses recorded the patients as under the triage category during the first and second ESI observation while, more than nearly the third (32.60%) during the third observation.

Regarding the correct triage category; it was observed that more than one quarter (26.10%) of the studied nurses recorded the patients as correct triage category during the first ESI observation while 32.60% and 41.30% were categorized as correct triage category during the second and third ESI observation respectively.

As regards to over triage category; it was seen that more than half (56.50%) of the studied nurses recorded the patients as over triage category during the first ESI observation while 50.00% and 26.10% were categorized as over triage category during the second and third ESI observation respectively.

**Table (6): Relationship between socio-demographic characteristics of the studied nurses and their total knowledge mean score**

| Nurses' socio-demographic characteristics | Total knowledge score | | | | $\chi^2$ P |
|---|---|---|---|---|---|
| | Poor (n=39) | | Fair (n=7) | | |
| | n | % | n | % | |
| **Age in years:** | | | | | |
| - 20-30 | 14 | 35.9 | 1 | 14.3 | |
| - 31-40 | 17 | 43.6 | 6 | 85.7 | **4.392** |
| - 41-50 | 5 | 12.8 | 0 | 0.0 | **0.222** |
| - 51-60 | 3 | 7.9 | 0 | 0.0 | |
| **Qualifications:** | | | | | |
| - Diploma | 5 | 12.8 | 0 | 0.0 | |
| - Associated degree | 30 | 76.9 | 0 | 0.0 | **26.270** |
| - Bachelor degree | 4 | 10.3 | 7 | 100.0 | **0.001**** |
| - Postgraduate | 0 | 0.0 | 0 | 0.0 | |
| **Total working experiences**: | | | | | |
| - < one year | 1 | 2.6 | 0 | 0.0 | |
| - 1 - < 5years | 1 | 2.6 | 2 | 28.6 | **6.804** |
| - 5 - <10 years | 1 | 2.6 | 0 | 0.0 | **0.078*** |
| - ≥ 10 years | 36 | 92.2 | 5 | 71.4 | |
| **Working experiences in the emergency department:** | | | | | |
| - < one year | 1 | 2.6 | 0 | 0.0 | |
| - 1 - < 5years | 1 | 2.6 | 7 | 100.0 | **39.218** |
| - 5 - <10 years | 1 | 2.6 | 0 | 0.0 | **0.001**** |
| - ≥ 10 years | 36 | 92.2 | 0 | 0.0 | |

Table (6) shows the relationship between socio-demographic characteristics of the studied nurses and their total knowledge mean score. This result revealed that more than two-fifth of the studied nurses with poor knowledge mean score and the majority of studied nurses with poor knowledge mean score (43.6% and 85.7%) were in the age group of 31-40 years old respectively.

Regarding qualifications; this finding showed that more than three quarters (76.9%) of studied nurses with poor knowledge mean score had associated degree, while all (100.0%) of studied nurses with a fair knowledge mean score had a bachelor degree.

Moreover, there were statistically significant differences among the studied nurses between total knowledge mean score and qualifications, total working experiences and working experiences as a triage nurse $p < 0.05$.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1383-1398), Month: May - August 2019, Available at: www.noveltyjournals.com

**Table (7): Correlation between total knowledge, practice and emergency severity index scores of studied nurses regarding their socio-demographic characteristics**

| Socio-demographic characteristics | Total knowledge score | | Total practice score | | Total ESI score | |
|---|---|---|---|---|---|---|
| | r | p | r | p | r | p |
| **- Age** | -0.065 | 0.666 | 0.144 | 0.345 | -0.388 | 0.008** |
| **- Qualifications** | 0.500 | 0.001** | 0.360 | 0.015* | 0.295 | 0.046* |
| **- Total working experiences** | -0.315 | 0.033* | -0.163 | 0.285 | -0.125 | 0.408 |
| **- Working experiences in the emergency department** | -0.724 | 0.001** | -0.528 | 0.001** | -0.254 | 0.088 |

** Correlation was significant at the 0.01 level (2-tailed)

* Correlation was significant at the 0.05 level (2-tailed)

Table (7) reveals the correlation between studied nurses total knowledge, practice and emergency severity index scores regarding their socio-demographic characteristics. It was found that there was a negative and significant correlation between the age of studied nurse and total ESI score where r=-0.388 and p= 0.008.

Regarding qualifications; This result revealed positive and significant correlation noticed regarding qualifications of the studied nurses and total knowledge score, total practice score and total ESI score (r= 0.500, 0.360 and 0.295 and p= 0.001, 0.015 and 0.046) respectively

Regarding total working experience: This result showed a negative and significant correlation between total working experience and total knowledge score where r= -0.315 and p= 0.033.

Regarding working experiences in the emergency department: This result showed a negative and significant correlation between working experiences in the emergency department and total knowledge and practice score (r= -0.724,-0.528, and p= 0.001) respectively.

**Table (8): Correlation between total knowledge and practice score and total emergency severity index score among studied nurses**

| Variables | Total knowledge score | | Total practice score | |
|---|---|---|---|---|
| | r | p | r | p |
| - **Total ESI score** | 0.166 | 0.270 | 0.148 | 0.326 |
| - **Total practice score** | 0.559 | 0.001** | | |

** Correlation was significant at the 0.05 level (2-tailed)

Table (8) illustrates the correlation between total knowledge and practice score and total emergency severity index score among studied nurses. This result showed positive and significant correlation noticed between total knowledge score and total practice score of the studied nurses where r= 0.559 and p= 0.001.

## 4. DISCUSSION

Triage is one of the modern emergency care in the emergency department. In this setting triage, nurses play a pivotal role in prioritizing the needs of the patient who is in critical conditions, thus they are required the proper knowledge and experience to increase their triage skills[(11)].

The present study finding revealed that all nurses had poor total knowledge about triage. This finding was due to greater than two-thirds of studied nurses certified associated degree, while nearly one-fourth of them had a bachelor degree in nursing. In addition, triage nurses who worked at Al-Menshawy General Hospital graduated from some institutes and faculties of nursing had not been provided with a comprehensive triage training system during the undergraduate study. Additionally, the triage system is a new system and the nurses need sufficient time to acquire experience. These insufficiencies of knowledge-oriented behaviors in nurses.

This finding was consistent with other studies, **Rahmani et al.** [25], **Javadi et al.** [26], **and Ebrahimi et al.** (2016) [11], they found that a high percentage of nurses had poor knowledge to triage.

The current study finding was inconsistent with **Aloyce et al. (2014),** [27] **and Afaya et al. (2017),** [28], they reported that a high percentage of nurses were knowledgeable about triage. Also, **Aghababaeian et al. (2017),** [29] **and Asgari et al. (2018),** [30] found that nurses' triage knowledge was at a moderate level.

As regards to total knowledge and practice mean scores, the current study finding showed that all nurses had an unsatisfactory total practice mean score and the majority of them had poor total knowledge mean score about triage. It may be due to the triage training program is limited to one- day. Also it may be as a result of an economic reason because Egypt is one of the developing country, scare resources for nurses during their work shift, over crowdedness of the emergency department and decrease of simple infrastructures for the emergency department could obstruct the nurses to classify the patients.

Similarly, **Rahmani et al. (2016)**[25] in their study reported that emergency department nurses had poor triage knowledge and practice levels. On contrary, **Aghababaeian et al. (2017)** [29], **Stiell et al.** [31] **and Meyer et al.** [32] in their study illustrated that nurses' triage practice was at a moderate level.

Regarding patients' co-morbidities, the most common co-morbidities among the studied patients was hypertension. This finding was in line with **Iversen et al. (2019)**[6], they stated that the highest percentage of patients undergoing triage suffered from hypertension.

In relation to the emergency severity index triage acuity level, The present study found that less than one-third of the studied nurses recorded the patients as correct triage category during the first and second ESI observation while more than two-fifth of them recorded the patients as correct triage category during the third ESI observation. The reasons for declining in correct categorization of triage acuity may be due to poor nurses' knowledge and unsatisfactory practice. Also, the lack of basic resources during patient assessment leading to inaccurate triage decision-making and improper prioritization of patient care. In addition, incomplete data due to poor documentation leads to triage records unreliable source of information for assessing patient's progress and quality of emergency care services given to patients.

As similar, a study was done by **Jordi et al. (2015)** [10], **who** clarified that low accuracy of ESI score could be noticed when nurses scored an ESI. Also, **Yazdannik et al. (2018)** [33], who showed that the ESI was planned for use by emergency nurses with triage experience or those who have continued teaching programs about triage. So, to attain enough experience, the triage nurses should have a thorough and a piece of comprehensive knowledge about the triage tool.

Additionally, **Aloyce et al. (2014),** [27] mentioned the lacking of basic equipment for assessment leading to inaccurate triage. A study by **Dadashzadeh et al. (2013),** [34] shown that emergency department factors such as patient overcrowding, the physical structure makes incorrect triage. Similarly, a study was done by **Yazdannik et al. (2018),** [33] reported that the level of nurse's knowledge about ESI triage was low before the workshop.

Regarding total knowledge and total practice mean scores in relation to working experience, the present study result found that there was a negative and significant correlation between nurse's knowledge and practice about triage in relation to working experience in the ED. This may be due to infrequent work exposure to certain clinical situations, lack of attending workshops / in-service training about triage in the ED and unavailable internet resources on triage. Similarly, the finding of Asgari et al. (2018) [30], reported that the work experience of nurses had a negative and significant correlation with triage knowledge and practice. On the other hand, **Martin et al. (2014),** [35] reported that there was no relationship between the triage experience and the accuracy of triage in the emergency department. In contrast, **Haghigh et al. (2017),** [36] found work experience had an association with nurses' triage knowledge.

Regarding the correlation between total knowledge and total practice mean scores, it was observed that there was a positive correlation between the total knowledge and total practice mean scores. It may be related to the nurses poor training can be skilled in poor practice. This finding was in line with Duko et al. (2019), [37] who showed that there was an association between total triage knowledge and practice scores.

**Limitation of the study**

The current study has some limitations. Firstly, this study was only limited to one hospital. Secondly, the limited size of the studied nurses, all triage nurses participated in the present study. Finally, the triage system is a new branch at Al-Menshawy General Hospital, it was opened for one year and the nurses still in need of additional training.

## 5. CONCLUSION

Nurses' poor knowledge and unsatisfactory practice total mean scores increase the emergency patients risk for triage acuity level errors which lead to serious patient problems. The majority of these errors were over-triage rather than the under-triage category level.

## 6. RECOMMENDATIONS

On the basis of the findings of the current study, the following recommendations were suggested:

1. The triage nurses should receive continuing education and demonstrate knowledge application into practice to rank the patient's triage acuity level successfully

2. The hospital leadership should increase the number of highly qualified nurses in the emergency department because it was noticed that the total knowledge and practice mean scores increased with high qualifications.

3. The sample of this study was limited to a small number because Al-Menshawy General Hospitals is the only general hospital used a triage system in Al-Gharbia state.

## REFERENCES

[1] Barfod C, Lauritzen M, Danker J, et al. Abnormal vital signs are strong predictors for intensive care unit admission and in-hospital mortality in adults triaged in the emergency department - a prospective cohort study. Scand J Trauma Resusc Emerg Med. 2016; 20: 28.

[2] Stanfield LM, Clinical decision making in triage: An integrative review. *J Emerg Nurs*. 2015;41(5):396–403. doi: 10.1016/j.jen.2015.02.003.[PubMed: 25814095].

[3] Yang K, Lam S, Low J, et al. Managing emergency department crowding through improved triaging and resource allocation. Operations Research for Health Care.2016;10:13-22.

[4] Pouraghaei M, Tabrizi J, Moharamzadeh P, et al. The effect of start triage education on knowledge and practice of emergency medical technicians in disasters. J Caring Sci. 2017; 6 (2): 119-25.

[5] Hinson JS, Martinez DA, Schmitz PS, et al. Accuracy of emergency department triage using the Emergency Severity Index and independent predictors of under-triage and over-triage in Brazil: a retrospective cohort analysis. International journal of emergency medicine. 2018;11(1):3.

[6] Iversen A K S, Kristensen M, Østervig RM, et al. A simple clinical assessment is superior to systematic triage in prediction of mortality in the emergency department. Emerg Med J. 2019; 36(2): 66-71.

[7] Elder E, Johnston A, Crilly J . "Review article: A systematic review of three key strategies designed to improve patient flow through the emergency department," Emergency Medicine Australasia. 2015; 27(50): 394–404.

[8] Hamamoto J, Yamase H, Yamase Y. Factors Affecting the Duration of Nurses' Decision Making in Triage in Japan. Arch Emerg Med Crit Care.2016;1(1): 1005

[9] Gligorijevic D, Stojanovic J, Satz W, et al. Deep Attention Model for Triage of Emergency Department Patients. In: Proceedings of the 2018 SIAM International Conference on Data Mining. Society for Industrial and Applied Mathematics, 2018. 297-305. Available at https://epubs.siam.org/doi/abs/10.1137/1.9781611975321.34.

[10] Jordi K, Grossmann F, Gaddis GM, et al. Nurses' accuracy and self-perceived ability using the Emergency Severity Index triage tool: a cross-sectional study in four Swiss hospitals. Scand J Trauma Resusc Emerg Med. 2015;23(1):62.

[11] Ebrahimi M, Mirhaghi A, Mazlom R, et al. The role descriptions of triage nurse in emergency department: A Delphi study. Scientifica. 2016; 1-6.

[12] Kathleen C. Crowding in the Emergency Department. Journal of Emergency Nursing. 2016;42(2):97-8.

[13] Delnavaz S, Hassankhani H, Roshangar F, et al. Comparison of scenario based triage education by lecture and roleplaying on knowledge and practice of nursing students. Nurse education today. 2018;70: 54-9.

[14] Duko B, Geja E, Oltaye Z, et al. Triage knowledge and skills among nurses in emergency units of Specialized Hospital in Hawassa, Ethiopia: Cross-sectional study. BMC research notes. 2019;12(1):21.

[15] Hardy A, Calleja P. Triage education in rural remote settings: A scoping review. International emergency nursing, 2018.

[16] Soontorn T, Sitthimongkol Y, Thosingha O, et al. Factors Influencing the Accuracy of Triage by Registered Nurses in Trauma Patients. Pacific Rim International Journal of Nursing Research, 2018, 22(2): 120-30.

[17] Mohammed AE. Nurses' knowledge regarding Triage in Omdurman Teaching Hospital, Omdurman locality, Khartoum state, Sudan (2016) Published Doctoral dissertation, University of Gezira. 2017.

[18] Navin M, Sacco W, McCord, T. "Does START Triage Work? The Answer is Clear!" Annals of Emergency Medicine. 2010; 55(6): 579–80.

[19] Craig LE, Taylor N, Grimley R, et al. Development of a theory-informed implementation intervention to improve the triage, treatment and transfer of stroke patients in emergency departments using the Theoretical Domains Framework (TDF): the T 3 Trial. Implementation Science, 2017, 12(1): 88.

[20] Burkle FM. Triage and the lost art of decoding vital signs: Restoring physiologically based triage skills in complex humanitarian emergencies. Disaster medicine and public health preparedness. 2018; 12(1):76-85.

[21] DeVita MA, Hillman K, Bellomo R, Odell M, Jones, DA, Winters BD, Lighthall GK. Textbook of Rapid Response Systems: Concept and Implementation. Springer.2017.

[22] Gilboy N, Tanabe T, Travers D, Rosenau AM. Emergency Severity Index (ESI): A Triage Tool for Emergency Department Care, Version 4. Implementation Handbook 2012 Edition. AHRQ Publication No. 12-0014. Rockville MD. Agency for Healthcare Research and Quality. 2011.

[23] Brown AJ, Drobatz KJ. Triage of the emergency patient. In BSAVA manual of canine and feline emergency and critical care. BSAVA Library.2018, 1-7.

[24] Kim JH, Kim JW, Kim SY, et al. Validation of the Korean Triage and Acuity Scale compare to triage by emergency severity index for emergency adult patient: preliminary study in a tertiary hospital emergency medical center. Journal of the Korean Society of Emergency Medicine. 2016; 27(5): 436-441.

[25] Rahmani E, Khani Jeihooni A, Hosseini Fahraji H. Knowledge and skill of hospital's disaster committee regarding triage at times of crisis; A cross-sectional study. Iranian Journal of Emergency Medicine. 2016; 3(4):143-8.

[26] Javadi S, Salimi T, Sareban MT, et al. Knowledge and practice of nurses regarding patients' triage in emergency department. Iranian Journal of Emergency Medicine. 2016; 3(1):15-22.

[27] Aloyce R, Leshabari S, Brysiewicz P. Assessment of knowledge and skills of triage amongst nurses working in the emergency centres in Dares Salaam, Tanzania. African Journal of Emergency Medicine. 2014;4(1):14–8.

[28] Afaya A, Azongo TB, Yakong VN. Perceptions and knowledge on triage of nurses working in emergency Departments of Hospitals in the Tamale Metropolis, Ghana. IOSR JNHS. 2017;6(3):59–65.

[29] Aghababaeian H, Sedaghat S, Taheri N, et al. Evaluating knowledge and performance of emergency medical services staff regarding pre-hospital triage. 2017; 4(2):63-7.

[30] Asgari H, Omidi MR, Omidi N. Evaluating the disaster triage knowledge of nurses personnel in Public Hospitals of Ilam. Health in Emergencies and Disasters Quarterly. 2018; 4(1):37-42.

[31] Stiell IG, Clement CM, Lowe M, et al. A multicenter program to implement the Canadian C-Spine rule by emergency department triage nurses. Annals of Emergency Medicine. 2018; 72(4):333-41.

[32] Meyer GD, Meyer TN, Gaunt CB. Validity of the South African Triage Scale in a rural district hospital. African Journal of Emergency Medicine. 2018; 8(4):145-9.

[33] Yazdannik A, Dsatjerdi EI, Mohamadirizi S. Utilizing mobile health method to mergency nurses' knowledge about Emergency Severity Index triage. J Edu Health Promot. 2018;7:10.

[34] Dadashzadeh A, Abdolahzadeh F, Rahmani A, et al. Factors affecting triage decision-making from the viewpoints of emergency department staff in Tabriz hospitals.Iran J Crit Care Nurs 2013;6(4):279–86.

[35] Martin A, Davidson CL, Panik A, et al. An examination of ESI triage scoring accuracy in relationship to ED nursing attitudes and experience. J Emerg Nurs. 2014;40(5):461–8.

[36] Haghighi S, Ashrafizadeh H, Mojaddami F, et al. A survey on knowledge level of the nurses about hospital triage. Journal of Nursing Education. 2017; 5(6):46-52.

[37] Duko B, Geja E, Oltaye Z, Belayneh F, Kedir A, Gebire M. Triage knowledge and skills among nurses in emergency units of Specialized Hospital in Hawassa, Ethiopia: cross sectional study. BMC research notes. 2019;12(1):21.