

Effect of Pediatric Triage Education on Nurses' knowledge and Attitude at Emergency Department

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Abstract

Background: Triage can be defined as sorting incoming patients at the emergency department based on their urgency rather than attendance. Unprofessional triage can have negative consequences, particularly for children. The study **was aimed** to determine the effect of pediatric triage education on nurses' knowledge and attitude at emergency department. **Design:** A quasi-experimental research design was used. **Subject:** A purposive sampling of 50 nurses participated in the study **Setting:** the study was carried out at emergency departments of El Mabara Hospital of Tanta and El Mahala ElKobra which are affiliated to health insurance. **Two tools** were utilized **Tool I:** knowledge structured interview schedule: to evaluate nurses' knowledge about pediatric triage and Australian triage scale descriptors for categories. **Tool II:** Nurses' attitude measuring scale. **Results:** The nurses' level of knowledge and attitude toward triage was improved post triage education as compared to pre triage education. **Conclusion:** it is proved that triage education enhanced nurses' knowledge and attitude toward triage. **Recommendations:** Emergency nurses ought to be provided with regular in-service training program on the Australian triage scale, which includes both theoretical and practical components.

Keywords: Emergency department- Pediatric triage -Nurses ' knowledge -Nurses 'attitude

Introduction:

Children compose approximately 20% of overall Emergency Department (ED) visits. Their symptoms cover a wide range in terms of both type and intensity. Some of the children have a new symptom or complaint, while others have had a sudden deterioration of an existing medical condition ⁽¹⁾.

Use of emergency departments is particularly unexpected due to the variability in the count of pediatric patients and the harshness of their troubles across the day and may be from hour to hour ⁽²⁾.

The mortality rate for children in hospitals is high within the first 24 hours of their admission. It could be possible to avoid

many of these deaths if very ill children were diagnosed and treated as soon as they arrived at a medical facility. All children admitted to a hospital should undergo fast triage to assess whether they have urgent or important symptoms ⁽³⁾.

The manner of prioritizing patients for receiving care in ED is known as triage. When the need for clinical services exceeds the available supply, triage must be an integral aspect of clinical risk management across all departments. The concept of emergency triage is spreading, and it provides standard referral methods with helpful explanation ⁽⁴⁾.

Furthermore, the goal of triage is to determine which patients need to be seen

immediately due to a life-threatening condition, identify the best course of action to take in that case, and then direct those patients to the proper area of the emergency department ⁽⁵⁾.

There are variety of triage systems used today. In the West, the most popular triage systems contain the Australian Triage Scale (ATS), the Canadian Triage and Acuity Scale (CTAS), the Emergency Severity Index (ESI), and the Manchester Triage System (MTS). El Mabara hospitals in Egypt, which are part of a health insurance network, have lately begun using ATS ⁽⁶⁾.

A five-level emergency department triage strategy which has undergone numerous research and continual development in Australia is called the Australasian Triage Scale (ATS) ⁽⁷⁾.

The first step towards safe triage practice is assessment of potential environmental hazards. The nurse responsible for triage should be familiar with the organizational rules regarding how to respond to security incidents. One of the primary responsibilities of the triage nurse, following the assessment of a pediatric patient, is to assign the ATS category and ensure that patients in the waiting room are continually reassessed and managed in accordance with their status for the length of time determined by the ATS category ⁽⁸⁾.

Significance of the research

According to available study that attempted to describe the profile of patients utilizing El-Behera Hospitals' emergency rooms in 2020. The percentage of registered pediatric ED visits at the period of the study was 22.5%. Infants under the age of one tend to be the largest group attending ED ⁽⁹⁾.

Children are at a higher risk for consequences of unprofessional triage as they are unable to provide accurate information to careers for review. So, proper selection of triage, and its time can prevent these serious complications. Therefore, providing emergency nurses with a proper education on triage will protect many lives, inhibit impairments, and reduce complications ⁽¹⁰⁾.

Aim of the research

was to determine the effect of pediatric triage education on nurses' knowledge and attitude at emergency department.

Research hypotheses:

1- Nurses' knowledge is expected to be improved after conducting pediatric triage education at Emergency department.

2-Nurses are expected to have a positive attitude after receiving pediatric triage education at emergency department.

Subjects and Method

Research design:

A quasi-experimental research design was utilized in this research.

Setting:

The study was carried out at Emergency departments of El Mabara Hospital of Tanta and El Mahala El Kobra which are affiliated to health insurance.

Subjects: A purposive sample of total 50 nurses composed of 22 nurses at Emergency departments of El Mabara Hospital of Tanta beside 28 nurses El Mabara Hospital - ElMahala ElKobra.

Inclusion criteria:

Nurses who had more than one year of experience at emergency department.

Tools of data collection: Two tools were used:

Tool (I): knowledge structured interview schedule: established by the

researcher following a thorough evaluation of the relevant literatures it included three sections^(11,12).

Part (1): focuses on the nurse's socio-demographics, including their age, sex, marital status, rotation shift, educational qualifications, years of experience and obtaining any related training courses.

Part (2): Nurses' knowledge about pediatric triage to assess main concepts about triage and included definition, principles, triage assessment and safety, time to treatment, re-triage, and triage colors.

- Definitions, arrival, and waiting time and documentation standard.

-Physiological approach and decision making, general appearance, air way, breathing, disability and child history

- Pediatric clinical urgency.

Part (3) Nurses' knowledge about Australian triage scale descriptors for categories, it included the following items.

Category 1 (Red): Immediately Life-threatening conditions such as cardiac and respiratory arrest.

Category 2 (Orange): Imminently life-threatening such as airway risk, severe stridor or salivating with distress.

Category 3 (Green): Potentially Life-Threatening such as severe hypertension, moderately severe blood loss

Category 4 (Blue): Potentially serious such as minor hemorrhage.

Category 5 (White): the case is chronic or with slight symptoms.

Nurses' knowledge scored as following:

- Correct and complete answer was scored (2).

- Correct and incomplete answer was scored (1).

-Incorrect (don't know) was scored (0).

Overall score of the questionnaire is classified as follow: -

-From 80 % and more was reflected as high level of knowledge.

- From 60 to below 80 % was reflected as moderate level of knowledge.

-Below 60% was reflected as low level of knowledge.

Tool II: Nurses' attitude measuring scale: was adopted from Kong (2006) and El sayed, Ahmed, and Abd elhamid (2014) in order to evaluate the pediatric nurses' attitudes towards triage activities^(13,14). It contained information related to the attitude of pediatric nurses towards triaging, delays in pediatric patient care, and pediatric patient reception. A 10-statement, three-point Likert style scale with a maximum score of 30 was used.

It classified as follow:

-Agree (3)

-Neutral (2)

- Disagree (1).

The overall score of Nurses' attitude measuring scale

-Positive attitude when the score is from 15-30

- Negative attitude when the score is from 0-14

Method

1-Administrative process

An official permission from Faculty of Nursing, Tanta University and was surrender to responsible authorities of the mentioned settings for consent to facilitate conducting the study.

2- Legal and ethical considerations:

a- Ethical approval was obtained for conducting the study from scientific research ethical committee at the Faculty of Nursing at 20 October 2021.

b- The entire sample wasn't exposed to any harm by the study.

c- Confidentiality and privacy concerning data collection were taken into account.

d. Study purpose was explained to the nurses before they gave their agreement to participate.

3-Tool development

Tools of the research were settled by the researcher after reviewing latest correlated literature.

4- A jury of five paediatric nursing professionals was provided with the tools of the research to evaluate the validity of the contents and the clarity of the questionnaire. Adjustments have been made accordingly. After determining the index of validity of the item content, the nominal validity of the questionnaire was calculated on the basis of expert opinion and was 99.1%.

5-The reliability of Content:

the research tools were tested by the pilot subjects. The test of reliability by using (cronbach's alpha) coefficient which was (0.751) for Education and (0.781) for attitude which indicates that data collection tools had good level of internal consistency.

6- A pilot research:

Ten percent of the nurses participated in a pilot study to examine the research capability of clear and useful results. The study's sample did not include pilot sample.

7- **Interview schedule** was translated into Arabic language by the researcher (Tool I).

8-Pretest questionnaire had been distributed to assess nurses' knowledge and attitude before the implementation of triage education using study tools assessment (Tool I, II).

9- The study sample was divided into ten groups and each group consisted of 5 nurses according to workload.

10-Triage education was carried out for nurses through conduction of five sessions.

11-Evaluation of implementing triage education on nurses' knowledge was carried out using the same assessment tools (Tool I, II) post implementation of pediatric triage education at fifth sessions for each group by the researcher.

Statistical analysis:

Quantitative data were given as mean, standard deviation, and range, while qualitative data were provided as numbers and percentages. The correlation between two qualitative factors was investigated using the chi-square test χ^2 . The Fisher exact test used to investigate the relationship between two qualitative variables. Value of <0.05 was considered statistically significant⁽¹⁵⁾.

Results

Table (1): Illustrates socio-demographic characteristics of studied nurses. it was revealed that more than half of the nurses (54%) had age ranged from 30-40 years old. It was also clear that 94 % of them were females and about two third of them were married.

Regarding their level of education, about three quarter of them (74%) of them had secondary nursing school education. As regards nurses' years of experience at emergency department, more than half of them (58.0%) had 5-10 years of experience with Mean \pm SD (5.16 \pm 3.63).

The table also revealed that more than three quarters (80%) of them had attended training courses related to triage. In addition, about two thirds of them (62%)

were working in morning shifts and only 38% of them in evening shift.

Table (2): describes total nurse's knowledge about pediatric triage and Australian descriptions for categories pre and post triage education, it was observed that more than half of nurses (58%) had low level of knowledge while 20%, 22% of them had moderate and high level of knowledge respectively pre triage education in contrast to post triage education where 16% only had moderate level of Knowledge and the highest percentage of them (84%) had high level of knowledge.

The table also clarifies Mean \pm SD for both total nurses' knowledge pre and post triage education where it was 21.5 ± 4.44 , 30.4 ± 2.59 pre and post respectively with a highly statistically significant difference between pre and post where ($P=0.0001$) as illustrated in figure 1.

Table (3) reveals total nurses' attitude pre and post triage education, it was found that more than half of the studied nurses (56%) had positive attitude pre triage education compared to post triage education where more than three quarter of them (76 %) had the same positive attitude with statistically significant difference between pre and post where $p=(0.034)$ while negative attitude decreased from 44% pre triage education to 24% post triage education.

The table also illustrated that Mean \pm SD of total nurses' attitude pre and post triage education increased from (14.9 ± 2.11) pre triage education to (16.0 ± 1.75) post triage education with highly statistically significant difference ($p=.002$)

Figure (2): explains correlation between total nurses' knowledge and years of experience at emergency department, It

was clear that, there was positive correlation between years of experience of nurses at ED and their total knowledge.

Figure (3) clarifies correlation between total nurses' knowledge and their attitude, there was positive correlation between total nurses' knowledge and their attitude where $r=0.347$ as $P =0.014$

Table (1): Percentage distribution of studied nurses regarding sociodemographic characteristics.

| Socio demographic characteristics | No. | % |
|--|-------------|----------|
| Age / years | | |
| <30 years | 14 | 28.0 |
| 30 – 40 years | 27 | 54.0 |
| > 40 years | 9 | 18.0 |
| Mean ±SD | 33.4±7.10 | |
| Range | 23.0 – 49.0 | |
| Gender | | |
| Male | 3 | 6.00 |
| Female | 47 | 94.0 |
| Marital status | | |
| Single | 17 | 34.0 |
| Married | 30 | 60.0 |
| Divorced | 1 | 2.00 |
| Widowed | 2 | 4.00 |
| Educational qualification | | |
| Secondary school for nursing | 37 | 74.0 |
| Technical Instituted of nursing | 11 | 22.0 |
| Bachelor of nursing | 2 | 4.00 |
| Years of experience at emergency department | | |
| < 5 years | 29 | 58.0 |
| 5 – 10 years | 12 | 24.0 |
| > 10 years | 9 | 18.0 |
| Mean ±SD | 5.16±3.63 | |
| Range | 1.00 – 15.0 | |
| Attendance of related training courses | | |
| yes | 40 | 80.0 |
| no | 10 | 20.0 |
| Rotation shift: | | |
| Morning | 31 | 62.0 |
| Evening | 19 | 38.0 |

Table (2): Total nurses' knowledge about pediatric triage and Australian descriptions for categories pre and post triage education.

| Total nurses' knowledge | Pre triage education n=50 | | Post triage education n=50 | | Test of sig | p value |
|-------------------------|------------------------------|------|-------------------------------|------|-------------|---------------|
| | No. | % | No. | % | | |
| Low (<60%) | 19 | 58.0 | 0 | 0.00 | X2 36.7 | 0.001* |
| Moderate (60% - <80%) | 10 | 20.0 | 8 | 16.0 | | |
| High (> 80%) | 11 | 22.0 | 42 | 84.0 | | |
| Mean ±SD | 21.5±4.44 | | 30.4±2.59 | | 14.6# | 0.001* |

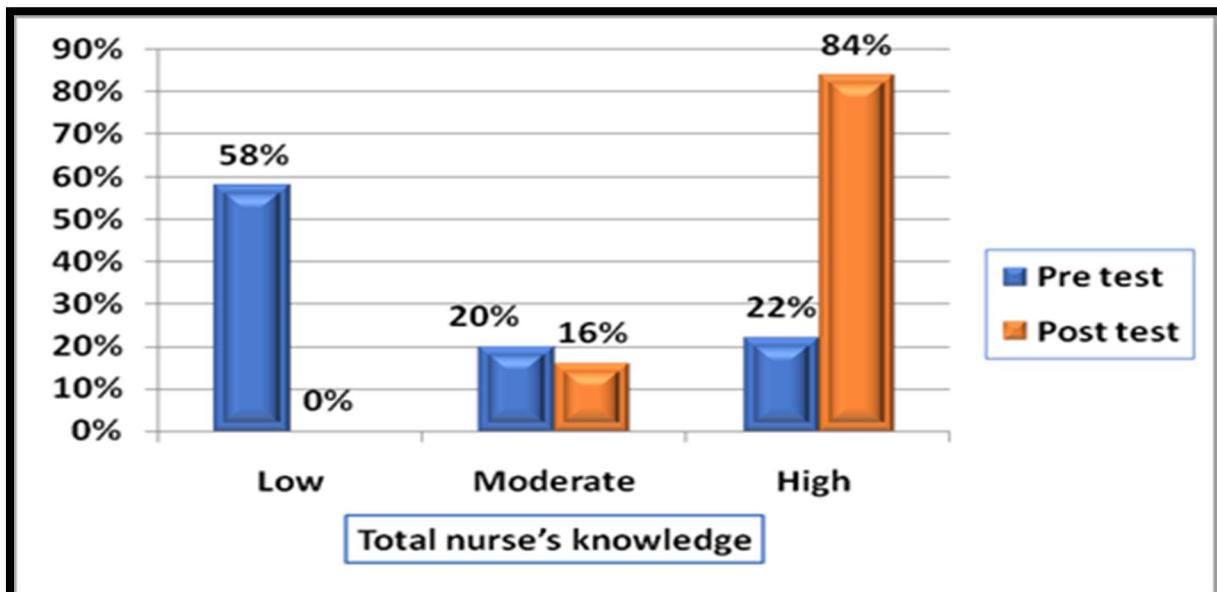
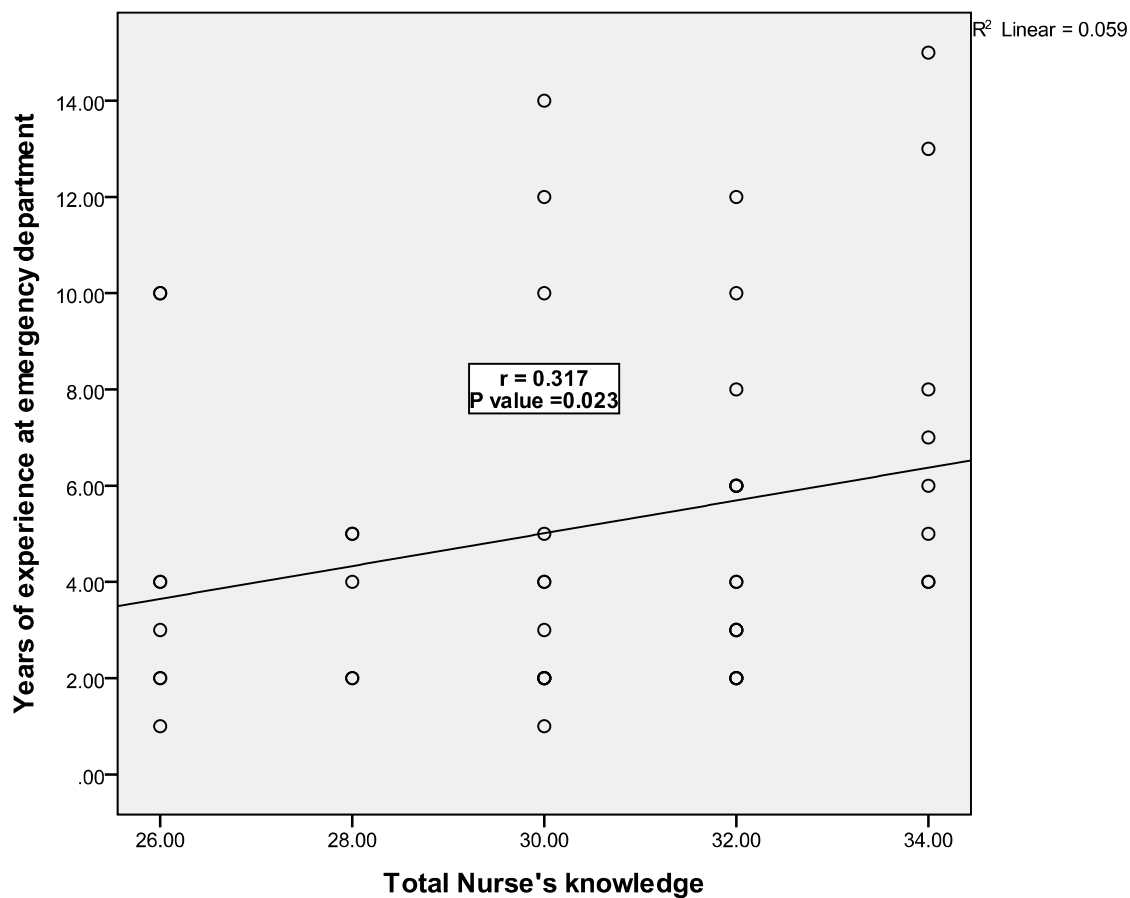


Figure (1): Total scores of nurses' knowledge pre and post triage education

Table (3): Total nurses' attitude pre and post triage education.

| Total Nurses' attitude | Pre triage education (n=50) | | Post triage education (n=50) | | Test of significance | P value |
|------------------------|-----------------------------|------|------------------------------|------|------------------------|---------|
| | No | % | No | % | | |
| Positive | 28 | 56.0 | 38 | 76.0 | X ² 4.46 | 0.034* |
| Negative | 22 | 44.0 | 12 | 24.0 | | |
| Mean± SD | 14.9±2.11 | | 16.0±1.75 | | 3.19 | 0.002* |

**Figure (2):** Correlation between total nurses' knowledge and their years of experience at emergency department.

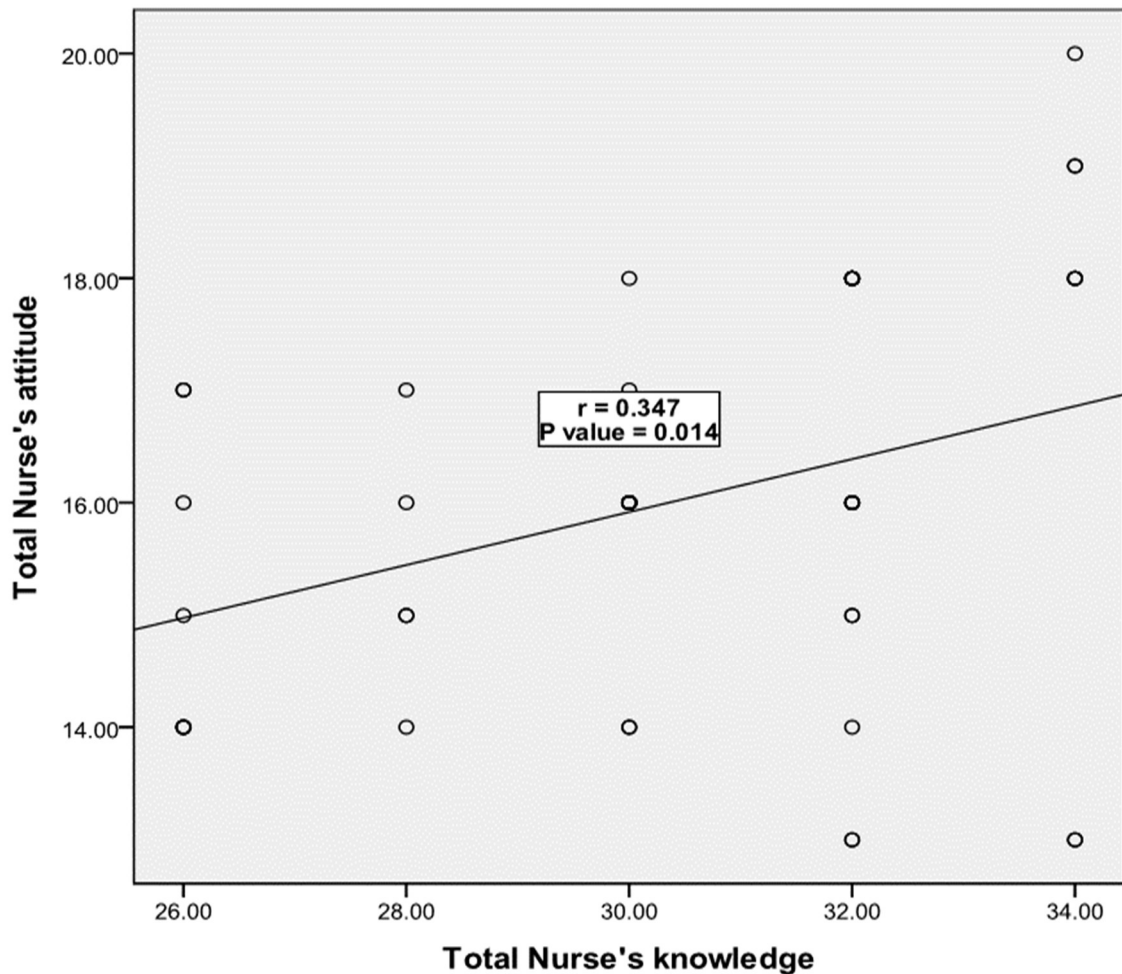


Figure (3): Correlation between total nurses' knowledge and their attitude

Discussion

A growing population increases the possibility that more pediatrics may need emergency care; triage is a crucial technique for directing pediatric patients to the appropriate point of care ⁽¹⁶⁾. Regardless of the number of times that children check into the emergency department, pediatric nurses should demonstrate that they have the necessary resources and crucial competences in order to deliver safe, effective, and stable emergency treatment to pediatric patients ⁽¹⁷⁾ Worldwide, many emergencies

pediatric nurses get comprehensive, evidence-based triage education in order to improve their triage knowledge and attitude. So, their performance can be greatly enhanced by education ⁽¹⁸⁾.

Regarding the socio- demographic characteristics of the nurses, the present study's results clarified that more than half of the nurses 'age ranged from 30-40 years old with. At the same line, **Mustafa et al. (2019)** found that more than half of the nurses were over 30 years old, ⁽¹⁹⁾ **Elgazzar (2021)** also reported the same result ⁽²⁰⁾. This finding also contradicted

with **Gargamo et al (2019)**, who stated that more than two-thirds of participants were between the ages of 20 and 30⁽²¹⁾.

Concerning gender, it was clear that the majority of nurses were females, this result was matched with **Phukubye et al (2021)** who stated that more than half of the studied nurses were females⁽²²⁾. It was also found that two thirds of nurses were married. Also, **Faheim et al (2019)** reached to the same finding⁽²³⁾. While, **Kerie et al (2018)**, on the other hand, claimed that nearly two-thirds of nurses in their survey were single⁽²⁴⁾.

Regarding nurses' level of education, about three quarters of them had secondary nursing school education, while less than one quarter of them had technical nursing education. This result was supported by **Shawky et al (2022)** who reported that most of studied nurses had a secondary nursing school education⁽²⁵⁾. However, these finding wasn't supported by **Duko et al (2019)** who found that more than two-thirds of the nurses had earned a bachelor's degree in nursing⁽²⁶⁾.

In relation to nurses' years of experience at emergency department, more than half of them had less than five years of experience. In addition, **Elgazzar (2021)** announced that almost half of ED nurses had less than five years of experience⁽²⁰⁾.

Eventually, more than three quarter of the studied nurses had attended training courses related to triage; this result was inconsistent with **Afaya et al (2017)** who stated that the majority of nurses did not receive triage training⁽²⁷⁾.

According to the study's results, more than half of nurses had low levels of knowledge about pediatric triage and Australian descriptions for categories pre triage education. Form researchers' point

of view the nurses' low level of knowledge pre-education may be due to nurses' inadequate preparation with a comprehensive Australian triage training system prior to implementation at the ER, and that improved significantly after implementing pediatric triage education.

This result was in line with **Abou Bakr (2021)**, who claimed that the majority of the nurses under study showed unsatisfactory knowledge levels prior to the program, but this was changed to satisfactory knowledge levels after the program's implementation⁽²⁸⁾. This also can be supported by **Shehab et al (2017) and El-Guindy et al (2022)** who reported that total triage knowledge among studied nurses showed marked improvement posttest in comparison to pretest assessment^(29, 30).

Furthermore, those findings concurred with **Moirangthem (2019)** who found that more than half of nurses had average level of knowledge about triage⁽³¹⁾, this can be supported by **Pouy et al (2019)** who revealed that most of the nurses did not have enough knowledge related to triage⁽³²⁾.

On the contrary side, the current study did not match the findings of **Ina Lea et al (2022)**, who stated that more than half of nurses had good knowledge of triage, nearly half had moderate knowledge, and none had poor knowledge⁽³³⁾. This can be clarified by pointing out that the nurses in that study received triage training and they had participated in at least one training, and some had participated in more than one training course. Also, the current study results were slightly different with **Esmaelpour et al (2022)** who found that level of nurses' knowledge working in the emergency departments regarding triage

was moderate⁽³⁴⁾. In the same context Al **Shatarat et al (2022)** declared that the studied nurses had overall high levels of triage knowledge⁽³⁵⁾. These results may be attributable to the global nature of the ED nurses who participated in the prior study, as well as to the effective implementation of organizational regulations mandating that ED nurses maintain their triage knowledge.

In relation to nurses' attitude toward triage pre-education it was noted that, the lowest percentage obtained in agreement with excessive work overload affects quality of pediatric triage at emergency department and un-felling safe at work environment and that improved significantly post triage education.

The current study also found that there was an improvement in nurses' overall attitude following triage education, with more than three-quarters of them having a positive attitude. While, negative attitude decreased to less than one quarter of nurses with statistically significant difference between pre and post. Furthermore, mean \pm SD of total nurses' attitude post triage education were increased with statistically significant difference. In the researcher's opinion, increasing nurses' knowledge post triage education had a positive impact on their attitude. That results could be supported the second study hypothesis, which stated that post-triage education improved nurses' attitudes.

This result could be supported by **Abou Bakr (2021)** who stated that the nurses had a positive attitude following the introduction of the program and one month later, with a highly statistically significant difference between pre, post, and follow up.⁽²⁸⁾ Besides, **Habibinezhad et al (2021)** stated that studied nurses had better

knowledge and attitude than before interactive training programs with statically significant difference.⁽³⁶⁾

The current study also revealed that, there was positive significant correlation between years of experience of nurses at ED and their total knowledge. This may be referred to repeated exposure to the same clinical experience as well as successful triage training courses. That result can be supported by another study done by **Al Marzooq (2020)** who stated that there was positive correlation between the correct knowledge of triage with years of experience of the ED nursing staff⁽³⁷⁾. In the same line **Malakeh et al (2022)** found that there was a positive correlation between triage knowledge and emergency experience⁽³⁸⁾.

In contrast to, **Pouy et al (2019)** who found no significant correlation between work experience and level of nurses' knowledge related to triage⁽³²⁾. Also, **Mustafa et al (2019)** mentioned that there was no statistically significant correlation between nurse's knowledge, and their experience years⁽¹⁹⁾. This could be due to a lack of ongoing educational training in pediatric emergency triage.

The result of current study clarified that there was positive correlation between total nurses' knowledge and their attitude and that result was matched with **Habibinezhad et al (2021)** who stated that the nurses with high knowledge had positive effect on their attitude toward triage⁽³⁶⁾. **BA Kassie et al (2020)** also mentioned that a good knowledge was directly associated with a positive attitude of the study participant.⁽³⁹⁾

Conclusion

The study concluded that the nurses' level of knowledge and attitude toward

triage improved post triage education in compared to pre triage education with statistically significant difference between pre and post. Furthermore, there was a positive significant correlation between total nurses' knowledge and their attitude towards triage.

The study recommended that:

1- Pediatric triage system should be applied in pediatric emergency department at Tanat University hospitals. Additional studies should be done before implementing the same (Australian triage scale) or comparable triage systems.

2- Pediatric triage nurses in the emergency department should be provided with regular in-service training program about the Australian triage system.

3-Hospital assignment of additional pediatric triage nurses in order to reduce work overload in emergency rooms, shorten wait times, and improve staff job satisfaction.

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