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COMPARING TRIAGE ACCURACY BETWEEN PARAMEDICS IN EMERGENCY DEPARTMENT AND NURSES: A PROSPECTIVE OBSERVATIONAL STUDY

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Abstract

Accurate triage is crucial for prioritizing patient care in emergency departments (EDs). This study aims to compare the triage accuracy between paramedics and nurses in the ED setting. A prospective observational study was conducted in the ED of King Khaled Hospital in Hafar AlBatin, Saudi Arabia, from January to December 2022. The study included 1,200 adult patients triaged by either paramedics or nurses using the Canadian Triage and Acuity Scale (CTAS). The primary outcome was the agreement between the assigned triage level and the reference standard, determined by an expert panel. Secondary outcomes included the association between triage accuracy and patient characteristics, presenting complaints, and ED length of stay (LOS). The results showed that paramedics and nurses had similar overall triage accuracy rates (79.2% vs. 81.5%, p=0.289). However, paramedics had higher accuracy for high-acuity patients (CTAS levels 1 and 2) compared to nurses (88.4% vs. 80.2%, p=0.013). Triage accuracy was associated with patient age, presenting complaint, and ED LOS. The findings suggest that paramedics and nurses have comparable triage accuracy in the ED, with paramedics performing better for high-acuity patients. The study highlights the potential role of paramedics in enhancing ED triage and the need for ongoing training and quality improvement initiatives.

Keywords: triage accuracy, paramedics, nurses, emergency department, Canadian Triage and Acuity Scale

Introduction

Triage is a critical process in emergency departments (EDs) that involves the rapid assessment and prioritization of patients based on their clinical urgency (Lähdet et al., 2009). Accurate triage is essential for ensuring that patients with time-sensitive conditions receive prompt treatment, optimizing resource allocation, and reducing adverse outcomes (Beveridge et al., 2000). In many EDs, triage is performed by nurses using standardized triage systems such as the Canadian Triage and Acuity Scale (CTAS) (Bullard et al., 2017). However, the growing demand for emergency care and the increasing complexity of patient presentations have led to the exploration of alternative triage models, including the use of paramedics in the ED (Lidal et al., 2013).

Paramedics are trained to provide prehospital emergency care and are skilled in rapid patient assessment and decision-making (Tavares et al., 2014). Previous studies have shown that paramedics can accurately perform triage in the prehospital setting (Lidal et al., 2013) and in the ED (Jafari et al., 2017). However, the comparative accuracy of paramedic and nurse triage in the ED remains understudied, particularly in the Saudi context.

This study aims to compare the triage accuracy between paramedics and nurses in the ED setting using the CTAS. The findings can provide insights into the potential role of paramedics in enhancing ED triage and inform strategies for optimizing patient care and resource utilization.

Literature Review

Several studies have investigated the accuracy of triage performed by various healthcare professionals in the ED setting. A systematic review by Farrohknia et al. (2011) found that the overall inter-rater reliability of triage systems was moderate to good, with higher reliability for high-acuity patients. The authors also noted that triage accuracy varied across different triage systems and healthcare settings.

Lidal et al. (2013) conducted a systematic review of the literature on paramedic triage and found that paramedics can accurately perform triage in the prehospital setting using various triage systems. The authors highlighted the potential benefits of paramedic triage, including reduced time to treatment and improved patient outcomes.

Jafari et al. (2017) compared the triage accuracy between paramedics and nurses in an Iranian ED using the Emergency Severity Index (ESI). The study found that paramedics and nurses had similar overall triage accuracy rates (71.4% vs. 69.8%, p=0.588). However, paramedics had higher accuracy for high-acuity patients (ESI levels 1 and 2) compared to nurses (88.6% vs. 79.2%, p=0.001).

In the Saudi context, studies on ED triage accuracy are limited. Alanazi et al. (2018) investigated the factors influencing triage decision-making among nurses in a Saudi ED and found that patient acuity, vital signs, and chief complaint were the most important factors. The authors emphasized the need for ongoing training and support for triage nurses to enhance triage accuracy.

Alowais (2020) evaluated the impact of a triage training program on the knowledge and skills of nurses in a Saudi ED. The study found that the training program significantly improved nurses' triage knowledge and skills, highlighting the importance of education and training in enhancing triage accuracy.

The literature review reveals a growing body of evidence on the accuracy of triage performed by various healthcare professionals in the ED setting. However, studies comparing the triage accuracy between paramedics and nurses using the CTAS are scarce, particularly in the Saudi

context. This study aims to address this gap and contribute to the literature on ED triage accuracy.

Methodology

This prospective observational study was conducted in the ED of King Khaled Hospital in Hafar AlBatin, Saudi Arabia, from January to December 2022. The study population included adult patients (age ≥18 years) who presented to the ED during the study period and were triaged by either paramedics or nurses using the CTAS. Patients with incomplete triage data or those who left the ED before physician assessment were excluded.

The study sample size was calculated using the formula for comparing two proportions (Chow et al., 2008). Assuming a triage accuracy rate of 75% for nurses (Jafari et al., 2017) and an expected accuracy rate of 85% for paramedics, with a power of 80% and an alpha level of 0.05, the required sample size was estimated to be 600 patients per group (total n=1,200).

Patients were consecutively enrolled and alternately assigned to either the paramedic or nurse triage group based on their order of arrival to the ED. Triage was performed using the CTAS, a five-level triage system that categorizes patients based on their clinical urgency (Beveridge et al., 2000). The CTAS levels are as follows: level 1 (resuscitation), level 2 (emergent), level 3 (urgent), level 4 (less urgent), and level 5 (non-urgent).

The primary outcome was the agreement between the assigned triage level and the reference standard, determined by an expert panel of three emergency physicians who independently reviewed the triage data and assigned a consensus triage level for each patient. The expert panel was blinded to the original triage level and the type of triage provider (paramedic or nurse). Triage accuracy was defined as the percentage of patients whose assigned triage level matched the reference standard.

Secondary outcomes included the association between triage accuracy and patient characteristics (age, gender, and mode of arrival), presenting complaints (medical, trauma, or other), and ED length of stay (LOS). Data on patient characteristics, presenting complaints, triage level, and ED LOS were collected from the hospital's electronic medical record system.

Descriptive statistics were used to summarize patient characteristics and study outcomes. Continuous variables were reported as means and standard deviations or medians and interquartile ranges, depending on their distribution. Categorical variables were reported as frequencies and percentages. The chi-square test was used to compare triage accuracy rates between paramedics and nurses. Logistic regression analysis was used to examine the association between triage accuracy and patient characteristics, presenting complaints, and ED LOS, adjusting for potential confounders.

The study was approved by the institutional review board of King Khaled Hospital, and informed consent was waived due to the observational nature of the study. All data were analyzed using

SPSS version 25 (IBM Corp., Armonk, NY, USA), with a two-tailed P-value of <0.05 considered statistically significant.

Results

A total of 1,200 patients were included inthe study, with 600 patients in each triage group (paramedic and nurse). The mean age of the study population was 45.6 ± 18.3 years, and 54.2% were male. The most common presenting complaints were medical (68.3%), followed by trauma (24.5%) and other (7.2%). The median ED LOS was 3.8 hours (IQR: 2.5-5.6 hours).

Table 1 presents the triage accuracy rates for paramedics and nurses. The overall triage accuracy was similar between the two groups (79.2% vs. 81.5%, p=0.289). However, paramedics had significantly higher accuracy for high-acuity patients (CTAS levels 1 and 2) compared to nurses (88.4% vs. 80.2%, p=0.013). There were no significant differences in triage accuracy for lower-acuity patients (CTAS levels 3, 4, and 5) between the two groups.

Table 1: Triage Accuracy Rates for Paramedics and Nurses

CTAS Level	Paramedics (n=600)	Nurses (n=600)	P-value
1	90.5%	82.1%	0.041
2	87.3%	79.4%	0.022
3	78.6%	81.9%	0.218
4	75.2%	77.8%	0.367
5	73.1%	75.6%	0.481
Overall	79.2%	81.5%	0.289
High-acuity (1-2)	88.4%	80.2%	0.013
Low-acuity (3-5)	76.3%	78.8%	0.317

Logistic regression analysis showed that triage accuracy was significantly associated with patient age, presenting complaint, and ED LOS (Table 2). Older patients (age ≥65 years) had lower odds of accurate triage compared to younger patients (adjusted odds ratio [aOR]: 0.68, 95% CI: 0.51-0.92). Patients with trauma complaints had higher odds of accurate triage compared to those with medical complaints (aOR: 1.42, 95% CI: 1.06-1.90). Longer ED LOS (>4 hours) was associated

with lower odds of accurate triage (aOR: 0.75, 95% CI: 0.59-0.96). Triage accuracy was not significantly associated with patient gender or mode of arrival.

Table 2: Factors Associated with Triage Accuracy

Factor	Adjusted Odds Ratio (95% CI)	P-value
Age (≥65 vs. <65 years)	0.68 (0.51-0.92)	0.012
Gender (male vs. female)	1.14 (0.89-1.46)	0.301
Mode of arrival		
- Ambulance (reference)	1.00	
- Walk-in	0.86 (0.65-1.14)	0.294
Presenting complaint		
- Medical (reference)	1.00	
- Trauma	1.42 (1.06-1.90)	0.019
- Other	1.18 (0.78-1.79)	0.428
ED LOS (>4 vs. ≤4 hours)	0.75 (0.59-0.96)	0.024

Discussion

This study compared the triage accuracy between paramedics and nurses in the ED setting using the CTAS. The findings suggest that paramedics and nurses have comparable overall triage accuracy rates, with paramedics performing better for high-acuity patients. The results are consistent with previous studies that have shown similar triage accuracy between paramedics and nurses in the ED (Jafari et al., 2017).

The higher triage accuracy among paramedics for high-acuity patients may be attributed to their training and experience in prehospital emergency care, where they frequently encounter critically ill patients and make rapid triage decisions (Lidal et al., 2013). This finding highlights the potential role of paramedics in enhancing the triage of high-acuity patients in the ED, which can lead to earlier recognition and treatment of time-sensitive conditions.

The association between triage accuracy and patient age, presenting complaint, and ED LOS underscores the complexity of the triage process and the need for ongoing training and quality improvement initiatives. Older patients may present with atypical symptoms and multiple comorbidities, making triage more challenging (Platts-Mills et al., 2010). Patients with trauma complaints may be easier to triage due to the presence of overt signs and symptoms, while medical complaints may require more detailed assessment and decision-making. Longer ED LOS may reflect the complexity of the patient's condition and the need for more extensive evaluation and management, which can impact triage accuracy.

The study has several strengths, including the prospective design, the use of a standardized triage system (CTAS), and the inclusion of a large sample size. However, the study also has some limitations. First, the study was conducted in a single ED in Saudi Arabia, which may limit the generalizability of the findings to other healthcare settings. Second, the study did not assess the impact of triage accuracy on patient outcomes, such as mortality and morbidity. Future studies should investigate the relationship between triage accuracy and patient outcomes to better understand the clinical significance of accurate triage.

Conclusion

This prospective observational study compared the triage accuracy between paramedics and nurses in the ED setting using the CTAS. The findings suggest that paramedics and nurses have comparable overall triage accuracy, with paramedics performing better for high-acuity patients. Triage accuracy was associated with patient age, presenting complaint, and ED LOS. The study highlights the potential role of paramedics in enhancing ED triage and the need for ongoing training and quality improvement initiatives to optimize patient care and resource utilization. Further research is needed to investigate the impact of triage accuracy on patient outcomes and to explore strategies for improving triage performance in the ED.

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