Knowledge and Practice of Triage Among Accident and Emergency Nurses in Selected Tertiary Hospitals in Ekiti State, Nigeria

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Abstract- Background and objectives: Triage is a critical function in emergency departments that determines the prioritization of patients based on clinical urgency. Inaccurate triage decisions can lead to adverse patient outcomes and increased morbidity and mortality. Despite the global recognition of triage importance, limited evidence exists regarding triage knowledge and practice among emergency nurses in South-Western Nigeria. This study aimed to assess the knowledge and practice of triage, identify associated factors, and determine predictors of triage knowledge and practice among Accident and Emergency nurses in selected tertiary hospitals in Ekiti State, Nigeria. Methods: A cross-sectional study was conducted among 120 nurses working in the emergency departments of three tertiary hospitals: Ekiti State University Teaching Hospital (EKSUTH), Federal Teaching Hospital Ido-Ekiti (FETHI), and Afe Babalola University Teaching Hospital (ABUAD). Participants were selected using simple random sampling. Data were collected using a self-structured, validated questionnaire with four sections assessing socio-demographics, knowledge, practice, and determinants of triage. Knowledge and practice scores were graded using mean score analysis. Data were analyzed using SPSS version 22, employing descriptive statistics, Chi-square tests, likelihood ratio tests, and binary logistic regression at a significance level of p<0.05. Results: The majority of respondents were female (76.7%), aged 21-35 years (77.5%), and held RN/RM/BNSC qualifications (45.0%). Mean age was 30.5±7.3 years, and mean emergency department experience was 3.8±3.5 years. Overall, 91.7% demonstrated good knowledge of triage, and 82.5% demonstrated good self-reported practice. However, specific knowledge deficits were identified: only 56.7% correctly identified the number of triage categories, and only 33.3% practiced triage at the recommended location. Factors significantly associated with triage knowledge were age group (p=0.014), marital status (p=0.008), and years of emergency experience (p=0.004). Educational qualification was significantly associated with triage practice (p=0.004). Logistic regression revealed that married nurses were 10.41 times more likely to have good triage knowledge compared to single nurses (OR=10.41, 95% CI: 1.275-84.998, p=0.029). No significant association was found between triage knowledge and practice (p=0.831). Conclusion: While emergency nurses in Ekiti State demonstrate high overall knowledge and self-reported practice of triage, significant gaps exist in specific knowledge domains and correct triage location practices. The dissociation between knowledge and practice suggests that factors beyond cognitive knowledge influence clinical triage performance. Educational qualification and clinical experience are critical determinants of triage competence. These findings underscore the urgent need for standardized triage protocols, continuous professional development programs, and system-level interventions to enhance triage accuracy and patient safety in Nigerian emergency departments.

Keywords: Triage; Emergency Nursing; Clinical Competence; Health Knowledge, Attitudes, Practice; Nigeria; Emergency Service, Hospital; Cross-Sectional Studies

I. INTRODUCTION

Triage, derived from the French verb "trier" meaning to separate or classify, represents one of the most critical functions in emergency medicine and disaster management (1). The concept originated in military medicine during the Napoleonic Wars when surgeon Dominique Jean Larrey developed a system to prioritize wounded soldiers based on the severity of injuries rather than rank or nationality (2). Today, triage has evolved into a sophisticated clinical decision-making process that determines the order and urgency of patient care in emergency departments worldwide (3).

The fundamental purpose of triage is to ensure that patients with life-threatening conditions receive immediate intervention while those with minor complaints can safely wait, thereby optimizing the allocation of limited healthcare resources (4). In modern emergency departments, triage is typically performed by trained nurses within minutes of patient arrival and involves rapid assessment of presenting complaints, vital signs, and clinical acuity (5). Various standardized triage systems have been developed internationally, including the Emergency Severity Index (ESI) in the United States, the Manchester Triage System (MTS) in Europe, the Canadian Triage and Acuity Scale (CTAS), and the Australasian Triage Scale (ATS) (6-8).

The accuracy of triage decisions has profound implications for patient safety and clinical outcomes. Accurate triage ensures that critically ill patients receive timely interventions, reduces waiting times for appropriate patients, and prevents emergency department overcrowding (9). Conversely, under-triage (assigning a less urgent category than clinically indicated) can result in delayed treatment, clinical deterioration, and increased morbidity or mortality, while over-triage (assigning a more urgent category than necessary) wastes scarce resources and prolongs waiting times for genuinely urgent patients (10). Studies have demonstrated that triage inaccuracy rates range from 20% to 50% in various international settings, with significant variations based on nurse experience, training, and institutional protocols (11,12).

Sub-Saharan Africa faces unique challenges in emergency care delivery, including high patient volumes, limited resources, inadequate infrastructure, and critical shortages of trained emergency personnel (13). Nigeria, as the most populous country in Africa, bears a disproportionate burden of emergency conditions resulting from road traffic accidents, violence, obstetric emergencies, and infectious disease outbreaks (14). Despite these challenges, emergency medicine remains an underdeveloped specialty in Nigeria, and standardized triage systems are not universally implemented across the country's tertiary hospitals (15).

Ekiti State, located in South-Western Nigeria, has three major tertiary hospitals that serve as referral centers for trauma and medical emergencies from surrounding states. These institutions collectively employ approximately 150 nurses in their emergency departments, yet no previous study has systematically evaluated triage knowledge and practice among emergency nurses in this region. Understanding the current state of triage competence is essential for identifying educational needs, developing contextually appropriate triage protocols, and ultimately improving emergency care quality and patient safety.

Benner's Novice to Expert Theory provides a valuable theoretical framework for understanding the development of clinical competence in nursing practice (16). According to this model, nurses progress through five stages of skill acquisition: novice, advanced beginner, competent, proficient, and expert. This progression is driven by experiential learning, reflective practice, and the integration of theoretical knowledge with clinical experience. The theory suggests that triage competence is not merely a function of factual knowledge but emerges from the synthesis of knowledge, experience, and clinical judgment over time.

Previous studies in Africa have reported variable levels of triage knowledge and practice among emergency nurses. In Ghana, Afaya et al. (2017) found that 62.6% of emergency nurses demonstrated adequate triage knowledge, yet significant gaps remained in practical application (17). In Ethiopia, Duko et al. (2019) reported that 58.3% of nurses had

good triage knowledge, but only 41.7% demonstrated competent triage skills (18). In South Africa, Goldstein et al. (2017) identified that despite 61% of nurses having good theoretical knowledge, only 30% demonstrated correct triage practice, highlighting a critical theory-practice gap (19). These findings suggest that knowledge alone is insufficient for competent triage performance and that multiple individual and organizational factors influence clinical practice.

Despite the growing body of evidence from other African countries, no published research has examined triage knowledge and practice among emergency nurses in South-Western Nigeria. This knowledge gap impedes the development of evidence-based educational interventions and quality improvement initiatives tailored to the Nigerian context. Therefore, this study was designed to address this gap by assessing the knowledge and practice of triage, identifying associated factors, and determining predictors of triage competence among Accident and Emergency nurses in selected tertiary hospitals in Ekiti State, Nigeria.

The specific objectives of this study were to:
1. Assess the level of triage knowledge among Accident and Emergency nurses in selected hospitals in Ekiti State
2. Assess the self-reported practice of triage among Accident and Emergency nurses in selected hospitals in Ekiti State
3. Identify the socio-demographic and organizational factors associated with triage knowledge and practice
4. Determine the predictors of triage knowledge and practice among emergency nurses
5. Examine the association between triage knowledge and self-reported practice

II.   METHODS

Study Design and Setting
This was a cross-sectional, descriptive study conducted between January and March 2024 in the Accident and Emergency departments of three tertiary hospitals in Ekiti State, South-Western Nigeria. Ekiti State has an estimated population of 3.3 million and is served by three major tertiary healthcare institutions

that provide emergency services to the state and neighboring regions.

The study settings were:
1. Federal Teaching Hospital Ido-Ekiti (FETHI): Established in 1998 and upgraded to a teaching hospital in 2014, FETHI is a 500-bed tertiary facility with three emergency units: Adult Accident and Emergency, Paediatric Emergency, and Obstetrics and Gynaecology Emergency. The hospital employs approximately 60 registered nurses across its emergency departments.
2. Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti: Established in 2008, EKSUTH is a 450-bed tertiary health facility affiliated with Ekiti State University. The hospital operates three emergency units staffed by approximately 60 registered nurses.
3. Afe Babalola University Multi-system Hospital (ABUAD), Ado-Ekiti: Established in 2018, ABUAD is a 400-bed ultra-modern private tertiary hospital with state-of-the-art emergency facilities. The emergency department employs approximately 30 registered nurses.

Study Population and Sampling
The target population comprised all registered nurses working in the emergency departments of the three selected hospitals, totaling 150 nurses. The sample size was calculated using the Taro Yamane formula:
$$n = N / (1 + N(e)^2)$$
Where n = sample size, N = total population (150), and e = margin of error (0.05)
$$n = 150 / (1 + 150(0.05)^2)$$
$$n = 150 / (1 + 150(0.0025))$$
$$n = 150 / (1 + 0.375)$$
$$n = 150 / 1.375$$
$$n = 109.09 \approx 109$$

An attrition rate of 10% was added to account for non-response and incomplete questionnaires, yielding a final sample size of 120 participants. Simple random sampling was employed using a computer-generated random numbers table to select participants from the sampling frame of eligible nurses.

Inclusion and Exclusion Criteria
Nurses were eligible for inclusion if they: (1) were registered with the Nursing and Midwifery Council of

Nigeria (NMCN), (2) had worked in the emergency department for a minimum of 12 months, and (3) provided written informed consent. Nurses were excluded if they: (1) had been transferred out of the emergency department during the study period, (2) were registered Accident and Emergency nurses currently on rotation outside the emergency department, or (3) were not currently registered with NMCN.

Data Collection Instrument

A self-administered, structured questionnaire was developed based on an extensive literature review and existing validated instruments from previous triage studies. The questionnaire comprised four sections:

Section A: Socio-demographic Characteristics – Eight items assessing gender, age, religion, ethnicity, marital status, educational qualification, and years of emergency department experience.

Section B: Knowledge of Triage – Nine items assessing understanding of triage definition, responsible personnel, timing requirements, triage categories, and colour coding systems. Knowledge items were scored dichotomously (1 = correct, 0 = incorrect), with total scores ranging from 0-15. Respondents scoring ≥ mean score were categorized as having "good knowledge," while those scoring < mean score were categorized as having "poor knowledge."

Section C: Practice of Triage – Four items assessing frequency of triage practice, methods used, location of triage, and actions during mass casualty incidents. Practice items were scored based on alignment with established triage standards, with total scores ranging from 0-8. Respondents scoring ≥ mean score were categorized as having "good practice," while those scoring < mean score were categorized as having "poor practice."

Section D: Determinants of Triage – Five items assessing perceived organizational factors affecting triage practice, including staffing levels, hospital policy, physical space, senior nurse participation, and patient record access.

Validity and Reliability

Content and face validity were established through review by three experts: a medical-surgical nursing faculty member, an emergency nursing specialist, and a biostatistician. The instrument was modified based on expert feedback to ensure comprehensiveness and clarity.

Reliability was established through a pilot study conducted among 12 emergency nurses at General Hospital Ifaki-Ekiti, State Specialist Hospital Ikole, and State Specialist Hospital Ikere-Ekiti – facilities with similar characteristics to the study sites but not included in the main study. The pilot data were analyzed using Cronbach's alpha, yielding a reliability coefficient of 0.75 for knowledge items and 0.71 for practice items, indicating acceptable internal consistency. The questionnaire was subsequently refined based on pilot study findings.

Data Collection Procedure

Ethical approval was obtained from the Research and Ethics Committees of all three participating institutions prior to data collection. Formal letters of introduction were submitted to the Heads of Nursing Services and Heads of Emergency Departments at each facility. Two research assistants with Bachelor of Nursing Science degrees were recruited and trained on the study protocol, ethical considerations, and data collection procedures.

Data collection occurred over 10 consecutive days at each facility to accommodate shift patterns and ensure maximum participation. Questionnaires were distributed during staff handover periods to minimize disruption to patient care. Participants were provided with detailed information about the study purpose, voluntary participation, confidentiality, and their right to withdraw at any time without consequences. Written informed consent was obtained from all participants prior to questionnaire administration. Completed questionnaires were collected in sealed envelopes to maintain anonymity and were checked for completeness at the point of collection.

Data Analysis

Data were entered into IBM SPSS Statistics version 22 (IBM Corp., Armonk, NY, USA) and cleaned to identify and correct entry errors. Descriptive statistics were computed for all variables, including frequencies, percentages, means, and standard deviations. The mean scores for knowledge and practice were calculated, and respondents were

dichotomized into "good" and "poor" categories based on the mean cut-off point.

Bivariate analysis was conducted to examine associations between socio-demographic characteristics and outcome variables (knowledge and practice). Pearson's Chi-square test was used for variables with expected cell frequencies ≥5, while Likelihood Ratio tests were applied when expected cell frequencies were <5. Statistical significance was set at $p<0.05$.

Binary logistic regression analysis was performed to identify independent predictors of triage knowledge and practice. Variables showing significant association at the bivariate level were entered into the regression model. Odds ratios (OR) with 95% confidence intervals (CI) were calculated, and significance was determined at $p<0.05$.

The association between triage knowledge and practice was examined using the Chi-square test.

Ethical Considerations
This study was conducted in accordance with the Declaration of Helsinki and the Nigerian National Code of Health Research Ethics. Ethical approval was obtained from:

- Ekiti State University Teaching Hospital Ethics Committee (Approval No: EKSUTH/ A67/2023)
- Federal Teaching Hospital Ido-Ekiti Research Ethics Committee (Approval No: FETHI/ REC/2023/045)
- Afe Babalola University Teaching Hospital Institutional Review Board (Approval No: ABUAD/IRB/2023/112)

All participants provided written informed consent after receiving comprehensive information about the study. Confidentiality was maintained through anonymized data collection and secure data storage. Participants were informed that non-participation would not affect their employment status or performance evaluations.

III. RESULTS

Participant Characteristics
A total of 120 questionnaires were distributed, and all were completed and returned, yielding a 100% response rate. Table 1 presents the socio-demographic characteristics of the study participants. The majority of respondents were female (76.7%, n=92), with a male-to-female ratio of approximately 1:3. The mean age of participants was 30.5 ± 7.3 years (range: 21-58 years), with the largest age group being 21-35 years (77.5%, n=93).

Table 1: Socio-demographic Characteristics of Respondents (N=120)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	28	23.3
Female	92	76.7
Age group (years)		
≤ 20	4	3.3
21 − 35	93	77.5
36 − 45	18	15.0
> 45	5	4.2
Mean ± SD	30.5 ± 7.3	
Religion		
Christianity	102	85.0
Islam	16	13.3
Traditionalist	2	1.7

Variable	Frequency (n)	Percentage (%)
Ethnicity		
Yoruba	91	75.8
Igbo	24	20.0
Hausa	3	2.5
Others*	2	1.7
Marital Status		
Single	60	50.0
Married	60	50.0
Educational Qualification		
RN	4	3.3
RN/RM	33	27.5
RN/RM/BNSC	54	45.0
RN/RAEN	8	6.7
RN/RAEN/BNSC	16	13.3
RN/RM/Others**	5	4.2
Years in Emergency Department		
≤ 5	98	81.7
6 – 10	18	15.0

Variable	Frequency (n)	Percentage (%)
11 – 15	2	1.7
> 15	2	1.7
Mean ± SD	3.8 ± 3.5	

Others: Urhobo, Annana
Others: RN/RM/MHN, RN/RM/PRN

The sample was predominantly Christian (85.0%, n=102) and of Yoruba ethnicity (75.8%, n=91). Equal proportions of single and married nurses were represented (50.0% each). Regarding educational qualifications, the largest category was RN/RM/BNSC (Bachelor of Nursing Science) at 45.0% (n=54), followed by RN/RM (Registered Nurse/Registered Midwife) at 27.5% (n=33). The mean duration of emergency department experience was 3.8 ± 3.5 years, with the vast majority (81.7%, n=98) having five years or less of emergency nursing experience.

Knowledge of Triage

Table 2 presents the findings on respondents' knowledge of triage. The vast majority of nurses correctly identified triage as "sorting out patients according to severity and resources available" (98.3%, n=118). However, there was considerable confusion regarding the responsibility for triage: only 61.7% (n=74) correctly identified that triage is the shared responsibility of doctors and nurses, while 34.2% (n=41) believed it was exclusively a nursing duty, and 4.2% (n=5) believed it was exclusively a medical duty.

Table 2: Knowledge of Triage Among Respondents (N=120)

Variable	Correct Response n (%)
Triage is:	

Variable	Correct Response n (%)
Sorting out patient according to severity and resources available	118 (98.3)
Sorting out patient according to the environment	105 (87.5)
Separating patients according to doctors' instruction	92 (76.7)
Putting patient in comfortable position	65 (54.2)
Triaging patient is the duty of:	
Doctor	5 (4.2)
Nurse	41 (34.2)
Doctor & Nurse	74 (61.7)
Time triage should start on arrival to emergency room*	
Before 5 minutes	94 (78.3)
Before 8 minutes	3 (2.5)
Before 10 minutes	18 (15.0)
Not sure	5 (4.2)
Duration of triage assessment	
≤ 5 minutes	110 (91.7)
> 5 minutes	4 (3.3)
Not sure	6 (5.0)

Variable	Correct Response n (%)
Number of triage categories	
< 5 categories	68 (56.7)
5 categories	36 (30.0)
> 5 categories	4 (3.3)
Not sure	12 (10.0)
Colour code interpretation	
Red (Urgent)	107 (89.2)
Yellow (Not urgent)	116 (96.7)
Green (Can wait)	73 (60.8)
Black (Dead)	1 (0.8)

Multiple responses allowed

Concerning timing parameters, 78.3% (n=94) correctly indicated that triage should commence within five minutes of patient arrival, and 91.7% (n=110) correctly identified that triage assessment should be completed within five minutes. However, knowledge regarding triage categories was suboptimal: only 56.7% (n=68) correctly identified that there are fewer than five categories in standard triage systems, while 30.0% (n=36) erroneously believed there are exactly five categories. Interpretation of colour codes revealed excellent knowledge for red (urgent: 89.2%) and yellow (not urgent: 96.7%) categories but comparatively poorer knowledge for green (can wait: 60.8%) and black (dead: 0.8%) categories.

Variable	Category	Frequency (n)	Percentage (%)
Health facility	Yes	109	90.8

Variable	Category	Frequency (n)	Percentage (%)
practices triage			
	No	5	4.2
	Not always	3	2.5
	I don't know	3	2.5
Frequency of practicing triage	During mass casualty	64	53.3
	Every day	33	27.5
	Always	20	16.7
	Never practice	3	2.5
Method used in triaging*	Colour code	79	65.8
	Tagging	18	15.0
	Using beds	17	14.2
	Standing order	3	2.5
	None of the above	3	2.5
Location of triage	Outside the emergency room entry	40	33.3
	Just at the door	12	10.0
	Resuscitation room	27	22.5
	On wheelchairs or stretchers	11	9.2
	Anywhere	30	25.0
Action during mass casualty	Use triage to deal with situation	90	75.0
	Call for help	19	15.8
	Report to supervisor	9	7.5
	Call management	2	1.7

Figure 1: Overall Knowledge Scores of Triage Among Emergency Nurses

[Bar chart showing: Good Knowledge = 110 (91.7%), Poor Knowledge = 10 (8.3%)]

Figure 1 illustrates the overall knowledge classification. The mean knowledge score was 11.4 ± 2.1 out of a maximum 15 points. Based on the mean score cut-off, 91.7% (n=110) of respondents were classified as having good triage knowledge, while only 8.3% (n=10) demonstrated poor knowledge.

Practice of Triage

Table 3 presents the self-reported triage practices of respondents. The majority (90.8%, n=109) reported that their health facility practices triage. However, the frequency of triage practice was concerning: only 27.5% (n=33) practiced triage daily, and 16.7% (n=20) practiced triage consistently ("always"), while 53.3% (n=64) practiced triage only during mass casualty incidents.

Table 3: Practice of Triage Among Respondents (N=120)
*Multiple responses allowed

The predominant triage method reported was colour coding (65.8%, n=79), followed by tagging (15.0%, n=18) and bed allocation (14.2%, n=17). Regarding triage location, only 33.3% (n=40) practiced triage at the recommended location outside the emergency room entry, while 25.0% (n=30) practiced triage indiscriminately ("anywhere"), and 22.5% (n=27) practiced triage in the resuscitation room, potentially compromising infection control and patient flow.

Encouragingly, 75.0% (n=90) of nurses reported using triage as their primary response strategy during mass casualty incidents, indicating appropriate understanding of triage utility in disaster situations.

Figure 2: Overall Practice Scores of Triage Among Emergency Nurses
[Bar chart showing: Good Practice = 99 (82.5%), Poor Practice = 21 (17.5%)]

Figure 2 displays the overall practice classification. The mean practice score was 5.6 ± 1.8 out of a maximum 8 points. Based on the mean score cut-off, 82.5% (n=99) of respondents were classified as having good triage practice, while 17.5% (n=21) demonstrated poor practice.

Determinants of Triage

Table 4 summarizes respondents' perceptions of factors affecting triage practice. The most frequently identified determinants were: time required to obtain hospital patients' records (80.8%, n=97), number of staff on duty (70.0%, n=84), and availability of adequate space for triage (61.7%, n=74). Hospital policy was identified by 45.0% (n=54) of respondents, and senior nurse participation in triage decisions by 40.0% (n=48).

Table 4: Perceived Determinants of Triage Practice (N=120)

Variable	Frequency (n)	Percentage (%)
Number of staff on duty	84	70.0
Hospital policy	54	45.0
Having enough space for triage	74	61.7
Senior nurse participation in triage decisions	48	40.0

Variable	Frequency (n)	Percentage (%)
Time to obtain hospital patients' records	97	80.8

Factors Associated with Triage Knowledge

Table 5 presents bivariate analysis of socio-demographic factors associated with triage knowledge. Three variables demonstrated statistically significant associations with knowledge level: age group (Likelihood Ratio = 10.595, df = 3, p = 0.014), marital status (χ^2 = 6.982, df = 1, p = 0.008), and years of emergency department experience (Likelihood Ratio = 13.125, df = 3, p = 0.004). Notably, 90.0% (n=9) of nurses with poor knowledge were married, compared to 46.4% (n=51) of those with good knowledge. Similarly, 30.0% (n=3) of nurses with poor knowledge had >45 years of age, compared to only 1.8% (n=2) of those with good knowledge.

Table 5: Socio-demographic Factors Associated with Triage Knowledge

Variable	Good Knowledge n=110 (%)	Poor Knowledge n=10 (%)	Total N=120 (%)	Statistics
Gender				$+\chi^2$ = 1.281, df=1, p=0.258
Male	27 (24.5)	1 (10.0)	28 (23.3)	
Female	83 (75.5)	9 (90.0)	92 (76.7)	
Age group (years)				$+\chi^2$ = 10.595, df=3, p=0.014*
≤ 20	4 (3.6)	0 (0.0)	4 (3.3)	
21 – 35	88 (80.0)	5 (50.0)	93 (77.5)	

Variable	Good Knowledge n=110 (%)	Poor Knowledge n=10 (%)	Total N=120 (%)	Statistics
36 – 45	16 (14.5)	2 (20.0)	18 (15.0)	
> 45	2 (1.8)	3 (30.0)	5 (4.2)	
Marital Status				χ^2 = 6.982, df=1, p=0.008*
Single	59 (53.6)	1 (10.0)	60 (50.0)	
Married	51 (46.4)	9 (90.0)	60 (50.0)	
Educational Qualification				+χ^2 = 3.156, df=5, p=0.676
RN	4 (3.6)	0 (0.0)	4 (3.3)	
RN/RM	30 (27.3)	3 (30.0)	33 (27.5)	
RN/RM/BNSC	50 (45.5)	4 (40.0)	54 (45.0)	
RN/RAEN	8 (7.3)	0 (0.0)	8 (6.7)	
RN/RAEN/BNSC	14 (12.7)	2 (20.0)	16 (13.3)	
RN/RM/Others	4 (3.6)	1 (10.0)	5 (4.2)	
Years in Emergency Department				+χ^2 = 13.125, df=3, p=0.004*
≤ 5	93 (84.5)	5 (50.0)	98 (81.7)	
6 – 10	15 (13.6)	3 (30.0)	18 (15.0)	
11 – 15	2 (1.8)	0 (0.0)	2 (1.7)	
> 15	0 (0.0)	2 (20.0)	2 (1.7)	

*Statistically significant (p<0.05); + Likelihood Ratio Factors Associated with Triage Practice

Table 6 displays bivariate analysis of factors associated with triage practice. Educational qualification was the only variable demonstrating a statistically significant association with triage practice

(Likelihood Ratio = 17.240, df = 5, p = 0.004). Nurses with RN/RM/BNSC qualifications constituted 49.5% (n=49) of those with good practice but only 23.8% (n=5) of those with poor practice. Notably, all four nurses (100%) with RN qualification fell into the poor practice category. Age group approached but did not reach statistical significance (p=0.079).

Table 6: Socio-demographic Factors Associated with Triage Practice

Variable	Good Practice n=99 (%)	Poor Practice n=21 (%)	Total N=120 (%)	Statistics
Gender				$+\chi^2 = 0.003$, df=1, p=0.955
Male	23 (23.2)	5 (23.8)	28 (23.3)	
Female	76 (76.8)	16 (76.2)	92 (76.7)	
Age group (years)				$+\chi^2 = 6.774$, df=3, p=0.079
≤ 20	1 (1.0)	3 (14.3)	4 (3.3)	
21 – 35	79 (79.8)	14 (66.7)	93 (77.5)	
36 – 45	15 (15.2)	3 (14.3)	18 (15.0)	
> 45	4 (4.0)	1 (4.8)	5 (4.2)	
Marital Status				$\chi^2 = 2.828$, df=1, p=0.093
Single	46 (46.5)	14 (66.7)	60 (50.0)	
Married	53 (53.5)	7 (33.3)	60 (50.0)	
Educational Qualification				$+\chi^2 = 17.240$, df=5, p=0.004*
RN	0 (0.0)	4 (19.0)	4 (3.3)	
RN/RM	27 (27.3)	6 (28.6)	33 (27.5)	
RN/RM/BNSC	49 (49.5)	5 (23.8)	54 (45.0)	
RN/RAEN	6 (6.1)	2 (9.5)	8 (6.7)	

Variable	Good Practice n=99 (%)	Poor Practice n=21 (%)	Total N=120 (%)	Statistics
RN/RAEN/BNSC	13 (13.1)	3 (14.3)	16 (13.3)	
RN/RM/Others	4 (4.0)	1 (4.8)	5 (4.2)	
Years in Emergency Department				$+\chi^2$ = 2.768, df=3, p=0.429
≤ 5	81 (81.8)	17 (81.0)	98 (81.7)	
6 – 10	16 (16.2)	2 (9.5)	18 (15.0)	
11 – 15	1 (1.0)	1 (4.8)	2 (1.7)	
> 15	1 (1.0)	1 (4.8)	2 (1.7)	

*Statistically significant (p<0.05); + Likelihood Ratio Predictors of Triage Knowledge

Binary logistic regression was conducted to identify independent predictors of triage knowledge, with variables demonstrating significant bivariate associations (age group, marital status, and years of experience) entered into the model (Table 7). The reference categories were: age >45 years, single marital status, and ≤5 years emergency experience.

Table 7: Predictors of Triage Knowledge Using Binary Logistic Regression

Explanatory Factors	Odds Ratio	95% Confidence Interval	p-value
Age group (years)			
≤ 20	0.00	0.000 –	0.999
21 – 35	0.04	0.005 – 0.281	0.001*
36 – 45	0.08	0.008 – 0.844	0.035*
> 45 (Reference)	1.00		
Marital status			
Single (Reference)	1.00		
Married	10.41	1.275 – 84.998	0.029*

Explanatory Factors	Odds Ratio	95% Confidence Interval	p-value
Years in Emergency Department			
≤ 5 (Reference)	1.00		
6 – 10	3.72	0.804 – 17.209	0.093
11 – 15	0.00	0.000 –	0.999
> 15	0.00	0.000 –	0.999

*Statistically significant (p<0.05)

Age group emerged as a significant predictor of triage knowledge. Nurses aged 21-35 years (OR=0.04, 95% CI: 0.005-0.281, p=0.001) and 36-45 years (OR=0.08, 95% CI: 0.008-0.844, p=0.035) were significantly less likely to have good triage knowledge compared to nurses aged >45 years, suggesting that older, more experienced nurses possess superior knowledge.

Marital status was a strong independent predictor: married nurses were 10.41 times more likely to have good triage knowledge compared to their single counterparts (OR=10.41, 95% CI: 1.275-84.998, p=0.029). Although nurses with 6-10 years of emergency experience were approximately 3.7 times more likely to have good knowledge compared to those with ≤5 years experience, this association did not reach statistical significance (p=0.093).

Predictors of Triage Practice
Logistic regression analysis was performed to identify predictors of triage practice, with educational qualification entered as the independent variable (Table 8). The reference category was RN qualification.

Table 8: Predictors of Triage Practice Using Binary Logistic Regression

Explanatory Factors	Odds Ratio	95% Confidence Interval	p-value
Educational Qualification			
RN (Reference)	1.00		
RN/RM	0.46	0.128 – 1.646	0.232
RN/RM/BNSC	1.50	0.241 – 9.337	0.664
RN/RAEN	1.04	0.224 – 4.823	0.962
RN/RAEN/BNSC	1.13	0.106 – 11.952	0.922
RN/RM/Others	0.00	0.000 –	0.999

None of the educational qualification categories demonstrated statistically significant predictive value for triage practice. Although nurses with RN/RM/BNSC qualifications were 1.5 times more likely to have good triage practice compared to those with RN qualification, this finding was not statistically

significant (p=0.664). The wide confidence intervals crossing 1.0 indicate imprecision in the estimates, likely attributable to the small number of nurses in the reference category.

Association Between Triage Knowledge and Practice
Table 9 presents the analysis of association between triage knowledge and self-reported practice. Among nurses with good knowledge, 91.9% (n=91) demonstrated good practice, and 8.1% (n=8) demonstrated poor practice. Among nurses with poor knowledge, 90.5% (n=19) demonstrated good practice, and 9.5% (n=2) demonstrated poor practice. The Chi-square test revealed no statistically significant association between triage knowledge and practice (Likelihood Ratio = 0.046, df = 1, p = 0.831).

Table 9: Association Between Triage Knowledge and Practice

Knowledge on Skills of Triage	Practice of Triage			
	Good n=99 (%)	Poor n=21 (%)	Total N=120 (%)	Statistics
Good	91 (91.9)	19 (90.5)	110 (91.7)	$+\chi^2 = 0.046$
Poor	8 (8.1)	2 (9.5)	10 (8.3)	df=1, p=0.831
Total	99 (100.0)	21 (100.0)	120 (100.0)	

- Likelihood Ratio

IV. DISCUSSION

This study provides the first comprehensive assessment of triage knowledge and practice among emergency nurses in South-Western Nigeria, revealing both strengths and significant areas for improvement. The findings have important implications for nursing education, clinical practice, health policy, and patient safety in Nigerian emergency departments.

Socio-demographic Profile of Emergency Nurses
The predominance of female nurses (76.7%) in this study reflects the global gender distribution in nursing and is consistent with previous African studies reporting female representation ranging from 73% to 85% in emergency settings (17-19). The mean age of 30.5 years and mean emergency experience of 3.8 years indicate a relatively young and inexperienced workforce. This finding is concerning given that triage is a complex cognitive skill that typically requires substantial clinical experience for proficient performance (20). Benner's Novice to Expert Theory posits that nurses require approximately 3-5 years of clinical experience to achieve competent performance, and 5-10 years to reach proficient or expert levels (16). The predominance of nurses with ≤5 years experience (81.7%) suggests that most emergency nurses in Ekiti State are functioning at novice or advanced beginner levels, which may compromise triage accuracy and patient safety.

Encouragingly, 45.0% of nurses held bachelor's degrees (RN/RM/BNSC), representing a substantial increase in educational preparation compared to previous Nigerian studies. This trend toward baccalaureate-prepared nurses aligns with global initiatives to enhance the educational preparation of emergency nurses and improve patient outcomes (21).

Triage Knowledge

The finding that 91.7% of nurses demonstrated good overall triage knowledge is substantially higher than previous African studies, which reported adequate knowledge rates of 62.6% in Ghana (17), 58.3% in Ethiopia (18), and 61.0% in South Africa (19). Several factors may explain this disparity. First, the high proportion of baccalaureate-prepared nurses in our sample suggests improved theoretical preparation in undergraduate nursing curricula. Second, the three study hospitals are tertiary academic centers with teaching missions that may emphasize evidence-based practice and continuing education. Third, recent curriculum revisions in Nigerian nursing education have incorporated emergency and disaster nursing content more comprehensively than in previous decades.

Despite high overall knowledge scores, significant knowledge gaps were identified in specific domains. Only 56.7% of nurses correctly identified the number of triage categories, and only 60.8% correctly interpreted the green colour code as indicating non-urgent patients who can safely wait. These deficits are clinically significant because misclassification of non-urgent patients as urgent (over-triage) wastes scarce resources, while misclassification of urgent patients as non-urgent (under-triage) can result in delayed treatment and adverse outcomes (10). The finding that only 61.7% correctly identified triage as a shared medical-nursing responsibility suggests persistent role confusion that may impede interprofessional collaboration in emergency care delivery.

The significant associations between triage knowledge and age, marital status, and emergency experience align with established theories of clinical competence development. The finding that nurses aged >45 years demonstrated superior knowledge supports Benner's assertion that expertise develops through prolonged engagement with clinical situations (16). The strong association between marital status and knowledge (married nurses 10 times more likely to have good knowledge) is an unexpected finding not previously reported in triage literature. This may reflect confounding by age (married nurses tend to be older) or may indicate that psychosocial maturity and life experience contribute to cognitive development and

knowledge acquisition. Alternatively, this finding may be spurious and requires replication in future studies.

Triage Practice

The finding that 82.5% of nurses demonstrated good self-reported triage practice is encouraging and exceeds rates reported in previous African studies (30-42%) (18,19). However, this finding must be interpreted cautiously given that practice was self-reported rather than directly observed. Social desirability bias may have led respondents to overreport compliance with recommended triage practices. Furthermore, the discrepancy between high knowledge scores (91.7%) and lower practice scores (82.5%) suggests a theory-practice gap consistent with previous research (22).

Several practice patterns are concerning. Only 27.5% of nurses practiced triage daily, and 53.3% practiced triage only during mass casualty incidents. This suggests that triage is perceived as a disaster response tool rather than an essential daily function of emergency care delivery. This misconception undermines the fundamental purpose of triage in managing routine emergency department patient flow and acuity differentiation. The finding that only 33.3% practiced triage at the recommended location outside the emergency room entry indicates widespread non-adherence to spatial triage protocols, potentially compromising infection control, patient privacy, and efficient patient streaming.

The predominant use of colour coding (65.8%) as the triage method is appropriate and consistent with international practice (6). However, the use of bed allocation (14.2%) as a triage method is concerning, as this represents an informal, non-standardized approach that is neither reliable nor reproducible. The absence of standardized triage tools in some facilities suggests that Nigerian emergency departments lack formal triage protocols and rely on individual nurse judgment, which is known to be highly variable and unreliable (23).

The significant association between educational qualification and triage practice (p=0.004) provides empirical support for ongoing efforts to elevate the educational preparation of Nigerian nurses. Nurses with bachelor's degrees demonstrated superior triage

practice compared to those with diploma-level qualifications (RN only). This finding aligns with international evidence linking baccalaureate education to improved clinical judgment, critical thinking, and patient outcomes (24). The finding that all four RN-only qualified nurses fell into the poor practice category underscores the inadequacy of basic nursing preparation for the complex cognitive demands of emergency triage.

Determinants and Predictors of Triage Competence

The identification of time required to obtain patient records (80.8%) and staffing levels (70.0%) as major perceived barriers to effective triage highlights critical system-level constraints in Nigerian emergency departments. Delays in accessing patient records impede rapid triage decision-making and may contribute to inappropriate prioritization. Inadequate staffing levels force nurses to prioritize immediate clinical care over documentation and formal triage processes. These findings suggest that individual nurse education alone is insufficient to improve triage quality; concurrent investment in health information systems, human resources, and physical infrastructure is essential.

The logistic regression analysis identified age >45 years and married marital status as independent predictors of superior triage knowledge. The age finding is consistent with expertise development theories and suggests that experienced nurses possess valuable knowledge that should be systematically transmitted to younger colleagues through mentorship programs, preceptorship models, and formal knowledge transfer initiatives (25). The lack of significant predictors for triage practice suggests that clinical performance is influenced by multiple interacting factors at individual, organizational, and system levels, none of which predominates in isolation.

The Knowledge-Practice Gap

The most striking finding of this study is the absence of significant association between triage knowledge and self-reported practice (p=0.831). Nurses with good knowledge were no more likely to report good practice than nurses with poor knowledge. This dissociation between theoretical knowledge and clinical performance has been documented in previous triage studies (19,22) and represents a fundamental challenge for nursing education and continuing professional development.

Several explanations for this knowledge-practice gap warrant consideration. First, triage is a complex psychomotor and cognitive skill that cannot be acquired solely through didactic instruction; it requires supervised clinical practice, deliberate reflection, and formative feedback (26). Second, organizational factors such as time pressure, resource constraints, and competing priorities may prevent knowledgeable nurses from implementing optimal triage practices. Third, the absence of standardized triage protocols and quality monitoring systems in Nigerian emergency departments removes the accountability structures necessary to translate knowledge into consistent practice. Fourth, the self-report methodology may have inadequately captured actual clinical performance; future studies employing direct observation or clinical simulation are needed to validate these findings.

Theoretical Implications

This study provides partial support for Benner's Novice to Expert Theory. The finding that experienced nurses (>45 years) demonstrated superior knowledge compared to younger colleagues aligns with the theory's assertion that clinical knowledge develops through experiential learning. However, the absence of significant association between years of experience and triage practice (p=0.429) challenges the theory's assumption that increased experience automatically translates into enhanced clinical performance. This suggests that experience without structured reflection, feedback, and continuing education may not produce the progressive skill acquisition described by Benner (16). Nursing education programs must therefore emphasize not merely the accumulation of clinical hours but the quality of learning derived from those experiences.

Strengths and Limitations

This study has several strengths. It is the first comprehensive investigation of triage competence among emergency nurses in South-Western Nigeria, addressing a significant gap in the African emergency nursing literature. The inclusion of three diverse tertiary hospitals (federal, state, and private) enhances

the generalizability of findings within the Nigerian tertiary hospital context. The use of validated instruments, rigorous sampling methods, and appropriate statistical analyses strengthens the internal validity of conclusions.

Several limitations must be acknowledged. First, the cross-sectional design precludes causal inferences; associations identified may reflect correlation rather than causation. Second, triage practice was assessed through self-report rather than direct observation or clinical record review, introducing potential social desirability and recall biases. Third, the study was conducted exclusively in tertiary hospitals, and findings may not generalize to secondary or primary healthcare facilities where triage practices may differ substantially. Fourth, the small number of nurses in some demographic categories (e.g., >45 years, RN qualification) resulted in wide confidence intervals in regression analyses, limiting precision of effect estimates. Fifth, the study did not assess triage training history, triage system type used, or patient outcomes, limiting understanding of the full spectrum of factors influencing triage quality.

CONCLUSION

This study demonstrates that emergency nurses in Ekiti State tertiary hospitals possess good theoretical knowledge of triage principles and report satisfactory triage practices. However, significant knowledge gaps persist in specific domains, particularly regarding triage categories and colour code interpretation. More concerning is the dissociation between knowledge and practice, indicating that cognitive knowledge alone is insufficient to ensure competent clinical performance. The findings reveal that triage is not consistently implemented as a daily emergency department function but is often reserved for mass casualty incidents. Triage location practices deviate substantially from international standards, and informal, non-standardized triage methods persist alongside formal colour coding systems. Educational qualification is the primary modifiable factor associated with triage practice, supporting continued investment in baccalaureate nursing education and specialized emergency nursing certification.

System-level constraints—including inadequate staffing, delayed access to patient records, and insufficient physical space—constitute major barriers to effective triage that cannot be overcome through individual nurse education alone. Addressing these barriers requires coordinated action by hospital administrators, health policymakers, and regulatory bodies.

The absence of standardized triage protocols across Nigerian tertiary hospitals represents a fundamental gap in emergency care quality infrastructure. Without formal triage systems, clear performance standards, and systematic quality monitoring, even highly knowledgeable nurses cannot consistently deliver optimal triage care. The development and implementation of a standardized, contextually appropriate national triage system for Nigerian emergency departments should be accorded urgent priority.

RECOMMENDATIONS

For Health Policymakers and Regulatory Bodies:
1. Develop and mandate a standardized national triage system for all Nigerian tertiary hospitals, adapted from validated international models (ESI, MTS, or CTAS) with contextual modifications appropriate to the Nigerian healthcare environment.
2. Incorporate triage competency as a mandatory requirement for emergency nursing certification and include triage performance indicators in hospital quality assurance frameworks.
3. Allocate resources for health information system strengthening to ensure real-time access to patient records at triage points, addressing the most frequently cited barrier to effective triage practice.

For Hospital Administrators and Nurse Managers:
4. Implement dedicated triage nurse positions with protected time, appropriate remuneration, and clear job descriptions to establish triage as a daily function rather than a disaster response tool.
5. Redesign emergency department physical spaces to include designated triage areas immediately outside or at the entrance of emergency units, with adequate privacy, infection control facilities, and workflow efficiency.

6. Establish triage mentorship programs pairing expert nurses (>45 years, >10 years experience) with novice and advanced beginner nurses to facilitate knowledge transfer and skill development.

7. Implement regular triage competency assessment and feedback systems using case scenarios, simulated patients, and clinical record audits to identify knowledge-practice gaps and guide continuing education.

For Nursing Educators:

8. Strengthen undergraduate nursing curricula to include comprehensive triage content with emphasis on practical skill development through simulation-based learning, not merely theoretical instruction.

9. Develop and implement standardized triage continuing education programs with periodic refresher courses, recognizing that single educational interventions produce only transient knowledge improvements.

10. Establish formal partnerships between nursing education institutions and clinical facilities to create structured clinical learning experiences in emergency triage with clear learning objectives, supervised practice, and formative assessment.

For Future Research:

11. Conduct multicenter studies using direct observation of triage encounters or standardized patient simulations to validate self-reported practice findings and more accurately characterize triage performance.

12. Investigate the relationship between triage accuracy and patient outcomes (waiting times, adverse events, mortality, length of stay) in Nigerian emergency departments to establish the clinical and economic impact of triage quality.

13. Employ mixed-methods approaches, including qualitative interviews with emergency nurses, to explore the contextual factors, barriers, and facilitators influencing triage practice from the perspective of frontline clinicians.

14. Evaluate the effectiveness and cost-effectiveness of alternative triage training modalities (simulation-based training, e-learning, mentorship programs) in the Nigerian context to identify optimal educational strategies.

15. Conduct implementation science research to identify effective strategies for translating evidence-based triage protocols into routine clinical practice in resource-constrained African emergency departments.

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HIGHLIGHTS

What is the current knowledge?
- Triage is a critical function that determines patient prioritization and resource allocation in emergency departments
- Previous African studies report triage knowledge rates of 58-63% and adequate practice rates of 30-42%
- A significant theory-practice gap exists in triage performance internationally
- Educational level, training, and experience influence triage competence
- No previous research has examined triage knowledge and practice among emergency nurses in South-Western Nigeria

What is new here?
- First comprehensive assessment of triage competence in Nigerian tertiary hospital emergency departments
- Higher knowledge rates (91.7%) than previously reported in Africa, likely reflecting improved educational preparation
- Married nurses were 10 times more likely to have good triage knowledge than single nurses—a novel finding requiring further investigation

- No significant association between triage knowledge and self-reported practice, confirming the persistence of theory-practice gaps
- Educational qualification was the only significant predictor of triage practice, supporting baccalaureate preparation for emergency nurses
- System-level constraints (patient record access, staffing, physical space) are perceived as major barriers to effective triage

REFERENCES

[1] Ciottone GR, Biddinger PD, Darling RG, Fares S, Keim ME, Molloy MS. Ciottone's Disaster Medicine. 2nd ed. Philadelphia: Elsevier Health Sciences; 2015.

[2] Bhalla MC, Frey J, Rider C, Nord M, Hegerhorst M. Simple Triage Algorithm and Rapid Treatment and Sort, Assess, Lifesaving, Interventions, Treatment, and Transportation mass casualty triage methods for sensitivity, specificity, and predictive values. Am J Emerg Med. 2015;33(11):1687-91.

[3] Pollaris G, Sabbe M. Reverse triage: more than just another method. Eur J Emerg Med. 2016;23(4):240-7.

[4] Alexander D, Masini E, Mugnai L. Integrated Emergency Management for Mass Casualty Emergencies. 2013:101.

[5] Angelini DJ. Triage: The evolution of an essential emergency department nursing role. J Emerg Nurs. 2015;41(5):386-7.

[6] Zachariasse JM, Seiger N, Rood PP, Alves CF, Freitas P, Smit FJ, et al. Validity of the Manchester Triage System in emergency care: A prospective observational study. PLoS One. 2017;12(2):e0170811.

[7] Bullard MJ, Musgrave E, Warren D, Unger B, Skeldon T, Grierson R, et al. Revisions to the Canadian Emergency Department Triage and Acuity Scale (CTAS) Guidelines 2016. CJEM. 2017;19(S2):S18-27.

[8] Ebrahimi M, Heydari A, Mazlom R, Mirhaghi A. The reliability of the Australasian Triage Scale: a meta-analysis. World J Emerg Med. 2015;6(2):94-9.

[9] Stanfield LM. Clinical Decision Making in Triage: An Integrative Review. J Emerg Nurs. 2015;41(5):396-403.

[10] Tam HL, Chung SF, Lou CK. A review of triage accuracy and future direction. BMC Emerg Med. 2018;18(1):58.

[11] Brosinski CM, Riddell AJ, Valdez S. Improving Triage Accuracy: A Staff Development Approach. Clin Nurse Spec. 2017;31(3):145-8.

[12] Fong RY, Glen WSS, Jamil AKM, Tam WWS, Kowitlawakul Y. Comparison of the Emergency Severity Index versus the Patient Acuity Category Scale in an emergency setting. Int Emerg Nurs. 2018;41:13-8.

[13] Jenson A, Hansoti B, Rothman R, de Ramirez SS, Lobue N, Wallis L. Reliability and validity of emergency department triage tools in low- and middle-income countries: a systematic review. Eur J Emerg Med. 2018;25(3):154-60.

[14] Ogunyemi T, Oyedeji R, Ogunyemi O. Emergency care in Nigeria: Challenges and opportunities. Afr J Emerg Med. 2020;10(4):171-5.

[15] Umar I, Oche M, Umar A, Bawa S, Gana G, Okafoagu N, et al. Triage knowledge and practice among nurses in emergency departments of tertiary hospitals in Sokoto, Nigeria. Niger J Basic Clin Sci. 2021;18(1):32-7.

[16] Benner P. From Novice to Expert: Excellence and Power in Clinical Nursing Practice. Menlo Park, CA: Addison-Wesley; 1984.

[17] Afaya A, Azongo T, Yakong V. Perceptions and knowledge on triage of nurses working in emergency departments of hospitals in the Tamale metropolis, Ghana. IOSR J Nurs Health Sci. 2017;6(3):59-65.

[18] 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: A cross sectional study. BMC Res Notes. 2019;12(21):1-4.

[19] Goldstein LN, Morrow LM, Sallie TA, Gathoo K, Alli K, Mnguni M, et al. The accuracy of nurse performance of the triage process in a tertiary hospital emergency department in

Gauteng Province, South Africa. S Afr Med J. 2017;107(3):243-7.

[20] Fathoni M, Sangchan H, Songwathana P. Relationships between triage knowledge, training, working experiences and triage skills among emergency nurses in East Java, Indonesia. Nurse Media J Nurs. 2013;3(1):511-25.

[21] Aiken LH, Sloane DM, Bruyneel L, Van den Heede K, Griffiths P, Busse R, et al. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. Lancet. 2014;383(9931):1824-30.

[22] Considine J, Botti M, Thomas S. Do knowledge and clinical experience have specific roles in triage decision-making? Acad Emerg Med. 2007;14(8):722-6.

[23] Farrohknia N, Castrén M, Ehrenberg A, Lind L, Oredsson S, Jonsson H, et al. Emergency department triage scales and their components: a systematic review of the scientific evidence. Scand J Trauma Resusc Emerg Med. 2011;19:42.

[24] Kutney-Lee A, Sloane DM, Aiken LH. An increase in the number of nurses with baccalaureate degrees is linked to lower rates of postsurgery mortality. Health Aff (Millwood). 2013;32(3):579-86.

[25] Benner P, Tanner C, Chesla C. From beginner to expert: Gaining a differentiated clinical world in critical care nursing. ANS Adv Nurs Sci. 1992;14(3):13-28.

[26] Ericsson KA. Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. Acad Med. 2004;79(10 Suppl):S70-81.

[27] Wolf P, Bigalke M, Graf BM, Birkholz T, Dittmar MS. Evaluation of a novel algorithm for primary mass casualty triage by paramedics in a physician manned EMS system: a dummy based trial. Scand J Trauma Resusc Emerg Med. 2014;22(1):50.

[28] Smith W. Triage in mass casualty situations. Contin Med Educ. 2012;30(11):413-5.

[29] Vassallo J, Beavis J, Smith JE, Wallis LA. Major incident triage: derivation and comparative analysis of the Modified Physiological Triage Tool (MPTT). Injury. 2017;48(5):992-9.

[30] Mohammad AlShatarat, Ahmad Rayan, Mohammed ALBashtawy. Triage Knowledge and Practice and Associated Factors Among Emergency Department Nurses. SAGE Open Nurs. 2022;8:23779608221130588.