Original Research Article

Knowledge and perceived skills of triage practices of nurses in emergency units of selected tertiary hospitals in Enugu state, South-East Nigeria

Abstract

Aim: Triage aims at promoting the safety of patients by ensuring the timing of care and resource allocation in requisite to the degrees of illness/or injury. The study investigated the knowledge and perceived skills of nurses in the practices of triage in ED of three purposively selected tertiary institutions in Enugu State.

Study design: A quantitative descriptive study.

Place and Duration of Study: The study was carried out at the Adult and Children Emergency Units of three tertiary hospitals in Enugu State, over a four (4) month period.

Methodology: All nurses who were employed and have worked for a minimum of 3 months at the emergency units formed the study population, with 74 studied altogether. Data collection was done with the aid of trained research assistants by means of a standardized, structured, self-report questionnaire. It was given to the nurses and a follow up visit scheduled for collection for those that cannot be collected same day. Eighty three (83) questionnaires were administered after giving written informed consent and seventy four (74) retrieved. Data was analysed using SPSS version 24.

Result: Major findings include: moderate triage knowledge(51.4%); high perceived skills in patient assessment in NOHE (83.1%) and UNTH (80.0%) but moderate in ESUTH (61.6%); high perceived triage skills in patients categorization in NOHE (83.3%), moderate in UNTH (73%) and low in ESUTH (42%); high perceived triage skills in allocation of patients in NOHE (85%) and UNTH (80%) but low in ESUTH (48.0%). Triage knowledge, years of experience in ED, triage skills and professional certificates all had a weak relationship with triage implementation practices. Years of working in the ED and nurses triage skills show no significant relationship.

Conclusion: Nurses in ED do not have sufficient knowledge to carry out triage effectively. Importance of continuous training/retraining portrayed, leading to timely response to patients, reduction in overcrowding and aggressiveness in ED; and maximize resource utilization.

Keywords: Knowledge and Perceived skills, Triage practices, Nurses, Emergency units, Tertiary hospitals, Enugu state

Introduction

An emergency department (ED) also referred to as the accident and emergency, trauma unit or casualty department is a medical treatment facility specializing in emergency medicine, the acute care of patients who present without prior appointment, either by their own means or by that of an ambulance.[1] The emergency department is a 24hour-a-day unit managed by an emergency team of doctors, nurses, laboratory scientist, pharmacist, physiotherapist and health attendants. The number of patients presenting to the emergency department is most times intensifying and overwhelming for example in a mass casualty situation. Due to the unplanned nature of patient attendance, the department must provide initial treatment for a broad spectrum of illnesses and injuries, some of which may be life threatening and require urgent attention. There is need to organize these patients to determine who should be given attention first in order to reduce mortality.

A process used to determine the severity of illness or injury and/or prioritize patients according to needs for medical care, irrespective of their order of influx or other factors including gender, age and socioeconomic status is known as triage.[2] Triage is an indispensable tool in the organization of care in the Emergency Department. It aims at promoting the safety of patients by ensuring the timing of care and resource allocation in requisite to the degrees of illness/or injury.[3,4]

The World Health Organisation[5] Injuries and Violence Prevention Department and International Association for the Surgery of Trauma and Surgical Intensive Care, have identified three basic rights of the injured patient. These rights are additional ground for triage on the ill or injured patients and so are imperative to all patient assessment and appropriate management. These include the management of life threatening injuries according to priorities so that the likelihood of survival is maximized, treatment of potentially disabling injuries and minimizing pain and psychological suffering are achieved.

However, triage process has been described as one requiring time-critical complex clinical decisions to be made under conditions of stress and uncertainty and with little margin for error.[6] Any emergency, including trauma and medical emergencies require competent early assessment by health care providers most especially nurses. Rendering the most appropriate type of care within the shortest time possible is one of the most important aspects in the prevention of death and disability in an emergency centre.[1]

The nurse plays a vital role in Triage in the emergency unit. She is at the front line in reception of patients into the unit. The triage nurse performs a brief, focused assessment and assigns the patient a triage acuity level, which is a proxy measure of how long an individual patient can safely wait for a medical screening examination and treatment.[7] Triage: Emergency Centre in Nursing Interventions Classification (NIC6364) is defined as nursing interventions aimed at establishing priorities and initiating treatment for patients in an emergency centre.[12]

The most important requirement for successful triage is the acquisition of triage knowledge and skills to enable the nurse perform at expected optimal level at the emergency unit. Studies have shown that doing correct triage needs a high level of cognitive and metacognitive processes.[9,10] Other studies have shown that the main factor related to triage skill of the emergency nurses was

triage knowledge.[9,11] Knowledge, skills, expertise, competence, qualification and readiness for triage decision making is very important for excellent outcome.[12,13] With pressure to assess a growing queue of patients, nurses use their expertise to process data obtained from the presenting problem, physiological observations, general appearance and all important gut feelings to arrive at a triage category for each patient.[14] If equipped with necessary knowledge and skills on triage, one will expect the triage nurse to perform better in triage task and reduce waiting time in the ED, reduce incidence of aggression in the ED, increase patients' satisfaction and most importantly reduce mortality and morbidity.

With the increase in insurgency in Nigeria and her ranking third on the Global Terrorism Index 2015, following Afghanistan and Iraq[15] under the attack of the Boko Haram group and the net effect of bomb blast which leaves a large number of injured and burnt patients, it becomes very imperative that nurses in the emergency department possess a very high level of knowledge and skill in triage in order to decide who is to be seen first and decrease number of deaths. Perhaps there are other factors that may affect implementation of triage in the emergency department, the knowledge and skills of emergency nurses are of great interest in this index study.

It is on this background that this study sets to assess and compare the knowledge and percieved skills of nurses in the implementation of triage in emergency departments of three purposively selected tertiary health institutions in Enugu State as a prelude to suggesting or implementing any remedial interventions.

Methods

Description of study setting

The study was carried out in National Orthopaedic Hospital (NOHE), University of Nigeria Teaching Hospital, Ituku-Ozalla (UNTH) and Enugu State University of Technology (ESUT) Teaching Hospital, Parklane all in Enugu Metropolis of Enugu State.

NOHE is located in Enugu-East L.G.A. of Enugu State, along Enugu-Abakaliki express road, adjacent to 82 Division of the Nigerian Army. It comprises of 12 wards, a Trauma (Emergency) unit and an Out-Patient Department. NOHE offers orthopaedic and trauma specialist services as seen during accidents, domestic violence, inter-tribal or ethnic clashes. NOHE is also the regional burns Centre of the South-Eastern part of Nigeria. The emergency department of this institution provides medical care to an average of 180 patients every month as observed in the medical record register of 2017. The department also trains both nurses and doctors in orthopaedics, plastic and burns care. High volume of patients and high level of expertise in triage are expected.

The UNTH is located in Ituku-Ozalla, about 21km from Enugu city along Enugu-Port Harcourt express way. This hospital covers approximately 306 hectares of land and is a teaching hospital for health care and training of medical students of the University of Nigeria. It is the highest point of referral for Enugu State and the South Eastern part of Nigeria and offers specialist services in medical, surgical, obstetrics and almost every other medical specialty. It has a 24hour emergency department for reception of acutely ill patients, accident and disaster victims. Experts in resuscitation and triage therefore, are expected. From the medical records of the institution, in

2017 the average monthly patient inflow in the adult and children emergency is 251 and 128 respectively.

ESUTH is located in Enugu East L.G.A. of Enugu state in the Government Residential Area, behind Shoprite shopping mall. This institution is located at the heart of the Enugu city and is known for its proximity to other regions of Enugu urban. This makes it prone to high influx of patient to the emergency unit thereby necessitating the need for a good triage system. The ED of the institution is open 24hours for reception of emergency patients. This institution also have separate emergency unit for adult and children. It also offers residency training for doctors. From the medical records of the institution in 2017, the average monthly patient load in the adult and children emergency unit are 210 and 115 respectively.

These three institutions were purposively selected out of the four tertiary health institutions in Enugu State for the study, dropping Federal Neuropsychiatric Hospital, because they are tertiary points of referral in Enugu State with high mix of cases and operate a 24hour emergency unit with high number of monthly patient load. They are training centers for doctors and nurses. It is therefore expected that patients who come to these institutions will receive high quality care from well trained and educated professionals, especially in the emergency unit.

Research design

A quantitative descriptive study design was used for the study. This research design seeks to obtain information concerning the current status of nurses knowledge and skills in implementing triage, describe relationship that exist as well as opinions held which are evident. Three standardized questionnaires looking at different aspects of triage were modified and adapted for use in this study. The questionnaire used in Tanzania and Ethiopia both looked at the knowledge and skills of triage amongst nurses in ED while the Iranian tool looked at knowledge and practice of nurses in patient triage. Our adapted tool was divided into four sections: Demographic data sheet; triage knowledge questions; triage skills questions and triage implementationpractice questions as to study the "knowledge and perceived skills in the implementation of triage by nurses in the emergency unit of UNTH, NOHE and ESUTH, parklane". This study design was used successfully in Tanzania, Ethiopia and Iran[4,16,17] respectively to assess knowledge and skills of triage amongst nurses working in the emergency centres.

Description of study population:

The population of study constituted all nurses who were employed and have worked for a minimum of 3 months at the emergency units (adult and paediatrics) of NOHE (21 nurses), UNTH (37 nurses) and ESUTH (40 nurses) with a total of 98 nurses. This was obtained from the Nursing Services Department of the various institutions. Since the population size was not much, all of them were targeted to be studied.

Sample and Sampling

This was a purposive study of three tertiary health institutions, targeting at the nurses working in the emergency department. Due to the small population, non-probability sampling (involving the entire identified population) was done. The total population of the nurses were eligible to be studied if they meet the following criteria; Nurses who have been employed to work in the emergency units of NOHE, UNTH and ESUTH; nurses who are on duty during the period of the study; nurses who would have spent a minimum of 3 months in the emergency unit of the hospitals; and nurses who gave a written informed consent to participate in the study.

Data collection Instruments and procedure

Data collection was done by means of a standardized, structured, self-report questionnaire. The structured questionnaire assessed how knowledgeable nurses are in triage, perceived triage skills and triage implementation by these nurses. The questionnaire was developed into 4 sections: Demographic Data Sheet (DDS); Triage knowledge questions (TKQ); Triage Skill Questions (TSQ);and Triage Implementation Practice Questions (TIPQ).

Assessment of Knowledge and Skills of Triage amongst Nurses Working in The Emergency Centres in Dar es Salaam, Tanzania questionnaire was adapted with permission[4] and similar questionnaire used in Addis Ababa.[16] Triage skill questions were adapted from Tilahun[16] while triage implementation practice questions from Robert.[4] The triage knowledge questions were constructed by the authors. The questionnaires were modified and adapted for the purpose of this study.

Designed for the reliability of the instrument, a pilot study was conducted and the instrument was administered once to 10 nurses in the emergency unit of Federal Medical Centre (FMC), Umuahia using split-half method. The chosen institution has similar characteristics (a tertiary health institution, good case mix, with a 24-hours functional emergency department) with the study institutions. The data generated were analysed using Cronbach's alpha and listwise deletion. A reliability coefficient of 0.763 was obtained. This is considered an acceptable level of reliability.

The study questionnaires were distributed to nurses working in the emergency unit of NOHE, UNTH and ESUTH by the researchers and trained research assistants to cover the three hospitals. The questionnaire takes about 10-15 minutes to complete which was given to the nurses and a follow up visit scheduled for collection for those that cannot be collected same day. Eighty three (83) questionnaires were administered after giving written informed consent and seventy four (74) collected as nine (9) later opted out.

Ethical consideration

Ethical clearance and approval for the study was obtained from Health Research and Ethics Committee of NOHE, ESUTH and UNTH, and administrative permit from the Head of Nursing Services of all the hospitals. Also, permission to conduct the study was taken from the Chief Nursing Officer in charge of the emergency units and written informed consent obtained from the respondents before administration of the questionnaire. Confidentiality of respondent's information was assured and strictly observed. Respondents who consented were given the questionnaire to complete.

Method of Data Analysis

Collected data were collated, cleaned and analysed using the Statistical Package for Social Sciences (SPSS) version 24.0. Triage knowledge based questions were analysed with descriptive statistics such as frequencies which was cumulated and ranked into various percentage groups. Triage Skills Questions and Triage Implementation Practice Questions were also analysed and represented in percentages, means and standard deviation. Linear regression was used to test for relationships in Hypothesis, and ANOVA was used to test for difference of mean in Hypothesis.

Results

Table I shows that 30 (40.5%) of the respondent work in ESUTH, 27 (36.5%) work in UNTH and 17 (30%) work in NOHE. Most (48.6%), of the nurses in the three institutions were between the ages of 30-39 (NOHE – 9 out of 17; UNTH- 13 out of 27 and ESUTH – 14 out of 30) with the mean age of 22.3 years (SD 9.4) and range of 30years.

Only 1(1.4%) of the respondent had an MSc in Nursing (in UNTH); 33(44.6%) had Bsc Nursing [NOHE - 6, UNTH – 12, ESUTH – 15] and 40(54.1%) had Diploma qualification [NOHE – 11, UNTH – 14 and ESUTH – 15].

With regards to specific professional training qualifications, only 21(28.4%) possess certificate in emergency/trauma care [NOHE – 11, UNTH – 8 and ESUTH – 2]; 1(1.4%) in critical/intensive care nursing [ESUTH – 1] and 52(70.2%) have other professional certificates such as orthopaedics, public health, midwifery, paediatircs nursing [NOHE – 6, UNTH – 19 and ESUTH – 27].

Fifty (67.6%) out of the 74 respondent have never had in-service training on triage [NOHE – 12, UNTH – 15 and ESUTH – 23]; Out of those that received in-service training, 13 (54.2%) have the training once in a year [NOHE – 4, UNTH – 8 and ESUTH – 7]; 4 (16.7%) agreed to having the training once in two years [UNTH – 3 and ESUTH -1] and 7(29.1%) of the nurses have this once in 3 years [NOHE – 1, UNTH – 1 and ESUTH – 5].

Only 13 (17.6%) have worked in the ED for >5years [NOHE – 6, UNTH – 3 and ESUTH- 4]; 21 (28.4%) have worked in the ED for 3-5 years [NOHE – 3, UNTH – 10 and ESUTH – 8]; 20 (27%) have worked there for 1-3 years [NOHE – 4, UNTH – 8 and ESUTH – 8] and another 20 (27%) have worked there for <1year [NOHE – 4, UNTH – 6, ESUTH – 10].

Table I: Demographic data of nurses in the ED (N=74)

			INSTITUTION			
			NOHE	UNTH	ESUTH	Total (%)
Age	20-29		1	1	12	14 (18.9)
	30-39		9	13	14	36 (48.6)
	40-49		4	6	1	11 (14.9)
	50-59		3	7	3	13(17.6)
Total						74(100.0)
Mean	22.3±9.4					
Level of Nursing Education	Diploma(RN/RM)		11	14	15	40 (54.1)
	Bsc/ BNSc		6	12	15	33(44.6)
	MSc		0	1	0	1(1.4)
Total						74(100.0)
Professional Certificate	Emergency/trauma Care		11	8	2	21(28.4)
	Critical/intensive care		0	0	1	1(1.4)
	Others (Orthopaedics, Public health etc)		6	19	27	52(70.2)
Total						74(100.0)
Years of working in ED	< one year		4	6	10	20(27.0)
	1-3 years		4	8	8	20(27.0)
	3-5 years		3	10	8	21(28.4)
	5-10 years		5	2	4	11(14.9)
	>10 years		1	1	0	2(2.7)
Total						74(100.0)
In-Service Training on Triage	No		12	15	23	50(67.6)
	Yes		5	12	7	24(32.4)
	If Yes, how often?	Once in a Year	4	8	1	13(54.2)
		Once in 2 years	0	3	1	4(16.7)
		Once in 3 years	1	1	5	7(29.1)

Table II shows the various skills acquired by nurses in the emergency department of the institutions. Out of the 74 respondents, 42 (62.2%) have had training in BLS [NOHE – 11,

UNTH – 17 and ESUTH – 18]; 12 (16.2%) in ALS [NOHE – 1, UNTH – 10 and ESUTH – 1]; 36 (48.6%) in CPR [NOHE – 6, UNTH – 16 and ESUTH – 14] , 10(13.5%) in ENPC [UNTH- 6 and ESUTH – 4] and 7(9.5%) of them have had training in TNCC [NOHE – 3, UNTH – 3 and ESUTH – 1].

Table II: Acquired triage skills of nurses in the ED. N=74

			NOHE (n=17)	UNTH (n=27)	ESUTH (n=30)	TOTAL(%)
Acquired triage Skills (more than one answer)	BLS	Yes	11(64.7%)	17(63.0%)	18(60.0%)	46(62.2%)
		No	6(35.3%)	10(37.0%)	12(40.0%)	28(37.8%)
		Total				74(100%)
	ALS	Yes	1(5.9%)	10(37.0%)	1(3.3%)	12(16.2%)
		No	16(94.1%)	17(63.0%)	29(96.7%)	62(83.8%)
		Total				74(100%)
	CPR	Yes	6(35.3%)	16(59.3%)	14(46.7%)	36(48.6%)
		No	11(64.7%)	11(40.7%)	16(53.3%)	38(51.4%)
						74(100%)
	ENPC	Yes	0(0%)	6(22.2%)	4(13.3%)	10(13.5%)
		No	17(100%)	21(77.8%)	26(86.7%)	64(86.5%)
		Total				74(100%)
	TNCC	Yes	3(17.6%)	3(11.1%)	1(3.3%)	7(9.5%)
		No	14(82.4%)	24(88.9%)	29(96.7%)	67(90.5%)
		Total				74(100%)

Basic Life Support (BLS), Advanced Life Support (ALS), Cardiopulmonary Resuscitation (CPR), Emergency Nurse Paediatric Course (ENPC), Trauma Nurse Core Course (TNCC)

Table IIIa shows that more than half 39(52.7%) of the nurses had a high knowledge of triage definition as they corrected all three definitions of triage. Specifically, more than half correctly defined triage in NOHE (58.8%) and UNTH (63.0%) while less than half could correctly define triage in ESUTH (40.0%). With regards to allocation of color codes to patients, 37(50.0%) of the nurses [NOHE – 8, UNTH – 11 and ESUTH – 18] had low triage knowledge level on this while 33(44.6%) of them [NOHE – 8, UNTH – 15 and ESUTH – 10] had moderate knowledge level, with only 4(5.4%) nurses [NOHE – 1, UNTH – 1 and ESUTH – 2] having high knowledge level on allocation of color codes to patients according to various triage category. Looking at their knowledge of triage patient categorization according to priority levels, 33(44.6%) of the nurses [NOHE – 8, UNTH – 15 and ESUTH – 10] had low level of knowledge, 32(43.2%) of them [NOHE – 8, UNTH – 12 and ESUTH – 12] had moderate knowledge while only 9(12.2%) of them [NOHE – 1, UNTH – 0 and ESUTH – 8] had high level of knowledge on various triage categories. More than half, 44(59.5%) of the nurses [NOHE – 9, UNTH -18 and ESUTH – 17] had low knowledge on triage waiting time for patients in various triage categories. The remaining 30(40.5%) had moderate knowledge [NOHE – 8, UNTH – 9 and ESUTH – 13], with none of the nurses exhibiting high level of knowledge in this domain. While the level of knowledge on triage color codes and waiting time showed no significant statistical difference across the three health institutions ($p>0.05$), knowledge of patient categorization revealed significant difference ($p<0.05$).

Table IIIb shows that generally in all triage knowledge questions, more than half, 38(51.4%) of the nurses [NOHE – 10, UNTH – 16 and ESUTH – 12] had moderate knowledge level of triage, 18(24.3%) had low level of knowledge in triage [NOHE - 5, UNTH – 8 and ESUTH – 5] and the remaining 18(24.3%) had high level of knowledge in triage [NOHE – 2, UNTH - 3 and ESUTH – 13]. However, the variation in the general level of knowledge in triage amongst the nurses in the three health institutions is not statistically significant ($p>0.05$).

Table IIIa: Triage Knowledge Level of Nurses in the Institutions N=74

Definition of Triage	NOHE(n=17)	UNTH(n=27)	ESUTH(n=30)	Total (N=74)
Low	3(17.7%)	2(7.4%)	11(36.7%)	16(21.6%)
Moderate	4(23.5%)	8(29.6%)	7(23.3%)	19(25.7%)
High	10(58.8%)	17(63.0%)	12(40.0%)	39(52.7%)
Knowledge on Triage Color Codes				
Low	8(47.1%)	11(40.7%)	18(60.0%)	37(50.0%)
Moderate	8(47.1%)	15(55.6%)	10(33.3%)	33(44.6%)
High	1(5.9%)	1(3.7%)	2(6.7%)	4(5.4%)
Mean	1.5	1.3	1.4	
S.D	0.51450	0.48038	0.50401	
P-value		> 0.05		
Knowledge on Patient Categorization				
Low	8(47.1%)	15(55.6%0	10(33.3%)	33(44.6%)
Moderate	8(47.1%)	12(44.4%)	12(40.0%)	32(43.2%)
High	1(5.9%)	0	8(26.7%)	9(12.2%)
Mean	1.5	1.2	2.5	
S.D	.885	.2090	.01966	
P-value		**<0.05**		
Knowledge on Triage Waiting Time				
Low	9(52.9%)	18(66.7%)	17(56.7%)	44(59.5%)
Moderate	8(47.1%)	9(33.3%)	13(43.3%	30(40.5%)
High	0	0	0	0(0.0%)
Mean	1.5	1.4	1.9	
S.D	0.618	0.506	0.784	
P-value		>0.05		

<60%= Low Knowledge, 60-80% = Moderate Knowledge and >80% = High knowledge

Table IIIb: Summary of Triage Knowledge of the Nurses in Various Institutions

Triage Knowledge		INSTITUTION				P-Value
		NOHE(n=17)	UNTH(n=27)	ESUTH(n=30)	Total(N=74)	
	Low	5(6.8%)	8(8.7%)	5(6.8%)	18(24.3%)	>0.05
	Moderate	10(14.5%)	16(23.2%)	12(16.2%)	38(51.4%)	
	High	2(2.9%)	3(4.1%)	13(17.6%)	18(24.3%)	
Total		17(22.9%)	27(36.5%)	30(40.5%)	74(100.0%)	

<60%= Low Knowledge, 60-80% = Moderate Knowledge and >80% = High knowledge

Table V shows that perceived skills in patient assessment were high in NOHE (83.1%) and UNTH (80.0%). It was however moderate amongst nurses in ESUTH (61.6%). In terms of patient categorization, nurses perceived triage skills was high in NOHE (83.3%), moderate in UNTH (73%) and low in ESUTH (42%). Their perceived triage skills in allocation of patients were also high in NOHE (85%) and UNTH (80%) but low in ESUTH (48.0%).

Table IV: Range, Mean, Standard Deviation, Percentage and Level of Perceived Triage Skill of nurses in the three institutions (N=74)

Objective II: To determine the level of triage skills possessed by nurses in emergency unit of NOHE, UNTH and ESUTH.

Variable	Possible Range	Actual Range	Mean	S.D	Standard Error	Percentage	Level
NOHE (n=17)							
Rapid Patient Assessment	0-145	51-140	121.3	12.4	3.1	83.4%	High
Patient Categorization	0-15	10-15	12.5	1.5	0.4	83.3%	High
Patient Allocation	0-15	9-15	12.8	1.8	0.4	85%	High
UNTH (n=27)							
Rapid Patient Assessment	0-145	60-140	113.3	16.9	3.6	80.0%	High
Patient Categorization	0-15	6-15	11.6	2.7	0.5	73%	Moderate
Patient Allocation	0-15	7-15	12.1	2.3	0.4	80%	High
ESUTH (n=30)							
Rapid Patient Assessment	0-145	42-98	89.3	28.7	5.8	61.6%	Moderate
Patient Categorization	0-15	6-9	6.3	2.3	0.5	42.0%	Low
Patient Allocation	0-15	4-8	7.2	2.3	0.4	48.0%	Low

<60%= Low Knowledge, 60-80% = Moderate Knowledge and >80% = High knowledge

Table V depicts the finding of multiple comparison analysis done across the three health institutions regarding some selected parameters. A further analysis was done on the significant difference noted in the level of knowledge on patient's categorization and found that the low knowledge that made the difference lies with ESUTH predominantly, followed by UNTH that had a moderate knowledge. When all the perceived Triage skills put together were compared across institutions, there was a significant difference (p=0.005). Further analysis shows that the difference lies in the low level noted in ESUTH. Level of education in all three institutions did not show significant relationship with nurses knowledge of Triage. This is reflected in values r=0.351, P>0.05 in NOHE, r=0.267, p>0.05 in UNTH and r=0.147, p>0.05 in ESUTH. There was a weak relationship (r= 0.003) between years of working in the ED and triage skills. A rise in years of working in the emergency department did not result to a significant rise in triage skills of the nurses in all the three health institutions.

Table V: MULTIPLE COMPARRISONS (CORRELATION) OF NURSES ATTRIBUTES ACROSS THE THREE HEALTH INSTITUTIONS

SERIAL NO.	PARAMETERS	R-VALUE OR R SQUARE	P-VALUE
1.	**Further analysis on Knowledge of patient categorization in Triage**		
	• ESUTH* Vs NOHE	97.0588	0.557
	• ESUTH* Vs UNTH	120.3704	0.014**
	• NOHE Vs UNTH*	23.3115	0.001**
2.	**Perceived triage skills among Nurses in Institutions**		
	• ESUTH* Vs NOHE	-23.3362	0.004**
	• ESUTH* Vs UNTH	-13.9044	0.003**
	• NOHE Vs UNTH*	9.4318	0.992
3.	**Nurses Education Certificates (RN/RM; Bsc Nursing; Msc Nursing) Vs Triage Knowledge in the Institutions**		
	• NOHE	0.351	0.199
	• UNTH	0.267	0.441
	• ESUTH	0.147	0.448
4.	**Years of working in ED Vs Perceived Triage skills**	0.003	0.671

Key: * (Institution with lower knowledge and skills); **(Significant p-value <0.05)

Discussion of findings

A skill of triage practices of nurses is an integral part in clinical nursing emergency unit. In the findings of the qualification of the respondents, this study shows that majority, 54.1%, of the nurses have diploma qualification. This is in contrast to that of Tilahun[16] that had majority (74.1%) of the nurses with B.Sc qualifications. In total, only 28.4% of the nurses have had professional certificates in emergency or critical care nursing. Other respondents have professional certificate in other nursing specialty such as midwifery, orthopaedics, public health and paediatrics. Since there is no subspecialty of triage nursing, emergency/critical care specialties are areas where nurses are exposed to courses on triage. Therefore, this finding indicates that most of the nurses may not have had better exposure to triage courses. A similar finding was also reported in a study in Indonesia by Fathoni et al.[18] In-service training of emergency nurses in triage is poor as 67.6% of the nurses have never had this training. Similar findings of inadequate in-service training on triage were reported by Hammand et al[19] and Augustyn[20] in China and South Africa respectively. Majority of the respondents have worked in the emergency department for less than 5years in our study. However, this finding is in contrast to the study by Fathoni et al[18] in Indonesia where it was reported that more than half of subjects (51.90%) had experience working at ED more than five years. Applying Benner's theory of novice to expert,[21] the best nurse suitable to carry out the triage process are the proficient and expert nurse with 2-5years and >5years of experience. Findings from this study show that there are few proficient nurses in the ED's. However, nurses with <3years of experience in the ED are high (54%). This may be as a result of the periodic rotation of nurses to different units in the various institutions.

Our finding that more than half (51.4%) of the nurses had moderate triage knowledge levels corresponds with the study in Ghana[22] that revealed that the overall level of knowledge about triage among nurses in the ED was 62.6% - moderate. In contrast however, some other studies reported low triage knowledge levels.[4,16,18,23,24]

As to their knowledge on the definition of triage, more than half (52.7%) of the respondent had high scores similar to the findings in Tanzania[4] and Ghana[22] where 67% and 61.5% respectively of the respondent were knowledgeable on triage. Most of the nurses in the three institutions had moderate (43.2%) to low (44.6%) knowledge on triage categorization, a finding that is also similar to that of the study in Tanzania[4] which reported that more than half (52%) of the respondent could not allocate patients to appropriate triage categories. More than half (59.5%) of the respondents had low knowledge level on triage waiting time. This is similar to findings of Robert et al[4] that reported about 58% of the nurses not being knowledgeable in triage waiting time limits while in contrast to the finding of Afaya et al[22] where most (51.4%) nurses had adequate knowledge of triage waiting time. Lack of adequate knowledge on waiting time limits may result to harmful delays in rendering timely emergency care, thereby increasing the risk of avoidable deaths. The reason for the findings of moderate knowledge level in this study may be multifactorial: due to the nurses educational exposure as majority (54.1%) of the nurses has a diploma in nursing, 44.6% have a B.Sc and only 1(1.4%) respondent have an M.Sc degree, may also be due to inadequate in-service training on triage as reported by more than half, 50(67.6%) of the respondent and their short stay at the EDs. It thus seems that nurses in the emergency department carry out this triaging process utilizing residual knowledge obtained from their basic schools.

Advanced nursing courses such as BLS, ALS, CPR and TNCC are essential in emergency nursing as they offer skill acquisition in triage as well as other life-saving skills. This study revealed that more than half (NOHE - 64.7%, UNTH – 63% and ESUTH – 60%)) of the respondent in all three institutions have had at least training in BLS, a finding in contrast to the study of Fathoni et al[18] in Indonesia which reported that advanced nursing skills were not high. Nurses in NOHE perceived their triage skills to be high, nurses in UNTH reported moderately-high perceived triage skills whereas nurses in ESUTH reported low-moderate perceived triage skills. This is quite similar to findings in Indonesia[18] and Ethiopia[16] which reported the perceived nurses skills of triage to be at moderate level. The reason for this finding in the level of triage skills in this study may be as a result of low exposure to advanced nursing programmes as earlier stated, a programme where skills in triage are taught. It is note-worthy that nurses in ESUTH were found to have the difference noted in the triage knowledge level comparison (Table V). This may be explained by their low-moderate perceived triage skills. However, an observational study to actually assess their skills may reveal a different result. Generally however, nurses' level of knowledge in triage in all three institutions showed no significant variation. The nurses tend to have similar triage knowledge level. A further analysis of the various knowledge groups indicated significant differences with regards to categorization of patients into various triage priority levels. Nurses in ESUTH revealed a lower knowledge level in this domain when compared to the other two institutions. However, knowledge in terms of allocation of color tags and triage waiting time showed no significant difference in all three health institutions.

The index study revealed a weak relationship between educational level and triage knowledge in all three institutions. This finding implies that nurses' level of education does not seem to matter as a rise in level of education does not result in a significant rise in nurses triage knowledge. This is in contrast to the study in Ethiopia[16] that showed significant association with level of education and triage knowledge as degree holders were found to have higher knowledge compared to diploma holders. As seen in this study, there is a moderate level of triage knowledge in nurses with B.Sc and M.Sc who may be expected to show high level of triage knowledge and those with diploma expected to show moderate level, still revealed low-moderate level of knowledge. The reason may be due to absence or low level of in-service training especially targeted on triage to refresh nurses existing knowledge. Similarly, only 28.45 of the nurses had qualification in emergency/trauma nursing or intensive care nursing (1.4%), specialty areas where triage is taught in details.

In this study, years of experience in the ED, triage knowledge and professional certificate did not have a significant relationship with triage implementation practices ($p>0.05$). This means that a rise in nurses' years of experience, triage knowledge or professional certificate may not result to a significant increase in their implementation practices. Therefore, in this study, the novice, advanced beginner, competent, proficient as well as the expert nurse may portray similar triage implementation practices. Nurses' knowledge of triage does not seem to matter from the findings of this study as they most likely would average the same. The reason for this finding may be due to existing work protocols or schedule in the ED or due to other related factors not covered in this study such as hospital policy.

However, there seem to be significant difference ($P<0.05$) in the perceived triage skills possessed by nurses in the studied institution with the difference lying amongst nurses in the ESUTH ($P=.000$). Perceived triage skills is not the same in all institutions as nurses in ESUTH was

shown to have less perceived triage skills than the other two hospital. This may be surprising even with relatively higher number of nurses who have attended one or more advanced nursing courses like BLS- 18(60.0%) and CPR-14(47.0%) in ESUTH. The question here is are these being applied in day to day work as work protocol? There may be other reasons not covered in this study.

The finding of a weak positive relationship between years of experience and triage skills (r=.003, p>0.05), is similar to that of Considine et al[25] which found out that there was also no significant relationship between experience and triage skills. The more experienced, the novice or the advanced beginner could have the same ability to perform triage. This may be as a result of no established triage knowledge/skills work protocol or other factors not covered in the study. This finding is at variance with that of Fathoni et al[18] and Tilahun[16] in Indonesia and Ethiopia with significant positive relationship (r=.27, p<.01) and (r=.52, p<.01) respectively, who noted that with increase in years of experience, nurses triage skills are improved. It is most likely that these centers had established triage protocols operational in different EDs and the nurses stayed for a long time in the ED duty posting that the effect on overall training is greatly appreciated.

Conclusion

The findings provide some understanding of triage knowledge, triage skill in the triage implementation practices of nurses working in emergency department of tertiary hospitals in Enugu State, South East Nigeria. Results from this study showed that nurses in the emergency department do not have sufficient knowledge to carry out this process of sorting and prioritizing patients to be seen or receive care in the emergency departments. This finding was noted in all the studied institution, especially in ESUTH. In- services trainings/workshop on triage which would have continuously updated their knowledge was noted to be poor. Their perceived skills to carry out this function were higher in NOHE and UNTH than in ESUTH. Although a report of good triage practices was found, the effectiveness of such practices is not ascertained especially with the low triage knowledge level revealed in this study. Also there was a weak relationship between level of education and knowledge and no significant association between triage knowledge and triage implementation practices. This portrays the importance of continuous training/retraining amongst these group of nurses. To correct these deficits, immediate continuous in-service training and workshops on triage knowledge and skills should be organized by hospital managers. The end result will be timely response to patients in the emergency department, reduction in overcrowding and aggressiveness in ED, maximize of resource utilization and ultimately saving more lives in our health institutions.

Recommendations:

1. Periodic In-service training workshops on triage for nurses in the emergency department should be organized by hospital managers.
2. Training programmes should address the knowledge deficits identified in this study as well as improve triage skills of nurses.

3. Triage courses should be improved in the diploma and undergraduate level.

4. Tertiary hospitals should minimize rotation of work place among nurse especially in specialized departments, as this made the nurses not to stay longer and not to have good work experience in emergency department.

5. Development of triage protocol policies and monitoring of the utilization of such policies in the emergency department.

6. Hospital administrators should ensure that there is visible hospital triage systems protocol hung inside the emergency department. This will always serve as a reminder for nurses working in the emergency unit.

7. Nurses, who have better knowledge and skill, should also teach their respective colleagues who have deficits.

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