Triage Competency and Its Associated Factors Among Healthcare Providers in Emergency Department in Kenya

By Faith Sabwa

Original Research Article

TRIAGE COMPETENCY AND ITS ASSOCIATED FACTORS AMONG HEALTHCARE PROVIDERS IN EMERGENCY DEPARTMENT IN KENYA

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Abstract

Background: In developing world triage is underutilized and often an ineffective area of health system. In Kenya triage system considered under developed and there is no National acceptable Accident and Emergency (A E) triage system.
Objective: The main objective of the study was to assess triage competency and its associated factors among healthcare providers in emergency department at selected hospitals in Kakamega County.
Methods: This was a cross-sectional study design. Census sampling was used to select the General Practitioner hospitals. Systematic sampling was used to select study participants from the 11selected hospitals. The study participants were 183 health care providers including; doctors, clinical officers and nurses working within the selected hospitals in accident and emergency departments. Data was collected using an observation check list and structured questionnaire. Data was analyzed using statistical package of social science software version 24. Inferential statistics were used to test the strength of association.
Results: The triage competency skills observed were; Rapid assessment; high level of skills observed at a mean of 88.9, patient categorization; the skills were moderate at a mean of 79.1, and Patient allocation skills which was moderate at a mean of 79.2.
Conclusion: The hospital should organize unit base training on triaging, formulate guidelines triaging, avail resources needed and supervise triage area.

Keywords: *Triage, Knowledge, Skills*

INTRODUCTION

Triage is a process that consist of timely and accurate identification of patents who require immediate treatment and distinguish them from those who present with diseases or illness but whose condition can wait (Mistry et al., 2018).

Emergency department (ED) is a crucial component of health care delivery system. Health care workers in ED are frontline staff who deal with patients presenting with acute life threatening conditions (Rayan et al.,2022) In developing world triage is underutilized and often an ineffective area of health system, (WHO, 2021). In Kenya, triage system is considered under developed and there is no national acceptable Accident and Emergency (A& E) triage system. (Wachira et al., 2012)

Effective triage ensures that health organization capacity meets overall patient demand especially during disaster pandemic, and other public health emergencies (Farcus et al., 2020). However, there are occasions when there are under and over triage scenarios. Under triage occurs when patient with rapidly deteriorating clinical conditions is

not identified and missed while over triaging occurs when patients with acute but not life-threatening illness are prioritized resulting to waste of medical equipment and man power (Hinson et al., 2018).

The reason for performing triage in an emergency department is to ensure that each patient is treated in order of clinical urgency and that the treatment is appropriate and timely (Lam2 et al., 2018). In Rapid assessment triage nurse need to be accomplished at rapid assessment this involves quick decision and suitable delegation of tasks. Long conversation with a patient should be avoided as should exhaustive history taking. Clinical observation such as temperature, pulse etc. need to be delegated if they are not required to establish priority as they are too time consuming (Varley et al., 2016). A triage assessment has to be done and consist of interpretation of clinical history and physiological assessment, allocation of an urgency code, and disposition to an appropriate area within ED. It is expected to take not more than 5 min; balancing speed and thoroughness to ensure the triage assessment itself does not impede to necessary clinical intervention (Rahman et al., 2013). Patient categorization in triage is one of the most important decision- making concept in ED, (Reisi et al, 2018).Triage system contain scales which have suitable time of waiting from seconds up to hours based on the condition of the patient (Golstein et al., 2017).The triage scales are the Australian triage scale (ATS), Manchester Triage System (MTA) also called Emergency Severity Index (ESI) and Canadian Emergency Triage and Acuity Scales (CTAS), (Ebrahim et al., 2016 ; Rahmani et al., 2013).

ATS is implemented by Australian college of emergency medicine, and aims to provide timely assessment and safety to all patients who present in ED based on clinical criteria (Soric et al., 2017). It includes five levels categories of acuity; immediately life-threatening (Category 1), imminently life-threatening (category 2), potentially life threatening (category 3), potentially life-serious (category 4),less urgent (category 5), (Hodge et al., 2013).

MTA/ESI focus on monitoring patient especially in waiting area before the condition can change or before being seen by the doctor

(Jones et al., 2014). Consist of three colors; Red-immediate intervention, Orange-condition ca waits for 10min to 1 hour, Yellow- mild hemorrhage (Worth, 2017).

CTAS aims to use a complaint list and specific physiological modifiers into triage level based on ideal maximum amount of time within which a patient should be seen by a physician, contain five levels that need resuscitation to non- urgent (Grisingh et al., 2018).

Anatomic and physiologic triage is recommended for pre hospital setting, can be used separately or in combination. Guidelines published in 2010 recommend that triage should be based on combination of physiologic and anatomic parameters alongside with mechanism of injury, co-morbidities, and demographics (Barraco et al, 2010)

Triage that is based on physiologic parameters include factors such as respiratory rate, palpable radical pulse, capillary refill, and Glass glow coma scale (GCS) among others (Koenig et al, 2010)

Most recommended triages scale that is also being used in Kenya is Emergency Severity Score (ESI) which classifies patients in five levels. 1 is resuscitation, 2 emergent, 3urgent, 4 less urgent and 5 non urgent (Esmailian, et al, 2014)

The tool manages patient within minimal time and this increases patient's outcome, reducing overcrowding in emergency department (Jordi et al, 2015) Patient allocation will often have to decide when to place the patient in the department, depending on departmental facilities policies. Patients who are distressed, in pain, bleeding or at extreme age may be placed in observational rooms away from general waiting rooms. In addition, patients who need to be lying down for examination for example those suffering from knee injuries, back and abdominal pain (Varndell et al., 2019). Moreover, the triage nurse needs to keep the occupants of the waiting room informed of the current approximate time. Constant observation and reassessment are necessary in order to spot those patients whose condition is changing. This may occur after an intervention e.g., administration of analgesia, (Rahmat et al., 2013).

Objective: To determine the triage competencies and associated factors required for the healthcare providers at selected hospitals in Kakamega County.

METHODS
Study Design
Analytic cross-sectional design was used.

Setting
The study was carried out in selected hospitals in Kakamega County. 1 county referral Hospital, 4 County hospitals, 3 sub-county hospitals and 3 faith- based level 4 hospitals on October 2019.

Research Subject
Health care providers (doctors, nurses and clinical officers) working in accident and emergency department from 6 months and beyond. Inclusion criteria was Doctors, clinical officers and nurses who had worked in the department above six months. Exclusion criteria was Doctors, clinical officers and nurses' interns.

The sample size was determined using fisher's formulae. The sample size used was 183 respondents. Census method was used to select 11 hospitals in Kakamega County. The health care providers were selected using systematic random sampling technique.

Instruments
Data was collected using structured questionnaire and observation checklist.

Data Analysis
Data collected was compiled and entered into computer for analysis using statistical package for social science software version 24. Descriptive statistics was used. Data was analysed using bivariate analysis. Odds ratio was used to test the strength of association between health care providers and triage competency and its associated factors. P value of 0.05 was considered as a level of significance. A one-way analysis of variance (ANOVA) was used to test differences in mean scores on physical resources. Higher mean scores reflected high triage competency skills. For ANOVA, F test of greater than 0.05 was used to test statistically significance differences.

Ethical Consideration

Ethical Approval to carry out the study was obtained from Masinde Muliro University of Science and Technology. Permission from ethical review committee of Kakamega County and license from National Committee for Science Technology& information (NACOSTI) (Applicant Identification Number: 883333). Permission to carry out the study was also given by the County Government of Kakamega, and by the selected health facilities within the County.

RESULTS
Socio-demographic characteristics of study participants
A total of 183 questionnaires were distributed of which all the respondents completed resulting in 100% response rate (Table 1). There were more females (53%) than males (47%). Most of the respondents were relatively young and aged between 25 – 34 (60.1%). About two-thirds (64.5%) were Protestants compared to 21.9%) who were Catholics. A higher proportion (48.1%) were nurses most being of KRCHN qualification (37.7%). More than one-third (36.1%) were clinical officers. On average, the healthcare providers had worked for 5.6 with a SD of ±4.7 years and ranging from 0.5 to 30 years. Majority (74.9%) had been in Emergency Department for less than 5 years.

Table 1. Sociodemographic characteristics of study participants

Variable	Categories	N	%
Gender	Male	86	47.0
	Female	97	53.0
Age group in years	25 - 34	110	60.1
	35 - 44	67	36.6
	45 - 54	5	2.7
	≥ 55	1	0.6
Religious affiliation	Catholic	40	21.9
	Protestant	118	64.5
	Other	25	13.7
Cadre	Nurse	88	48.1
	Clinical Officer	66	36.1
	Doctor	29	15.8
Qualifications	KRCHN	69	37.7
	KECHN	3	1.6
	BSN	16	8.7
	RCO	66	36.1
	MOH	29	15.9

Mean duration in the profession ± SD (Range)		5.6 ± 4.7 (0.5 – 30.0)	
Duration in Emergency Department (years)	Less than 5	137	74.9
	5 – 9	42	22.9
	≥10	4	2.2

Source: Primary Data, 2019

Triage Knowledge on Triage Competency

Overall knowledge level was calculated by scoring each of the correct responses as 1 and wrong responses as 0. The total was added up and scores of at least 60% or above was considered as high level of knowledge in line with NCK clinical placement grading system. As presented in Table 2, the knowledge level low as only 35.5% displayed high level knowledge on triage. Best three knowledge scores were on cervical injury being the diagnosis in cases of car accident with neck pain and dyspnea were 91.8%, oropharyngeal airway being used to eliminate possibility of upper airway obstruction (80.9%) and first placing patient with cervical collar in case of car accident with neck pain and dyspnea as correct answers (79.8%). Worst performance was on correct drug and dose for treatment of asystole which is epinephrine 1mg IV (4.4%). Over three-quarters (77.1%) did not know that otorrhea is the sign that confirms the diagnosis of base of skull fracture.

Table 2. Triage Knowledge on Triage Competency

Variable	Categories	n	%
Overall knowledge level (Out of score of 11)	≥ 6.6 (60% or more)	65	35.5
	< 6.6	118	64.5
Severe pain and contusion at flank following history of fall from a hill – likely injured	Liver	118	64.5
	Other responses	65	35.5
Likely complication for fall from a hill	Hypovolemic shock	144	78.7
	Other responses	39	21.3
Sign to confirm diagnosis of base of skull fracture	Otorrhea	42	22.9
	Other responses	141	77.1
following motor accident with skull fracture			
Motor accident with skull fracture GCS score	7	44	24.0
	Other responses	139	76.0
Car accident with neck pain and dyspnea	Cervical injury	168	91.8
	Other responses	15	8.2
Car accident with neck pain and dyspnea: what to respond to first	Place patient with cervical collar	146	79.8
	Other responses	37	20.2
Car accident: absence of breathing – anticipated problem	Pneumothorax	47	25.7
	Other responses	136	74.3
What oropharyngeal airway is	Eliminates possibility of upper airway obstruction	148	80.9
	Other responses	35	19.1
What to do first if patient has no pulse or respiration	Initiate closed chest massage	111	60.7
	Other responses	72	39.3
Correct drug and dose for treatment of asystole	Epinephrine 1mg IV	8	4.4
	Other responses	175	95.6
Drug and dose to use where Ventricular Fibrillation has failed after 3 shocks	Amiodorone 300mg IV push	63	34.4
	Other responses	120	65.6

Perceived Triage competency

Table 3 shows results of respondents' perceived triage competency which was assessed by asking them how they would decide how urgently and where a patient needs to be seen. Majority would perform physical assessment (94%) with a smaller proportion (48.6%) stating that they would their intuition and 71% relying on their experience. Whereas more than a third (38.2%) have categories that correspond to those used for disaster situation less than a third (32.2%) have written formal categories for triage with more than half

(57.4%) having four triage categories. However, even fewer (20.2%) have color codes for the categories and a comparable proportion documenting the color codes in patient notes (19.7%). Less than half (38.8%) have limits for each category by which each patient should be seen by a doctor. That notwithstanding, majority (80.3%) do reassess the trauma patients at time intervals. A higher proportion (35.5%) take between 4 -5 minutes for triaging a trauma patient.

Table 3. Perceived Triage Skill

Variable	Categories	n	%
How do you decide how urgently and where a patient needs to be seen?			
By physical assessment	Yes	172	94.0
	No	11	6.0
By experience	Yes	130	71.0
	No	53	29.0
By intuition	Yes	89	48.6
	No	94	51.4
Have written formal categories for triage	Yes	59	32.2
	No	124	67.8
Categories correspond to those used for disaster situation	Yes	70	38.2
	No	113	61.8
Number of triage categories available	Two	28	15.3
	Three	14	7.6
	Four	105	57.4
	Five	24	13.1
	None	12	6.6
Have color codes for the categories	Yes	37	20.2
	No	146	79.8
Document the color codes in the patient notes	Yes	36	19.7
	No	147	80.3
Have limits for each category by which each patient should be seen by a doctor	Yes	71	38.8
	No	112	61.2
Reassess the trauma patients	Yes	147	80.3
	No	36	19.7
at time intervals			
Average length of time taken for triaging a trauma patient	1-3 minutes	57	31.2
	4-5 minutes	65	35.5
	6-10 minutes	56	30.6
	More than 10 minutes	5	2.7

Perceived triage skill: Rapid Patient Assessment

Perceived Triage Skill Questionnaire was a 34-item questionnaire with three dimensions including rapid assessment, patient categorization, and patient allocation. Subjects were assessed in response to each item using 1-5 rating scale: 1 = need improvement, 2 = poor, 3 = fair, 4 =good, and 5 = very good. These were collapsed so that responses of Very Good were considered as high level with the remaining rating being categorized as low-level triage skills.

Respondents' Assessment on rapid patient assessment results are presented in Table 4.6. More than two-thirds of the respondents (68.3%) had high level triage skills in identification of a patient with respiratory distress, assessing temperature of the patient and collaborating with physician to administer emergency drugs, with 68.3% of the respondents falling under each of the three areas that were self-assessed. Low level triage skills were in protecting cervical spine when patient suspect cervical fracture with cervical collar (38.8%) and performing to insert oropharyngeal or nasopharyngeal airway (26.8%).

Table 4. Assessment on Triage Competency in Performing Rapid Patient Assessment

Rapid Patient Assessment	Level of triage skills	n	%
Assess patient including vital signs with rapid assessment in 2-5 min	High	120	65.6
	Low	63	34.4
Assess or ask chief complain of patient rapidly	High	113	61.7
	Low	70	38.3
In unconscious patient look in upper airway for blood, vomitus, oedema to assess patency of the airway	High	89	48.6
	Low	94	51.4
Decide to open airway and remove foreign body when obstructed according to airway management	High	82	44.8
	Low	101	55.2

Perform clear airway by correct position with jaw [10] ust and head tilt chin lift	High	90	49.2
	Low	93	50.8
Perform clear airway by correct position by jaw thrust without head tilt if patient suspect cervical injury	High	61	33.3
	Low	122	66.7
Perform to insert oropharyngeal or nasopharyngeal airway	High	49	26.8
	Low	134	73.2
Look at the chest about patient chest abnormal movement	High	97	53.0
	Low	86	47.0
Assess the rate and depth of respiration to observe breathing rate, pattern rhythm	High	102	55.7
	Low	81	44.3
Look at patient skin to investigate for integrity, wound bruising, texture color	High	110	60.1
	Low	73	39.9
Listen to the noise in the airway such as gurgling, snoring, wheeze	High	99	54.1
	Low	84	45.9
Listen the silent or noise breathing	High	102	55.7
	Low	81	44.3
Easily identify a patient in respiratory distress	High	125	68.3
	Low	58	31.7
Administer oxygen therapy	High	122	66.7
	Low	61	33.3
Perform bag mask-ventilation	High	104	56.8
	Low	79	43.2
Protect cervical spine when patient suspect cervical fracture with cervical collar	High	71	38.8
	Low	112	61.2
Check pulse rate and rhythm according to the circulation system	High	116	63.4
	Low	67	36.6
Assess capillary refill	High	120	65.6
	Low	63	34.4
Assess the temperature of the patient	High	125	68.3
	Low	58	31.7
Assess patients with diaphoresis	High	111	60.7
	Low	72	39.3
Perform chest compression in critical condition of patient	High	91	49.7
	Low	92	50.3
Collaborate with physician to administer emergency drugs	High	125	68.3
	Low	58	31.7
Assess internal and external bleeding	High	84	45.9
	Low	99	54.1
Perform control of blood loss appropriately	High	109	59.6
	Low	74	40.4
Collaborate resuscitation to provide appropriate IV fluid	High	108	59.0
	Low	75	41.0

Assessment on triaging skills of patient categorization

Rating on Assessment on triaging of patient categorization which included four areas is presented in Table 5. In all the four areas of interest, less than half of the respondents considered as having high level of skills. Only 30.1% could initiate nursing intervention during triage categorization with the lowest proportion of 28.4% being able to categorize the patient according to triage categorization.

Table 5. Assessment on Triaging Skills of Patient Categorization

Patient Categorization	Level of triage skills	n	%
Categorize the patient according to triage categorization.	High	52	28.4
	Low	131	71.6
Identify patient who require immediate care, urgent and non-urgent according to triage categories	High	53	29.0
	Low	130	71.0
Avoid the condition of the patient with over triage or under triage	High	39	21.3
	Low	144	78.7
Initiate nursing intervention during triage categorization.	High	55	30.1
	Low	128	69.9

Assessment on triaging skills of patient allocation

Results on the five areas that were examined on Assessment on triaging skills of patient allocation are presented in Table 6. Again, less than half had high level skills in allocating the patient to get advance treatment in ED [10] accurately and timely (30.1%), making decision to allocate the patient with priority 1(resuscitation in [10] D) in the right place (28.4%) or making decision to allocate patient with priority 2 (23.5%).

Table 6. Assessment on Triaging Skills of Patient Allocation

Patient allocation	Categories	n	%
Make decision to allocate the patient	High	52	28.4
	Low	131	71.6

		High	43	23.5
Make decision to allocate patient with priority 2		Low	140	76.5
Make decision to allocate patient with priority 3 in the right place		High	49	26.8
		Low	134	73.2
Allocate patient with collaboration with other emergency and doctor with hand over effectively		High	51	27.9
		Low	132	72.1
Allocate the patient to get advance treatment in ED in accurately and timely		High	55	30.1
		Low	128	69.9

Triage competency score

The participant exhibited overall high level on triage skills with a mean of 86.3% and a standard deviation of ± 9.0. High triage skill was also observed in rapid assessment with a mean of 88.9%. On the contrary, triage skills in patient categorization and patient allocation had a mean of 79.1 and 79.2, respectively and were regarded as moderate.

Table 7. Triage skill score

Variables	Possible range	Actual range	Mean	SD	Triage skills level
Overall triage skills	5 - 100	57.7 – 100.0	86.3	9.0	High
Rapid assessment	5 - 100	56.8 – 100.0	88.9	9.7	High
Patient categorization	5 - 100	40.0 – 100.0	79.1	14.6	Moderate
Patient allocation	5 - 100	28.0 – 100.0	79.2	15.5	Moderate

DISCUSSION
Relationship of knowledge and health care provider triage competency

Triage knowledge refers to the level of factual and procedural knowledge required for emergency nurses to perform rapid assessment, patient categorization and patient allocation, Careter *et al.,* 2014). Studies

continue to add that a triage nurse must keep the knowledge updated, follow clinical guidelines, and consider evidence-based practice during decision making. At selected hospitals in Kakamega County, knowledge level on triaging was low only (35%) displayed high level knowledge on triage. Best three scores were on cervical injury, being a diagnosis in cases of a car accident with neck pain and dysponea (91.8%), oropharyngeal airway being used to eliminate possibilities of upper airway obstruction (80.9%), and first pacing patient with cervical collar in case of car accident with neck pain and dysponea as correct answers, (79.8%). Worst performed was on correct drug used in a systole only 4.4% gave the correct drug, over three quarters (77.1%) did not know that otorrhea is the sign that confirms diagnosis of base of skull fracture. This is in line with study done by Ali, Taverner that revealed that a large number of participants 69% having poor knowledge they correctly answered less than 50% of the questions in self- administered questionnaire (Milberatt *et al.,* 2009).

Patient assessment

Triage skill is one of the most competencies required for emergency nurses (Anderson et al 2006). More than two- thirds of the respondents (68.3%) had high level of triage skill in identification of a patient with respiratory distress, assessing temperature and collaborating with a physician to administer emergency drugs. This is in line with a study that revealed that a triage nurse has a role to evaluate a patient acuity based on patient assessment, vital signs and estimated resources (Shelton, 2009). In another study factors such as vital signs, the main complaint, disease history and clinical examination were reported to be affecting decision making in triage (Patel, 2008).

Low level of triage skills was in protecting cervical spine with collar (38.8%) and performing to insert oropharyngeal or nasopharyngeal airway (26.8%). This agrees with a study that revealed that skills related to advanced nursing skill were not high, such as insertion of oropharyngeal or nasopharyngeal airway, assessment of internal and external bleeding, stop bleeding, manual ventilation and bag-valve mask ventilation (Salonen, 2007).

Patient categorization

In all the four areas of interest, less than half of the respondents considered themselves to have high level of skills. Only (28.1%) were able to categorize the patient according to triage categorizations. In addition, with perceived triage skill, (38.2%) had categories that correspond to those used in a disaster situation, less than a third (32.2%) have written formal categories for triage and even fewer (20.2%) have color codes for the categories, and (38.8%) have units for each category. The finding agrees with the study done by Gilboy et al.,2011 who stated that ED triage is the complex process of sorting and prioritizing patients care. The reason for performing triage in ED is to ensure that each patient is treated in order of clinical urgency and that the treatment is appropriate and timely (Lampi et al., 2018).

Patient allocation

Less than half of the respondents had high level of skills in allocating the patient to get advanced treatment in an accurate and timed (30.1%). Making decision to allocate patient with priority 1 (resuscitation in ED) was (28.4%) or making decision to allocate with priory 2 (23.5%). This agrees with a study done by Milberet (2009), who indicated that 52% of the nurses were unable to allocate an appropriate triage category, and also lacked knowledge on waiting time.

CONCLUSION

Knowledge and skill level on triaging was moderate; most health care providers attended trainings which were not emergency related. Most health care providers lacked skills in managing airway by or pharyngeal and nasopharyngeal airway and only 38.8% were able to protect the C-spine using cervical collar. There was low level of triage categorization 78.8% had low skills to avoid conditions of over-triage and under-triage. Moreover, most of the respondents 79.2% had moderate skills in patient allocation, especially with priority 1 category.

SUGGESTIONS

The study findings suggest that there was moderate level of skills. The hospital management should ensure training opportunities and short courses on courses like Basic Life Support, Advanced Cardiac Life Support and Advanced Trauma Life Support are available accessible and affordable to all health care providers. Continuous Program Development on Triage should be done frequently and all health care providers to be encouraged to attend. Health care providers be updated on frequent updates on triaging. Results in the study shows almost half of the respondents 48% were nurses who were involved in triage. Therefore, there is need for further research in the area with a larger population.

DECLARATION OF CONFLICTING INTEREST

The author declares no conflict of interest, financial or otherwise.

AUTHOR CONTRIBUTION

Faith Angose Sabwa: Main researcher

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