FRONTLINE HEALTH PROVIDERS COMPETENCE IN TRIAGING AT EMERGENCY DEPARTMENTS OF HEALTH FACILITIES IN KAKAMEGA COUNTY, KENYA

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A Thesis Submitted in Partial Fulfillment of the Requirements for the award of the Degree of Master of Science in Advanced Nursing Practice (Trauma and Emergency Nursing) of Masinde Muliro University of Science and Technology

October, 2023

DECLARATION

This is my own unique thesis. work written using just the references and assistance listed, and it hasn't been submitted for a degree or other award anywhere else..

Signature:……..…….. Date:……

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HNR/G/10/2016

Authentication

The signatory attests to having read the thesis, which they thus suggest Masinde Muliro University of Science and Technology approve. "**Frontline Health Providers Competence in Triaging at Emergency Departments of Health Facilities in Kakamega County, Kenya."**

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COMMITMENT

I dedicate Like this research To my amazing family consisting of Ruth, Rehema, Rohi, Ramaliah and my parents, thanks for your continuous support.

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ABSTRACT

Triaging is characterized as assigning patients a priority based on the severity of their disease and giving the majority of patients the best treatment possible in the shortest amount of time feasible. Long waiting times in the emergency room is a problem in most hospitals in the world. Some of the health facilities have no Emergency Department where triaging can be done. In developing Countries Triage in Emergency Department consist of a weak link. The study's objective was to evaluate frontline health providers' competence in triaging at the Emergency Departments. Study objectives were; to assess triage competence among frontline health providers, to determine the health provider factors influencing triaging and to examine the health institutional factors influencing triaging at the emergency departments. Selected hospitals in Western Kenya's Kakamega County served as the study's sites.; a descriptive cross section design was adopted. Simple random sampling technique was used to involve all health care providers to include doctors, nurses and clinical officers. The study participants were 183 healthcare professionals operating inn emergency unit. Fissures Equation et al. was used to arrive at the sample volume. Quantitative information was gathered via a pretested personal questionnaire. Data was input and coded. into Excel files that have been cleaned and examined using a statistical program of version for social sciences 24. Chi square, fissures In the data analysis, precise, P value, frequency, mean, and percentages were used.. The study findings revealed that high competency was observed in identification of a patient with respiratory distress 89%, assess patient for temperature 68.3% and collaboration with physician to give emergency drugs. Low skills were observed insertion of cervical collar 61.2% and performing oropharyngeal and nasopharyngeal airway 73.2%. More than 74.9%. of the responders had employment in Emergency Department for less than five years and most of them were not flexible to work in the department at a P value of < 0.07.Health facility factors that influenced triaging included shortage of staff P value < 0.001, lack of training P value of< 0.001 and lack of guidelines and policies that support triaging P value of < 0.007. Therefore, the researcher recommended that, the hospital management to ensure training opportunities for staff on Three levels of life support: Basic, Advanced Cardiac, and Advanced Trauma Sustain Life. The hospital management to look into deployment of staff with experience in emergency departments to mentor the less experienced. The National and County Government management to consider human resource issues like formulation of guidelines, staffing and availability of equipment that support triage.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACLS	-	Advanced Cardiac Life Support
ATLS	-	Advanced Trauma Life Support
ATS	-	Australian Triage Scale
BLS	-	Basic Life Support
CDC	-	Control Disease Centre
CTAS	-	Canadian Triage Score
ED	-	Emergency Department
ESI	–	Emergency Severity Index
ISS	-	Injury Severity Score
SALT	–	Sort, Assess, Life- saving, intervention, treatment and/or transport
WHO	-	World Health Organization

OPERATIONALIZATION OF TERMS

Competence: An expected and measurable level of performance that integrates knowledge, skills, abilities and judgment, based on scientific knowledge and expectation of practice.

Frontline Health providers: include qualified doctors, nurses, and clinical officers working in emergency department.

Mis-triaging: Occurs when triaging is not done properly considering the guidelines being in use.

Over triaging: Unintended over estimating the urgency of the condition of the patient arriving and prioritizing the person management over a patient with most urgent needs.

Overcrowding: defined as a situation in which the need for the resources exceed those available

Resource: include laboratory, and diagnostic tests, ECG, IV fluids administration, IM injection, specialty consultation, simple procedures, and conscious sedation.

Self-assessment: defined as the act of judging ourselves and making decisions about the next step.

Training experience: refers to the number of times and types of previous training in triage and related topics in the past three years, such as attending short courses, workshops etc

Triage knowledge: refers to level of factual and procedural knowledge required for emergency nurses to perform rapid assessment, patient categorization, and patient allocation.

Triage competence: refers to level of health care providers' perception of ability in making decision accurately in the following areas; 1) Rapid assessment 2) patient categorization and 3) patient allocation

Triage: A rapid assessment of a patient general condition appearance including brief history of the presenting problem using physiological data.

Under triaging: under estimating the urgency of the condition of a person's condition, illness or injury.

Working experience: refers to the numbers of months in working as emergency practitioners.

CHAPTER ONE

INTRODUCTION

1.0 Overview

The backdrop, the research issue statement, the study's goal, and its objectives are all covered in this chapter. Additionally, the study topics, rationale, and theoretical framework are presented..

1.1 Background of the Study

Triage is the practice of ranking patients' treatment needs according to how serious their conditions are. (Sasser, *et al,*2012). Triage can as well be defined as a procedure that includes promptly and accurately identifying people in need of emergency care, distinguishing them from others whose circumstances can wait (Mistry *et al.,*2018)

Injury is a significant worldwide public health issue.. It is estimate that 5 million deaths worldwide occur each year due to injuries from all causes, accounting for 10% of all deaths. It is worth noting that with traumatic injuries, millions of persons get disabled either temporarily or permanently every year as and this creates a burden on families, communities, and societies. It is estimated that It is anticipated that the worldwide injury burden will rise in the next years, reaching a significant level by 2020. (CDC, 2008). Beyond communicable diseases and chronic illnesses, injuries account for 116 deaths per 100,000 people in Africa while injuries account for 49 deaths per 100,000 people in Europe.,(WHO, 2015). Throughout Sub-Saharan Africa, the cost of emergencies condition is high, and these disorders have a high death rate. these are as a result of poor emergency services mostly due to limited resources relatively little study was conducted, (Richardson *et al.,* 2019). The goal of trauma care ti include

triage is to reduce morbidity and mortality by quick injury evaluation, stabilization, and care patients (Farrokhnia *et al.,* 2011).

Globally, triage systems were used to decrease death rates, shorten patient wait times for urgent treatment, and enhance patients flow in accident when they arrive at emergency rooms (Burges *et al.,* 2017). Ideal triage system should be capable of determining patients with need for emergency care to provide easy access to diagnostic and therapeutic measures by directing such patients to a proper channel (WHO, 2016) The triage method used by different healthcare facilities differs depending on the community's needs, the emergency department's workload, and the availability of medical resources. (Gammal, 2014).

The emergency room is an essential aspect of health care delivery system where health care providers are frontline in dealing with life threatening conditions (Rayan *et al.,* 2022). When triaging is done properly for potentially injured patients may translate into increased shorter travel times to final treatment, better results, and more efficient use of resources. Mis-triaging of trauma patients, whether by demoting them, always have detrimental effects (Goldstein, 2017).

In developing countries triage is underutilized and often ineffective area of health system, (WHO, 2021). An ideal The goal of the triage method is to assist medical professionals in recognizing potentially fatal situations and taking prompt action. assessment and setting priorities based on how serious a patient's medical condition is (Baker *et al.,* 2019). Effective triage ensures that health organization capacity meets overall patient demand especially during disaster pandemic, and other public health emergencies (Farcus *et al.,* 2020). But sometimes, there are instances when there are under and over triage scenarios. Under triage occurs when patient having clinical

symptoms that are progressively becoming worse is not recognized and overlooked throughout the triaging happens when individuals with severe but non-life-threatening illness are prioritized resulting to waste of medical equipment and man power (Hinson *et al.,* 2018).

Study done in Dares salaam Tanzania to assess knowledge and skill in triage revealed that 52% were not able allocate patients to appropriate category (Alloyce *et al.,* 2014). Various factors affect triage decision making; ED crowding, nurse shortage and personal factors, (Johnson, 2017). For triage decision A number of elements must be present for it to be accurate and consistent: emergency nursing education, triage nurse professional development, guidelines modification on a regular basis, updated triage scale, and quality framework for auditing the process and outcomes (Carter *et al.,* 2014).

Triage skill is an element of supervision if not done well the outcome of clinical care of the patient will be compromised, (Rahmah, 2013). Studies reveal that doing correct triage needs high level of mental operations, information, and also possessing skills, knowledge, proficiency, eligibility, and preparedness for making decisions based on priority. Sufficient professional experience and knowledge of disease indications and symptoms, as well as sufficient tools and resources, are an important role in correct triage decision making.

In Kenya, triage systems are underdeveloped and there is no National acceptable triage system, (Wachira *et al.,* 2012). There is no nationally accepted A&E triage system; A National Hospital like Kenyatta has no standardized triage procedures, (Lampi, 2018). In Kakamega, extensive research has not been done on triage; therefore the study seeks

to determine frontline health providers' competence in triaging at Emergency Departments of Health facilities in Kakamega County.

1.2 Statement of the problem

Long waiting time in hospitals is a problem not only in a particular Country, but in most hospitals in the world. The results of an American research showed that patients waited a median of eleven minutes before being triaged, (Houston *et al.,* 2015). There are many causes of long waiting time, such as crowding, and lack of staff among others (Stancy *et al.,* 2015). The quantity of patients showing up at Emergency Departments has increased for past few years in developed high income Countries but is low in low-income nations as a consequence of self-referrals to overcrowding in ED, (Moineddin *et al.,* 2011).

In some hospitals There's usually none Emergency Department and patients are seen either in wards or outpatient clinics when they get there. This method doesn't provide space to handle urgent and important matters right away, (Dunster *et al.,* 2016) This large numbers of patients visits because ED may affect the quality of health care by channeling the resources intended or emergency cases to individuals who have less urgent needs, (Thomson *et al.,* 2010). Hence there is a unanimity that triage is an important system in Emergency Department that reduces waiting times and ensures If every patient that visits the ED receive the proper treatment, (Considine *et al.,* 2014).

Lehmann *et al.,* (2012) said that prompt and precise patient triage is the key to success in patients care and also Proper triage of wounded patients has decreased mortality and maximized the use of available resources. According to study conducted in US across emergency departments to assess educational preparation of triage nurse, found that

43% of emergency department are run by personnel who had no education preparation on triage (ENA, 2017).

In developing Countries initial triage and treatment of a patient in emergency department constitute of weakest link in health system. Study conducted in Malawi revealed delay in care provision among children which resulted into avoidable deaths and disability (Fathoni, 2013).

Study conducted in Dares Salam Tanzania to assess the knowledge and skill of triaging among four hospitals revealed that 33% of the respondents had no knowledge about triage and 52% of the respondents were not able to allocate the patients to the appropriate triage category (Aloyce *et al.,* 2014).

Mis-triaging of patients, whether by incorrect promoting or demoting them can have detrimental effects. Incorrect promotion increases the number of patients who need to be seen urgently and puts strain on already under-resourced and understaffed system, which might result in patients being appropriately triaged but getting treatment later than is advised for more serious cases (Goldstein, 2017).In Kakamega County Hospitals many trauma patients are being received and majority of those Patients arrive accompanied by family members or good Samaritans from the scene of accident. According to health records within the facilities, 300 cases were received in the year 2016 of which 100 of the cases died, 400 cases received in the year 2017, and as well 133 of the patients died. Most of these patients die while receiving care at the emergency department or before being attended to by the health care providers. (KHIS, 2018).

In Kakamega, extensive research has not been done on triage; therefore, the study seeks to determine Frontline Health providers' competence in triaging at the Emergency Departments of Health Facilities in Kakamega County.

1.3 Justification

Opiro *et al.,* (2017), reported that Across Sub-Saharan Africa, the emergency burden condition is significant, with death from these condition, inadequate emergency care largely as a result of resource constraints and that there is little research done. Proper triaging or arranging patients who could be hurt interprets to decreased transport times to definitive care, better outcome in addition to better resource management (WHO, 2016).

In Kenya, being a middle-class nation in East Africa, the death rate from injuries is 1001 per 100,000 populations, (WHO, 2015). It is estimated that injuries as a major cause of death in Africa (Lozano *et al.,* 2012). One of the approach to manage patient flow in Emergency Department using a simple triage tool, which might enhance emergency treatment at a lower cost., (Baker *et al.,* 2011).

The study will help in identifying gaps in the triaging of trauma patients in Kakamega County Hospital, so that appropriate measures can be put in place. The study is aimed at assisting the management to develop policies and procedures that will help in triaging of trauma patients so that patients who need priority care are attended to well. The study will also help the stake holders gain knowledge and data for future studies. Example of the stake holders include; staffs at the ED, training institutions, patients and the County Government.

1.4 Main Objective

To determine frontline health providers' competence in triaging at Emergency Department of Health Facilities in Kakamega County.

1.5 Specific Objectives

1. To assess triage competence among frontline health providers in emergency departments at medical centers located in Kakamega County. To determine the health provider factors influencing triaging of patients in emergency of health facilities in Kakamega County.
2. To examine the health facility factors influencing triaging of patients in emergency departments of medical centers located in Kakamega County.

1.6 Research Questions

1. What are the triage competencies required for the health providers in Emergency Department at health facilities in Kakamega County?
2. What are the health provider factors that influence triaging in emergency Department at the medical centers located in Kakamega County.?
3. What are the health facilities elements affecting triaging among health providers in emergency Department at the Health facilities in Kakamega County?

1.7 Limitations of the Study

Some participants were on study leave, maternity leave respectively. Also because of the busy nature of the emergency departments (dealing with emergency cases) some

of the participants had a challenge in finding time to participating in the study. The sample size consisted mainly of frontline healthcare providers i.e. Doctors, clinical officers and Nurses and yet paramedics also perform triage, other studies can be done to include the paramedics so as to make good generalization.

1.8 Conceptual Framework of the study

Donabedian model 2003 was be adopted in this study. It focuses on three main components namely the Structure, procedure, and result were all interconnected. Organization will include all elements that impact the setting in which healthcare is provided. This covers organizational features including staff training in addition to the physical space, machinery, and human resources (Donabedian 2003). A well-designed health care system will increase the possibility of an efficient delivery procedure, and thus improves outcome of care (Bergs *et al.,* 2014).

In this study poor characteristics, include institutional factors like lack of facilities, quality care, policy and guidelines on triaging. Health providers' reasons may include years of experience in ED, workload, knowledge and skills and trauma training as well as lack of motivation (Gardener, 2013).

Process will include the way that healthcare is provided. In adoption to the study will refer to the level of designation of triage performed by the health care providers, according to the guidelines.

Outcome includes all effects of healthcare on the patient among which are state of health and conduct change, or understanding, in addition to patient satisfaction and quality of life in relation to health (Donabedian, 2003) In this study outcome will refer to The precision of the triage procedure and the outcome of the patient who has undergone proper triaging process.

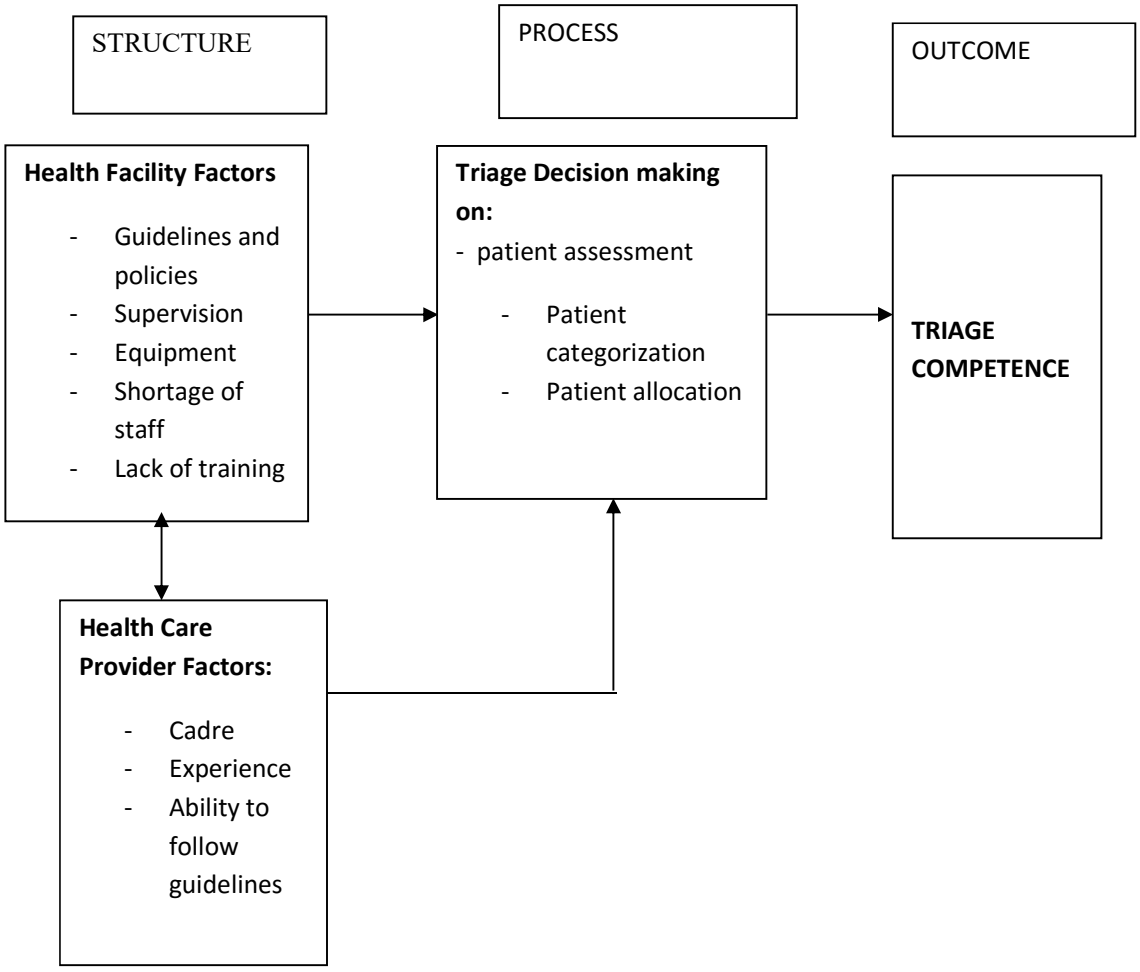
STRUCTURE
PROCESS
OUTCOME
Health Facility Factors
- Guidelines and policies
- Supervision
- Equipment
- Shortage of staff
- Lack of training
Triage Decision making on:
- patient assessment
- Patient categorization
- Patient allocation
TRIAGE COMPETENCE
Health Care Provider Factors:
- Cadre
- Experience
- Ability to follow guidelines

Figure 1.1: Conceptual framework of the study adopted from Donabedian Model with some modification

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter addresses detailed description of variables under study, beginning with the background then focusing on competence the health care providers have on triage, examining how triaging should be done and assessing the factors that influence the triaging process. A brief summary of literature review is also inclusive.

2.2 Background

Triage originates from a French word 'trier' which means 'to sort' or 'sieve', seeks to evaluate and rank patients who have been hurt, regardless of the severity of the injuries every day from an automobile collision (Maria Lampi, 2017).

The main principle behind triage is to Determine which individuals have life-threatening illnesses and treat them first., though the Priority may be established by staff qualifications, equipment availability, and medical need. (WHO, 2016).

In In times of crisis, triage aims to reduce morbidity and death by offering the most benefit to the greatest number of victims. (Debacker *et al.,* 2012).

According to World Health Organization, traffic accidents and injuries account for 1. 25 million fatalities in 2014, and by 2030 is predicted to become the third most common cause of disability globally. (WHO, 2014).

Effective triage begins from pre hospital care. The majority of trauma fatalities happen either four hours after the trauma incident or in the pre-hospital setting. Effective patient identification, field triage, and transfer of critically wounded patients to specialist trauma hospitals may lower mortality and morbidity. (WHO, 2016).

The main reasons for incorrect triaging include failure to record discriminator i.e. abdominal pain, chest pain, shortness of breath, vomiting, reduced level of consciousness, psychosis, aggression that leads to incorrect triaging decisions either by demotion or by promotion (Dalwai, *et al,* 2014).

Assessing nurse competency is a crucial need for ensuring that patients get competent nursing care and identifying areas in which nursing practice has to advance, since it is crucial to ensuring both the quality and affordability of healthcare. (Deflour *et al.,* 2006).

A self-assessment of nursing competence has been used to gauge clinical competency in order to identify areas for professional improvement as well as education need areas to make sure clinical expertise is used into use in best possible ways for patients, (Meretoja *et al.,* 2004).

2.3 Triage Competence

In an emergency room, triage is done to make sure that each patient receives appropriate and timely care, ranked according to clinical urgency (Lampi et al., 2018).).

2.3.1 Rapid assessment

A triage nurse must complete assessments quickly, which calls for prompt decision-making and appropriate work distribution.. Long conversation with a patient ought to be avoided, as ought to take a thorough history.Clinical observation Since they take too much time, parameters like temperature, pulse, etc., should be assigned if they are not needed to determine priority (Varley et al., 2016).

A triage evaluation has to be done and consist involves assigning an urgency code, interpreting the physiological evaluation and clinical history, and placing the patient in the proper ED section. It's anticipated to need not more than 5 min; striking a balance between completeness and quickness to make sure the triage evaluation doesn't get in the way of a required clinical action (Rahmat et al., 2013).. Having sufficient familiarity with pathophysiology of disease, symptom, and diagnostic exams, in addition to high-risk emergency treatments such shock, airway blockage, cardiac arrest, internal bleeding, trauma, and poisoning. In addition to their professional expertise, triage nurses need to have clinical skills which include technical skills (Terry, 2014).

2.3.2 Patient categorization

One of the most crucial decision-making processes is triage. concept in ED, (Reisi et al; 2018). Triage system contain scales which have a reasonable waiting period ranging from minutes to hours, depending on the patient's health. (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 depending on clinical criteria, all patients that arrive in the ED (Soric et al., 2017). It include five tiers of acuity classification: potentially life-threatening (Category 2), imminently life-threatening (Category 1), and instantly life-threatening (Category 1). (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 *et al.,* 2017).

The goal of CTAS is to utilize a list of complaints and certain physiological variables to determine the optimal maximum length of time that a patient should be treated. 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 either alone or in combination. Published guidelines back in 2010 either alone or in combination. Published guidelines back 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 physiological characteristics consist of elements like 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, 3urgentfive not urgent, four less urgent (Esmailian, *et al,* 2014)

The tool manages patient within minimal time and this increases patients outcome, reducing overcrowding in emergency department (Jordi *et al,* 2015)

2.3.3 Patient allocation

Depending on the regulations of the departmental facilities, the triage nurse will often have to make the decision about when to admit the patient. Individuals who are very old, in pain, in distress, or who are bleeding may be admitted to observational rooms apart from the main waiting areas. Additionally, individuals with conditions including knee injury, back discomfort, or stomach pain who must lie down during an evaluation (Varndell *et al.,* 2019).

In addition, the triage nurse must notify everyone in the waiting area of the estimated time that is now in effect. To identify patients whose condition is changing, ongoing monitoring and evaluation are required. This might happen after an intervention, such giving analgesic medication., (Rahmat *et al.,* 2013).

The tool manages patient within minimal time and this increases patients outcome, reducing overcrowding in emergency department (Jordi *et al,* 2015).

2.4. Health provider factors influencing Triage

2.4.1 Human Factors

Health providers can possess great talent, drive, and knowledge, yet they are still fallible human beings.. Therefore, to understand human factors may assist in reducing the mistakes band adverse events. (Mercer *et al.,* 2014).

The error can be viewed in terms of individual or system approach. Whereby, system has multiple of layers whose function is to protect error from happening. One of the layers can have a problem ether individual like making mistakes, violating procedures or problem arising from procedure writers or top management (Hofinger *et al.,* 2016).

Active failures occur more frequently like in the case of fatigue, stress, illness, overload, inexperience and complacency (Bleetman *et al.,* 2012).

2.4.2 Team work

Trauma team must work together in uniformity in order to meet the purpose. This will include performing specific tasks and roles, follow the direction of the leader, sometimes may call for confronting the leader in a way that is acceptable and based in evaluation (Mercer *et al,* 2014).

An extreme trauma Centre may consist of trauma surgeons, emergency doctors, emergency nurses, subspecialist surgeons, respiratory therapist, technicians, and social workers. The team must have a management plan and specific tasks (Kaufman ES, Richmond TS *et al.,* 2017).

Sorreide K.(2012), argued that team approach to trauma is recourse intensive; however Resources and staff may become overburdened in non-hospital setting, in settings with a high casualty rate and in smaller institutions. Conditions like number of skills levels, available providers' estimate of clinical probability of each patient survival.

2.4.3 Situational Awareness

It is being aware of the situation so that You're capable of making decisions.. This calls for overall picture of the individual. Understanding the patient's past experiences, present condition, and anticipated future outcomes, calls for understanding of the mechanism of injuries, past medical history of the patient, detection of abnormal vital signs and ability to discern relevant clues (St. Pierre *et al,* 2016).

Studies reveal that triage decision making can be affected by factors like situation, insight, clinical qualification, external factors such as stress of work environment, high workload and crowdness (Fitz *et al.,* 2010).

2.4.4 Accuracy

Accuracy in Triage shortens the time patients must wait for care, therefore reduces the trauma patients' burden of impairment and a decline in death rates (Cameroon *et al.,* 2014)

The healthcare workers need to assess the mechanism of injury for the trauma patients, whether penetrating injury or blunt injury, since if not well assessed can lead to over triaging of the patient (Colte, 2017).

Negoli, (2015) reported that patient with traumatic injuries need to be assessed the glass glow coma scale (GCS) since patients with altered level of consciousness with injuries like brain injury need urgent investigation and care. Pain assessment should be done alongside assessment of the tool being used and the health care providers need to be educated on the same (Ahmadi, 2016).

Health care workers need to put into consideration other factors as well symptoms when triaging trauma patients like the old people, known conditions i.e. diabetes, cardiac, pregnancy and the process should be on going.

2.4.5 Skills required in triaging

Emergency nurses Association (ENA) have indicated several instructional initiatives. Additionally, interpersonal abilities such as critical thinking, communication, and multidisciplinary interpersonal skills as well as precise decision making have been found useful in making triage decisions (Emergency nurses Association, 2011).

Jih-Chang *et al.,* (2016) commented that it is important to improve nurses competency by training so that they are able to make accurate judgments with regard to the diversity of client being encountered. Several courses and education program that include elements of triage training has been created. The American College of Surgeons

created the Advanced Trauma Life Support (ATLS), which is a requirement in emergency medicine (Berlin, 2012).

Mohammed, (2014) reported that the course is recommended for all health care providers dealing with trauma patients. Pre hospital Trauma Life Support (PHTLS) was also developed by the American College of Surgeons but being practiced worldwide. The training provided an the chance to standardize Prior to hospitalization, trauma care. Both training emphasized evaluation of patient using ABCDE (Salome, 2011).

Iran-based study on knowledge and practices of nurses regarding patient triage in emergency department, was revealed that the knowledge and the experience of nurses working in emergency department regarding triage is below average. It was suggested that special training courses in the field of triage for the staff in order to improve the quality of care (Javadi, Salimi,*et al.,*2016).

The lack of medical education and the Ministry of Health triaged training that according to the recent instructions of this ministry concerning Triage education for all nurses must include ESI triage.. The training should be monitored both at the ends of the course and at intervals, and retraining if necessary, by a valid a reputable test (Ghanbarzohi *et al,* 2016).

Evans and Kolhi (2014) created a practical competency-based learning curriculum to enhance the emergency department's present training methodology. personnel. The study suggested that the personnel need diverse knowledge base done by creating a simulation environment.

Deteo (2013), reported that when there is uniformity in nursing education and resource use will be able to facilitate prediction of the patient's resource needs. It was suggested that continuous education, quality assurance, feedback and minimum of one year ED experience can improve the skills.

Evans and Kolhl (2014) created a practical competency-based curriculum to enhance the existing procedure of triaging. This achieved by creating a simulated environment to produce the skill of triage and utilization of a mentor, to guide in the triaging process

2.4.6 Mis-triaging

Studies done in United states of America reveal that misguided triage that result in a patient requiring a higher level of care not being transported to trauma center is termed as under triage, and can lead to avoidable morbidity and mortality (Fee, *et al* 2012). Mistriaging occurs when guidelines are not utilized properly, so that the severity of the disease, damage, or circumstance is under or over estimated. When this occurs will lead to negative care process, and poor health outcomes (Tu, & Schull 2010).

Grossman *et al,* (2014) further added that under triage is a safety concern since patients may be at a risk of deterioration. Some of the reasons that could contribute to mistriaging include advanced age, ethnicity and female gender (Lopez *et al,* 2010)

2.4.7 Team triage

Team triage means that triage is being performed by different categories of staff (physician, nurses, assistant nurse, clinicians) this shortens the waiting time and patients leaving emergency department before medically being evaluated (Bunch *et al.,* 2010).

2.5 Health facility factors affecting frontline health providers triage skills

2.5.1 Leadership

Leadership will influence efficient decision-making, resource management, effective communication, and efficiency, which is effective for optimal trauma team functioning (Ford *et al,* 2016).

Clear identification of a trauma enhanced team collaboration, a more thorough secondary survey, and more adherence to trauma protocols are all results of the leader's work.. In addition, the leader must possess attribute like being able to know capabilities of each team members, should accept leadership roles, ability to remain calm, good communicator, and delegation of task appropriately (Norris, 2012).

2.5.2 Human resource

Conflict is inevitable in any team. A successful settlement is usually required for optimal team performance. The conflict may arise from goals setting, optimal performance, daily activities balancing against performance, managerial authority verses member's autonomy (Overton *et al,* 2013).

Johnson *et al.,* (2017) argued that There are several variables that might influence triage decision-making and cause mistakes. i.e. ED crowding level, health care provider' shortages, patient capacity level, family members presence and personal factors.

2.5.3 Equipment

Insufficient rudimentary equipment for evaluation has been identified as a factor contributing has been found to be a factor the contribute to triage delays and in accurate decision making leading to improper prioritization (Burr, 2001).

2.5.4 Policies and guidelines

Administration need to create rules and procedures that emergency personnel will utilize as a reference for triage evaluation and emergency treatment prioritizing. (Considine, 2007). Globally different triage guidelines are usesd in Emergency Department, such as the Australian triage scale, Canadian triage scale, and Manchester triage scale all They are then split into five categories highlighting the patient's need for immediate treatment (Acharya *et al.,* 2011). More over there is till debate about whether to adopt an internationally methodology or creating new triage techniques at the federal level, since it's crucial that the same system be used. thought the whole health organization (Lahdet *et al.,* 2017).

2.5.5 Monitoring and feedback

Nurses' ability to triage patients is a critical component of emergency department supervision; if it is not performed to a standard level, patient outcomes and emergency department efficiency will suffer. (Kelly, 2001).

Quality assurance and feedback is useful to evaluate performance. A study provides evidence from nurse mentors that mentoring is beneficial for preserving consistency and improving triage competence (Dateo, 2013).

2.6 Summary of Literature Review

Triaging is an essential element in assessing the patient to determine the outcome of the patient with traumatic injuries. The knowledge and skills the health care providers have on triaging will contribute a great deal in making proper decisions during triage. Knowledge on Basic Life support, Advanced Cardiac life support and Advanced Trauma life support is mandatory for one to effectively triage a trauma patient.

Continuous training and education is needed for the emergency staff to be competent. During training simulation environment is encouraged to build on the competencies gained during training. Personnel working in emergency department being adequately trained and skilled will put them in a position to make correct judgment during triaging minimizing errors.

With the triage process, the guidelines and protocols need to be followed as far as triaging is concerned. Team approach in triaging should be emphasized since it will reduce the waiting time for the patient to get definitive care. Proper decision making should be done during triage to prevent under or over triaging.

An inaccurate triage system will waste resources and result to delay in admission and treatment of patients, patients' dissatisfaction, and undesirable consequences.

Over triage occurs when a patient receives more than necessary; they are costly, high level of care for non-threatening condition, whereas under triaging occurs when a severely injured patient fails to get the necessary care

Factors influencing triaging process include human factors that make one prone to making error i. e. violating procedures, stress, fatigue, overload and inexperience.

The management and leadership could also influence trauma functioning. Other factors that would make triaging effective for trauma patients include teamwork, proper conflict management, and situation awareness.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

The research approach that will be used in this study. It encompasses the target population, study location, sampling protocol, sample size, ethical concerns, data collecting, data processing, and results presentation.

3.1 Study Design

Analytic cross section study design was used employing both qualitative and quantitative methods. The researcher chose this in order to assess triage competency and associated factors among medical professionals at a few Kakamega County institutions.

3.2 Study Area

The investigation was done. at Kakamega County Referral Hospital in Kakamega County in emergency department. Other hospitals included in the study were Butere, Malava, Lumakanda, Iguhu, Matungu Sub county, Navakholo, Likuyani, Mukumu mission, St. Mary's Hospital, and Mwihila hospitals, so as to get enough sample size. The hospital was selected by cluster sampling whereby Kakamega County hospitals were divided into West, East, Central, North and South then simple random sampling used to arrive at the selected hospitals. The economic activities of the areas are maize and sugarcane farming. The poverty level in the region is high as 70%.

3.3 Study Population

The study's participants included 293 medical professionals (nurses, clinical officers, and doctors) employed in the emergency departments of the chosen hospitals in Kakamega County. The distribution was as shown in the table 3.1:

Table 3.1: Study population

HEALTH FACILITY	DOCTORS	CLINICAL OFFICERS	NURSES	TOTAL
KCTRH	6	-	24	30
BUTERE COUNTY HOSPITAL	8	12	6	26
MALAVA COUNTY HOSPITAL	5	18	12	35
LUMAKANDA COUNTY HOSPITAL	6	9	13	28
IGUHU COUNTY HOSPITAL	3	8	21	32
MATUNGU SUB-COUNTY HOSPITAL	2	9	16	27
NAVAKHOLO SUB COUNTY HOSPITAL	2	8	8	18
LIKUYANI SUB COUNTY HOSPITAL	6	3	8	17
ST. ELIZABETH MISSION HOSPITAL	3	9	8	20
ST. MARYS MISSION HOSPITAL	6	21	18	45
MWIHILA MISSION HOSPITAL	2	5	8	15
TOTAL	49	102	142	293

3.4 Inclusion and Exclusion Criteria

3.4.1 Inclusion Criteria

In order to be included in the study, the participant must be a nurse, clinical officer, or doctors who are qualified to labor during an emergency department at the selected

hospitals, willing to take part in the research and have worked in the department more than six months.

3.4.2 Exclusion Criteria

Those who were excluded from the study were the nurses and clinical officers and doctors working in the department who were interns.

3.5 Sampling Size

Sample size was calculated using fisher's formulae so as to determine the number of clinical staff who were to participate in the study.

$N = (Z^2 X P (1-P))/e^2$

Where Z = Value from standard normal distribution to the desired confidence level (Z= 1.96 for 95% CI)

P is expected true proportion

E is the desired precision (half desired CI width)

Substituting the values, the steps was:

$= (1.96^2 \text{ x}0.5 (1-0.5))/0.05^2$

= 384.16

Since population was less than 10,000 people Yamane formulae was in -cooperated

Where;

nf : the desired sample size when population was less than 10,000

n : the desired sample size when population was more than 10,000

N : the estimate of population size which was 293

$$nf = \frac{n}{1 + \frac{n}{N}}$$

$$= \frac{384}{1 + 384/293} = 166.23$$

Adding 10% of non-respondents, the sample was thus come to;

10% of 166 =17 participants

= 183 respondents.

Calculating proportion for each institution the sample size per institution was shown in the Table 3.2:

Formulae is a/b=c/d (where a was the total population per institution, b was the total population in all institutions and c was the desired portion, and d was the total sample size.i.e. 6/293=C/183 where C was 4 (C being the desired sample size per the institution)

Table 3.2: Sample Size

HEALTH FACILITY	DOCTORS	CLINICAL OFFICERS	NURSES	TOTAL
KCTRH	4	-	15	19
BUTERE COUNTY HOSPITAL	5	7	4	16
MALAVA COUNTY HOSPITAL	3	11	7	21
LUMAKANDA COUNTY HOSPITAL	4	6	8	18
IGUHU COUNTY	2	5	13	20
MATUNGU SUB-COUNTY HOSPITAL	1	6	10	17
NAVAKHOLO SUB COUNTY HOSPITAL	1	5	5	11
LIKUYANI SUB COUNTY HOSPITAL	4	2	5	11
ST. ELIZABETH MISSION HOSPITAL	2	6	5	13
ST. MARYS MISSION HOSPITAL	4	13	11	28
MWIHILA MISSION HOSPITAL	1	3	5	9
TOTAL	31	88	64	183

3.6 Sampling procedure

Census method was used to select the 11 hospitals to include all level 6 and 5 hospitals in Kakamega County. Proportionate sampling method was also used to allocate the health providers per institution according to cadre. Simple random sampling method was used to select the health care providers.

3.7 Data Collection Method

A well-structured questionnaire was used to gather data. and checklist for observations. A pretest was conducted at Vihiga County Referral hospital, being one of the hospitals that receive emergency patients in Western region. This was done to test for reliability of the research instrument.

3.8 Measurement

Data from study participants were gathered using a pre-tested, structured, self-admini stered questionnaire. The questionnaire was created by reviewing previous research o n related subjects. The Demographic Data Sheet (DDS) and the Triage Skill Question naire (TSQ) are its two components. A triage skill questionnaire was used to assess tr iage ability. The triage skill questionnaire (TSQ) had 34 items that fell into three cate gories: quick assessment, patient classification, and patient assignment. On a scale of 1 to 5, participants were asked to rate each item as follows: 1 = needs improvement, 2 = bad, 3 = fair, 4 = excellent, and 5 = very good. The triage skill total score might fall between 34 and 170. A percentage was calculated from the overall score. The score w as interpreted as follows using the above criterion: 60% = low level of triage compete nce, 60–80% = moderate level of skill, and > 80% = high level of expertise. Three In donesian experts assessed the questionnaire's content validity, and the Cronbach's alp ha value came out at 0.93.

3.9 Validity and Reliability of the instrument

Validity is a measure to assess the accuracy or truth of an instrument (Burns and Groove, 2005). It refers to if the measurement is accurate intended to measure (Pilot and Beck, 2008) whereas reliability refers to the ability of the measuring instrument to yield consistent results. This was ensured by conducting a pilot study whereby the measuring instrument were tested for both face validity and content validity and also if the instrument gave same results throughout with different people.

3.10 Data Analysis

Information was collected using self-administered questionnaire and observation checklist. Missing numbers and discrepancies were removed from the data. Simple frequencies were used to visualize the study's general distribution. subjects with the variables being examined and examined using version 24.0 of the statistical software package (SPSS). The mean values of perceived triage skills (rapid patient assessment, patient categorization, patient allocation), were determined. Parametric tests (Student's test and ANOVA) were used in bivariate analysis to evaluate the relationship between each variable and study participants' self-assessment on triage skills. Likert Scale variable responses were collapsed into dichotomous independent variables before subjecting them to One-Way ANOVA. Higher mean scores on participants' self-assessment on triage skills suggested higher perceived competence level on triage skills. ANOVA was according to the F-statistic, which demands that each group's dependent variable have a normal distribution. The outcome variable was subjected to normality test. For the t test, the significance threshold was set at 0.05..

3.11 Ethical Consideration

Ethical Approval to carry out Masinde Muliro University of Science and Technology provided the research.. Permission to carry out research was acquired from nursing research and ethical review committee of Kakamega County General Hospital prior to commencement of the study. The authorization to carry out the study was requested from NACOSTI. Voluntary and informed consent was acquired from the respondents. The responders were informed about the study's objectives, potential hazards, confidentiality guarantee, benefits, and compensation—or lack thereof. The responders' information was kept anonymous and secret. People who choose not to were to do so without loss of any benefit. When clarification was needed, the

respondents were able to ask questions, and their privacy was protected. Regardless of the research's conclusion, the findings were made public and shared transparently.

CHAPTER FOUR

RESULTS

4.0 Overview

The study's findings are presented in this chapter. The results have been arranged in accordance with the study's goals and the respondents' sociodemographic traits. The goals of the research were as follows:; assessing the triage competence among health care providers, to determine the health provider factors and institutional factors influencing triage in emergency departments for the selected hospitals in Kakamega County.

4.1 Distribution of study participants by health facilities

Table 4.1 presents the distribution of health facilities where data was collected from 183 health care provides. Most of the healthcare providers were from St. Mary's Mumias Hospital (15.3%) followed by Malava (11.5%) and Iguhu Sub-County hospitals (10.9%) with Mwihila Mission Hospital having the least (4.9%).

Table 4.1: Distribution of study participants by health facilities

Variable	n	%
Kakamega County Referral Hospital	19	10.4
St Mary's Mumias Hospital	28	15.3
Mwihila Mission Hospital	9	4.9
Mukumu Hospital	13	7.1
Likuyani Sub-County Hospital	11	6.0
Lumakanda Sub-County Hospital	18	9.8
Navakholo Health Centre	11	6.0
Butere Sub-County Hospital	16	8.7
Malava Sub-County Hospital	21	11.5
Iguhu Sub-County Hospital	20	10.9
Matungu Sub-County Hospital	17	9.3
Total	**183**	**100.0**

4.2 Sociodemographic characteristics of study participants

All in all, 183 questionnaires were distributed of which all the respondents completed resulting in 100% response rate (Table 4.2). 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 4.2: 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	Less than 5	137	74.9
Department (years)	5 – 9	42	22.9
	≥10	4	2.2

4.3 Triage competence on Rapid Patient Assessment

Triage Skill Observation check list was a 34-item of observation including three aspects: patient allocation, patient classification, and quick evaluation. Participants were assessed in response to every item using a scale of 1 to 5: Needs improvement is indicated by a score of 1–2, bad, fair, excellent, and 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 4.3. 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 collar and fracture combined (38.8%) and performing placing the nasopharyngeal or oropharyngeal airway in place (26.8%).

Table 4.3: Assessment of triage competence 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 thrust 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

4.4 Assessment of triage competence on patient categorization

Rating on Assessment on triaging of patient categorization which included four areas is presented in Table 4.4. 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 4.4: Assessment of triage competence on patient categorization

Patient Categorization	Level of triage skills	n	%
Categorize the patient according to triage categorization.	High	52	28.4
	Low	131	71.6
Determine which patients, based on triage classifications, are urgently in need of treatment and which ones are not.	High	53	29.0
	Low	130	71.0
Steer clear of the patient's over- or under-triaged state.	High	39	21.3
	Low	144	78.7
Initiate nursing intervention during triage categorization.	High	55	30.1
	Low	128	69.9

4.5 Assessment of triage competence on patient allocation

Results on the five areas that were examined on Assessment on triaging skills of patient allocation are presented in Table 4.5. Again, less than half had high level skills in allocating the patient to get advanced care in the ED precisely and on time (30.1%), making choosing the appropriate location for the patient with priority 1 (resuscitation in the ED). (28.4%) or making decision to allocate patient with priority 2 (23.5%).

Table 4.5: Assessment of triage competence on patient allocation

Patient allocation	Categories	n	%
Make decision to allocate the patient with priority 1(resuscitation in ED) in the right place	High	52	28.4
	Low	131	71.6
Make decision to allocate patient with priority 2	High	43	23.5
	Low	140	76.5
Decide where to put the patient who has priority 3 care.Peak 49 26.8	Decide where to put the patient who has priority 3 care.Peak 49 26.8	Decide where to put the patient who has priority 3 care.Peak 49 26.8	Decide where to put the patient who has priority 3 care.Peak 49 26.8
	Low	134	73.2
Assign patient with cooperation to other emergency personnel and physician with efficient handover High 51 27.9.	Assign patient with cooperation to other emergency personnel and physician with efficient handover High 51 27.9.	Assign patient with cooperation to other emergency personnel and physician with efficient handover High 51 27.9.	Assign patient with cooperation to other emergency personnel and physician with efficient handover 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

4.6 Observed triage competence score

The scores earned in each of the assessed items in each of the three major sub-domains of Assessment on triage skills, i.e. rapid patient Evaluation, patient classification, and patient assignment were summed up. The total score under each sub-domain was converted to percentage. The following rating was used: < 60% = low level of triage skills, 60-80% = moderate level of triage skills, and ≥ 80% = high level of triage skills.

4.7 Triage competence score

The participants exhibited overall high level on triage competence 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 4.7: Triage competence score

Variables	Possible range	Actual range	Mean	SD	Triage skills level
Overall triage competence	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

4.8 Health Provider factors affecting Triage

Table 4.8 shows results on the ranking of health care provider factors affecting decision-making for triaging of patients based on participants' views. Flexibility, assessment skills and insight were the leading. On the other hand, acuity, past educational course or being an expert, played the least role according the participants' views.

Table 4.8: Ranking health care provider factors affecting triage decision-making for patients

Personnel factors	Mean	Rank
Flexibility	2.36	1
Assessment skills	2.34	2
Insight	2.30	3
Experience	2.29	4
Organizing skill	2.28	5
Relationship method	2.25	6
Acuity	2.24	7
Past educational course	2.19	8
Being an expert	2.12	9

4.9 Trainings attended in the past three years

Over the last three years, the participants had attended several trainings. As illustrated in Table 4.9, slightly more than half (53.6%) have attended training in the past one year. Among those who had attended BLS training, majority (73.7%) took between 1 – 5 days. Of the 98 who had attended any form of training, 81.6% (n = 80) had undertook BLS course. Only 17 had had ATLS with more than half (58.8%) having had the training for between 1 – 5 days. An even smaller number had training specifically on triage course. The 13 who attended the training, 61.5% were in training for duration of 1 – 5 days. Out of the 28 who had ACLS course, three-quarters took between 1 – 5 days. Apparently, more days were spent on other trainings that were not emergency or triaging-related (80%) of which participants spent at least 6 days or more (n=25).

Table 4.9: Trainings attended in the past three years

Type of training	Categories	n	%
Attended training in the past three years	Yes	98	53.6
	No	85	46.4
Basic Life Support (BLS)	1 – 5 days	59	73.7
	≥ 6 days	21	26.3
Advanced Trauma Life Support (ATLS)	1 – 5 days	10	58.8
	≥ 6 days	7	41.2
Triage Course	1 – 5 days	8	61.5
	≥ 6 days	5	38.5
Advanced Cardiac Life Support (ACLS)	1 – 5 days	21	75.0
	≥ 6 days	7	25.0
Basic Emergency	1 – 5 days	5	50.0
	≥ 6 days	5	50.0
Disaster Management	1 – 5 days	5	71.4
	≥ 6 days	2	28.6
Other trainings	1 – 5 days	5	20.0
	≥ 6 days	20	80.0

4.10 Triage Knowledge on Triage Skill

Overall knowledge level was calculated by scoring each of the correct answers as 1, and incorrect answers 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 4.10, 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 medication and dosage for asystole therapy 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 4.10: Triage Knowledge on Triage Skill

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 following motor accident with skull fracture	Otorrhea	42	22.9
	Other responses	141	77.1
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

4.11 Institutional factors influencing triage

Table 4.11 illustrates the order of ranking of institutional factors influencing triaging. The top three possible barriers are Staff members are not routinely trained in triage, no triage chart shown at the emergency room arrears to guide practice, and Shortage of staff on duty to perform triage. Lack of space to allocate patients into categories even if triaged and staff have poor attitude to following the triage protocol were not considered as the major barriers resulting in lower mean scores.

Table 4.11: Institutional factors influencing triage.

Patient factors	Mean	Rank
Lack of regular training of staff on triage	4.59	1
No triage chart displayed in emergency receiving arrears to guide practice	4.48	2
Shortage of staff on duty to perform triage	4.45	3
Triage scale vary from one hospital to another	4.42	4
Poor administration policy and support	4.17	5
Not enough room to classify patients, even after triaging	4.16	6
Staff have poor attitude to sticking to triage guideline	3.94	7

4.12 Availability of equipment

Figure 4.1 illustrates availability status of essential triage equipment in the health facilities surveyed. The most common equipment available were stethoscope, urinalysis strip and thermometer (100%), glucometer strip (95.1%), sphygmomanometer (88.5%) and Oxygen Flow Meter (69.9%). Notably, Triage Acuity Rating Guidelines and Cardiac Monitor Machine were not available.

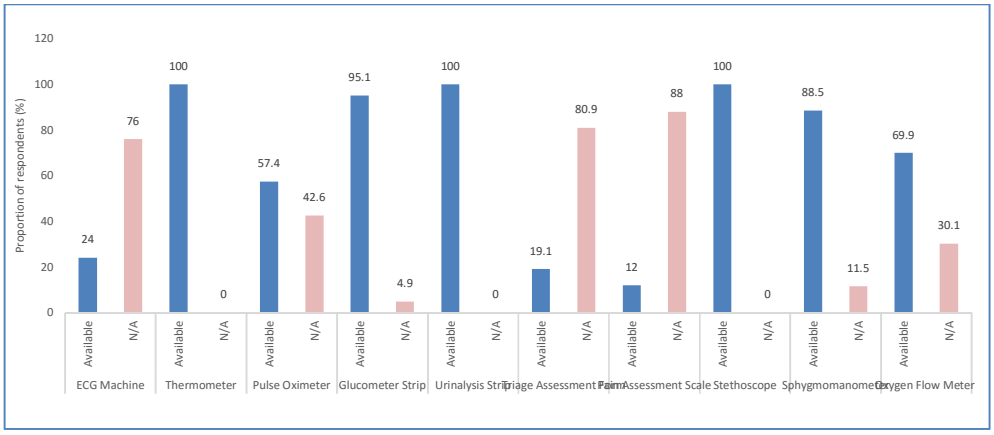

Figure 4.1: Availability of equipment

4.13 Descriptive statistics for normality

The skewness and kurtosis for triage skills were tested for normalcy. The kurtosis and skewness values that are less than the absolute value of 1 i.e., +/-1, i.e. -0.47 and 0.28,

respectively. Avkiran (1995) and Ahmad (2010) state that data is deemed regularly distributed if the skewness and kurtosis values are close to zero. These two indicators' values demonstrated that the study's premise about the data's normalcy was satisfied., and hence One-Way ANOVA test is appropriate to test the relationship between categorical variables and triage skills being continuous dependent variable.

In order to treat the dependent variable triage skills as continuous variable, the scores from each participant on the 34-items were added up. Mean score was 57.3±15.2 and a median of 57.0 and ranged between 34.0 to 106.0.

Table 4.13. Descriptive statistics for normality

Variable	Mean	S.D.	Skewness	Kurtosis
Triage skills	57.3	15.2	0.28	- 0.47

4.14 Relationship between socio-demographic characteristics and healthcare providers' Assessment on triage

One-Way ANOVA parametric test results on relationship between socio-demographic characteristics and healthcare providers' assessment on triage skills is shown in Table 4.13. The findings reveal socio-demographic characteristics, such as being female (F: 4.16, $p = 0.04$) or being a nurse (F: 25.02, $p < 0.0001$) were significantly associated with higher mean scores in self-assessment on triage skills. None of the remaining socio-demographic variables yield any statistically significant results.

Table 4.14: One-Way ANOVA test on relationship between socio-demographic characteristics and healthcare providers' assessment on triage

Variable	Categories	n	Mean	SD	F	p value
Age group in years	< 34	110	57.9	14.6	0.42	0.52
	≥ 34	73	56.4	16.2		
Gender	Male	86	54.8	13.5	4.16	**0.04**
	Female	97	59.4	16.4		
Religious affiliation	Catholics	40	57.0	15.4	0.01	0.90
	Protestant and others	143	57.3	15.3		
Professional cadre	Nurse	88	62.8	13.4	25.02	**< 0.0001**
	Other cadres	95	52.2	15.1		
Work experience in the profession	< 6 years	116	56.8	15.6	0.26	0.61
	≥ 6 years	67	58.0	14.8		
Number of years worked in Emergency Department	< 5 years	137	56.8	15.6	0.41	0.52
	≥ 5 years	46	58.5	14.4		
Health Facility	County Hospital	19	61.2	16.4	1.39	0.24
	Sub-County Hospitals	164	56.8	15.1		

4.15 Relationship between health care factors and healthcare providers' assessment on triage skills

Responses on health care provider factors effecting triage, from their views participating in the study were prioritized as '3 = high' or 'low' where responses were 2 or 3 suggesting that participants rating of that particular variable as either medium or low. The categorization of the responses into dichotomous variable enables One-Way ANOVA test to be conducted basing on the self-assessment of triage skills being continuous variable. Only one independent variable had significant relationship with the outcome. Participants who considered experience as high priority factor that affects triage decision-making for trauma patients registered a significantly higher mean scores on self-assessment on triage skills (F: 4.49, p = 0.04). This suggests that participants who rated their experience highly in guiding their decision-making were more likely to rate themselves as competent in triage skills unlike those who rated

experience as low. Flexibility yielded a weaker association with the dependent variable with borderline p value (F: 3.29, p = 0.07).

Table 4.15 One-Way ANOVA test on relationship between healthcare providers factors on triage skills

Variable	Priority level	n	Mean	SD	F	p value
Experience	High	57	60.8	13.7	4.49	**0.04**
	Low	126	55.7	15.7		
Assessment skills	High	64	59.8	15.4	2.79	0.10
	Low	119	55.9	15.0		
Being an expert	High	37	57.5	13.1	0.01	0.92
	Low	146	57.2	15.8		
Organizational skill	High	52	58.2	13.8	0.31	0.58
	Low	131	56.9	15.8		
Past educational course	High	39	60.0	13.7	1.61	0.21
	Low	144	56.5	15.6		
Acuity	High	48	60.4	15.3	2.90	0.09
	Low	135	56.1	15.1		
Relationship method	High	57	58.8	13.9	0.89	0.34
	Low	126	56.5	15.8		
Insight	High	58	58.6	15.1	0.61	0.43
	Low	125	56.7	15.3		
Flexibility	High	68	59.9	15.0	3.29	**0.07**
	Low	115	55.7	15.2		

4.16 Relationship between type of training and healthcare providers' assessment on triage skills

Table 4.6 presents results on parametric test on the relationship between type of training and healthcare providers' triage competence. Attendance of training was significantly associated with lower mean scores on assessment on triage skills (F: 5.35; p = 0.02) while those who had attended at least six days' training on Advanced Trauma Life Support had significantly higher mean scores (F: 6.32, p = 0.02).

Table 4.16: One-Way ANOVA test on relationship between type of training and healthcare providers' assessment on triage skill

Variable	Number of training days	n	Mean	SD	F	p value
Attended training	Yes	98	54.9	15.3	5.35	**0.02**
	No	85	60.0	14.8		
Basic Life Support (BLS)	≥ 6 days	21	56.5	17.3	0.55	0.46
	< 6 days	59	53.7	13.7		
Advanced Trauma Life Support	≥ 6 days	7	67.6	20.8	6.32	**0.02**
	< 6 days	10	45.8	15.1		
Triage Course	≥ 6 days	5	58.2	24.2	0.00	0.95
	< 6 days	8	57.5	17.5		
Advanced Cardiac Life Support (ACLS)	≥ 6 days	7	60.3	24.3	1.76	0.20
	< 6 days	21	50.6	13.7		
Other trainings	≥ 6 days	20	53.5	12.9	3.03	0.09
	< 6 days	5	42.0	14.6		

*Basic Emergency and Disaster Management trainings had 5 vs 5 and 2 vs 5 trained for ≥ 6 days and < 6 days, respectively.

4.17 Relationship between knowledge and healthcare providers' assessment on triage skills

Knowledge on triage skills was assessed based on 10 questions with multiple choice responses. A correct response was entered as 1 and incorrect one as 0. Overall median score was 6.0 with a mean score of 5.7±2.1 ranging from 1.0 to 10.0. A score of 6.0 and above was considered as 'Good.' Participants who correctly identified Epinephrine 1mg IV as treatment for a systole showed higher mean scores on self-assessment on triage skills, and the distinction was highly statistically noteworthy (F: 19.9, $p < 0.0001$). Other knowledge parameters that were examine did not show any statistically significant association.

Table 4.17: One-Way ANOVA test on relationship between knowledge and healthcare providers' assessment on triage skills

Variable	Knowledge rating	n	Mean	SD	F	p value
Overall knowledge level	Good	116	58.0	15.4	0.86	0.35
	Poor	67	55.9	14.9		
Injury to the liver with history of fall with contusion at flank	Good	118	58.6	15.6	2.60	0.11
	Poor	65	54.8	14.3		
Hypovolemic shock as most important complication of injury to the liver	Good	144	58.0	15.7	1.64	0.20
	Poor	39	54.5	13.4		
Ortorrhea as sign that confirms diagnosis of base of skull fracture	Good	42	56.4	15.5	0.18	0.67
	Poor	141	57.5	15.2		
GCS score of 7 for patient ortorrhoea	Good	44	55.7	17.6	0.58	0.45
	Poor	139	57.7	14.5		
Cervical injury for patient with neck pain and dyspnoea after car accident	Good	168	57.1	14.9	0.13	0.72
	Poor	15	58.6	19.2		
Placing cervical collar as first response to patient with neck pain after car accident	Good	146	57.8	15.4	0.77	0.38
	Poor	37	55.3	14.7		
Pneuthorax as main problem for patient with absence of breathing sound in right upper lobe of the lung	Good	47	53.9	15.9	3.07	0.08
	Poor	136	58.4	14.9		
Oropharyngeal airway eliminates possibility of an upper airway obstruction	Good	148	56.8	14.5	0.77	0.38
	Poor	35	59.3	18.0		
For paint without pulse, first action to take is to initiate closed chest massage	Good	111	55.8	14.5	2.72	0.100
	Poor	72	59.6	16.1		
Epineprine 1mg IV as treatment for asystole	Good	8	79.6	16.5	19.9	< **0.0001**
	Poor	175	56.2	14.4		
Amiodorone 300mg IV push for failed (after 3 shocks) Ventricular Fibrillation	Good	63	57.3	16.5	0.00	0.98
	Poor	120	57.2	14.6		

4.18 Relationship between type of training and healthcare providers' assessment on triage skills

Table 4.18 presents results on parametric test on the relationship between type of training and healthcare providers' triage skills. Attendance of training was significantly associated with lower mean scores on assessment on triage skills (F: 5.35; p = 0.02) while those who had attended at least six days' training on Advanced Trauma Life Support had significantly higher mean scores (F: 6.32, p = 0.02).

Table 4.18: One-Way ANOVA test on relationship between type of training and healthcare providers' assessment on triage skills

Variable	Number of training days	n	Mean	SD	F	p value
Attended training	Yes	98	54.9	15.3	5.35	**0.02**
	No	85	60.0	14.8		
Basic Life Support (BLS)	≥ 6 days	21	56.5	17.3	0.55	0.46
	< 6 days	59	53.7	13.7		
Advanced Trauma Life Support	≥ 6 days	7	67.6	20.8	6.32	**0.02**
	< 6 days	10	45.8	15.1		
Triage Course	≥ 6 days	5	58.2	24.2	0.00	0.95
	< 6 days	8	57.5	17.5		
Advanced Cardiac Life Support (ACLS)	≥ 6 days	7	60.3	24.3	1.76	0.20
	< 6 days	21	50.6	13.7		
Other trainings	≥ 6 days	20	53.5	12.9	3.03	0.09
	< 6 days	5	42.0	14.6		

*Basic Emergency and Disaster Management trainings had 5 vs 5 and 2 vs 5 trained for ≥ 6 days and < 6 days, respectively.

4.19 Relationship between knowledge and healthcare providers' assessment on triage skills

Knowledge on triage skills was assessed based on 10 questions with multiple choice responses. A correct response was entered as 1 and incorrect one as 0. Overall median score was 6.0 with a mean score of 5.7±2.1 ranging from 1.0 to 10.0. A score of 6.0 and above was considered as 'Good.' Participants who correctly identified Epinephrine 1mg IV as treatment for a systole showed higher mean scores on self-

assessment on triage skills, and the difference was highly statistically significant (F: 19.9, $p < 0.0001$). Other knowledge parameters that were examine did not show any statistically significant association.

Table 4.19: One-Way ANOVA test on relationship between knowledge and healthcare providers' assessment on triage

Variable	Knowledge rating	n	Mean	SD	F	p value
Overall knowledge level	Good	116	58.0	15.4	0.86	0.35
	Poor	67	55.9	14.9		
Injury to the liver with history of fall with contusion at flank	Good	118	58.6	15.6	2.60	0.11
	Poor	65	54.8	14.3		
Hypovolemic shock as most important complication of injury to the liver	Good	144	58.0	15.7	1.64	0.20
	Poor	39	54.5	13.4		
Ortorrhea as sign that confirms diagnosis of base of skull fracture	Good	42	56.4	15.5	0.18	0.67
	Poor	141	57.5	15.2		
GCS score of 7 for patient ortorrhoea	Good	44	55.7	17.6	0.58	0.45
	Poor	139	57.7	14.5		
Cervical injury for patient with neck pain and dyspnoea after car accident	Good	168	57.1	14.9	0.13	0.72
	Poor	15	58.6	19.2		
Placing cervical collar as first response to patient with neck pain after car accident	Good	146	57.8	15.4	0.77	0.38
	Poor	37	55.3	14.7		
Pneuthorax as main problem for patient with absence of breathing sound in right upper lobe of the lung	Good	47	53.9	15.9	3.07	0.08
	Poor	136	58.4	14.9		
Oropharyngeal airway eliminates possibility of an upper airway obstruction	Good	148	56.8	14.5	0.77	0.38
	Poor	35	59.3	18.0		
For paint without pulse, first action to take is to initiate closed chest massage	Good	111	55.8	14.5	2.72	0.100
	Poor	72	59.6	16.1		
Epineprine 1mg IV as treatment for asystole	Good	8	79.6	16.5	19.9	**< 0.0001**
	Poor	175	56.2	14.4		
Amiodorone 300mg IV push for failed (after 3 shocks) Ventricular Fibrillation	Good	63	57.3	16.5	0.00	0.98
	Poor	120	57.2	14.6		

4.20 Relationship between institutional factors and triage by health care providers

Respondents' opinion was sought on potential obstacles to triaging At a hospital using official local practice, where the answers range from 'Highly agree = 5 to Agree = 4 Neutral = 3, Disagree = 2, Strongly disagree = 1'. For analysis purposes, the responses were collapsed into dichotomous responses as either 'Strongly agree / Agree as Agree and Neutral, Disagree and Strongly disagree as Disagree'. All the seven variables examined resulted in negative association between the variables and participants' self-assessment on triage skills with the available evidence revealing low mean scores on self-reported competency in triage skills suggesting that the identified independent variables are barriers to triaging in hospital with formal local protocol. There were statistically significant negative association between participants who agreed that triage scale vary from one hospital to another (F: 8.63, p 0.004), there There was not a triage chart available for emergency reception. arrears to guide practice (F: 11.77, $p = 0.0007$), there was staff members are not routinely trained in triage (F: 20.4, $p < 0.0001$), there was shortage of staff on duty to perform triage (F: 11.02, $p = 0.001$), there was staff have poor attitude to sticking to triage guideline (F: 31.26, $p < 0.0001$), there was not enough room to classify individuals, even after triaging (F: 34.86, $p < 0.0001$), or there was poor administration policy and support (F: 17.95, $p < 0.0001$).

Table 4.20: One-Way ANOVA test on relationship between institutional factors and healthcare providers' assessment on triage

Variable	Categories	n	Mean	SD	F	p value
Triage scale vary from one hospital to another	Agree	107	54.5	15.4	8.63	**0.004**
	Disagree	76	61.1	14.2		
No triage chart displayed in emergency receiving arrears to guide practice	Agree	113	54.3	14.6	11.77	**0.0007**
	Disagree	70	62.0	15.2		
Lack of regular training of staff on triage	Agree	122	53.8	14.9	20.4	< **0.0001**
	Disagree	61	64.1	13.6		
Shortage of staff on duty to perform triage	Agree	108	54.2	15.2	11.02	**0.001**
	Disagree	75	61.6	14.2		
Staff have poor attitude to sticking to triage guideline	Agree	80	50.6	14.8	31.26	< **0.0001**
	Disagree	103	62.4	13.5		
No space to allocate patients into categories even if triaged	Agree	88	50.9	14.6	34.86	< **0.0001**
	Disagree	95	63.1	13.4		
Poor administration policy and support	Agree	86	52.4	14.6	17.95	< **0.0001**
	Disagree	97	61.6	14.6		

CHAPTER FIVE

DISCUSSION

5.1 Overview

The explanation of the study's findings is presented in this chapter, which is based on the goals listed below.; To assess triage competence among health providers in emergency departments at Health in Kakamega County, to determine the health provider factors influence examine the health facility factors influencing triaging of patients in emergency departments of Health facilities in Kakamega county.

5.2 Triage competence on Patient Assessment

One of the most important skills needed for emergency nurses is triage. (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 evaluation, vital signs, and projected resource levels (Shelton, 2009). Vital signs, the primary complaint, the history of the illness, and clinical examination were reported to be affecting decision making in triage (Patel, 2008).

Low level of triage skills were 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 The level of proficiency in advanced nursing skills, such as nasopharyngeal or oropharyngeal airway insertion, evaluation of internal and external bleeding, bleeding control, manual breathing, and bag-valve mask use, was low. ventilation (Salonen, 2007).

5.2.1 Triage competence on 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 limits for each category. The finding agrees with the study done by Gilboy *et al.,*2011 who said that the intricate process of classifying and ranking patient treatment is known as ED triage.

To make sure that every patient receives appropriate and timely care, triage is done in the emergency department based on clinical urgency (Lampi et al., 2018).

5.2.2 Triage Competence on Patient allocation

Approximately 50% of the participants had high level of skills in allocating the patient to get advanced treatment in an accurate and timed (30.1%). Making decision to Assign the patient a priority 1 (ED resuscitation). 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 failed to designate a suitable triage category, and also lacked knowledge on waiting time.

5.3 Health Care Provider factors that influence triage

Numerous health care provider factors influence triage skills as discussed in the results section. However, most of the factors have been discussed in the results section as mentioned by the respondents. The four most common factors included, gender, trainings, following rules and criteria and possibility injury to the patient.

5.3.1 Gender

Ineffective healthcare systems and fundamental metrics Implicit social variables connected to the traits of the health practitioner themselves may cause mistakes. The perceived authority position, gender, and race of healthcare practitioners may have an impact on clinical pain reporting and experimental pain behaviors. (Vigil *et al.,* 2014). In the selected hospitals in Kakamega County, there were more females (53%) than males who were 47%. In addition, a higher proportion (48.1%) being nurses. This agrees with study done by schumaker *et al.,* (2019) who argued that females remain higher dominant gender in nursing profession.

With regard to knowledge, there is no association between knowledge score in triage and participants studied (Reisie *et al.,* 2017)

5.3.2 Training

Training is an organized system of education, instruction, or discipline, (Farlex 2012). According to the findings, attendance of training was significantly associated with lower mean scores on self-assessment on triage skills (F: 5.35; p=0.02). While those who had attended at least six days training on Advanced Trauma Life Support had significantly higher mean scores (F:6.32, P=0.02). This is in line with a study done by Dulandas *et al.,* (2018) who confirms that short courses in emergency care like ACLS and PHLS enhanced the expertise and practical abilities of ED nurses. Another study done by Fathoni *et al.,* (2013) also adds that most nurses graduate at diploma level and less numbers attending trainings and this may suggest knowledge deficit.

5.3.3 Experience

Experience is asset of abilities developed by repeatedly doing out a certain task or action, which therefore suggests competency in performing the task of interest (Pub

med 2002). At selected hospitals in Kakamega, averagely, 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. This disagrees with study done by sedaghat *et al.,* (2012) who stated that there is an association between total triage knowledge and years of experience. Additionally, Hicks et al. (2003)), stated that in America experience increases decision-making stability in triage situation.

5.3.4 Following rules and criteria

The rules are generally described as words that are methodically created to help practioners and make choices on the right medical treatment under certain conditions (Institute of medicine, 1990). In the selected hospital in Kakamega, the findings revealed that among the non-personnel factors affecting triage decision making process include following rules and criteria (P=0.04). Carter *et al.,* (2014), reported that for triage decision to be accurate and consistent among other measures they need to be regular revision of guidelines, a revised triage scale, and a triage process quality audit outcome.

5.4 Relationship of knowledge and health care provider triaging skills

The degree of factual and procedural knowledge necessary for emergency nurses to carry out quick assessments, patient classification, and patient assignment is referred to as "triage knowledge." (Careter *et al.,* 2014). Studies continue to add that a triage nurse must maintain current information, adhere to therapeutic recommendations, and take 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%), oropharengeal 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 otorrhoea 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 sizable portion of participants—69%—had inadequate awareness that they answered less than half of the self-administered questionnaire's questionse (Milberatt *et al.,* 2009).

5.5 Health facility factors influencing triage decision making process

Top possible barriers were staff members are not routinely trained in triage (P<0.001). Dateo *et al.,* (2013), said that in order to make it easier to estimate a patient's requirement for resources, training and resource use must be standardized.

No triage chart was present to be displayed in emergency department to guide practice (P<0.0007).This disagrees with a study done by Considine *et al.,* (2007), who stated that administrators need to create rules and procedures that will serve as a tool for emergency personnel to use in order to prioritize emergency treatment and conduct triage assessments.

Another barrier cited in the study was shortage of staff (P< 0.001). In a study done by Gottschalk *et al.,* (2006), revealed that other factors that may influence triage assessment include lack of resources and staff.

5.5.1 Equipment for triaging

Available equipment's were stethoscope, urinalysis strip, thermometer (100%), glucometer (95.5%) sphygmanomometer (88.8%) and oxygen flow meter (69.9%). Notably, triage rating charts and cardiac monitors were not available. Resources required for triaging according to ESI guidelines include; laboratory, diagnostic tests,

ECG, IV fluids administration, IM injection (except from tetanus), specialist advice, straightforward operations, and conscious sedation, (Gilboy *et al.,* 2011), a gap identified in availability of resources with the current study. Triaging delays have been demonstrated to be influenced by a lack of basic evaluation equipment. (Gold Hill,2004).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Overview

The study's conclusions and recommendations—which were informed by the particul ar objectives—are presented in this chapter.**6.2 Conclusion**

6.2.1 Competence required in triage

89% of respondents had high skills in identification of patient with respiratory distress, assessing temperature at 68.3% and collaborating with physician to give emergency drugs at 68.3%. However, low skills observed in protecting C spine with cervical collar (61.2%) and performing oropharyngeal and nasopharyngeal airway at 73.2%.

6.2.2 Health care Provider Factors influencing triaging

More than half 74.9% of the respondents had worked in ED for less than five year. The study findings reveal that most of the respondents were not flexible to work in emergency department associated with p value of 0.07.

6.2.3 Health facility factors influencing triaging

Institution factors affecting triaging decision included; shortage of staff P value of 0.001, lack of standardized training P value <0.0001, and lack of guidelines and policies that support triage p value of 0.007.

6.3 Recommendations

- In order to improve on triage competencies, Hospital administration should make sure that there are possibilities for training and quick courses in Advanced Cardiac Life Support, Basic Life Support, and Advanced Trauma Life Support for health care providers. Continuous Program Development on

Triage should be done frequently and all frontline health providers to be encouraged to attend.

- The hospital management should ensure deploying highly experienced heath providers to work in ED to mentor the less experienced.
- The county and national government to look at human resource to include formulation of policies and guidelines, staffing and availability of equipment and resources to support triaging in ED for all facilities.

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APPENDIX I: CONSENT FORM FOR THE RESPONDENTS:
TRAUMA PATIENT TRIAGING BY HEALTHCARE WORKERS IN EMERGENCY DEPARTMENT

This study is being conducted by Faith Sabwa who is a Master of Science in Nursing student at Masinde Muliro University of Science and technology in Kakamega main Campus.

You are asked to participate in the study to provide information regarding triaging of trauma patients within your hospital. Please read this form and ask any question before deciding to participate.

The purpose of the study is to evaluate trauma patient triaging among health care providers in selected hospitals within Kakamega County so as to improve the current practice and in a long run improving the outcome of patients who were sustained traumatic injuries. You must be a nurse, doctor or clinical officer working in emergency unit/ outpatient department to take part in the study.

If you agree, you will be provided with a questionnaire to fill and the researcher will be there to assist in case of any clarification. The exercise will take 30minutes to an hour. You may find some questions sensitive but the study poses no specific risk other than those encountered on daily basis.

There is no benefit or compensation attached to this study as it is voluntary. If you decide not to take part in the study it will not affect you or your future relationship and if you decide to participate, you can withdraw at any time you feel you don't want to continue.

Ask any question now or later and you can as well contact me through this mobile phone number

0723938644

I have read the information; my question has been answered and I give consent to participate in the study

Participant's signature---------- Date----------

Interviewer's Signature---------- Date----------

This consent form will be kept by the researcher for three years after the study.

APPENDIX II: QUESTIONNAIRES

PART ONE: SOCIO- DEMOGRAPHIC DATA:

Instruction:

I would like to ask you some information concerning your personal data. Please answer by putting a mark (x) in the space available as appropriate for you/ or filling in the blank spaces provided.

1. Age
   a) 25-35 Years ☐
   b) 35-45 Years ☐
   c) 45-54 Years ☐
   d) > 55 Years ☐
2. Gender
   a) Male ☐
   b) Female ☐
3. Religion

   ☐ Orthodox ☐ Muslim ☐ Protestant

   ☐ Catholic ☐ Others

   Specify……

4. Cadre
   a) Nurse ☐
   b) Doctor ☐
   c) Clinical Officer ☐

If Nurse or clinical officers go to number 5 and if a doctor go to number 6

5. Cadre of a nurse or clinical officer a) Qualifications……..

   b) Years of working……

6. Qualification of a doctor
   a) Medical Officer ☐
   b) Consultant ☐
7. Specialty
   a) Medicine ☐
   b) Orthopedic Surgery ☐

b) Orthopedic surgery ☐

c) General Surgery ☐

d) Neuro Surgery ☐

e) ENT Surgery ☐

f) Obstetric Surgery ☐

g) None ☐

8. How long have you worked in Emergency Department?

a) < 5 Years ☐

b) 5-9 Years ☐

c) 10-14 Years ☐

d) 15-19 Years ☐

e) > 20 Years ☐

9. Training and Continuing Education

9:1 did you attend any training, course or workshop during the past three years

☐ Yes ☐ No

NO	Training	No of training	Duration of training Course (days)
1.	Basic life support (BLS)		
2.	Advanced trauma life support(ATLS)		
3.	Triage course		
4.	Advanced cardiac life support (ACLS)		
5.	Basic emergency care		
6.	Disaster management		
7.	Others……..please specify.		

PART TWO: Triage Knowledge

The questionnaire provides 10 questions regarding knowledge on triage skill. Please check your choice by putting mark (√) in the available options A, B, C, and D.

Case 1: for question 1 to 2

A male patient 35 years old come to emergency department with history of falling approximately 20 meters from the hill, has severe pain and contusion at the flank. His neighbor transfers him to ED and the patient condition is unconscious.

1. What is the injured organ in the abdomen from the patients observation

   Liver [ ] Kidney [ ]

   Gastric [ ] Pancreas [ ]

2. What is the most important complication for the patient above

   Neurogenic shock [ ] Anaphylactic shock [ ]

   Hypovolemic shock [ ] Sepsis [ ]

Case 2: For question 3-4

A male patient, 25 years old involved in a motor vehicle accident. The patient condition is; eye opening by pain stimulus, inappropriate words verbal and abnormal flexion of both arms. The physical exam reveals presence of bleeding and discharge from the right ear.

3. Which of the following signs will confirm the diagnosis of base of skull fracture

   Periorbital ecchymosis [ ] Battle sign [ ]

   . Ortorrhea [ ] Hemotympanum [ ]

4. What is the GCS score of the Patient?

   6 [ ] 8 [ ]

   7 [ ] 9 [ ]

Case 3: For question 5 to 11

The male patient who is 30 years old has a car accident. He complains of neck pain, and dyspnea.

5. Which of the following problems would you anticipate?
   - Thoracic injury [ ]
   - Cervical injury [ ]
   - Sub clavicle injury [ ]
   - Head injury [ ]
6. As the health care provider, which of the following actions will you respond first? [ ]
   - Administer oral analgesic drug
   - Place the patient with cervical collar [ ]
   - Give oxygen [ ]
   - Suction [ ]
7. The health care provider found absence of breathing sound in the right upper lobe of the lung. Which of the following problem would you anticipate? [ ]
   - Flail chest
   - Acute lung injury [ ]
   - Pericardial tamponade [ ]
   - Pneumothorax [ ]
8. Which of the following is true about oropharyngeal airway?
   - It eliminates the need to position the head of unconscious patient [ ]
   - It eliminates the possibility of an upper airway obstruction [ ]
   - It is of no value once tracheal tube is inserted [ ]
   - It may stimulate vomiting or laryngospasm if inserted in semi-conscious patient [ ]
9. The patient has no pulse or respiration. After calling for help the first action you should take is?
   - Start peripheral IV [ ]
   - Initiate closed chest massage [ ]
   - Establish airway [ ]
   - Obtain the crash cart [ ]

10. Which of the following is the correct drug and dose for treatment of asystole [ ]

    Epinephrine 2mg IV

    Atropine 0.5mg IV [ ]

    Lidocaine 1mg/kg IV [ ]

    Epinephrine 1mg IV [ ]

11. A patient who has Ventricular Fibrillation has failed to respond to 3 shocks. After being started on intravenous and inserted a tracheal tube, confirm proper placement. Which of the following drug should the patient receive first [ ]

    Amiodorone 300mg IV push

    Lidocaine 1-1.5mg/kg IV push [ ]

    Procainamide 30mg/min up to total of 17mg/kg [ ]

    Epinephrine 1mg IV push [ ]

PART THREE: Triage Skill.

1. How do you decide how urgently and where a patient needs to be seen?

PLEASE TICK ALL THE APPROPRIATE ANSWERS:

	YES	NO
Have written policy and guidelines in the department	☐	☐
By visual and verbal assessment	☐	☐
By physical assessment	☐	☐
By experience	☐	☐
By intuition	☐	☐

Other- Please Specify----------

2. Do you have written formal categories for triage?

YES ☐ NO ☐

3. Do the categories correspond to those used for disaster situation?

YES ☐

NO ☐

4. How many triage categories do you have?

Two ☐

Three ☐

Four ☐

Five ☐

More than five- please specify----------

PLEASE GIVE DETAILS FOR EACH CATEGORY

……

……

---

5. Do you have color codes for the categories?

YES ☐ please specify below

NO ☐ if no proceed to question 7

Color Codes

……

……

……

6. Do you document the color codes in the patients notes

YES ☐

NO ☐

7. Do you have limits for each category by which each patient should be seen by a doctor? ☐

   YES Please specify below

   NO ☐

   Time limits for each category

   ……

   ……

   ……

8. Do you reassess the trauma patients at specified tome intervals?

   YES ☐ Please specify below

   NO ☐

   Reassessment time

   ……

   ……

   ……

9. What is the average length of time taken for triaging a trauma patient?

   1-3 MINUTES ☐

   4-5 MINUTES ☐

   6-10 MINUTES ☐

   More than 10 Minute ☐

PART FOUR: Factors influencing triaging:

1. Please indicate an (x) in the column provided for how you can rank personnel factors affecting triage decision making for a trauma patient.

Personnel factors	3 = High priority	2 = Medium priority	1 = Low priority
1. Experience			
2. Assessment skills			
3. Being an expert			
4. Organizing skill			
5. Past educational course			
6. Acuity			
7. Relationship method			
8. Insight			
9. Flexibility			

2. How will you rank non- personnel factors that can affect triaging process? Kindly tick on the column as appropriate.

Inter-unit factors	3 = High priority	2 = Medium priority	1 = Low priority
1. Unit crowdness			
2. The possibility of injury to the patient			
3. Work volume			
4. Medical team coverage			
5. Nursing team coverage			
6. Rules and criteria			
7. Personnel team coverage			
8. Funding			

3. What are patient's factors that can affect triage decision making process (mark X as appropriate)

Factors related to patient	common	Most common	uncommon
1. Vital signs			
1. Kind of injury			
2. Pain			
3. duration of event			
4. Age			
5. Patient behavior			
6. Patient appearance			
7. Patient history			
8. Gender			
9. Triage scale			

4. What is your opinion on possible barriers to improve triage in hospital with formal local protocol?

Limiting factor to improve triage	5 = Strongly agree	4 = Agree	3 = Neutral	2 = Disagree	1 = Strongly Disagree
1. Triage scale vary from one hospital to another					
2. No triage chart displayed in					

emergency receiving arrears to guide practice					
3. Lack of regular training of staff on triage					
4. Shortage of staff on duty to perform triage					
5. Staff have poor attitude to sticking to triage guideline					
6. No space to allocate patients into categories even if triaged					
7. Poor administration policy and support					

APPENDIX III OBSERVATION CHECKLIST

Instructions: Observation made on the respondent's ability in triage skills by check list the number on scale 1-5 following each statement below. i.e. 5=Very good, 4= Good, 3= Fair, 2= Poor and 1= Need improvement

NO	Triage assessment	Perceived triage skill				
	Rapid patient Assessment	VG(5)	G(4)	F(3)	P(2)	NI(1)
1.	Assess patient including vital signs with rapid assessment in 2-5 min					
2.	Assess or ask chief complain of patient rapidly					
3.	In unconscious patient, look in the upper airway for blood, vomitus, foreign bodies, edema and tongue obstruction according so as to assess the patency of the air way.					
4.	Decide to open up airway and remove foreign body when airway is obstructed according to airway management					
5.	Perform clear air way by correct position with jaw thrust and head tilt chin lift.					
6.	Perform clear airway by correct position by jaw thrust without head tilt if patient suspect cervical injury					
7.	Perform to insert oropharyngeal or nasopharyngeal air way					
8.	look at the chest about patient chest abnormal movement					
9.	Assess the rate and depth of respiration to observe breathing rate, pattern rhythm, will look and listen					
10.	Look at the patient skin to investigate for integrity, wound, bruising, texture, color.					
11.	Listen to the noise in the airways such as gurgling, snoring, wheeze					
12.	Listen the silent or noise breathing					
13.	Easily identify a patient in respiratory distress					
14.	Administer oxygen therapy					
15.	Perform bag mask-ventilation					

16.	Protect cervical spine when patient suspect cervical fracture with cervical collar					
17.	Check pulse rate and rhythm according to circulation assessment					
18.	Assess capillary refill					
19.	Assess the temperature of the patient					
20.	Assess patient with diaphoresis					
21.	Perform chest compression in critical condition of the patient					
22.	Collaborate with physician to administer emergency drugs					
23.	Assess internal and external bleeding					
24.	Perform control of blood loss appropriately to stop bleeding					
25.	Collaborate resuscitation to provide appropriate intravenous fluid					
	Patient categorization:					
26.	Categorize the patient according to triage categorization.					
27.	Identify patient who require immediate care, urgent and non-urgent according to triage categories					
28.	Avoid the condition of the patient with over triage or under triage					
29.	Initiate nursing intervention during triage categorization.					
	Patient allocation:					
30.	Make decision to allocate the patient with priority 1(resuscitation in ED) in the right place.					
31.	Make decision to allocate patient with priority 2					
32.	Make decision to allocate patient with priority 3 in the right place.					
33.	allocate patient with collaboration with other emergency and doctor with hand over effectively.					
34.	Allocate the patient to get advance treatment in ED in accurately and timely.					

APPENDIX IV: APPROVAL LETTER FROM DPS

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: directordps@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
Kakamega – 50100
Kenya

Directorate of Postgraduate Studies

Ref: MMU/COR: 509099

1st October, 2019

Faith Angose Sabwa,
HNR/G/10/2016,
P.O. Box 190-50100,
KAKAMEGA.

Dear Ms. Sabwa

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters Proposal entitled: "***Evaluation of Trauma Patient Triaging among Health Care Providers in Emergency Department at Selected Hospitals in Kakamega County***" and appointed the following as supervisors:

1. Prof. Lt. Col (Rtd) John M. Okoth - SONMAPS, MMUST
2. Dr. Tecla Sum - SONMAPS, MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director of Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Nursing & Midwifery Graduate Studies Committee and Chairman, Department of Clinical Nursing and Health Informatics and Graduate Studies Committee. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

Dr. Consolata Ngala
DEPUTY DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

APPENIDX IV: APPROVAL LETTER FROM IERC

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
Tel: 056-31375
Fax: 056-30153
E-mail: ierc@mmust.ac.ke
Website: www.mmust.ac.ke
P. O. Box 190-50100
Kakamega, Kenya

Institutional Ethics Review Committee (IERC)

Ref: MMU/COR: 403012 vol2 (63) **Date:** 29th October, 2019

Faith Angose Sabwa
Masinde Muliro University of Science and Technology
P.O. Box 190-50100
KAKAMEGA

Dear Ms Sabwa

RE: Evaluation of Trauma Patient Triaging among Health Care Providers in Emergency Department at Selected Hospitals in Kakamega County -MMUST/IERC/092 /19

Thank you for submitting your proposal entitled as above for initial review. This is to inform you that the committee conducted the initial review and approved (with minor revisions) the above Referenced application for one year.

This approval is valid from **29th October, 2019 through to 29th October, 2020.** Please note that authorization to conduct this study will automatically expire on **29th October, 2020**. If you plan to continue with data collection or analysis beyond this date please submit an application for continuing approval to the MMUST IERC by **29th September, 2020.**

Approval for continuation of the study will be subject to submission and review of an annual report that must reach the MMUST IERC secretariat by **29th September, 2020**. You are required to submit any amendments to this protocol and any other information pertinent to human participation in this study to MMUST IERC prior to implementation.

Please note that any unanticipated problems or adverse effects/events resulting from the conduct of this study must be reported to **MMUST IERC**. Also note that you are required to seek for research permit from **NACOSTI** prior to the initiation of the study.

Yours faithfully,

Dr. Gordon Nguka (PhD)
Chairman, Institutional Ethics Review Committee

Copy to:
- The Secretary, National Bio-Ethics Committee
- Vice Chancellor
- DVC (PR&I)
- DVC (A & F)

APPENDIX V: APPROVAL LETTER FROM NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **883333**

Date of Issue: **09/January/2020**

RESEARCH LICENSE

This is to Certify that Ms.. FAITH SABWA of Masinde Muliro University of Science and Technology, has been licensed to conduct research in Kakamega on the topic: EVALUATION OF TRAUMA PATIENT TRIAGING AMONG HEALTH CARE PROVIDERS IN EMERGENCY DEPARTMENT AT SELECTED HOSPITALS IN KAKAMEGA COUNTY for the period ending : 09/January/2021.

License No: **NACOSTI/P/20/3126**

883333

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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APPENDIX V: APPROVAL LETTER FROM COUNTY GOVERNMENT OF KAKAMEGA

REPUBLIC OF KENYA
COUNTY GOVERNMENT OF KAKAMEGA

OFFICE OF THE GOVERNOR
COUNTY SECRETARY AND HEAD OF PUBLIC SERVICE

Telephone: 056-31850/31852/31853
Website:www.kakamega.go.ke
E-mail:countysecretary@kakamega.go.ke

When replying please Quote

REF NO.CGK/OCS/GEN CRR/02(2)

County Government of Kakamega
P.O. Box 36-50100
KAKAMEGA

Date: 13th February, 2020

MS.FAITH ANGOSE SABWA
REG NO.MMUST/IERC/092/19

REF: AUTHORITY TO COLLECT RESEARCH DATA

The above subject matter refers,

This is to inform you that you have been granted permission to collect data on "*Evaluation of Trauma Patient Triaging among Health Care Providers in Emergency department at Selected Hospitals in Kakamega County*" for your Masters of Science Degree in advanced Nursing Practice (Trauma and Emergency) of Masinde Muliro University of Science and Technology.

You are therefore required to adhere to Hospitals Ethical and Research committee's standards and the County Government regulations on confidentiality.

Thank you

Jacinta Aluoch Odhiambo (Mrs.)
County Secretary and Head of Public Service

Copy to: H.E the Governor
CECM-Health Services
Chief Officer- Medical Services