

ASSESSMENT OF HOSPITAL-BASED ADULT TRIAGE AT  
EMERGENCY RECEIVING AREAS IN HOSPITALS IN  
NORTHERN UGANDA

By

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Signed by candidate

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Keneth Opiro

29<sup>th</sup> June 2016

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## **Abstract**

**Background:** Limited health service resources must be used in a manner which does “the most for the most”. This is partly achieved through the use of a triage system, but health workers must understand it, and it must be used routinely. Whereas efforts have been made to introduce paediatric triage in Uganda, such as Emergency Triage Assessment and Treatment Plus (ETAT+), there is no unified adult triage system being used in Uganda, and it is not clear if hospitals have local protocols being used in each setting. There are limited data on adult triage systems in Uganda. This study aimed at determining how adult hospital-based triage is performed in hospitals in northern Uganda.

**Methodology:** This was a descriptive study. Allocating numbers to the three sub-regions in the northern region, and using a random number generator, we randomly selected the Acholi sub-region for the study. The study was conducted in 6 of the 7 hospitals in the region – one hospital declined to grant permission for the research. It was a written questionnaire survey under supervision of the investigator. In each hospital, at least one representative of nurses in various duty shifts (night, morning and evening shifts), the nursing in-charge/leader, at least one doctor (head of department or any doctor on duty, if available) and a clinical officer (physician assistant, if available), making a minimum of 5-6 study participants who were health professional staff working in emergency receiving areas from each hospital consented and participated in the study.

**Results:** Thirty-three participants from 6 hospitals including 5 doctors, 4 physician assistants, 11 registered nurses, 9 enrolled nurses and 4 nursing assistants consented and participated in the study. Experience of staff working in emergency receiving areas varied with 15(45.5%) greater than 2 years, 7(21.2%) 1-2 years, 5(15.2%) 6 - <12 months and 6(18.2%) for less than 6 months. Only one hospital (16.7%) of the 6 hospitals surveyed had a formal adult hospital-based triage protocol in place. The triage guide/protocol/charts were kept in drawers, had 3 colours – red, yellow and green. Staff rated it as “good”, and all staff acknowledged the need to improve it. Only 2 (33.3%) hospitals had an allocated emergency department, the rest receive emergency patients/perform triage from Out Patient Department (OPD) and wards. Lack of training, variation of triage protocols from hospital to another, shortage of staff on duty, absence of

national guidelines on triage and poor administrative support were the major barriers to improving/developing formal triage in all these hospitals.

**Conclusion:** Formal adult, hospital-based triage is widely lacking in northern Uganda, and staff do perform subjective “eyeball” judgments to make triage decisions. Most hospitals do not have specifically allocated emergency department which risks disorganization in the flow of patients, crowding and consequently worse patient outcomes.



## **List of Abbreviations**

- **WHO** – World Health Organization
- **OPD** – Out Patient Department
- **ETAT+** - Emergency Triage Assessment and Treatment plus
- **SOFA** – Sequential Organ Failure Assessment
- **ICU** – Intensive Care Unit
- **KTS** – Kampala Trauma Score
- **CME** – Continuous Medical Education
- **GRRH** – Gulu Regional Referral Hospital
- **HREC** – Human Research Ethic Committee
- **HIV/AIDS** – Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
- **PNFP** – Private Not For Profit
- **SPSS** – Statistical Package for Social Sciences
- **UNCST** – Uganda National Council of Science and Technology
- **UCT** – University of Cape Town

## Definition of key words

- **Triage**—“Triage is the process of allocating priorities to patients based on the severity of their illness in order to decide who should be treated before others. It is taken from the French word *trier*, which means to separate, sift or select”(1).
- **“Eyeball” triage** - refers to a situation where staff subjectively make triage decisions in the absence of a formal triage protocol. Staff use their own individual judgments of how sick a patient may be.
- **Emergency receiving area** – refers to any place within hospital where emergency patients go first on arrival for emergency medical care. It is where emergency triage is done. It is also sometimes referred to as Emergency Department (ED), Emergency Unit, Accident and Emergency Department (A&E). These areas may be anywhere like the wards or OPD in the absence of a specifically allocated emergency department.
- **Emergency health conditions**—“are those requiring rapid intervention to avert death or disability, and those for which treatment delays of hours or more make interventions less effective. Concern that such a condition exists requires urgent assessment.”(1).
- **Emergency care** – “Emergency care is a subset of acute care concerned with providing effective health action in response to extreme risk under intense time pressure to address emergent health conditions that present sudden or unexpected threats to life or limb”(1)

## 1. Chapter One

### 1.1. Background

Proper decisions have to be made on how to distribute healthcare resources when the demands significantly exceed the available resources. These decisions are made at various levels of health services ranging from government (under the Ministry of Health in its resource allocations), to facility based emergency receiving areas where healthcare providers have to decide who receives immediate emergency care and who can wait when the demand is high. While these decisions are being made at facility based emergency receiving areas it is important to recognize that not all needs can be satisfied urgently, therefore rationalization using a proper guiding tool in order to maximize its benefits is very important. It is this guiding tool that is referred to as triage scale. Limited health service resources must be used in a manner which does “the most for the most”. This is partly achieved through the use of a triage system, but health workers must understand it, and it must be used routinely (2-4).

The importance of triage in care of acutely ill patients cannot be overestimated especially in resource limited settings; it helps mitigate many challenges facing emergency services such as overcrowding by patients and improves the quality of health outcomes cost-effectively (2, 4). Waiting time is also reduced significantly with use of triage (3, 5). A study done to evaluate the impact of introduction and training of staff on emergency triage in paediatric clinic in Malawi found significant reduction in inpatient mortality from 10-18% before to 6-8% after introduction of the program(6). We cannot talk of basic emergency care especially in resource limited settings without bringing in an element of how sick patients are recognized and prioritized for urgent treatment just as needed.

However, triage itself is to some degree resource intensive given the limited resource availability in Uganda and other sub-Saharan countries. Triage requires basics working equipment such as sphygmomanometer, thermometer, pulse oxymetry, and sometimes ECG machine among others all of which may not be available in rural settings. For effective and efficient triage, staffing level is as well critical. Need for designated personnel to perform triage undermines the staff shortage that is well

documented in sub-Saharan Africa (7). Other resources of importance in triage are spaces and time. Specifically designated area for triage to ensure organised flow of patients may require additional rooms and space. This may be limited in rural hospitals. However, rearrangements of the existing infrastructure may suffice. All these intense resources required for formal triage need to be balanced with the availability and local priorities while comparing with “eye ball” triage.

In resource limited settings - especially rural areas such as in Uganda, just like other Sub-Saharan African nations - the use of international triage systems may not be appropriate; simple scales may be sufficient to perform its function such as the one developed in South Africa which has been found to be effective in rural areas and is now widely implemented (8, 9). The South African Triage Scale is not only being implemented in South Africa but in some of the Sub-Saharan African countries because of its simplicity and consideration of African context, for example, successful implementation in urban teaching hospital in Ghana (10). Having such a scale that is put in use would be a significant milestone in improving emergency care to acutely ill in Uganda.

Emergency care is thought by many resource limited countries as not being cost effective, however, this is demonstrably inaccurate (11), as simple and cheap tools such as a triage scale can make a significant impact in emergency care of patients. A recent survey regarding emergency and surgical care access in Sub-Saharan Africa showed that only 19–50% of hospitals had the ability to provide 24-hour emergency care and the main reason was infrastructure challenge (12). However, even with the available infrastructure, improving emergency services is still possible if the quality and timeliness of interventions when very sick patients arrive at emergency receiving areas are improved; one way is the use of simple tools such as triage (13).

## **Uganda**

Uganda, like many Sub-Saharan African countries, is experiencing increasing population and changes in lifestyles from active to more sedentary as well as change in dietary habit. This is coupled with poor road infrastructure and poor traffic law enforcement making it bound to face challenges with increasing number of both

medical emergencies from non-communicable disease (14) and surgical/trauma related injuries especially from traffic accidents and the resultant mass casualty incidence (15). In Kampala, largest single cause of mortality and morbidity was found to be injuries resulting from road traffic injuries (16). These stress the point that development of functional triage systems that are well understood by staff should be one of the basic steps towards preparedness (while not undermining preventive measures).

A trial of two year training program for nurses to become midlevel providers called emergency care practitioners as a task shifting model in order to address the skill gaps in rural Uganda found it feasible with significant impact (17).

A systematic review of emergency care in low- and middle-income countries (LMICs) showed that Sub-Saharan countries have higher burden of patient loads with substantial proportions of deaths occurring in emergency department (18). This could be due to lack of timely assessment and interventions at the emergency departments. This could be made easier by use of triage scale.

Whereas efforts have been made to introduce paediatric triage in Uganda such as Emergency Triage Assessment and Treatment Plus (ETAT+), the WHO tool and Integrated Management of Childhood Illness (19), such programs are lacking for adult emergency medical care. There is no unified adult triage system being used in Uganda, and it is not clear if hospitals have local protocols being used in each setting. In Uganda, as in other Sub-Saharan Africa countries, health care facilities often lack an integrated approach to triage, resuscitation, and stabilization of acutely ill patients (20).

One triage score, the Kampala Trauma Score (KTS), was initially found to be a trauma triage tool for resource poor settings (21). However, its usefulness was found to be limited (22). A report from the Malaria Consortium Uganda on a survey done to determine severe malaria clinical practice in Hoima, central Uganda, found that although not specific to adult triage, only 44% of those health facilities surveyed had established and functional triage systems in place (23). Such information is lacking in Northern Uganda.

## **Northern Uganda**

Northern Uganda is one of the five regions in Uganda about 300km from Kampala, the Capital city.

There are limited data on adult triage systems in northern Uganda as well as Uganda at large. This study aimed to determine the practice of adult triage in emergency receiving areas in hospitals in northern Uganda.

## **1.2. Research Question**

How is hospital-based adult emergency triage performed at emergency receiving areas in hospitals in northern Uganda?

## **1.3. Study Purpose**

In keeping with other low resource settings, Uganda has a need to use scarce healthcare resources to do the most for the most. Formal emergency triage is a critical mechanism to facilitate that, but there is no national system currently in the country and it is not clear if hospitals have local protocols in use. This study was to gather information that would act as baseline for further development of triage systems - and hence improvement in emergency care in Uganda.

## **1.4. Aims and Objectives**

The aim of this study was to determine the practice of adult triage in emergency receiving areas in hospitals in northern Uganda.

To achieve this aim, this study had the following objectives:

1. To determine the presence of existing hospital triage systems, and – where present – which systems were being used.
2. To determine the cadre of staff undertaking triage (either through formal systems or initial subjective “eyeball” assessments).
3. To determine staff’s opinion on possible barriers to development/improvement of formal triage systems and ways through which it could be developed or improved (where local protocol is present).

## 2. Chapter Two

# Literature Review

### 2.1. Triage

Triage –“is the process of allocating priorities to patients based on the severity of their illness in order to decide who should be treated before others. It is taken from the French word *trier*, which means to separate, sift or select” (1). It is the determination of priorities for action in an emergency; it involves sorting patients into categories based on their need for or likely benefit from immediate medical treatment (24). It is a tool used to appropriately select patients for urgent treatment according to the medical need in situations where services being offered are overwhelmed by the numbers and therefore not all patients can be treated immediately.

The origin of triage dates back to the 18<sup>th</sup> century in military systems where treatment of injured combatants was first allocated to those likely to survive rather than the moribund ones. Most scholars attribute this to distinguished French military surgeon Baron Dominique-Jean Larrey who recognized the need to evaluate and categorize wounded soldiers promptly during battle (25). There are many triage types depending on the settings; Emergency triage in the field (26); Emergency department triage (27); ventilator triage (28), triage in theatre for procedures among others. However, emergency department triage is modern as it was introduced in practice in the 1950s from the United States (29).

There are many emergency department triage systems in use worldwide such as the Canadian Emergency Department Triage and Acuity Scale (30), Australasian Triage Scales (31), South African Triage Scale (8), Manchester Triage Scale (32), among others, and no study has demonstrated one is superior, as triage scales can be very difficult to validate and compare (33, 34). It is important to have a tool that works well in a given setting (35).

Generation of a triage scale de novo is a complex and difficult process that takes a long time. That said, many countries adopt a scale and modify if necessary to suit the local contexts. For example in 2005, the American College of Emergency Physicians



and Emergency Nurses Associations jointly recommended in their review, adoption of Canadian Emergency Department Triage and Acuity Scale among other scales for use in the Emergency Department (36).

Staff in emergency care often face challenges on how to decide who should be attended to first and such decisions can have life and death consequences, so it is important to have a triage system and understand the values that foster it such as human life, human health, fairness, and so on (37). These decisions are often influenced by number of factors both internal; such as skills and personal capacity and external; such as environment and practical arrangements (38). There are two main factors that are considered while making triage decisions; patient's vital signs (temperature, respiratory rate, blood pressure, pulse rate, oxygen saturation and level of consciousness) and history. History is especially important as a patient may have normal vital signs at the beginning while having a life-threatening condition, thus history from patient or caretakers is equally vital in making triage decision (39).

Triage can be done by any health professional (40); doctors, nurses, paramedics or non-physician clinicians depending on the setting, however, the most important thing is to have a triage system that works in a particular settings and health care personnel are familiar with it.

Structured education in training of staff in triage is important. Sandal and colleagues showed in a study evaluating the use of JumpSTART triage training on performance of pre-hospital staff on paediatric triage, that structured training in triage related activities significantly improved triage performance (41). Although this was specifically on pre-hospital and mass casualty incidents response, it points to a clear significance of training in ensuring familiarity with triage process and having appropriate training that can be done on emergency department triage system and other forms of triage as well.

## **2.2. Emergency Care in Resource Limited Settings**

Emergency care in resource limited settings has long been regarded as unaffordable and not cost effective given the competing demands from primary health care interventions with public health impact (11). Most attention and funding are directed

towards research in HIV/AIDS (42). Although communicable diseases such as Malaria and Tuberculosis, perinatal, maternal and nutritional conditions contributed highly-60% of all mortality in all age groups and sexes in Uganda in 2012 compared to 13% injuries, 9% cardiovascular diseases and 10% other non-communicable diseases (43). All these however, have emergency components which need attention. There is therefore need to advocate for re-prioritisation of needs within the health systems to consider emergency medicine as a vital component of the health system that needs special consideration in terms of funding for research and interventions. Although there is a trend towards an increase in emergency medicine research in resource limited setting as shown from a 2011 global emergency medicine review of the literature (44), there is still need to advocate further. It is also important to note that as epidemiologic transitions occur towards non-communicable diseases in developing countries, cardiovascular and non-communicable disease emergencies will rise to buffer the high trauma incidence from road traffic accidents (45).

Emergency care capacity in resource limited settings is at its minimum with huge gaps in essential care capabilities mainly due to lack of organised structure, personnel and equipment (46). In Tanzania a survey of 10 hospitals in four regions showed deficits in infrastructure and training, with none of the hospitals having specific triage areas and only 40% of the hospitals had adult triage protocol in use (47). One possibly easy intervention to contribute to the organisation is having simple tool like emergency triage protocols in health facilities as well as training in their use. This will not only improve on setting priority for patients and preventing avoidable bad outcomes but help in timely referral from lower health systems to tertiary care which are better equipped.

Main obstacles identified to development of emergency care in resource limited settings include; lack of training institutions, no clear structural models that fit these environments, concern about cost-effectiveness and challenges with sustainability in the presence of many competing demands for services (48).

Major incidents are unexpected and can occur without warning. More commonly are mass casualty incidents from trauma resulting from road traffic accidents (15, 49). Hospital preparedness towards this is recommended and emphasised. One of the areas

for attention is triage – having designated triage areas, specific triage officers, triage scales and charts available (50).

Developing nations have higher mortality from trauma as compared to developed nations, with most of the mortality shown to be from poor pre-hospital care (51). However, pre-hospital care cannot exist in isolation. The central receiving point, i.e., emergency centres, needs improvement too. These improvements range from infrastructure, staffing, and overall organisation to equipment such as triage tools.

Currently initiatives are being taken to develop and improve emergency care in Africa especially in low income countries. For example creating acute care facilities, developing curriculum and emergency training program in Muhimbili Tanzania (52). African Federation for Emergency Medicine as well is advocating for development of emergency care in Sub-Saharan Africa with focus on; acute referral system – field care and transfer; facility based acute care; emergency nursing and sustainability – advocating for funding and policy; as well as specialist training in emergency medicine (53).

### **2.3. Emergency Care in Uganda**

Coming down to Uganda specifically, just as other Sub-Saharan countries, has a high burden of emergencies especially injuries from road traffic accidents (54, 55). In Kampala Uganda, the odds of a patient dying from injuries were 5 times higher than in San Francisco and 4.2 times higher than in United States (56). In fact, the odds could be higher in rural areas as this survey was done in the Capital city with much better emergency care compared to up country regions such as northern Uganda. Such high mortality rates could be explained from poor or absent formal pre-hospital emergency medical services including early transportation to hospitals, as well as poor system of selection and prioritisation of these emergency patients for urgent treatment from emergency receiving areas in these hospitals.

Uganda is not different from other Sub-Saharan African areas with limited resources having poor infrastructure especially roads in rural areas, long distance from health units with no formal pre-hospital emergency system, coupled with poor health seeking behaviours and poverty among community members – making sick patients arrive late

when often severely ill (57-60). This is worse with human resource crisis whereby few staff can be on duty and patients have to wait in a queue for a long time before seeing a clinician (61). This can bear negative impact in terms of outcome of patients' illness if very ill patients cannot be easily identified with an appropriate triage tool so that urgent treatment is instituted according to the need.

There are several reports on experiences by visiting healthcare workers from Europe and United States that should be considered a glimpse of the miserable state of acute care health services offered in Ugandan hospitals and lower health units. For example Nicola Credland, a nurse from British Association of Critical Care nurses (BACCN) expressed a lot of emotions in her reports on the miserable situations in acute and emergency care unit at Mbarara hospital in western Uganda. "...there is no concept of an ABCDE assessment, no triage, no prioritization, no equipment, limited drugs, extremely limited oxygen supply"(62). Given the fact that this was a regional referral and a University teaching hospital, it can therefore be said that the situation is similar or even worse in other regions especially northern Uganda given its historical background on economic, social and political state (63-65).

Several attempts are currently being taken to improve on emergency care in Uganda in both pre-hospital and emergency department services. In pre-hospital care where there is still no formal system, training of laymen as first responders has been tried with feasibility to escalate to many groups of people such as the police, "BodaBoda" riders (commercial motorcycle riders carrying passengers) (66, 67). Similar training was conducted and found to be effective in Madagascar (68). In the emergency department/facility acute care services, a pilot project to increase access to emergency care to many in rural areas through training of non-physician clinician cadres in an attempt to address world health assembly resolution 60.22, has been found to be feasible (69).

The Global Emergency Care Collaborative (GECC) has been trying to develop and implement a curriculum for training rural health care staff in clinical resource management, the concept of triage, and mass casualty incidence management with rewarding outcomes in terms of staff learning experiences (70). Although there is no formal pre-hospital emergency service, such initiatives - if expanded to reach wider

regional coverage - can be regarded as one of the foundations required to organise the system in the direction of developing and improving emergency care in the country.

A trial of implementation of the South African Triage Scale in one hospital in Uganda – *International Hospital Kampala* – found it feasible, applicable and sustainable (71). Doctors' and nurses' opinion assessed were positive. They found improved patient-nurse and nurse-doctor interactions with nurses becoming more involved in the care of patients, attaining new skills and highly recommending its use.

In Sub-Saharan Africa, the burden of emergency conditions is high, with high mortality from these conditions. There are poor emergency care services mostly due to resource limitations, and there is limited research done. In Uganda specifically, there are very few published research papers on emergency care, and even those available are all rotating around, Kampala the capital city, with little, if any, known about other regions located in the country side such as northern Uganda. Hence this study is aimed at assessing the practice of adult hospital-based emergency triage in hospitals in northern Uganda.

### **3. Chapter Three**

## **Methodology**

### **3.1. Study Design**

This was a descriptive cross-sectional study

### **3.2. Study Setting and Population**

The Republic of Uganda is a landlocked country in East Africa. It has a population of 34.9 million people with five regions; Northern, Southern, Eastern, Western and Central - with the central region being most populated (9.2 million), northern the least populated (7.2 million), and other regions with uneven distribution in between (72). It has 12 Regional Referral Hospitals spread across regions, and one National Referral Hospital located in the central region, with many other faith based hospitals (private, not for profit) scattered unevenly all over the country (73).

The northern region is the most affected by the two recent decades of civil war. With a high level of poverty, it is the poorest region in Uganda (63-65). The northern region has poor health services compared to other regions in terms of number of health workers (74), number of privately owned clinics, and poor community health seeking behaviour depending on socioeconomic status typical for sub-Saharan countries (75). This results in patients presenting late to facilities, and are often critically ill when seen in emergency receiving areas.

The Northern region is divided into three sub-regions: Acholi, Lango and west-Nile. Each sub-region has a similar distribution of hospitals, with each having one Regional Referral, at least two faith based and at least two district hospitals.

### **3.3. Study site selection**

Allocating numbers to the three sub-regions, and using a random number generator, we randomly selected Acholi sub-region for the study. The study was carried out in 6 of the 7 hospitals in the sub-region, an area serving a population of 2.7 million (72).

The 6 surveyed hospitals and their affiliations are outlined below:

- One Regional Referral Hospital (government facility): *Gulu Regional Referral Hospital*, the only regional referral hospital in the Acholi sub-region with total bed capacity of 250, average annual admissions of about 13,000 and emergency unit annual attendance of over 10,000,
- Three faith based hospitals [Private, Not For Profit (PNFP)]: *St. Mary's Hospital Lacor* (the largest hospital in northern Uganda - with 475 bed capacity, average annual emergency receiving areas attendance of about 11,000 and average annual admissions of about 33,000 (personal communication with hospital management); *Kalongo Hospital* - with total bed capacity of 360 and average annual admissions of about 11,500 (personal communication with hospital management); and *St. Joseph's Hospital Kitgum* – with total bed capacity of 350 and annual admissions of about 10,000 (personal communication with hospital management),
- Two district hospitals (government facilities): *Nwoya District hospital* (also known as Anaka hospital) and *Kitgum District hospital*, each with same total bed capacities of 250 and similar average annual admissions of 7,000-8,000 (personal communication with hospital management),
- One private for profit hospitals (PFP): *Gulu Independent Hospital*, the only privately owned profit making hospital (attempt made to obtain hospitals statistics in vain). However, this hospital declined to give permission for the research.

All government hospitals (National Referral, Regional Referral, and district hospitals provide services free of charge, while faith based hospitals have limited user fees levied on patients, and private hospitals charge patients according to their aimed profit margin.

### **3.4. Sample Size**

Participants were health professionals who were involved in daily initial management of emergency patients at the emergency receiving areas of these hospitals. To seek representativeness and experience from each hospital, at least one representative of nurses in various duty shifts (night, morning and evening shifts), the nursing in-charge/leader, one doctor (head of department or any doctor on duty), if available, and

a clinical officer if any, making a minimum of 5-6 staff who consented to participate in the study from each hospital were recruited.

### **3.5. Inclusion and Exclusion Criteria**

#### *Inclusion*

- Staff who consented to participate in the survey,
- Health professionals – nurses, clinical officers, and doctors who are involved in emergency care of patients.

#### *Exclusion criteria*

- Those who refused to consent to participate in the study,
- Those who were not qualified health personnel (e.g. receptionists, cashiers, cleaners, social workers, porters, etc.) as they were not involved in making triage decisions.
- Those who are not routinely involved in emergency care of patients

### **3.6. Data Collection**

This was in the form of self-administered written questionnaire – each participant read and noted his/her response according to instructions (**AppendixA2**). Language used in the questionnaires was English as this is the official language for education in Uganda and all qualified staff are able to speak it. The questionnaires were adopted partly and modified from the study done in Sweden (40).

Participants were informed that this study relates to the triage of patients aged 12 years and over as this is the age criterion for a patient to be managed as an adult in Uganda.

Data collection was done from Dec 2015 to Jan 2016.

### **3.7. Pilot Study**

A pilot study was conducted in *Kuluva hospital* located in west Nile sub-region northern Uganda. Two nurses from OPD consented and participated to pre-test the questionnaire in terms of readability and ease of understanding. In addition, face to face interactions with them were made to specifically ask for difficulties, if any, in



reading and understanding the questionnaires. No difficulties were reported by them and therefore no change was made to the questionnaires after the pilot study.

### **3.8. Data Management**

The collected data were compiled and kept under safe custody of the investigator. The information was entered in work computer and the electronic records were password-protected. Only investigators had access to data.

### **3.9. Data analysis**

Information was entered into Microsoft Excel for Windows, and analysed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics are reported here. Where space was allocated for staff to make comments, these were noted, aggregated and categorized.

### **3.10. Quality Control**

Staff were asked to fill questionnaires just before the start of the duty, at break time, or after duty when they had signed out of duty to avoid interference of duty and hurried responses which may affect the quality of the information. Some staff made appointment outside duty hours for the survey. All participants had plenty of time and had privacy as required to fill the questionnaires without interference.

The design of the questions was done in such a way as to eliminate desirability bias (tendency of respondents to respond in manner that is viewed favourably by others), as well as obtain background information as accurately as possible.

### **3.11. Ethical Considerations**

Ethical approval was obtained from the University of Cape Town (**HREC No. 705/2015**). In Uganda, ethical approval was obtained from local Research and Ethic committee (**Appendix B**) – St. Mary’s Hospital Lacor - accredited by Uganda National Council of Science and Technology (UNCST) for ethical approval (76, 77). In addition, individual institutional permission where this study was conducted was sought before collecting data (**Appendices C1-C6**). However, one hospital – *Gulu*

*Independent hospital* (purely private hospital) declined verbally to give permission to conduct the study

*Potential risks and benefits*

There were no health risks, discomforts, or inconveniences reported due to participation which was expected to take few minutes to complete. Information obtained from this study will be used to guide further development of adult triage systems which will improve emergency medical care in northern Uganda and Uganda at large.

*Privacy and confidentiality*

Data were kept confidentially. No participants' identifying data were collected. Each participant had the comfort and confidence required during filling the questionnaires.

*Informed consent process*

Each study participant signed informed consent (**Appendix A3**). They were free to decline from participating in the study and to withdraw at any time with no consequences.

*Reimbursement for participation*

There were no monetary or material forms of reimbursement to participants for taking part in this study.

#### 4. Chapter Four

### Results

Six out of seven hospitals (85.7%) granted permission to conduct the research. Overall there were total of 33 (out of 30-36 expected) participants enrolled in the study from all six hospitals.

**Table 1: Number of participants from each hospital**

Hospitals	n	(%)
Anaka hospital	6	18.2
Gulu RRH	5	15.2
Kalongo Hospital	6	18.2
Kitgum hospital	6	18.2
Lacor hospital	5	15.2
St. Joseph's hospital	5	15.2
Total	33	100.0

At least 5 participants from emergency receiving areas from each hospital participated.

Most of the staff who participated in the study were nurses with few clinical officers and some doctors as seen in the table (Table 2). All in all, the majority had at least one-year experience in emergency receiving areas (Table 3).

**Table 2: Profession of study participants**

Profession	n	(%)
Clinical Officer	4	12.1
Doctor	5	15.2
Enrolled Nurse	9	27.3
Nursing assistant	4	12.1
Registered Nurse	11	33.3
Total	33	100.0

Majority were nurses – enrolled (certificate in nursing), registered (diploma in nursing) and nursing assistants (certificate in nursing assistance).

**Table 3: Experience in the emergency receiving areas across the six hospitals**

Participants Duration of work	n	(%)
>2 years	15	45.5
1-2 years	7	21.2
6-12 months	5	15.2
<6 months	6	18.2
Total	33	100.0

Most participants had experience for at least 1 year working in the emergency receiving areas.

### **Presence of formal triage protocol**

Only one of the six hospitals (16.7%) – *St. Mary's hospital Lacor* was found to have a formal local triage protocol in use. The other 5 hospitals have no formal triage guideline and staff apply subjective “eye-ball” triage to judge on which patients need emergency attention.

In all hospitals, all participants reported applying a similar ABCD approach – airway, breathing, circulation and level of consciousness in assessing patients while taking vitals and making triage decisions.

Only two hospitals (33.3%) – *St. Mary's hospital Lacor and Gulu Regional Referral Hospital* had allocated emergency department, in the other hospitals emergency triage was performed from OPD and wards.

### **Who triages patients?**

In two hospitals – *St. Mary's hospital Lacor and Gulu Regional Referral Hospital* – all staff (100%) reported triage is done by enrolled and registered nurses, and all staff in the other four hospitals reported nursing assistants involved in triage activities in addition to enrolled and registered nurses.

### **Settings with formal triage protocol present**

In *St. Mary's hospital Lacor* (with formal local triage protocol), three colour codes were used (red, yellow and green). Two of the five respondents reported that written triage guideline/algorithm was kept on the wall while the rest said they were kept in drawers. All staff reported no formal training on this protocol. All staff rated their local protocol as “good” but acknowledged the importance of improving the current protocol.

### **Opinion on possible barriers to improving existing local triage protocol and way forward:**

**Barriers** – all staff agreed with the lack of training as the major barrier (80% strongly agree and 20% agree), followed by variation of triage scales from one hospital to another and shortage of staff on duty to perform triage (both – 60% strongly agree and 20% agree). See Table 4.

**Table 4: Participants’ opinion on possible barriers to improving triage in hospital with formal local protocol in use**

<b>Limiting factors to improving triage (n = 5)</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Not Sure</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Triage scales varies from one hospital to another	60%	20%	0%	0%	20%
No triage chart displayed in emergency receiving areas to guide practice	0%	0%	0%	40%	60%
Lack of regular training of staff on triage	80%	20%	0%	0%	0%
Shortage of staff on duty to perform triage	60%	20%	0%	0%	20%
Staff have poor attitudes toward sticking to triage guideline	60%	0%	0%	20%	20%
No space to allocate patients into categories even if triaged	40%	20%	0%	0%	40%
Poor administrative policy and support	20%	40%	0%	20%	20%

Most participants concurred with the suggested barriers to improving triage except on the points of poor administrative support, poor attitudes of staff, no space allocated for triage and absence of triage chart displayed in emergency receiving areas where some staff disagreed.

**Possible way forward** – conduct regular training on triage (100% strongly agree), Adopt a unified triage scale nationwide (100% Strongly agree), print triage tool(chart/scales) and put in open place in emergency receiving areas (100%), administrative support in terms of number of staff on duty (100% Strongly agree). See Table 5.

**Table 5: Participants’ opinion on the way forward to improve triage in hospitals with formal local protocol in use**

<b>Way forward to improve triage (n = 5)</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Not Sure</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Conduct regular training on triage	100%	0%	0%	0%	0%
Adopt a unified triage scale nationwide	100%	0%	0%	0%	0%
Need to assign staff specifically to do triage during each shift	80%	20%	0%	0%	0%
Print triage tool(chart/scales) and put in open place in emergency receiving areas	100%	0%	0%	0%	0%
Administrative support in terms of number of staff on duty	100%	0%	0%	0%	0%
Emphasis for staff to stick to guideline	100%	0%	0%	0%	0%
Create and label areas for various triage categories	80%	20%	0%	0%	0%

Respondents generally agreed 100% (strongly agree plus agree) for all the possible way forwards to improving on the existing local protocol.

### **Settings with no formal triage system in use (using “eye-ball” triage)**

All participants in hospitals with no formal triage rated importance of having formal triage system as “very important” and all agreed on possible improved patients’ care if formal triage system were to be in place.

**Table 6: Steps taken when a “very sick patient” arrives at the emergency receiving areas in hospitals with no formal triage system**

<b>Hospital</b>	<b>Steps taken when sick patients arrive</b>
Anaka hospital	History/vitals, triage, Clinician's review, registrations and admission/referral in that order
Gulu RRH and Kitgum hospitals	Triage, history/vitals, Clinician's review, registration and admission/referral in that order
Kalongo and St. Joseph's hospital	Triage, registrations, history/vitals, Clinician's review, admission/referral and billing in that order

Steps taken when sick patients arrive at emergency receiving areas in hospitals with no formal triage system in place (gathered and summarised from responses from participants from these hospitals).

### **Barriers to development of formal triage system**

Lack of national triage guideline, absence of triage guideline displayed in emergency receiving areas and shortage of staff on duty were cited as the main barriers (68%, 97% and 85% respectively generally agreed with the points). See table 7.

**Table 7: Participants’ opinion on barriers to development of formal triage system in hospitals with no form system in place**

<b>Barriers to development of Triage (n = 28)</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Not Sure</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
No national guidelines exist on triage	50%	18%	32%	0%	0%
No triage chart displayed in emergency receiving areas to guide practice	61%	36%	4%	0%	0%
Staff are not trained on triage	36%	36%	0%	21%	7%
Shortage of staff on duty to perform triage	57%	32%	0%	11%	0%
Triage is considered not very important	14%	4%	7%	32%	43%
Triage wastes time	18%	4%	4%	39%	36%
No space to allocate patients into categories even if triaged	18%	29%	7%	39%	7%
Poor administrative policy and support	21%	36%	14%	25%	4%

Lack of displayed triage protocol, shortage of staff on duty, lack of training on triage and lack of national triage guideline were the common barriers as per participants’ opinion while some respondents thought triage waste times and not considered important.

### **Possible way forward to develop formal triage system**

The majority of participants agreed with all suggested way forward in order to develop triage system – 100% of participants agreed with all points except on the issues of creating more space and assigning specific staff to conduct triage where 4% and 8% of participants respectively disagreed. See Table 8.

**Table 8: Participants’ opinion on possible way forward to develop formal triage in hospitals with no formal triage system in place**

<b>Way Forward to develop triage (n = 28)</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Not Sure</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Conduct regular training on triage	86%	14%	0%	0%	0%
Formulate or adopt a triage system/scale	71%	29%	0%	0%	0%
Need to assign staff specifically to do triage during each shift	64%	29%	0%	4%	4%
Print triage tool(chart/scales) and put in open place in emergency receiving areas	82%	18%	0%	0%	0%
Administrative support	68%	25%	7%	0%	0%
Create space for triage categories	57%	36%	4%	4%	0%

Most participants agreed with all suggested way forward to develop triage protocol with exception of few who disagreed on the point of creating space specifically for triage and assigning a staff member specifically to do triage.



## 5. Chapter Five

### Discussion

One hospital - *Gulu Independent Hospital* – declined to grant permission for the survey. However, this does not have significant effect on results as 33 out of expected 38 participants were recruited for the study making up to 86.8% response rate. In addition, this hospital was a private hospital (although profit oriented) which is still fully represented by the three private hospitals recruited allowing the results to be generalised to the other sub-regions. This study shows that the use of formal ED triage system is very rare in northern Uganda (only 1 out of 6 hospitals - 16.7%). This is far less compared to report by Uganda Malaria Consortium which showed 44% of health facilities surveyed in Hoima central Uganda had functional triage (23). A possible explanation for this difference is that the study in Hoima didn't specify between adult or paediatric triage as there has been training and rapid uptake of WHO - ETAT+ in Uganda (19) under the package of IMCI compared to this study which assessed specifically adult hospital-based triage. This result is as well low compared to findings in Tanzania, similar settings where it was found that 40% of 10 hospitals surveyed had adult triage system in place (47). Over all, these are low figures for effective emergency service delivery at emergency receiving areas. Even though it is often thought that resource scarcity is the explanation for poor emergency services, it may not hold true in all aspects, as having a triage protocol routinely used in emergency receiving areas should not require unaffordable magnitude of resources. In other words, there are many basic steps – simple re-organizations of service flow in emergency areas, continuing medical education for staff in the form of workshops and simulations in acute care services in addition to use of triage protocol, that can be taken without the need for extra resource yet it can lead to significant improvement in acute care services offered to our patients in these settings (78, 79).

This local protocol uses similar approach in assessing severity of illness and taking vital signs to aid in making triage decisions i.e. Airway, breathing, circulation and level of consciousness while taking vitals, this is vital in systematic approach of assessing patients as a whole. This is consistent with most triage protocols used in

other countries (80, 81). There is no formal staff training on this triage protocol which raises the question whether nurses are effectively using this protocol or not. It has been found that training improves triage performance (41) but is not being done in this setting.

The triage is done by nursing cadres (enrolled and registered nurses) which does not differ from what is done elsewhere (80, 82), however due to shortage of doctors and other non-physician clinicians, these cadres are not involved in triage as might be in other middle and high income countries. Notably, all the participants who responded to the survey in this hospital rated the protocol as “good” and all agreed to need for further improvements which is a good positivity needed from staff to drive improvement. It is commendable for this hospital to have a formal local protocol as this is a very important initiative. It may not matter which protocol is in use as this varies from country to country and it is difficult to validate which protocol is superior to the other but having one that suits local setting or even better, having one uniform national protocol used countrywide is of paramount importance (33, 34).

Although most participants rated triage as working well, there have been limitations in improving and using this triage. Most notably is the lack of training – similar in Tanzania where there was no training on triage, shortage of staff on duty, variations of triage system if present from hospital to another as well as lack of space (47). Shortage of staff is a well-known crisis in Africa especially Sub-Saharan African countries. This is due partly to emigration of health workers to high and middle income countries for economic reasons (83), and partly due to few training institutions and low level of output from these training institutions (61, 84). A recent survey which included Uganda, estimated that it would take 29 years for nurses and 36 years for physicians to reach WHO recommendation of 2.28 per 1000 population (61). A task-shifting phenomenon where midlevel providers trained in emergency care deliver health care to acutely ill patients has been tried in rural Uganda. Nurses underwent a two year training program to become emergency care practitioners in rural settings. It was found to have had significant impact on mortality indices in the region compared to data before the implementation of the program (17). Although credit cannot be given wholly to this single project on improved mortality indices reported, it has shown one

of the ways that can be of great significance in an attempt to bridge the gaps in emergency care service providers in such settings.

As far as the lack of space/infrastructure is concerned, it is a general problem in the country similar in other regions as well as other countries like Kenya and Tanzania with similar settings. However, the point here could be inappropriate use of available infrastructure by not prioritizing for emergency services or difficulty in rearranging the existing infrastructure to suit emergency department strategic locations – need for ambulance disembarkation areas, triage areas, visitors'/caretakers' waiting areas, etc. Management and staff themselves should assess the feasibility of rearranging the overall organizations of service flow within the available infrastructure which might be easier and achievable within short a term, rather than demanding additional, totally new infrastructure which is resource intensive given these poor settings.

Triage was done in OPD and Wards in 67.7% of the hospitals since they do not have dedicated emergency departments. There are scarce published data within the same region if not country wide to compare with this. One study done in 10 hospitals along highways in Uganda to assess surge capacity in mass casualty incidents found none of these hospitals had dedicated emergency receiving areas (85), whereas in Tanzania, 70% of 10 hospitals surveyed did not have emergency rooms (47). Using wards outside routine working hours and OPD during working hours for receiving emergency cases can be complex especially in mass casualty incidents. These areas are often congested and disorganized and this poses great challenges in situations of mass casualties where there are influx of patients, attendants, spectators and media teams. This situation can be made worse with the absence of triage protocol.

A variation of triage systems from hospital to another was cited as one of the key barriers to improving the existing protocol in this hospital. The point here is that staff change job locations within the country and each time they change they need to learn a new system (if available in the new work place). In addition, most of these staff were probably trained from local institutions within the country where curriculum does not specify which triage protocol to teach since there is no national guideline on triage. This is one of the reasons why having one national triage system used countrywide is important. Lastly but not least, poor administrative support gathered about 57%

agreement as a possible barrier to improving triage. This is true especially if head of departments do not encourage continuing medical education (in the form of workshops and trainings) to emphasize the need to familiarize staff with the guideline and the need to have additional staff on duty to perform triage – although this may be compromised by shortage of trained professionals and financial constraints of the institutions amidst competing demands for the little resources.

It was not surprising to see that all participants concurred with all the possible suggested ways forward to improve on the existing local protocol – conduct regular training, adopt a unified triage scale nationwide, assign a staff on duty to specifically perform triage, have triage guideline/chart displayed in an open place in emergency receiving areas, and administrative support because these are simple truths and obvious ways improvement can be achieved. However, all these remain opinion without action unless initiatives are taken by clinicians, researchers and other staff, ministry of health, and individual institution administrations to work towards implementing them.

In the settings with no formal triage, “eyeball” (subjective form of triage) triage was done by nurses (enrolled, registered and in some hospitals nursing assistants) similar to hospital with formal triage protocol. This is not surprising given the scarcity of doctors with more roles in clinical assessment, diagnosis, treatment prescription and evaluation of clinical course.

Anaka hospital seems to have a more logical flow of steps followed when a sick patient arrives in the emergency receiving areas – history/vitals, triage, clinician's review, registration and admission/referral in that order as compared to Gulu RRH & Kitgum hospitals – triage, history/vitals, clinician's review, registration and admission/referral in that order; and Kalong & St. Joseph's hospitals – Triage, registrations, history/vitals, Clinician's review, admission/referral and billing. Since triage is based on mostly vital signs, it is logical to take this first as airway, breathing, circulation and level of consciousness is assessed briefly before triage decision is made as seen in organisation of Anaka hospital. In Gulu RRH, Kitgum, Kalongo and St. Joseph's hospitals reported doing triage first before vitals are taken, which suggests that triage decisions are not being made based on vitals, and individual staff uses

his/her own judgement of how sick a patient appears to be – “eye ball triage”. Overall organisation of patients’ flow in emergency departments has been found to decrease number of patients waiting to be seen and reduced waiting time (79). In a systematic review of triage related interventions to improve patient flow in emergency departments where 33 studies were included with over 800,000 total patients, showed that having a triage team led to reduced waiting time and reduced number of patients leaving without being seen from emergency departments (86).

All participants (100%) from hospitals with no formal triage accepted in their response the importance of having a formal triage protocol – rated “very important” and acknowledged improvements in patient outcome in the presence of formal triage protocol. This indicates that they actually recognise the importance and need for such a tool and indirectly informs us how willing they would be to take up and apply a protocol should it be in place. Notably, they reported using a similar approach of patient assessment i.e. airway, breathing, circulation and level of consciousness similar to the hospital with formal triage and standard approach in many guidelines (87-89). However, their application of findings (physical examinations and vitals) from this approach in making triage decisions is still questionable especially looking at the steps taken when sick patients arrive – triage done before vitals are taken as noted above in 4 of the 5 hospitals without formal triage protocol (see Table 6 under results). Although this approach may not solely define the severity of illness during nurses’ triage, it is equally an important approach through which the patient’s state of health is fairly accurately assessed.

As in the setting with formal triage protocol (discussed above), the main barriers to development of a formal triage system were absence of national guideline that could act as a guide to formulate a local protocol, lack of training, shortage of staff on duty to implement the protocol even if formulated/adopted and poor administrative support all generally scored above 50% agreement from Likert scale (see Table 7 under results). However, lack of space was not reported as a major barrier in these settings compared to setting with formal triage system probably because they have not used a protocol before to judge how demanding an effective formal triage overall organisation can be in terms of space requirement. Similarly, the need to conduct

training, need to formulate or at least adopt a protocol, print and display it in emergency receiving areas, create space for triage as well as administrative support were all major barriers noted by the respondents (see Table 8 – Results). An overall point picked from this response is that staff do yearn for a triage protocol that somehow would make their work easier and are willing to implement it if present. The main problem is lack of initiatives, administrative support, and policy to drive the initiatives to create a local protocol at least even if national guidelines do not exist.

This study achieved the set objectives which were to determine presence or absence of a formal triage system, determine the cadre of staff performing triage (formal or “eyeball”) and to determine the opinion of staff on barriers to development or improvement of a formal triage system and possible ways through which it can be developed or improved. Findings from this study can be generalised to other regions given the similarity of study settings, study participants (all cadres - nurses, physician assistants and doctors) hospitals included (both private and public) and distribution of this hospitals in the region when compared to the other regions.

#### *Study limitations*

This study has potential limitations:

Desirability bias: since this was a questionnaire survey asking for their individual input, staff may want to respond to impress by portraying a better work situation than actually exists regarding triage.

Time of participation: data collection was done around period of duty; just before duty started - this might have led to hurried response as staff were to start duty; or after duty – they might have been tired from duty with less concentration. However, each staff who felt tired or a bit in a hurry was contacted another time when they felt comfortable and free to participate in the study potentially mitigating the mentioned challenge.

## **6. Chapter Six**

# **Conclusion and Recommendations**

## **Conclusion**

Adult hospital-based formal triage protocol is lacking in hospitals in northern Uganda. Most hospitals do not have dedicated emergency receiving areas; emergency patients are received from various wards or OPD. Nursing staff are the main health workers involved in triage – either formal or “eye ball”. The main barriers to development/improvement of triage were lack of national guidelines on triage scale, lack of staff training on triage, shortage of staff, lack of space and lack of administrative support and initiatives. Lack of resources is arguably the overall barriers in developing emergency care in developing countries but this should not be an excuse all the time from improving the quality of emergency care even when simple steps such as having emergency triage protocol that is routinely used is an inexpensive way of improving care for acutely ill.

## **Recommendations**

- Ministry of Health, using its expertise should develop one formal triage guideline that can be uniformly used in hospitals as well as in training institutions countrywide,
- Individual hospital should frequently organise trainings in the form of CME (workshops, drills and simulations) not only on triage but on other basic skills needed to care for acutely ill patients,
- Ministry of Health, within its capacity scale up recruitment of health workers – through prioritization as well as scale up training of these cadres in liaison with Ministry of Education – to increase the capacity of the available institutions to take more trainees.

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## 8. Appendices

### 8.1. Appendix A1: – Research Proposal submitted to UCT HREC

#### “ASSESSMENT OF HOSPITAL-BASED ADULT TRIAGE AT EMERGENCY RECEIVING AREAS IN HOSPITALS IN NORTHERN UGANDA

##### **Abstract**

**Introduction:** Limited health service resources must be used in a manner which does “the most for the most”. This is partly achieved through the use of a triage system, but health workers must understand it and it must be used routinely. Whereas efforts have been made to introduce paediatric triage in Uganda such as Emergency Triage Assessment and Treatment Plus (ETAT+), there is no unified adult triage systems being used in Uganda and it is not clear if hospitals have local protocols being used in each setting. Only 44% of health facilities surveyed in Hoima district central region had established and functional triage systems in place. Such information is lacking in Northern Uganda. One triage score-Kampala Trauma Score (KTS) which was initially found to be a kind of triage score in trauma in resource poor setting, its usefulness as a triage tool was found to be limited. There are limited data on adult triage systems in northern Uganda as well as Uganda at large. Hence, this study aims to determine how adult triage is performed in hospitals in northern Uganda so as to provide the background knowledge as one of the initial steps in developing national triage systems and so the development/improvement of emergency medical care in northern region and country wide.

**Methodology:** This will be a descriptive study. Allocating numbers to the three sub-regions in northern region, and using a random number generator, we randomly selected Acholi sub-region for the study. The study will be carried out in all the hospitals in this sub-region, an area serving a population of 2.7 million. It will be a written questionnaire under supervision of the investigator. In each hospital, at least one representative of nurses in various duty shifts (night, morning and evening shifts), the nursing in-charge/leader, at least one doctor (head of department or any doctor on duty) and a clinical officer (physician assistant) if any, making a minimum of 5-6 study participants from each site.

**Results:** Descriptive statistics will be obtained

**Conclusion:** overall views, conclusions and recommendations will be made and it’s expected to give background knowledge on what is going on as far as triage in emergency units are concerned. This will be one of the initial steps in improving emergency medical care in northern Uganda.

**Key words:** Triage, Hospital, Northern Uganda, Emergency receiving areas, emergency medical care.

## **Introduction**

### **Background/Literature Review**

Limited health service resources must be used in a manner which does “the most for the most”. This is partly achieved through the use of a triage system, but health workers must understand it and it must be used routinely. Triage is the determination of priorities for action in an emergency; it involves sorting out patients into categories based on their need for or likely benefit from immediate medical treatment.

The origin of triage dates back to 18<sup>th</sup> century in military systems where treatments of injured combatants were first allocated to those likely to survive than the moribund ones. Most scholars attribute this to distinguished French military surgeon Baron Dominique-Jean Larrey who recognized a need to evaluate and categorize wounded soldiers promptly during a battle (25).

There are many triage systems in used worldwide and no study has proved which one is superior as triage scales can be very difficult to validate and compare (33, 34). It is more important to have a tool that works than no tool.

The importance of triage cannot be overestimated especially in the resource limited settings; it helps mitigate many challenges facing emergency services such as overcrowding by patients, and improves the quality of health outcomes cost-effectively(4). Waiting time is also reduced significantly with use of triage (3, 5).

Triage can be done by any health personnel (40), however, the most important thing is to have a system that works and health care personnel familiar with it. Structured education in training of staff in triage is important; structured training in triage related activities significantly improved triage performance (41).

Staff in emergency care often face challenges on how to decide who should be attended to first and such decisions can have live and death consequences, so it is important to have a triage system and understand the values that foster it such as human life, human health, fairness, and so on (37). These decisions are often influenced by number of factors both internal; such as skills and personal capacity) and external; such as environment, practical arrangements (38).

In resource limited settings - especially rural areas such as in Uganda, just like other sub Saharan African nations - the use of international triage systems may not be appropriate; simple scales may be sufficient to perform its function such as the one developed in South Africa which has been found to be effective in rural areas and now widely implemented (8, 9). The South African Triage Scale is not only being

implemented in south Africa but in some of the sub Saharan African countries because of its simplicity and consideration of African context, for example, successful implementation in urban teaching hospital in Ghana (10). Having such a scale that is put in use would be a significant milestone in improving emergency medical care in Uganda.

Emergency care is thought by many resource limited countries as being cost ineffective, however, this is demonstrably inaccurate (11) as simple and cheap tools such as triage scale makes much input in emergency care of patients. A recent survey regarding emergency and surgical care access in Sub-Saharan Africa showed that only 19–50% of hospitals had the ability to provide 24-hour emergency care and the main reason was infrastructure (12). However, we believe that even with the available infrastructure, improving emergency services is still possible if the quality and timeliness of interventions when very sick patients arrive at emergency receiving areas is improved by use of simple tools such as triage (13).

With increasing population and change in lifestyles from active to more sedentary as well as change in dietary habit, coupled with poor infrastructure such as roads, compounded by poor traffic law enforcement, Uganda is bound to face challenges with increasing number of both medical emergencies from non-communicable disease (14) and surgical/trauma related injuries especially from road traffic accidents and its resultant mass casualty incidence (15). All these further stress the point that development of functional triage systems that is well understood by staff should be one of the basic and cheap steps towards preparedness while not undermining preventive measures.

Whereas efforts have been made to introduce paediatric triage in Uganda such as Emergency Triage Assessment and Treatment Plus (ETAT+) from the World Health Organization (WHO) and integrated management of childhood illness (19), such programs are lacking for adult emergency medical care. There is no unified adult triage system being used in Uganda and it is not clear if hospitals have local protocols being used in each setting. In Uganda, just as in other Sub-Saharan Africa countries, health care facilities most often lack an integrated approach to triage, resuscitation, and stabilization of acutely ill patients (20)

One triage score, the Kampala Trauma Score (KTS), was initially found to be a kind of trauma triage score for resource poor settings (21). Its usefulness, however, was found to be limited(22). A report from the Malaria Consortium Uganda on a survey done to determine severe malaria clinical practice in Hoima, central Uganda, found that although not specific to adult triage, only 44% of those health facilities surveyed had established and functional triage systems in place (23). Such information is lacking in Northern Uganda.



There are limited data on adult triage systems in northern Uganda as well as Uganda at large. Hence, this study aims to determine the practice of adult/adolescent triage in emergency receiving areas in hospitals in northern Uganda.

### **Research Question**

How is hospital-based adult emergency triage performed at emergency receiving areas in hospitals in northern Uganda?

### **Study purpose**

In keeping with other low resource settings, Uganda has a need to use scarce resources to do the most for the most. Emergency formal triage is a critical mechanism to facilitate that, but is absent throughout the country. This study will gather information that will act as baseline for further development of triage systems - and hence improvement in emergency care in northern Uganda.

### **Aims and Objectives**

The aim of this study is to determine the practice of adult triage in emergency receiving areas in hospitals in northern Uganda.

To achieve this aim, this study has the following objectives:

To determine the presence of existing hospital triage systems, and – where present – which systems are being used.

To determine the cadre of staff undertaking triage (either through formal systems or initial subjective “eyeball” assessments)

To determine staff opinion on possible (if any) barriers to development of triage systems and ways through which triage can be improved

### **Methodology**

#### **Study design**

This will be a descriptive cross-sectional study

#### **Study setting and population**

The Republic of Uganda is a landlocked country in East Africa. It has population of 34.9 million people with five regions; Northern, Southern, Eastern, Western and Central - with central region being most (9.2 million), northern the least populated (7.2 million) and other regions with uneven distribution in between (72). It has 12 regional referral hospitals spread all over the regions and one National referral hospital located

in the central region, with many other faith based hospitals scattered unevenly all over the country.

The northern region is the most affected by the two recent decades of civil war. With a high level of poverty, it is the poorest region in Uganda (63-65). The northern region has poor health services compared to other regions in terms of number of health workers (74), number of privately owned clinics, and poor community health seeking behaviour depending on socioeconomic status typical for Sub-Saharan countries (75). This results in patients presenting late to facilities, and are often critically ill when seen in emergency receiving areas.

Northern region is divided into three sub-regions: Acholi, Lango and west-Nile. Each sub-region has a similar distribution of hospitals, with each having one regional referral, at least two faith based and at least two district hospitals.

Allocating numbers to the three sub-regions, and using a random number generator, we randomly selected Acholi sub-region for the study. The study will be carried out in all the hospitals in Acholi, an area serving a population of 2.7 million (72).

The seven hospitals and their affiliations are outlined below:

One regional referral hospital (government facility): *Gulu Regional Referral Hospital*, the only regional referral hospital in Acholi sub-region with total bed capacity of 250, average annual admissions of about 13,000 and emergency unit annual attendance of over 10,000

Three faith based hospitals [Private Not For Profit (PNFP)]: *St. Mary's Hospital Lacor* (the largest hospital in the whole northern Uganda - with 475 bed capacities, average annual emergency receiving areas attendance of about 11,000 and average annual admissions of about 33,000 (personal communication with hospital management and records department); *Kalongo Hospital* - with total bed capacity of 360 and average annual admissions of about 11,500 (personal communication with hospital management and records department); and *St. Joseph's Hospital Kitgum* – with total bed capacity of 350 and annual admissions of about 10,000 (personal communication with hospital management and records department)

One private for profit hospitals (PFP): *Gulu Independent Hospital*, the only privately owned profit making hospital (attempt made to obtain hospitals statistics in vain)

Two district hospitals (government facilities): *Nwoya District hospital* (also known as Anaka hospital) and *Kitgum District hospital*, each with same total bed capacities of 250.

The study will be carried out in all these hospitals. The participants will be staff working in the emergency receiving areas of these facilities and are involved in the initial stage of managing emergency patients who come to these hospitals.

### **Sample size**

In each hospital, at least one representative of nurses in various duty shifts (night, morning and evening shifts), the nursing in-charge/leader, at least one doctor (head of department or any doctor on duty) and a clinical officer if any, making a minimum of 5-6 staff who will participate in the study from each hospital to seek representativeness and experience at each site. These are health professionals who are involved in daily initial management of emergency patients at the emergency receiving areas of the hospitals. Staff will not be included in study if they refuse to consent to participate in the study or are not a qualified health personnel (e.g. receptionist, cashier, cleaner, social worker, etc.).

### **Data Collection**

This will be a written questionnaire under supervision of the investigator – each participant will read and note his/her response according to instructions (Appendix A). Language used in the questionnaires will be English as this is the official language for education in Uganda and all qualified staff speak it.

Participants will be told that this study relates to the triage of patients aged 12 years and over as this is the age criterion for a patient to be managed as an adult in Uganda.

A pilot study will be conducted in a similar setting to pre-test the questionnaires in terms of readability and ease of understanding.

The questionnaires are adopted partly and modified from the study done in Sweden by Gorranson in his survey of how triage was organised in emergency departments in hospitals in Sweden (40).

### **Data Management**

The collected data will be compiled and kept under safe custody of the investigator. The information will be entered in computer and the electronic records will be password protected on a work computer. Only investigators will have access to data.

### **Data analysis**

Information will be entered into Microsoft Excel for Windows, and analysed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics will be reported.

### **Study Limitations**

This study has potential limitations:

Desirability bias: staff may want to respond to impress by portraying a better work situation than actually exists including triage, other than what is exactly on the ground.

Time of participation: research will be done during period of duty; just before duty starts - this may lead to hurried response as staff is to start duty; or after duty – they may be tired from duty.

### **Quality control**

Staff will be asked to fill questionnaires just before the staff starts work, at break time, or after the staff has signed out of duty to avoid interference of duty and hurried responses which may affect the quality of the information.

The design of the questions will be done in such a way as to eliminate desirability bias and so obtain background information as real as possible.

Data will be kept under safe custody of the investigator and then later entered into computer and summarised without alterations so as to retain the original meaning of the responses.

### **Ethical Considerations**

Ethical approval will be obtained from the University of Cape Town. While in Uganda, ethical approval will also be obtained from local Research and Ethic committee; St. Mary's Hospital Lacor - accredited by Uganda National Council of Science and Technology (UNCST) for ethical approval, after which the research will be registered with the national body - UNCST. In addition, individual institutional permission where study will be conducted will be sought before conducting the study.

Please note that ethical approval and individual hospital permission from Uganda can only be obtained once approval has been gained from HREC at UCT. The letters will be sent to HREC once obtained from Uganda.

#### *Potential risks and benefits*

There are no foreseeable health risks, discomforts, or inconveniences envisaged due to participation. Information from this study will be used to guide further development of adult triage systems which will improve emergency medical care in northern Uganda and Uganda at large.

#### *Privacy and confidentiality*

Data will be kept confidentially. No identifying data will be collected

#### *Informed consent process*

Each study participant will sign informed consent (Appendix A3). They are free to decline from participating in the study and to withdraw at any time with no consequences.

*Reimbursement for participation*

There will be no monetary or material form of reimbursement to participants for taking part in this study.

**Time frame**

Activities	Time Period					
	2015			2016		
	JUN- AUG	SEP- NOV	DEC- JAN	FEB- APR	MAY- JUL	AUG- DEC
Preparing for Submission for ethical approval in UCT						
Ethical Approval In Uganda						
Data Collection						
Data Analysis						
Preparing for Submission of dissertation						
Dissemination of results						

**Resources required for the research.**

This research project will be funded by Total E & P Uganda as part of the study costs for the MPhil Student.

Budgets

<b>No.</b>	<b>Item/Expenses</b>	<b>Unit (Rand)</b>	<b>Total (Rand)</b>
01	Administrative fees and processes including, processing of ethical approval from internal review board and registration with Uganda National Council of Science and Technology.	Block	15,600.00
02	Travelling allowance for the interviewer (Food, accommodation, Air time, etc) four days while in the Hospital (for seven hospitals=28 days).	575, each day for 28 days.	16,100.00
03	Transport for all the activities(to and from all the hospitals in northern Uganda and others)	7,750	7,750.00
04	Data entrance and statistical analysis	Block	3,450.00
04	Stationery	Block	2,150.00
05	Miscellaneous	block	1,150.00
	<b>Total</b>		<b>46,200.00</b>

### **Dissemination of results**

A report will be written on the findings from this survey and submitted to University of Cape Town as a partial fulfillment of the Degree MPhil Emergency Medicine.

We will aim to submit an article for publication in a peer reviewed journal and will report back to the Uganda Ministry of Health.”

**8.2. Appendix A2: – Questionnaires**

**Instructions:** Tick 1 more option(s) that is applicable to you/your settings and/or write down your answer if any, where space is provided.

**Hospital:**

.....

**1. Category of profession of the participants**

Nursing Assistance  Enrolled Nurse  Registered Nurse  Clinical Officer

Doctor

**2. How long have you worked in this Department?**

<6 months  6-12 months  1-2 years  >2 years

**3. Does the hospital/Health centre have a formal triage system?**

Yes  No

If yes, Answer Section A (a-k), If NO answer Section B (a-h)

**SECTION A (IF THERE IS A FORMAL TRIAGE SYSTEM IN USE)**

**a) Where is the triage done?**

OPD  Emergency Reception  Triage area  Other place(s) specify

.....  
.....

**What is the triage based on?**

Vital signs only  History only  Both vital signs and History

Caretaker/patients Opinion

Others

specify.....

**b) What are the categories/scales/colour codes of the triage?**

1).....  
.....

2).....  
.....

3).....  
.....

4).....  
.....

Others.....  
.....

**c) How good do you think the hospital's triage is?**

Very good    Good    Average    Poor

**d) Who does the triage?**

Nursing Assistance    Enrolled Nurse    Registered Nurse    Clinical Officer

Doctor

**e) Are the staff trained in triage?**

Yes    No

**If yes, who does the training? How frequent?**

Who.....  
.....

How frequent?    Twice a year    Once a year    Once after every two years,  
 Once every five years

**f) Is triage done before registration?**

Yes    No

**g) Does triage assess Airway, Breathing, Circulation, and Conscious Level?**

Yes    No

**h) Are there written Triage Guidelines/Charts?**

Yes    No

**If yes, where are they kept?**



On the wall  In the drawers  in the (  )ce Other places  
specify.....  
.....

**i) How important do you think it is to improve on Triage?**

Very Important  Important  Not important

**j) Possible limiting factors to improving triage systems in this hospital**

No.	Possible Barriers	Choose only one that is applicable to you by ticking in the box				
		Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
01	Triage scales varies from one hospital to another					
02	No triage chart displayed in emergency receiving areas to guide practice					
03	Lack of regular training of staff on triage					
04	Shortage of staff on duty to perform triage					
05	Staff have poor attitudes toward sticking to triage guideline					
06	No space to allocate patients into categories even if triaged					
07	Poor administrative policy and support					
08	Others...					
09	Others...					
10	Others...					

**k) Possible ways to improve the existing triage systems in this hospital**

No.	Possible way forward	Choose only one that is applicable to you by ticking in the box				
		Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
01	Conduct regular training on triage					
02	Adopt a unified triage scale nationwide					
03	Need to assign staff specifically to do triage during each shift					
04	Print triage tool(chart/scales) and put in open place in emergency receiving areas					
05	Administrative support in terms of number of staff on duty					
06	Emphasis for staff to stick to guideline					
07	Create and label areas for various triage categories					
08	Others.....					
09	Others.....					
10	Others.....					

**Section B (If NO formal triage system)**

**a) Briefly describe what happens if a „very sick patient“ arrives in the emergency receiving areas**

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 .....  
**b) Who decides that the patient is very sick and so need immediate/urgent attention?**

Patient  Relative/caregiver  Doctor

Nursing Assistant  Enrolled Nurse  Registered Nurse  Clinical Officer

**c) Where is this done?**

OPD  Emergency Reception  Triage area  Other place(s)  
 specify.....  
 .....

**d) Are Airway, Breathing, Circulation, Conscious Level assessed?**

Yes  No

**e) How important do you think it is to have a formal triage protocol?**

Very Important  Important  Not important

**f) Do you think presence of formal triage protocol would have improved your emergency care to patients?**

Yes  No  Not sure

**g) Possible barriers to development of triage.**

No.	Possible Barriers	Choose only one that is applicable to you by ticking in the box				
		Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
01	No national guideline exist on triage					
02	No triage chart displayed in emergency receiving areas to guide practice					
03	Staff are not trained on triage					
04	Shortage of staff on duty to perform					

	triage					
05	Triage is considered not very important					
06	Triage wastes time					
07	No space to allocate patients into categories even if triaged					
08	Poor administrative policy and support					
09	Others.....					
10	Others.....					
11	Others.....					

#### **h) Possible way forward**

<b>No.</b>	<b>Possible way forward</b>	<b>Choose only one that is applicable to you by ticking in the box</b>				
		<b>Strongly Agree</b>	<b>Agree</b>	<b>Not sure</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
01	Conduct regular training on triage					
02	Formulate or adopt a triage system/scale					
03	Need to assign staff specifically to do triage during each shift					
04	Print triage tool(chart/scales) and put in open place in emergency receiving areas					
05	Administrative support					
06	Create space for triage categories					
07	Others.....					
08	Others.....					

09	Others.....					
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### **8.3. Appendix A3: – Participant’s Consent form**

#### **CONSENT FOR YOUR PARTICIPATION IN THIS RESEARCH**

##### **Organization of adult based triage systems in hospitals in Northern Uganda**

You are requested to voluntarily participate in this study organised by a researcher from University of Cape Town, South Africa, as you are a health worker in the emergency receiving areas in one of the hospitals selected as study site in northern Uganda.

##### **Purpose of this study**

This study aims to collect information that will act as baseline knowledge for further development of triage systems and subsequently improvement in emergency medical care services in northern Uganda, as well as add on the existing knowledge in health science.

##### **Background**

Limited health service resources must be used in a manner which does “the most for the most”. This is partly achieved through the use of a triage system, but health workers must understand it and it must be used routinely.

Whereas effort have been made to introduce paediatric triage in Uganda such as Emergency Triage Assessment and Treatment Plus (ETAT+), there is no unified adult triage system being used in Uganda and it is not clear if hospitals have local protocols being used in each setting.

There are limited data on adult triage systems in northern Uganda as well as Uganda at large. Hence, this study is to provide the background knowledge as one of the initial steps in developing national triage systems and so the improvement of emergency medical care in northern Uganda and the country at large.

##### **Procedures**

After asking any questions which you may have, if you voluntarily accept to participate in this study, you will be asked to sign below. This study will take a maximum of 30 minutes of your time, and will take the form of questionnaires.

##### **Potential risks and discomforts**

There are no foreseeable health risks, discomforts, or inconveniences envisaged due to participation apart from your time that is needed.

##### **Potential benefits to participants and/or society**

Information from this study will be used to guide further development of adult based triage systems that will not only improve triaging in emergency departments but also act as one of the initial steps in improvement of emergency medical care in northern Uganda and Uganda at large.

**Payment for participation**

There will be no payment to participants who choose to participate, however we thank you for your time.

**Confidentiality**

No information regarding your identity will be collected except in this consent form. All other information will be kept under safe custody. De-identified reports from the study will be submitted for academic purpose at the University of Cape Town as well as where possible, disseminated in publications for the purpose of adding knowledge in global health science.

**Participation and Withdrawal**

You are free to choose to participate or not and free to decline even when you have started participation already without any penalty.

**Identification of Investigator**

Dr Opiro Keneth,

MBChB, Student MPhil EM

University of Cape Town

Email: [opiroken@yahoo.co.uk](mailto:opiroken@yahoo.co.uk)

Tel: +27(0) 786347651/+256(0) 774210558

**Note:** The UCT FHS Human Research Ethics Committee can be contacted on +27(0)21 406 6338 in case participants have any questions regarding their rights and welfare as research subjects on the study.

**Signature of the Participant**

I HAVE READ THE INFORMATION ABOVE AND UNDERSTOOD IT AND ALL MY QUERIES HAVE BEEN ANSWERED SATISFACTORILY AND I HAVE AGREED NOW TO PARTICIPATE IN THE STUDY.

Name of Participant .....

Signature of Participant .....  
Date.....

**Signature of the Investigator**

I declare that I have explained the information given in this document to above signatory and he/she has had ample time for queries which were answered in English and no translator was used.

Name of Investigator .....

Signature .....



#### **8.4. Appendix B: –Ethical approval from Uganda**



## **8.5. Appendix C1: – Lacor Hospital permission**

## **8.6. Appendix C2: – Anaka Hospital permission**

**8.7. Appendix C3: – Gulu Regional Referral Hospital Permission**

**8.8. Appendix C4: – St. Joseph’s hospital permission**

## **8.9. Appendix C5: – Kitgum Hospital permission**

**8.10. Appendix C6: – Kalongo (Dr Ambrossoli) Hospital permission**