

**A DESCRIPTIVE ANALYSIS OF EMERGENCY CARE PROVIDED IN NORTHERN SOMALIA**

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**ACRONYMS AND ABBREVIATIONS:**

AFEM: African Federation for Emergency Medicine

GDP: Gross Domestic Product

HIV: Human Immunodeficiency Virus

IFEM: International Federation for Emergency Medicine

LMIC: Low-and-middle income countries

MoH: Ministry of Health

NCDS: Non-communicable diseases

TB: Tuberculosis

UNICEF: United Nations Children's Emergency Fund

WHA: World Health Assembly

WHO: World Health Organisation.

**ABSTRACT:**

Emergency care is an integral part of an effective healthcare system. However, emergency care systems remain largely underdeveloped in low- and middle-income countries, particularly in Sub-Saharan Africa.

Somalia is in the horn of Africa. Decades of civil war, political instability, and terrorism insurgency have greatly hampered healthcare in the country, and the country does not have a formal emergency care system. The aim of the study was to assess the current provision of emergency care in healthcare facilities in northern Somalia, namely Somaliland and Puntland.

This was a cross-sectional descriptive study carried out in all emergency units in Hargeisa and Garowe, the capital cities of Somaliland and Puntland respectively. A standardised WHO emergency care assessment tool was used to assess the performance of emergency care procedures in the emergency units. Simple descriptive statistics were used to analyse the data.

Six facilities - two in Puntland, and four in Somaliland - participated in the study. Two of these were regional referral public facilities, while the rest were private. The performance of sixty emergency care procedures was assessed. Absent equipment was the main reason (47%, n=60) for the non-performance of these emergency care procedures. Lack of training (29%), stock out of supplies (13%), and lack of skilled personnel (10%) were the other reasons for the non-performance of these emergency care procedures.

The findings of this study underscore the need for more resource allocation with a focus on equipping emergency units and having adequate supplies. The study also highlights the need for training of healthcare providers who routinely provide care in emergency units.

## 1: INTRODUCTION:

Emergency care is defined as, “the provision of initial resuscitation, stabilisation, and treatment to acutely ill and injured patients, and delivery of those patients to the best available definitive care, regardless of ability to pay”.(1) It can also be conceptualised as “the ability of a health system to provide access to acute health care, such as injury stabilization and initial treatment of acute illnesses, many of which are not preventable.”(2) The purpose of emergency care is to stabilize patients who have a life-threatening or limb-threatening injury and also serves a fundamental role in health care systems by providing an entry point to health care. (2-5) An efficient and well-organized emergency care system has been shown to reduce morbidity and mortality from time-sensitive conditions. (6, 7)

Emergency care constitutes the components of care at the community, care during transport and care at a receiving facility.(1, 4, 5, 8) Despite the fact that emergency care is a fundamental component of any health care system, it remains largely underdeveloped in many low and middle income countries (LMIC), particularly those in Sub-Saharan Africa. (2, 4, 8) Most countries in this region do not have an organised emergency care system. (9, 10) This as opposed to emergency care in high income countries like those in Europe and North America, which tend to have very advanced emergency care systems. (2, 9)

Globally, 90% of violence and injuries occur in LMIC, and 80% of deaths from injuries occur in these resource-limited countries. (11) Emergencies, whether medical or arising from trauma and injury can occur anytime and anywhere, and they cut across different age groups. (12) Road traffic injuries alone are projected to be the sixth-leading cause of death by the year 2020, far exceeding the burden from any single infectious disease. (2) Besides injuries, medical emergencies also constitute a major component of morbidity and mortality in LMICs. (2) This has largely been contributed by the change in lifestyles especially among the growing middle-class in urban settings that has given rise to a higher incidence of non-communicable chronic conditions such as diabetes and hypertension. (2, 9, 13, 14) This epidemiological shift has seen more emergencies arising from these chronic non-communicable diseases (NCDs) being reported. (2, 9, 13) In addition, a rise in air

pollution in these countries has also seen an increase in chronic respiratory conditions such as asthma and chronic obstructive airway disease, which often present as emergencies. (15)

The World Health Assembly resolution 60.22 adopted in 2007, and a more specific resolution proposed for the 2019 World Health Assembly, recognise the critical role played by emergency care in health systems and call on the World Health Organization (WHO) and governments to take specific actions in order to realise the benefits of a strengthened emergency care system in reducing the burden of acute illness and injury. (3) Despite the resolutions and recommendations, emergency care in LMICs continues to be underdeveloped and most countries do not have a formal emergency care system. (1, 3-5, 8, 9) Some of the barriers to the development of emergency care systems in these countries include the focus on primary healthcare and the notion that emergency care systems are costly to establish and sustain. (3, 4, 12) This is not however the case as effective emergency care systems can be realised even in resource-limited settings, with the most prudent approach being horizontal integration to an already existing healthcare infrastructure. (3-5, 8) Governments and donor agencies have over the years given priority to funding and research in communicable diseases like malaria, tuberculosis and HIV/AIDS. (2) There has however been an epidemiological shift in these countries with a higher incidence of NCDs being reported. (9, 13, 16)

Some of the challenges facing the development of emergency care in Sub-Saharan Africa include little or no resource allocation, largely due to a lack of understanding of the critical role that emergency care plays in the larger healthcare system in morbidity and mortality reduction. (4) This can be attributed to little or no advocacy on the role of emergency care in the health system sustainability. (4) Other factors that are a challenge to the development of emergency care in Sub-Saharan Africa include little or no training, resulting in the lack of skills among care givers to carry out some emergency care procedures. With all these shortcomings, there is a need to have baseline data on the capacity of health facilities to provide emergency care. Facility capacity assessment on the provision of emergency care is thus the first step towards the development of a national and regional emergency care system.

### **Emergency care at health facilities**

Care at a receiving facility is one of the three major components of an emergency care system. (4, 5) Facilities differ in their capacity to provide emergency care for medical and trauma cases as well as obstetric conditions, and some capacity to provide emergency care should be available at every level of a country's health care system. (5) Health care facilities of lower quality produce poorer outcomes, and a health care system should be designed such that when a patient's condition requires resources not possessed by a primary care centre, they can be transferred to the nearest hospital. (5)

The World Health Assembly Resolution 60.22 calls on governments to undertake comprehensive assessments of emergency care needs as well as the availability and quality of emergency care services and to understand to what extent those needs are not being met by existing services. (3)

### **Somalia**

Somalia is in the Horn of Africa, with an estimated population of about fifteen million people as of 2018. (11, 17, 18) (Appendix 1) The country covers an area of land of about 637,657 square kilometres and neighbours Kenya to the South, Ethiopia and Djibouti to the north and the Indian Ocean to the East. (11, 17) The country is officially referred to as the Federal State of Somalia and is divided into different administrative regions each led by a regional president.

Puntland is the oldest federal state of Somalia. It is located in the mid to the northern part of Somalia and covers an area of about 212,510km<sup>2</sup> with an estimated population of 3.4 million people. (16) Garowe is the capital. On the other hand, although not recognised internationally as an independent state, Somaliland, which is in the northern most region of the greater Somalia, has declared independence from the rest of Somalia. Somaliland covers an area of about 137,600 square kilometres- just slightly larger than England, and has an estimated population of about four and half a million. (19, 20) The region has its own autonomous administration with a functional legislature, executive, and judiciary. Hargeisa city is the capital.

### **Healthcare in Somalia**

The health care system in Somalia remains weak, poorly resourced and inequitably distributed; and the country's health indicators are among the lowest in the world. (21, 22) Health expenditure is also very low and there is a critical shortage of health workers. (23)

Health care in Somalia can be divided into two distinct categories; public and private, and both state and private health facilities are to be found throughout all the regions in Somalia. Public health facilities are funded by the state with the support of multilateral organizations such as the WHO and the United Nations International Children's Emergency Fund (UNICEF) as well other donor agencies. (21, 24) There is no formal healthcare scheme in the country, and the public sector is largely in an underfunded state and hence poorly resourced in terms of physical infrastructure, supplies, as well as human resources. (23, 25) There has also been considerable brain drain of healthcare providers particularly doctors and this has further deprived the country of much needed healthcare personnel. (25, 26)

These public facilities are complemented by a fledgling private sector which suffers similar challenges: resources are limited, so are personnel. (23)

### **Emergency care in Somalia**

The healthcare system in Somalia-and specifically emergency care remains in a seriously underdeveloped state. Years of civil strife, terror activities, and political instability have been a hindrance to the development of an effective health care system, including emergency care. This is further complicated by the fact that there are no trained emergency medicine physicians in the country, and most of the emergency care provision is by clinical officers and medical officers without any specialist training.

There has also been no documented baseline data on the state of facility-based emergency care in the region. To effectively develop emergency care systems, a three-step approach is needed:

1. Baseline assessment.
2. Development of a national plan.

### 3. Implementation with monitoring and evaluation.

An effective plan cannot be developed without baseline data, and there has been no baseline data on the provision of emergency care in Somalia. The same situation holds for the northern regions of Somalia, Somaliland (capital city Hargeisa), which is a self-declared independent region, and Puntland (capital city Garowe), a federal state of Somalia. This study endeavoured to develop such data for these two regions.

The study thus concerned itself with the provision of emergency care within hospitals in northern Somalia, and a similar study is needed required for pre-hospital care and other regions of Somalia. Pre-hospital care was beyond the scope of this project.

#### **Aims and objectives of the study:**

**Research Question:** What is the state of emergency care provision in healthcare facilities in northern Somalia?

**Aim:** The aim of the study was to assess the current provision of emergency care in healthcare facilities in northern Somalia.

The objective of the study was to describe hospital-based emergency care provision in northern Somalia.

## 2: LITERATURE REVIEW:

Emergency care is an integral part of an effective health care system. However, emergency care in developing countries is under-developed and lacks a formalised structure. (10) There is also lack of proper integration into the broader healthcare system making it even more difficult to have an efficient emergency care system in these settings. Some of the factors that have contributed to the under-development of emergency care system in LMICs include the focus on primary care as well as the notion that emergency care systems are inherently expensive to put up and run sustainably. (27) There has also been a misconception that ambulances equate emergency care with an emphasis on providing transport alone for the acutely ill and injured. (4) This is not however the case, as emergency care includes the whole continuum of care at the community, transport to a receiving health facility, care at the facility, be it health centre, district or regional hospital, and an organised referral mechanism. (1)

However, emergency care system does not have to be expensive in its implementation, and cost-effective interventions have been shown to be effective in resource-constrained settings. (7, 14, 28) While an efficient emergency care system ultimately leads to a reduction in morbidity and mortality, this largely depends on the capacity of a health facility to provide the required care. (28)

The capacity of facilities to handle emergencies depends on several factors. This includes the physical infrastructure and resources within the facility, as well as the human resource factors which encompasses the level of training and the experience of the personnel rendering care. In order to effectively measure the capacity of a facility to deliver emergency care, all these aspects must be assessed. The WHA resolution 60.22 tasks the WHO *“to devise standardized tools and techniques for assessing need for prehospital and facility based capacity in trauma and emergency care”* (3) The resolution also calls on governments to undertake comprehensive assessments of emergency care needs, as well as the availability and quality of emergency care services, to understand to what extent those needs are not being met by existing services. (3) To this end the WHO and professional organizations such as IFEM and AFEM have endeavoured to develop tools for facility based

assessment of emergency care. (29) The assessment of the capacity for facilities to provide emergency helps in identifying the gaps in facility resources and personnel to provide emergency care for a wide range of medical, trauma, and obstetric emergencies and also sets a baseline data that can be used for policy decision making.(29) This need is particularly crucial in LMICs where emergency care remains largely underdeveloped. (2, 4)

### **What has been done so far**

AFEM has developed the Emergency Care Assessment tool (ECAT) (30) This tool assesses the provision of key medical interventions that emergency units should be able to perform to adequately treat six common life threatening presentations. (30) The tool has been developed and standardised for facility-based emergency care assessment in a few African countries and has been described as the first standardised tool for assessing facility-based emergency care in the African context. The ECAT has a total of seventy-one items. Advanced or well resource-endowed centre should be able to perform all the 71 signal functions in the tool, while intermediate facilities should be able to perform fifty-three of those functions. The tool therefore helps to identify how mature a health facility or system is and the gaps that exist in the delivery of health care. (30) Such data can be utilised in policy making and planning.

### **The WHO assessment tool:**

The WHO assessment tool is based on the World Health Organization's (WHO) *Emergency Care System Framework*, *WHO Guidelines for Essential Trauma Care*, *WHO Tool for Situational Analysis to Assess Emergency and Essential Surgical Care* and AFEM's ECAT. (10) The WHO emergency care assessment tool is designed to evaluate the structure and key functions of emergency care in the emergency unit, which is any dedicated intake area for acutely ill and injured patients. The tool also considers the broader infrastructure of a facility required for delivering timely, effective and safe emergency care, and the coordination of care required across units and services.

The tool is designed to assess emergency care capacity and organization at the facility level, and it can be used at individual facilities or by a sample of facilities

region- or country-wide. If used at a single facility, an interdisciplinary committee can review the results to identify gaps in emergency care and determine action priorities for capacity development and quality improvement. Similarly, health system planners can use the findings from several facilities to get a better understanding of facility-based emergency care across a region or the country and develop a broader emergency care development or improvement strategy.

If the tool is to be used at more than one facility, a sampling strategy such as purposeful, random, or exhaustive sampling should be considered. The ideal sampling strategy and number of facilities sampled should reflect the objectives of the assessment, demands of the stakeholders, and the total number and types of facilities. The tool has four types of questions; namely: open-ended questions, number responses, discrete answers, and availability rating. The availability rating question types are used to assess the specific resource and service capacity and ability to perform key or sentinel functions. These question types are meant to reflect the demand-side factors (e.g., number of patients in need) for the service, as well as the supply-side factors (e.g., enough resources, satisfactory training). By doing so, a more robust and informative assessment of capacity can be performed. For each of these question types, the answer options are the resource, service or sentinel function is:

1. Generally unavailable (**NOT AVAILABLE FOR ANYONE** who needs it);
2. Some availability (available to **LESS THAN ALL** of those who need it);
3. Adequate (**PRESENT, AVAILABLE** to almost everyone in need, and used when needed).

If the resource, service or sentinel function rating is less than 3 that is less than adequate, it is important to know the factors that contribute to its deficiency. Common factors that contribute to the deficiency of critical or several resources, services or sentinel functions can then be identified and addressed. For ratings less than three, the following factors as possible reasons for the less than adequate rating are sought. These are:

- *Infrastructure* - physical space, electricity, water to support resource, service or function not available (e.g., lack of water source, lack of electricity)

- *Absent equipment* - resource has never been present at the facility
- *Broken equipment* - required resources present, but broken and awaiting repairs
- *Personnel* - resource, service or function available, and staff trained, but when trained staff are away from the hospital, no one is available to fill the position
- *Training* - No staff trained in using resource or performing function
- *Stock out* - Resource or function cannot be procured, or required supplies out of stock often due to stock management practices or procurement failures (e.g., reagents, tubes, IV catheters)
- *User fees* - Resource or function available, but out-of-pocket payment requirement prevents care delivery.
- *Opening hours* - Hours the facility can be accessed by acute patients
- *Other* - Other factors.

The data acquired from such an assessment can then be analysed to determine the capacity of a facility and different facilities in providing emergency care.

### **3: METHODOLOGY**

#### **Study Design:**

The study was a cross-sectional descriptive study.

**Study setting:** The study was carried out in Hargeisa, and Garowe, the capital cities of Somaliland and Puntland respectively. All Hospitals in the two cities were approached for participation in the study.

#### **Inclusion and exclusion criteria:**

Both private and government facilities were included in the assessment. Only hospitals that consented were included in the assessment.

#### **Data collection and Management:**

Data were collected using a standardised WHO emergency care assessment tool. (Appendix 2) The tool is designed to evaluate the structure and the key functions of emergency care in the emergency unit. It assesses the performance of sixty emergency care interventions that are then grouped into seven key functions i.e. difficulty in breathing, haemorrhagic shock, other shock, altered mental status, trauma, pain and obstetric.

The assessment tool was administered to key informants in each of the participating facilities as recommended in the tool. In each of the facility that participated in the study, at least two key informants were interviewed. Convenience sampling was carried out to identify the key informants; these were mainly doctors and nurses working in the emergency departments of the participating facilities. The assessment tool was administered by the student researcher with the help of assistants who helped to explain some of the aspects of the questionnaire to the key informants. The research assistants also assisted in clarifying issues in cases where there was a language problem. Once a key informant was identified and consent obtained, they were given time to familiarise themselves with the questionnaire and given an opportunity to ask any questions or seek clarification on how to respond to the questionnaire. Explanations were offered as appropriate and where need be this was offered in Somali.

**Data analysis:**

Data were analysed using simple descriptive statistics. Frequency tables and graphs were used to illustrate the findings from the study. Data from multiple key informants was collated.

**Ethical considerations:**

Approval for the study was gained from the University of Cape Town (Appendix 4), the Ministries of Health of Somaliland and Puntland (Appendix 5) Consent was obtained from each of the informants, and facility level consent was also sought. (Appendix 3)

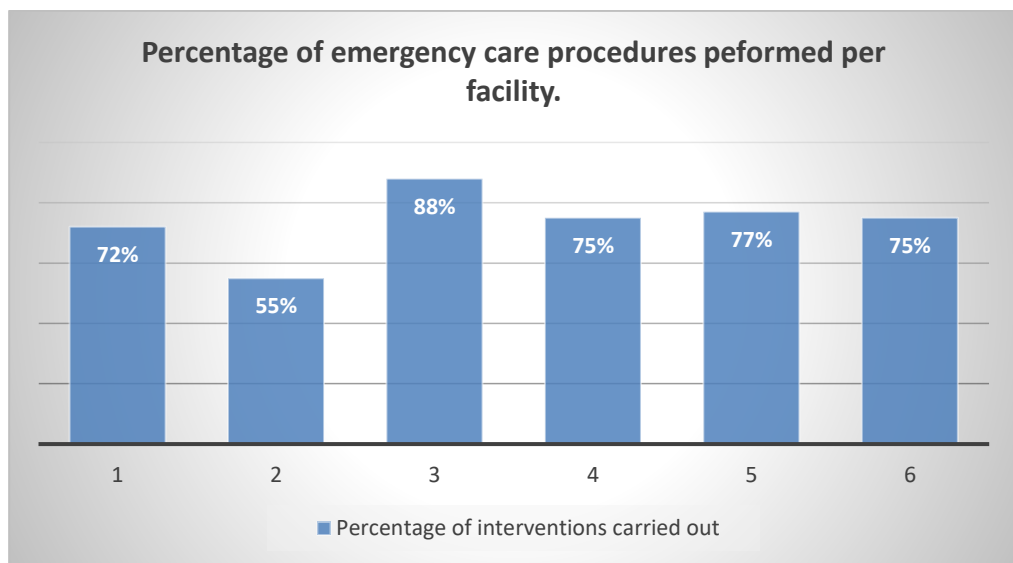
#### 4: RESULTS

##### Overall findings:

A total of six (n=6) facilities participated in the study and were assessed, two in Puntland and four in Somaliland. Three facilities in Puntland were approached but one did not participate in the study. Each region had only one government facility with the rest being private facilities. Both government facilities were referral hospitals serving each region respectively.

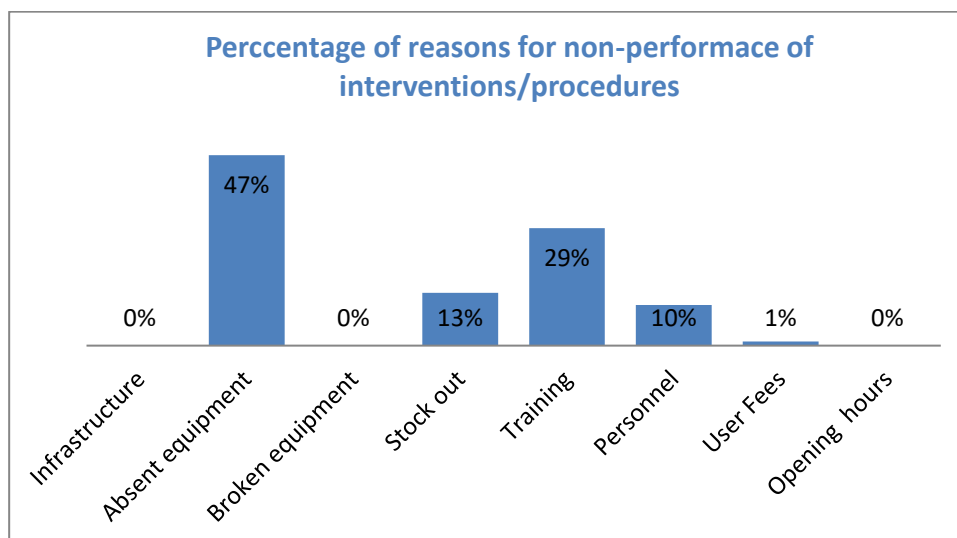
Sixty emergency care interventions were assessed in each of the six facilities as shown in the breakdown that follows. Overall, all the facilities performed an average of 74% of these interventions. The percentage of performance of emergency care procedures per facility is summarised in figure 1:

*Figure 1: Percentage of total emergency care interventions performed per facility.*



Absence of equipment was the overall major reason (47%) for the non-performance of emergency care interventions across all the facilities that were assessed. Training (29%) and stock out (13%) were the other reasons as shown in figure 2:

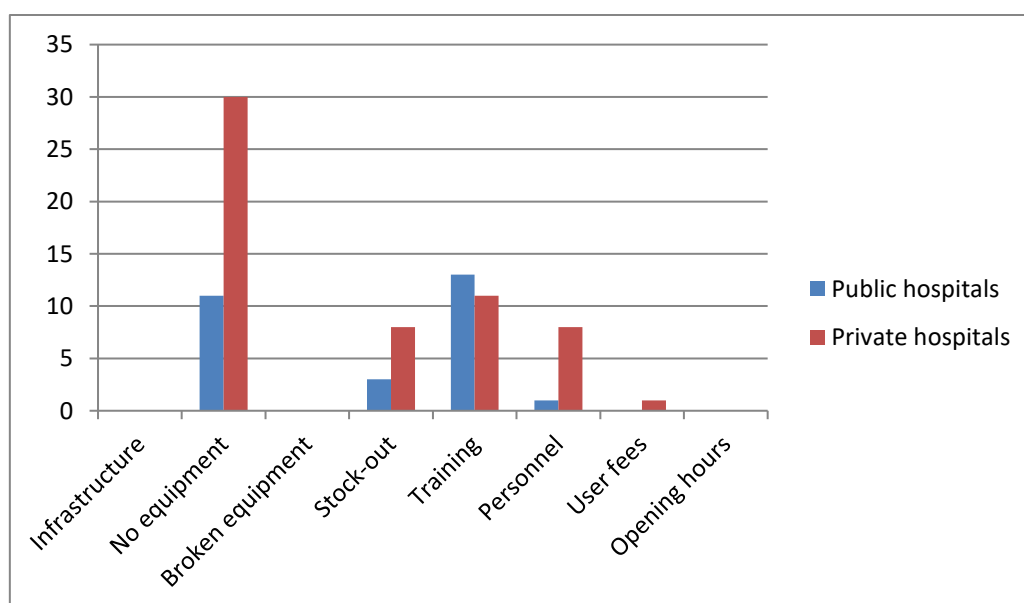
Figure 2: Reasons for non-performance of emergency care interventions



### Public versus Private facilities

For public hospitals, training was the main reason for the non-performance of emergency care procedures while absence of equipment was the main reason for the non-performance of emergency care procedures in private hospitals. This is illustrated in the figure 3 below:

Figure 3: Reasons for the non-performance of emergency care procedures in public and private hospitals.



The following is a breakdown of the assessment of key emergency care functions at the health facilities.

### Difficulty in breathing

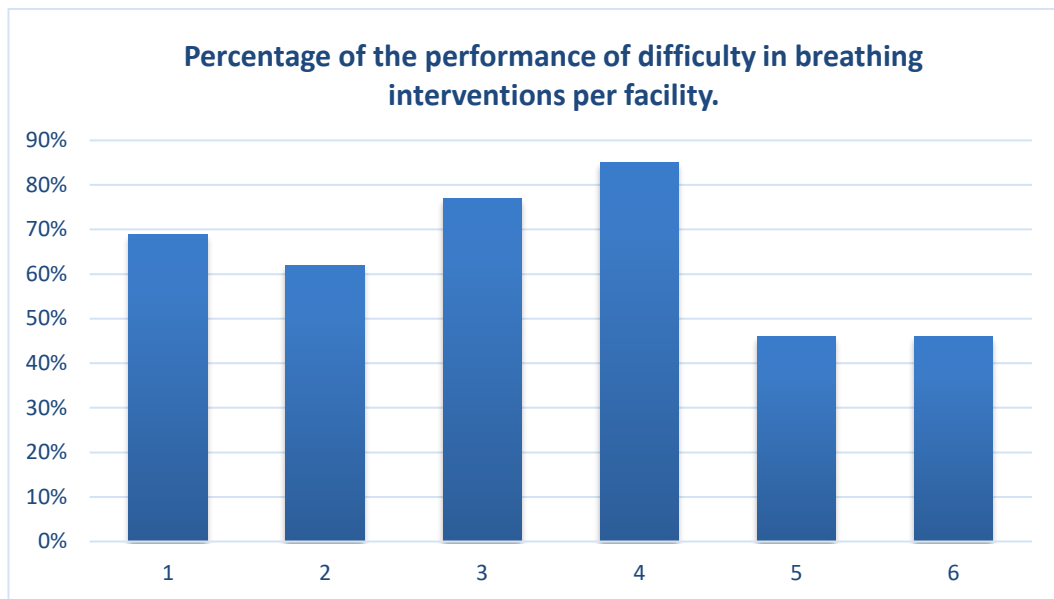
Table 1 shows the performance of difficulty in breathing interventions.

**Table 1: Availability of difficulty in breathing interventions across all facilities**

Sentinel Function/ Procedure		Facility						Availability across all facilities
		1	2	3	4	5	6	
<b>DIFFICULTY IN BREATHING</b>								
<b>Obstructed Airway:</b>								
1	Manual manoeuvres	√	√	√	√	√	√	100%
2	Use of suction	√	√	√	√	√	√	100%
3	Perform surgical airway	X	√	X	√	X	X	33%
<b>Respiratory distress</b>								
4	Oxygen administration	√	√	√	√	√	√	100%
5	Admin of critical therapies for reactive airway disease.	√	√	X	X	x	X	33%
6	Placement of oro or naso-pharyngeal airway device.	√	√	√	√	x	√	75%
7	BVM ventilation	√	√	√	√	x	√	83%
8	Placement of supraglottic device.	x	x	x	x	X	x	0%
9	Endotracheal intubation	X	X	√	√	√	X	50%
10	Non-invasive mechanical ventilation	√	X	√	√	√	X	67%
11	Invasive mechanical ventilation	X	X	√	√	X	X	33%
12	Perform rescue breathing	√	√	√	√	X	X	67%
13	Chest tube placement.	√	X	√	√	√	√	83%
<b>Availability of Difficulty in breathing procedures per facility:</b>		<b>69%</b>	<b>62%</b>	<b>77%</b>	<b>85%</b>	<b>46%</b>	<b>46%</b>	

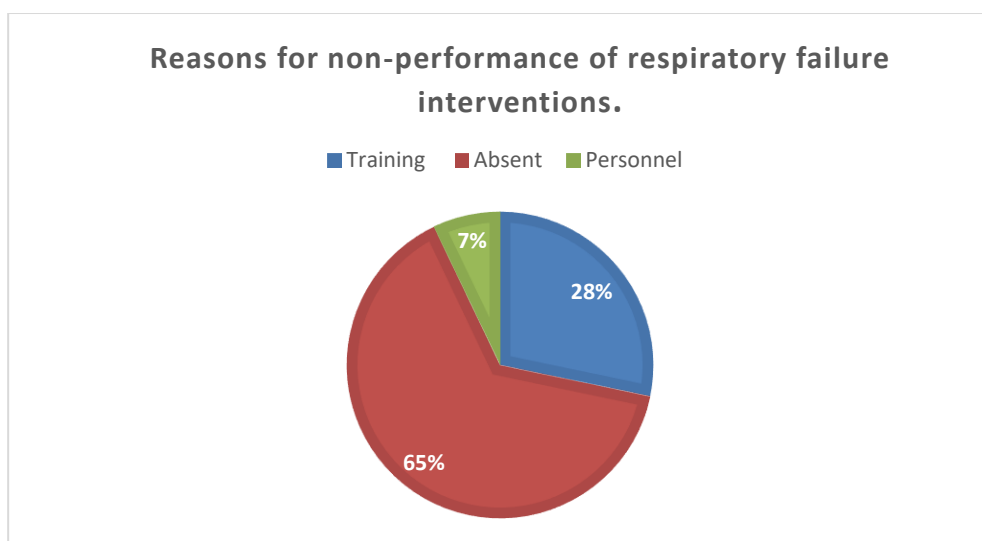
Figure 4 shows a summary of the performance of the emergency care interventions under the difficulty in breathing key function per facility.

Figure 4: Percentage of difficulty in breathing interventions available per facility.



The reasons for the non-performance of difficulty in breathing procedures are shown in figure 5:

Figure 5: Reasons for the non-performance of difficulty in breathing procedures.



All the facilities that participated in the study could perform manual manoeuvres, use suction to clear obstruction from the airway and administer oxygen as shown in table 1. However, none of the facilities could perform placement of a supra-glottic device. In addition, invasive mechanical ventilation was available in only two (33%) of the facilities.

**Haemorrhagic shock:**

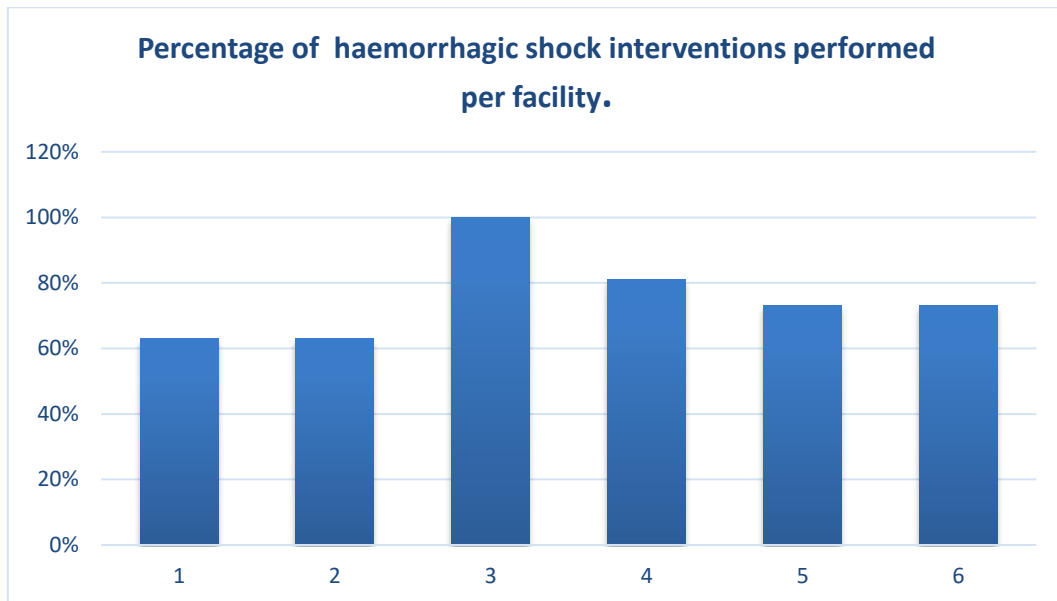
Table 2 shows the breakdown of the performance of interventions relating to shock.

Table 2: Availability of haemorrhagic shock interventions across all facilities

HAEMORRHAGIC SHOCK								
Intervention/ Procedure		Facility						Availability across all facilities
		1	2	3	4	5	6	
1	External control of haemorrhage	√	√	√	√	√	√	100%
2	Packing/suture control	√	X	√	√	√	√	83%
3	Apply arterial tourniquet	√	√	√	√	√	√	100%
4	Pelvic binding or sheeting	X	√	√	X	X	√	50%
5	Place peripheral IV Access	√	√	√	√	√	√	100%
6	Establish IO access.	√	√	√	X	X	X	50%
7	Perform venous cut-down	X	√	√	√	√	X	50%
8	Establish central venous access	X	X	√	√	√	X	50%
9	Admin IV fluids	√	√	√	√	√	√	100%
10	Admin pathogen screened blood transfusion.	√	X	√	√	√	√	100%
11	Perform & interpret U/S.	X	X	√	√	X	√	50%
<b>Availability of haemorrhagic shock procedures per facility.</b>		<b>63%</b>	<b>63%</b>	<b>100</b>	<b>81%</b>	<b>73%</b>	<b>73%</b>	

The percentage of haemorrhagic shock interventions performed by a facility is shown in the figure below:

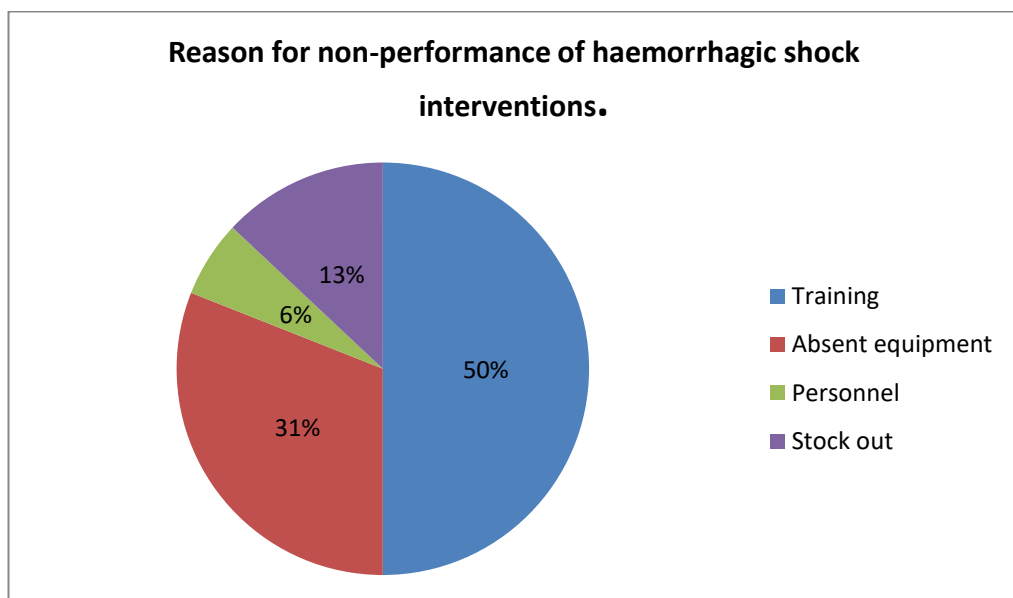
*Figure 6: Percentage of haemorrhagic shock interventions available per facility.*



Only one facility could perform all the interventions relating to the management of haemorrhagic shock. All facilities (n=6, 100%), could carry out external control of haemorrhage, placement of peripheral intravenous access, application of arterial tourniquet and administration of intravenous fluids.

Training was the main reason for an intervention not being performed. It accounted for 50% of the reasons for non-performance of an intervention while absent equipment, stock out, and personnel contributed to 31%, 13%, and 6% respectively as the reason for non-performance of an intervention. This is summarised in the pie chart below:

*Figure 7: Reasons for non-performance of haemorrhagic shock interventions.*



### **Other types of shock**

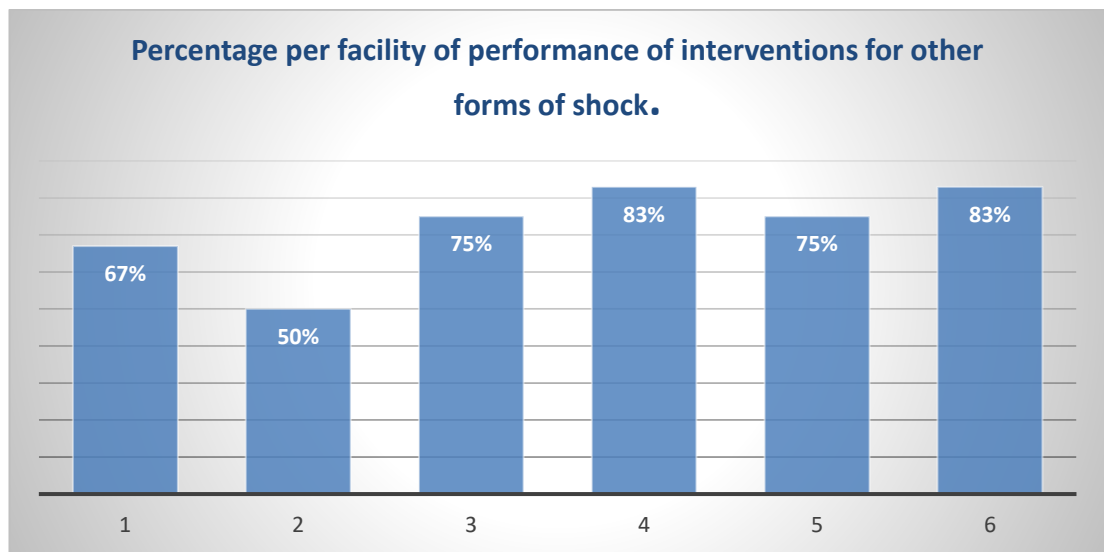
Table 3 shows the availability of interventions for other types of shock across all facilities.

Table 3: Availability of interventions for other shock across all facilities:

OTHER SHOCK								
Intervention/ Procedure.		Facility						Availability across all facilities
		1	2	3	4	5	6	
1	Administer oral rehydration.	√	√	X	√	√	√	83%
2	Place urinary catheter	√	√	√	√	√	√	100%
3	ECG interpretation	X	√	√	√	X	√	67%
4	Perform External defibrillation	X	X	X	√	X	X	33%
5	Perform needle compression of tension pneumothorax	√	√	√	X	√	√	83%
6	Admin of IV antibiotics	√	√	√	√	√	√	100%
7	Admin of adrenaline	√	√	√	√	√	√	100%
8	Admin of IV vasopressors	√	X	√	√	√	√	83%
9	Admin of thrombolytic	X	X	√	√	√	√	67%
10	Perform pericardiocentesis	X	X	X	X	X	X	0%
11	Perform paracentesis	√	X	√	√	√	√	83%
12	Bedside minor techniques for source control.	√	X	√	√	√	√	83%
<b>Percentage availability of other shock procedures per facility.</b>		<b>67%</b>	<b>50%</b>	<b>75%</b>	<b>83%</b>	<b>75%</b>	<b>83%</b>	

Figure 8 shows a summary of the performance of the emergency care interventions for other shock key function per facility:

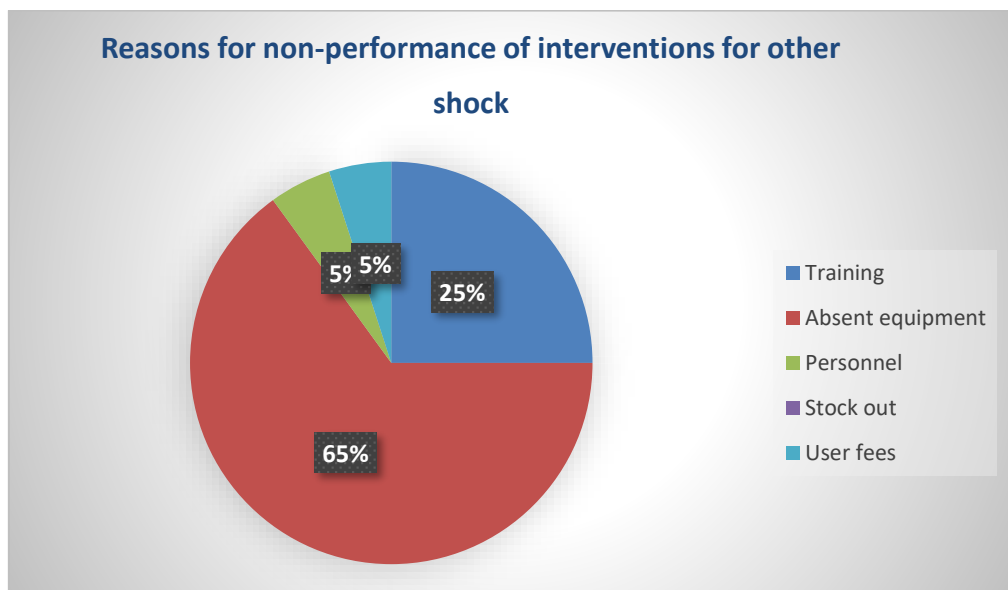
*Figure 8: Percentage of the performance of interventions for other shock per facility.*



All facilities (n=6), could perform placement of urinary catheters for monitoring urine output in patients with shock as well as administer intravenous antibiotics and adrenaline for patients with sepsis.

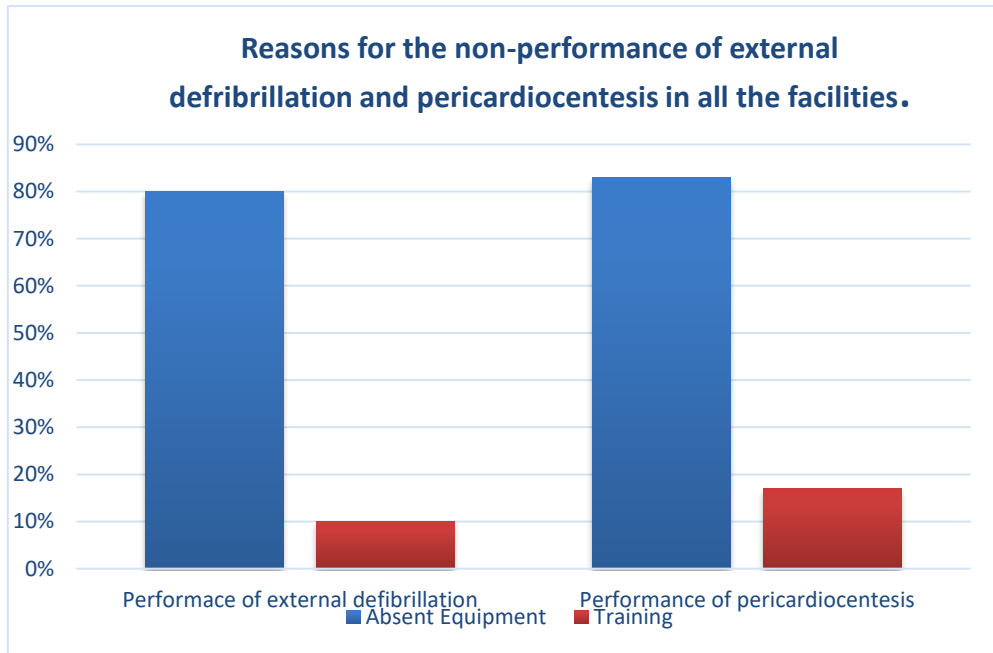
The main reasons for non-performance of interventions for other shock were; absent equipment (65%), training (25%), user fee (5%), and personnel (5%). This is summarised in the diagram below:

Figure 9: Reasons for non-performance of interventions for other shock.



Performance of external defibrillation and/ or cardioversion and pericardiocentesis were the least available interventions with defibrillation being available in only one facility while performance of pericardiocentesis was absent in all the facilities that participated in the study. Training and absent equipment were the main reasons for the unavailability of these interventions as shown in figure 10 below:

Figure 10: Reasons for the non-performance of external defibrillation and pericardiocentesis.



**Altered mental status:**

Table 4 below shows the availability of interventions for altered mental status in all the facilities.

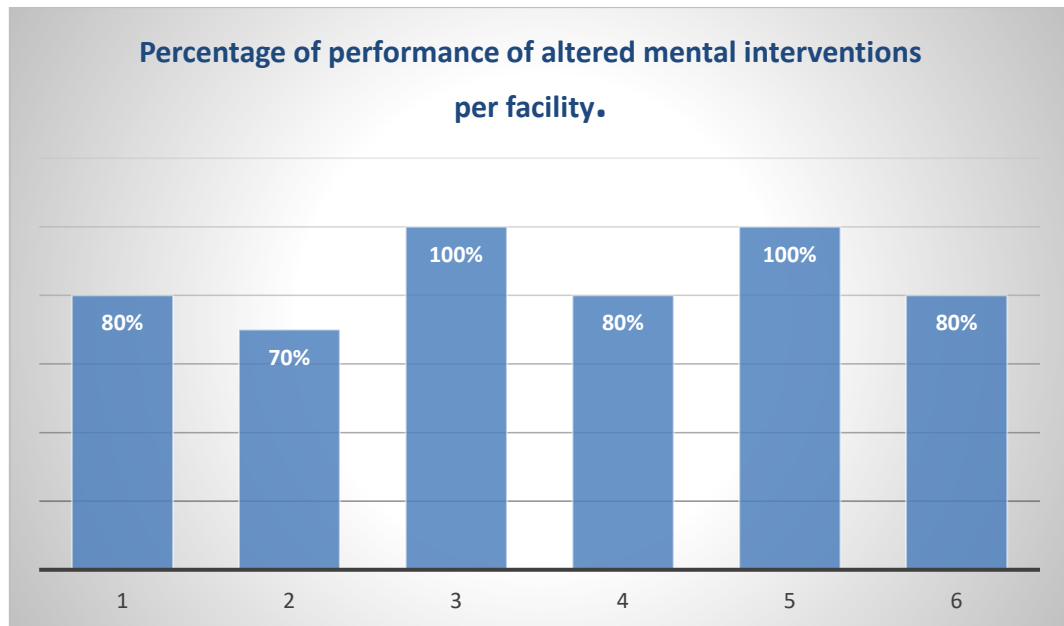
Table 4: Availability of altered mental interventions across all the facilities

ALTERED MENTAL STATUS								
Intervention		Facility						Availability across all facilities.
		1	2	3	4	5	6	
1	Protect from secondary injury	√	√	√	√	√	√	100%
2	Check/administer glucose	√	√	√	√	√	√	100%
3	Administer insulin for hyperglycaemia	√	√	√	√	√	√	100%
4	Perform Lumbar puncture	X	X	√	√	√	X	50%
5	Administer benzodiazepine	√	√	√	√	√	√	100%
6	Admin IV MgSO <sub>4</sub> for pregnant patient	√	X	√	√	√	√	83%
7	Administer locally available antidote	X	X	√	√	√	X	50%
8	Perform mental state exam	√	√	√	X	√	√	83%
9	Management of extreme temperatures	√	√	√	√	√	√	100%
10	Administer appropriate therapeutics for	√	√	√	X	√	√	83%

	agitation.							
<b>Percentage availability of altered mental procedures per facility.</b>	<b>80%</b>	<b>70%</b>	<b>100%</b>	<b>80%</b>	<b>100%</b>	<b>80%</b>		

Figure 11 shows a summary of the performance of the emergency care interventions under the altered mental status key function per facility.

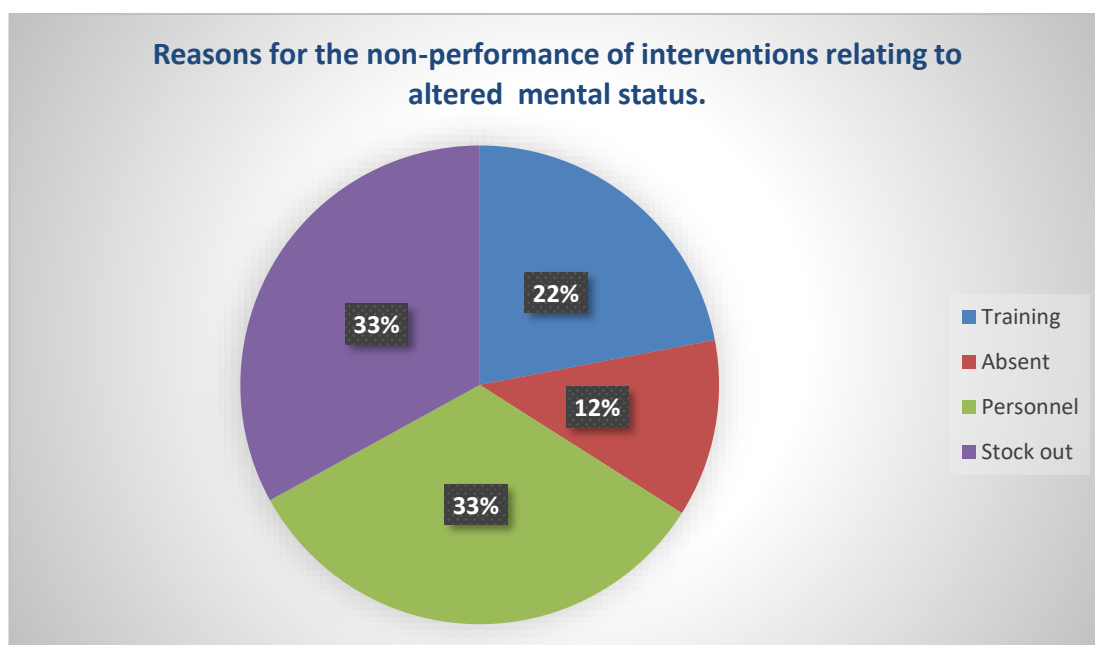
*Figure 11: Percentage availability of altered mental interventions per facility.*



All facilities that participated in the study indicated that they could protect the unconscious patient from secondary injury, check and administer glucose for a patient with hypoglycaemia as well as the capacity to administer insulin for a patient with hyperglycaemia. They also could administer benzodiazepines for patients with convulsions as well as effectively deal with patients presenting with extremes of temperatures. Magnesium sulphate for pregnant patients with convulsions was also present in all facilities except one in which the reason for non-availability was stock out.

The reasons for the non-performance of interventions/ procedures relating to altered mental status is summarised in the pie chart below:

Figure 12: Reasons for the non-performance of interventions relating to altered mental status.



**Trauma:**

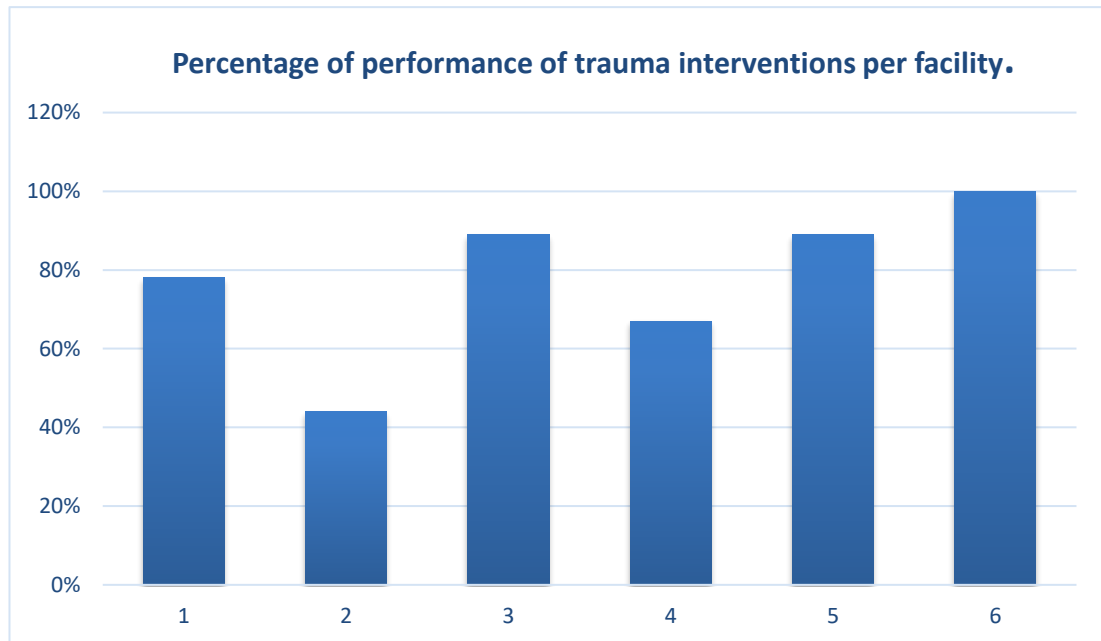
The availability of trauma care interventions across all facilities is shown in the table below.

Table 5: Availability of trauma care interventions across all facilities

TRAUMA								
Intervention		Facility						Availability across all facilities.
		1	2	3	4	5	6	
1	Perform initial wound care	√	√	√	√	√	√	100%
2	Administer T.T	X	X	√	√	√	√	67%
3	Admin rabies vaccine	X	X	√	X	√	√	50%
4	Immobilize the C-spine	√	√	√	X	√	√	83%
5	Immobilize fractures	√	√	√	√	√	√	100%
6	Perform closed reduction of fracture or dislocation	√	X	√	√	√	√	83%
7	Administer antibiotic for open fracture	√	√	√	√	√	√	100%
8	Perform fasciotomy or escharotomy for compartment syndrome	√	X	X	X	X	√	33%
9	Apply three-way dressing for sucking chest wound.	√	X	√	√	√	√	83%
<b>Percentage availability of trauma procedures per facility.</b>		<b>78%</b>	<b>44%</b>	<b>89%</b>	<b>67%</b>	<b>89%</b>	<b>100%</b>	

A summary of the performance of trauma related interventions per facility is presented in figure 13 below:

Figure 13: Percentage of trauma interventions available per facility.



One facility could perform all the interventions related to trauma. However, one facility could only perform 44% of the interventions relating to the multiply injured patient. All facilities (n=6, 100%) that participated in the study indicated that they could perform initial wound care as well as immobilize fractures and administer intravenous antibiotics for open fractures.

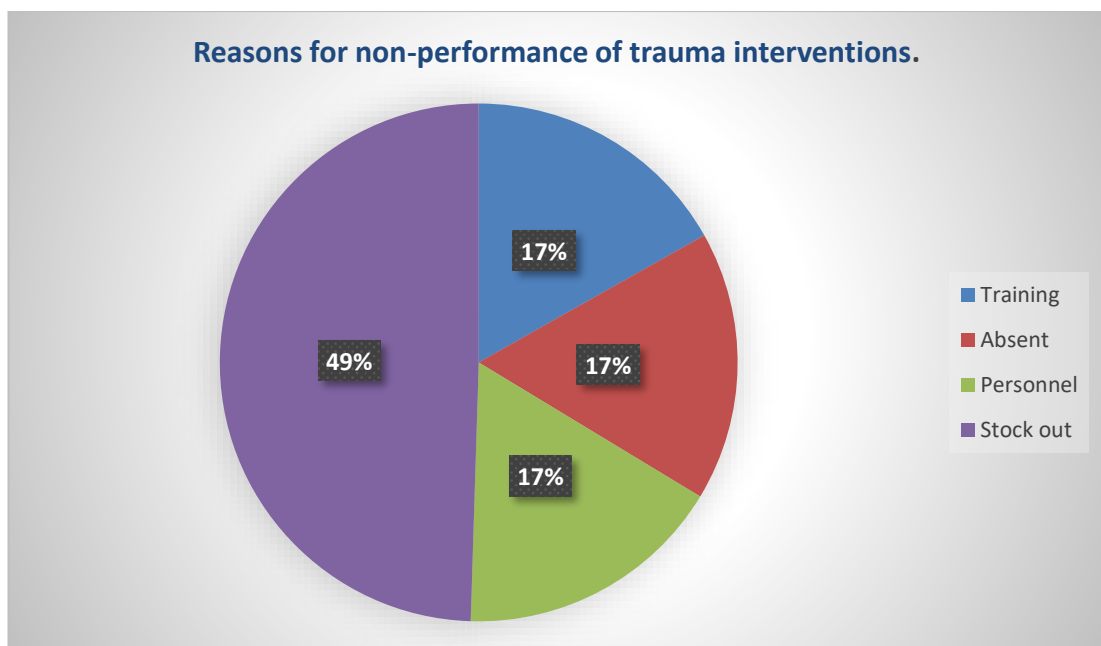
All facilities except one could immobilize the c-spine, perform closed reduction of fracture or dislocation, and apply three-way dressing for sucking chest wound. The reason for the non-performance of immobilization of the c-spine was stock-out, while the reason for the non-performance of closed reduction of fractures and dislocations was training. Application of a three-way dressing for a sucking chest wound was absent at the facility that could not provide it.

Tetanus toxoid was available in four facilities (67%), with stock-out being the reason for non-availability in 33% of the facilities. Similarly, anti-rabies vaccine was only available in half (50%) the facilities that participated in the study; the main reason (100%) for non-availability in the facilities that it was missing being stock out.

Fasciotomy and escharotomy were the least available interventions; being available in only two facilities. The main reasons for non-performance of the procedure were personnel and training. Each accounted for half (50%) of the reason for non-performance of the procedures.

Overall, stock out accounted for half (50%) reason for an intervention not being able to be performed, while training, absent equipment, and personnel each accounted for 17% as shown in the pie chart below:

Figure 14: Reasons for non-performance of trauma interventions.



**Pain management and obstetric emergencies:**

The table below shows the availability of pain and obstetric emergencies across all facilities.

Table 6: Availability of pain and obstetric emergencies across all facilities

PAIN								
Intervention		Facility						Availability across all facilities.
		1	2	3	4	5	6	
1	Admin opiate analgesia	√	√	√	√	√	√	100%
2	Admin aspirin for chest pain.	√	√	√	√	√	√	100%
<b>Availability of pain per facility.</b>		<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	

OBSTETRIC								
Intervention		Facility						Availability across all facilities.
		1	2	3	4	5	6	
1	Perform assisted vaginal delivery	√	X	√	√	√	√	83%
2	Administer uterotonic drugs	√	X	√	√	√	√	83%
3	Perform neonatal resuscitation	√	X	√	√	√	√	83%
<b>Availability of obstetric procedures per facility.</b>		<b>100%</b>	<b>0%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	

All the facilities that participated in the study could administer opiate analgesics and aspirin for chest pain. Similarly, except for one facility, all others could perform all obstetric related interventions, namely; assisted vaginal delivery, administration of uterotonic drugs, and performance of neonatal resuscitation.

## 5: DISCUSSION

The main finding of this study was that absent equipment was the main reason for the non-performance of emergency care procedures across all the facilities, both public and private. This was followed by training, stock out, personnel, and user fees respectively. The results thus underscore the resource limitation in emergency care provision in the region. These findings are like those of similar studies carried out in the African continent in which training, infrastructure, absent equipment, and personnel were the main reasons for the non-performance of emergency care interventions. (29, 31-33) Moreover, none of the facilities that participated in the study could perform all the procedures in the assessment tool; the highest ranked facility was only able to provide 88% of the interventions with the facility with the least provision of services offering only 55% of these interventions, and an average of 74% for all the facilities that were assessed.

Although the WHO emergency care assessment tool does not rank facilities in categories the way the ECAT tool does, a facility can be said to have the capacity to adequately provide emergency care if it can provide more than fifty percent of the emergency care procedures in the assessment tool. However, that would depend on whether the facility can provide life-saving procedures such as endotracheal intubation, surgical airway and mechanical ventilation.

### **Public versus private facilities:**

In this study the unavailability of resources cuts across both public and private facilities. This is unlike findings from the results of similar studies carried out in other African countries in which central and regional public hospitals were found to be have better infrastructure, more resources and more trained staff and were therefore able to deliver most if not all emergency care interventions that they were assessed for. (29, 32, 33) A study in Ghana assessing trauma capacity found that regional and central hospitals were more equipped in infrastructure, resources, and had more highly trained personnel. (33)

In the two public facilities that participated in the study, training was the major reason for the non-performance of emergency care interventions. This is a pointer

to the need for training of emergency care givers in these facilities. Although absent equipment was also a factor for the non-performance of interventions; comparatively these facilities were more adequately resourced to handle emergencies. This can be attributed to the fact that these facilities are mainly supported through donor funds and hence the availability of infrastructure and equipment. (24, 25)

However, despite the availability of equipment, their utilisation to deliver emergency care might be hampered by a lack of skills due to lack of training of care providers. Training has been identified as one of the major hindrances to the provision of healthcare in Somalia and other African countries. (25) Not much attention has been given to the training of health workers in the country, and particularly in emergency care. Thus, if the region is to see an improvement in emergency care provision, there is a need to allocate funds for training especially in the public sector where most of the indigent population seeks medical care.

On the other hand, the main reason for the non-performance of emergency care interventions in private hospitals was absent equipment with training coming in second. This implies that although these private facilities may not be adequately resourced to provide emergency care interventions, they comparatively have better trained care providers than the public facilities. This can be attributed to better salaries and working conditions likely to be found in private facilities. However, the presence of better trained care givers in the private facilities cannot be fully quantified as this was self-reported questionnaire and personnel may over-report their capabilities. Thus, this may not be a true representation of the skill level of personnel in these facilities.

Interestingly, user fees were not a major factor for the patients not being able to access an emergency care procedure or intervention. This would not be expected in the region given that Somalia is one of the poorest countries in the world with a very low Gross Domestic Product (GDP) and with more than half of the population living below the poverty line. (34) The findings of this study as pertains to user fees not being a major barrier to the access of emergency care procedures can be attributed to the fact that services offered at the government facilities are highly

subsidised as they are largely supported by donor funds. (34) On the other hand, those who seek health care from private facilities are generally able to pay for the services. This is mainly through support from relatives most of whom are living in the diaspora who remit funds back home. Moreover, most facilities have a policy of providing initial care to emergency cases regardless of the patient's ability to pay.

**Key function performance:**

Overall, difficulty in breathing related emergency care interventions were the least available across all the key functions. They accounted for 47 % of all the reasons of the non-availability of a function. This can be a pointer to poor patient outcomes as the capacity of a health facility to secure the airway and ventilate a critically ill or injured patient is paramount for good patient outcomes as patients whose airway is not secured and adequately ventilated can easily deteriorate (35) In this assessment, none of the facilities could place a supraglottic device and only two could perform a surgical airway. The placement of supraglottic device is an easy procedure that can be done with minimal training and is also not inherently expensive. (35) This makes it ideal for resource constrained settings that are also understaffed with minimal training of personnel. In addition, a surgical airway is a critical procedure for patients who cannot be intubated or ventilated, and its non-performance in such patient can lead to poor outcomes including cardiopulmonary arrest and anoxic brain injury. (35)

**Limitations of the study:**

The study only focused on facility-based emergency care provision in the region. While pre-hospital care does contribute to the outcomes of trauma and medical emergencies, this facet of the emergency care continuum was not included in this project. Similarly, rural facilities in the regions were not part of the study and thus data from them is not presented in the study. AS such, patient outcomes on morbidity and mortality cannot be entirely premised on the findings of this study. In addition, the study does not assess the capacity of facilities to handle mass casualty incidents

While the results of the study can be generalised to other regions in Somalia, this may be not be entirely accurate as some of the regions are more politically volatile

and unstable which has subsequently affected infrastructure and personnel availability. Thus, a similar study would need to be carried out in those regions to determine the actual capacity of emergency care provision in those regions. Moreover, this was a self-reported study and the actual situation could be quite different from what is reflected by the findings of the study because of reporting bias.

## **6: CONCLUSION AND RECOMMENDATIONS:**

The study highlights the need for more resource allocation and training of healthcare providers in a bid to improve emergency care provision in the region. Although the country is still struggling with scarce resources and limited budget for health, there is a need to focus on equipping emergency care units if better patient outcomes for patients presenting with time-limited conditions is to be realised. There is also a need for more training of care providers who routinely attend to patients in the emergency units so that they can be adequately skilled and have the requisite competence to provide emergency care.

Another area that needs to be stream-lined is the supplies in the health facilities and at the emergency units. This will curb the problem of stock-out in the facilities and ensure that supplies are available when needed. As such, facilities in the region need to embrace technology in monitoring their stocks.

### **Future Research:**

The current study only assesses the capacity of a facility to perform specific emergency care interventions. It does not however assess the capacity of facilities in dealing with mass casualty incidents which is a common occurrence in the country due to terror attacks. Similarly, the study does also not assess pre-hospital emergency care provision. Future research should focus on these two areas to develop a comprehensive understanding of the whole spectrum of emergency care provision in the region.

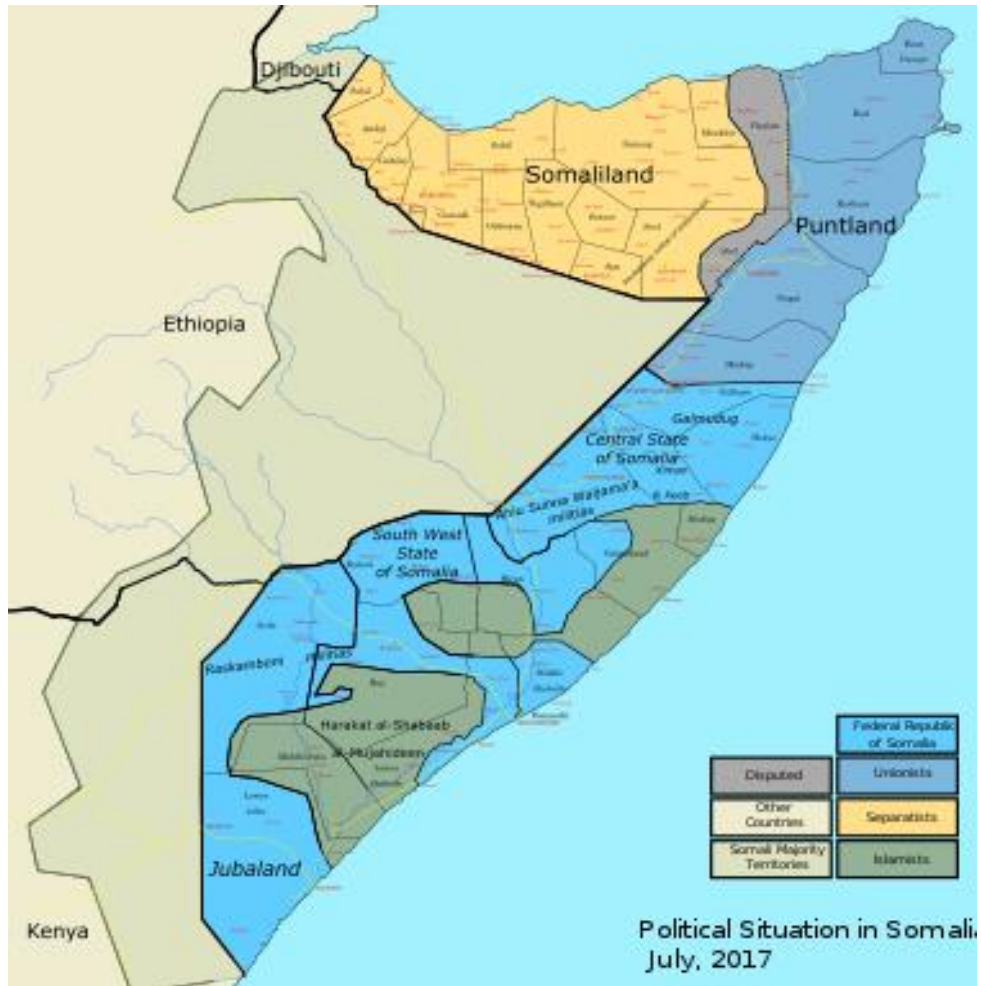
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**APPENDIX:**

**Appendix 1: Political map of Somalia:**



## Appendix 2: WHO Emergency Care Assessment tool.

### Emergency Care Delivery Assessment:

#### 1. Facility Characteristics

##### 1.1 Identifying Information

1.1.1		<b>Date</b>																											
1.1.2		<b>Country</b>																											
1.1.3		<b>Name</b> person filing out form																											
1.1.4		<b>Contact</b> person filing out form	<b>Email:</b> <b>Phone:</b>																										
1.1.5		<b>Name of facility</b>																											
1.1.6		<b>Address of facility</b> (include city, state or province)																											
1.1.7		<b>GPS Reading</b> (if available)	<table border="0" style="width: 100%;"> <tr> <td></td> <td style="text-align: center;"><u>Degrees</u></td> <td style="text-align: center;"><u>Minutes</u></td> <td style="text-align: center;"><u>Seconds</u></td> <td colspan="3"></td> </tr> <tr> <td>Latitude:</td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> <tr> <td>Longitude:</td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> </table>							<u>Degrees</u>	<u>Minutes</u>	<u>Seconds</u>				Latitude:							Longitude:						
	<u>Degrees</u>	<u>Minutes</u>	<u>Seconds</u>																										
Latitude:																													
Longitude:																													
1.1.8		<b>Type of facility</b>	Health centre or clinic	1 <sup>st</sup> level referral hospital	2 <sup>nd</sup> level referral hospital	Tertiary hospital	Private hospital	NGO or mission hospital																					
1.1.9		Is there an area (room, unit, and department) specifically designated for emergency care? <b>Yes</b> <b>No</b>																											
1.1.10		Population served by facility (e.g., 123,000):																											

##### 1.2 Facility Metrics

	<b>Descriptor</b>	<b>Number</b>
1.2.1	Beds/gurneys dedicated for emergency care	

1.2.2	Emergency unit visits per year	
1.2.3	Inpatient hospital beds	
1.2.4	Inpatient admissions per year	
1.2.5	Outpatient visits per year	
1.2.6	Functioning operating theatres (24/7)	
1.2.7	Functioning high acuity unit with continuous monitoring and ventilation management	
1.2.8	Emergency operations per year (if known)	
<b>Available hours</b>		
1.2.9	During which hours is the emergency unit covered by providers who are <u>physically</u> present in the unit?	
1.2.10	During which hours is the emergency unit covered by providers who are on call, <u>in the facility</u> ?	
1.2.11	During which hours is the emergency unit covered by providers who are on call, <u>outside the facility</u> ?	
<b>Opening hours of:</b>		
1.2.12	Emergency Unit	
1.2.13	Laboratory	
1.2.14	Pharmacy	
1.2.15	Radiology	
1.2.16	Operating Theatre	

### 1.3 Infrastructure and core equipment

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	Infrastructure Element	Rating	Comments (if rating <3)
1.3.1	Clean, running water		

1.3.2	Electricity source (e.g., wired, generator)		
1.3.3	Oxygen supply (e.g., cylinder, wall, concentrator)		
1.3.4	Designated telephone or radio for communicating with prehospital providers and/or other facilities		
1.3.5	Paper-based medical records		
1.3.6	Electronic medical records		
1.3.7	Isolation room for certain infectious diseases (e.g., TB, Ebola)		
1.3.8	Easy physical access to the emergency unit for those requiring a wheelchair or stretcher		
1.3.9	Designated waiting area		
1.3.10	Designated triage area		
1.3.11	Designated resuscitation area		
1.3.12	Immediate access to a transport vehicle and provider to administer care during transport for patients who need to be transferred to another facility		

	<b>Core Equipment</b>	<b>Rating</b>	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stock out (Supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>	<i>Other</i>
1.3.13	Personal protective equipment (e.g., hair covers, eye protection, face masks, impervious gowns, shoe covers, gloves)										
1.3.14	Pulse oximetry at triage										
1.3.15	Pulse oximetry in emergency unit										
1.3.16	Electronic cardiac monitoring in emergency unit										

1.3.17	Crash trolley or code cart with high-acuity equipment and supplies of various sizes in emergency unit											
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### 1.4 Ancillary Services

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	Descriptor	Rating	Infrastructure	Absent Equipment	Broken Equipment	Stock out (Supplies)	Training	Personnel	User fees	Opening hours	Other
<b>Laboratory Testing</b>											
1.4.1	Haemoglobin										
1.4.2	Full blood count										
1.4.3	Coagulation profile										
1.4.4	Electrolytes										
1.4.5	BUN and creatinine										
1.4.6	Lipase										
1.4.7	Cardiac marker (e.g., troponin)										
1.4.8	Arterial blood gas										
1.4.9	Cross matching for blood and blood products										
<b>Point of Care Testing – ED only</b>											
1.4.10	Urine dipstick										
1.4.11	Urine pregnancy										
1.4.12	Glucose										
1.4.13	Malaria Rapid Diagnostic Test (RDT)										
<b>Radiology</b>											
1.4.14	Stationary X-ray										

1.4.15	Portable X-ray for use in emergency unit											
1.4.16	Ultrasound in the hospital											
1.4.17	Ultrasound for use in emergency unit											
1.4.18	CT scan											
	<b>Other</b>											
1.4.19	System for reporting laboratory and radiology results in a timely fashion											
1.4.20	System for stocking, managing and dispensing medications in the emergency unit											
1.4.21	Containment and disposal of sharps and biomedical waste											

## 2. Human Resources

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

2.1	Do you have a core of fixed (non-rotating) providers permanently assigned to the emergency unit?	Yes	No
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	Descriptor	Total Number	Number of licensed or certified
	<b>Number of <u>non-rotating</u> providers assigned to emergency unit</b>		
2.2	Nurses		
2.3	Mid-level provider or advance practice nurses (e.g., clinical officers)		
2.4	Medical officers (doctors without specialist training)		
2.5	Emergency medicine specialists		

2.6	Another specialist doctor		
<b>Number of <u>rotating</u> providers assigned to emergency unit</b>			
2.7	Nurses		
2.8	Mid-level provider or advance practice nurses (e.g., clinical officers)		
2.9	Medical officers (e.g., doctors without specialist training)		
2.10	Emergency medicine specialists		
2.11	Other specialist doctor		

### 3. Clinical Services

#### 3.1 Access

3.1.1	What proportion of patients with emergency conditions are brought to the facility by formally trained prehospital care providers?	_____ %	Don't know
3.1.2	Are there regulations and/or protocols mandating that acutely ill or injured patients are clinically triaged prior to being required to register?	Yes	No
3.1.3	Does the facility require payment prior to provision of emergency care?	Yes	No

#### 3.2 Triage

3.2.1	Designated triage personnel 24 hours each day, 7 days per week	Yes	No
3.2.2	Time targets for each triage category (e.g., ORANGE - Very Urgent - <10 minutes for provider assessment)	Yes	No
3.3.3	Tracking of compliance with triage time targets	Yes	No

#### 3.3 Guidelines, protocols and checklists

3.3.1	Protocol for systematic triage that ensures patients are seen in order of acuity	Yes	No
3.3.2	Emergency unit screening protocol for certain conditions (e.g., TB, diabetes, violence)	Yes	No
3.3.3	Syndromic surveillance guidelines with links to public health officials for case definition and reporting	Yes	No

3.3.4	EU specific emergency response protocol, including protocol for mass casualty incidents	Yes	No
<b>Emergency condition-specific clinical management protocols</b>			
3.3.5	Trauma care protocol or checklist	Yes	No
3.3.6	Medical resuscitation protocol or checklist	Yes	No
3.3.7	Sepsis care protocol or checklist	Yes	No
3.3.8	Protocol for adjusting interventions for malnourished patients	Yes	No
3.3.9	Other condition specific protocol	Yes	No
<b>Disposition</b>			
3.3.10	Acuity-based internal transfer protocols to OR or ICU	Yes	No
3.3.11	Protocol for timely disposition from the emergency unit	Yes	No
3.3.12	Protocol for conveying information about discharge or disposition to the patient	Yes	No
3.4.13	Hand-over protocols when transferring patients from one care provider to another	Yes	No
<b>Outside Transfer</b>			
3.3.14	Condition-specific transfer or referral protocols (e.g., criteria for transfer of burn patient to burn centre)	Yes	No
3.3.15	Communication with receiving facility prior to transfer of patients with emergency conditions	Yes	No
<b>Safety</b>			
3.3.16	Infection prevention and control protocols	Yes	No
3.3.17	Protocol for post exposure prophylaxis for health care workers	Yes	No
3.3.18	Security protocols to protect staff, patients, and infrastructure from violence.	Yes	No
<b>COMMENTS</b> - include for all fields marked "no"			

### 3.4 Quality improvement

3.4.1	Systematic process for collecting patient data that links condition, management and outcomes (e.g., trauma registry)	Yes	No
3.4.2	Regular meetings convened to use clinical data for quality improvement (e.g., morbidity and mortality conferences, preventable death panels)	Yes	No
3.4.3	Tracking (e.g., clinical audit) to ensure that quality improvement actions (e.g., corrective action) are implemented after review meetings	Yes	No
3.4.4	Clinical document template (e.g., standardized clinical chart)	Yes	No

## 4. Signal Function Performance

### 4.1 Difficulty in Breathing

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	<b>DIFFICULTY IN BREATHING</b>	<b>Rating (1-3)</b>	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stock out (Supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>
	<b>Obstructed airway</b>									
4.1.1	Manual manoeuvres (e.g., jaw thrust, chin lift)									
4.1.2	Use of suction									
4.1.3	Perform surgical airway									
	<b>Respiratory distress</b>									
4.1.4	Oxygen administration									
4.1.5	Administration of critical therapies for reactive airway disease									
4.1.6	Placement of oro- or nasopharyngeal airway device									
4.1.7	Bag-valve-mask ventilation									
4.1.8	Placement of supraglottic device									
4.1.9	Endotracheal intubation									

4.1.10	Non-invasive mechanical ventilation									
4.1.11	Invasive mechanical ventilation									
4.1.12	Perform rescue breathing									
4.1.13	Chest tube placement									

## 4.2 Shock

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	<b>SHOCK</b>	<b>Rating (1-3)</b>	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stock out (Supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>
	<b>Haemorrhagic shock</b>									
4.2.1	External control of haemorrhage									
4.2.2	Perform packing and/or suture control									
4.2.3	Apply arterial tourniquet									
4.2.4	Apply pelvic binding or sheeting									
4.2.5	Place peripheral IV access									
4.2.6	Establish intraosseous access									
4.2.7	Perform venous cutdown									
4.2.8	Establish central venous access									
4.2.9	Administration of IV fluids									
4.2.10	Administer pathogen screened blood transfusion									
	Perform and interpret ultrasound									
	<b>Other shock</b>									
4.2.11	Administer oral rehydration									
	Place urinary catheter									

4.2.12	ECG interpretation										
4.2.13	Perform external defibrillation and/or cardioversion										
4.2.14	Perform needle decompression of tension pneumothorax										
4.2.15	Administration of IV antibiotics										
4.2.16	Administration of adrenaline										
4.2.17	Administration of IV vasopressors										
4.2.18	Administration of thrombolytics										
4.2.19	Perform pericardiocentesis										
	Perform paracentesis										
	Bedside minor surgical techniques for source control (e.g., abscess, empyema)										

### 4.3 Altered Mental Status

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	<b>ALTERED MENTAL STATUS</b>	<b>Rating</b> (1-3)	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stock out (Supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>
	<b>Unconscious patient</b>									
4.3.1	Protect from secondary injury									
4.3.2	Check and/or administer glucose									
4.3.3	Administer insulin for hyperglycaemia									
4.3.4	Perform lumbar puncture									
	<b>Seizure</b>									
4.3.5	Administer benzodiazepine									
4.3.6	Administer IV magnesium for pregnant patient									

4.3.7	Administer locally appropriate antidote									
	<b>Other</b>									
4.3.8	Perform mental status examination									
4.3.9	Management of extreme temperatures									
4.3.10	Administer appropriate therapeutics for agitation									

#### 4.4 Trauma

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

*Transfusion included in Shock section 4.2*

	<b>TRAUMA</b>	<b>Rating (1-3)</b>	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stock out (Supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>
4.4.1	Perform initial appropriate wound care									
4.4.2	Administer tetanus vaccination or IVIG as appropriate									
4.4.3	Administer rabies vaccine or IVIG as appropriate									
4.4.4	Immobilize the cervical spine									
4.4.5	Immobilize fractures									
4.4.6	Perform closed reduction of fracture or dislocation									
4.4.7	Administer antibiotics for open fracture									
4.4.8	Perform fasciotomy or escharotomy for compartment syndrome									
4.4.9	Apply three-way dressing for sucking chest wound									

#### 4.5 Pain

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	<b>PAIN</b>	<b>Rating</b> (1-3)	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stock out (Supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>
	<b>General</b>									
4.5.1	Administer opiate analgesia									
	<b>Chest pain</b>									
4.5.5	Administer aspirin for ischemia									

#### 4.6 Obstetric

(Rating: 1 - Generally unavailable, 2 - Some availability, 3 – Adequate)

	<b>OBSTETRIC</b>	<b>Rating</b> (1-3)	<i>Infrastructure</i>	<i>Absent Equipment</i>	<i>Broken Equipment</i>	<i>Stockout (supplies)</i>	<i>Training</i>	<i>Personnel</i>	<i>User fees</i>	<i>Opening hours</i>
4.6.1	Perform assisted vaginal delivery									
4.6.2	Administer uterotonic drug (e.g., oxytocin)									
4.6.3	Perform neonatal resuscitation									

### **Appendix 3: Study Consent form:**

#### **Study Consent form:**

**Title of the study: A DESCRIPTIVE ANALYSIS OF EMERGENCY CARE PROVIDED IN NORTHERN SOMALIA.**

**Researcher:** Dennis Muange  
Email: mgnden002@myuct.ac.za  
Candidate for MPHIL in emergency Medicine

**Supervisor:** Professor Lee A Wallis  
Division of Emergency Medicine  
University of Cape Town  
Email: lee.wallis@uct.ac.za  
UCT Staff Number: 01401390

**Co-supervisor:** Dr. Benjamin Wachira:  
Assistant Professor of Emergency Medicine, the Aga Khan  
University Hospital, Nairobi  
Email: benjamin.wachira@aku.edu

#### **Invite:**

You are being asked to take part in a research study that aims at assessing emergency care provision in northern Somalia.

If you agree, we will ask you to complete the following survey, based around a series of questions on the ability of your emergency centre in managing specific emergency conditions. We do not anticipate any additional risks to you from participating in this study. Any report generated will NOT include information that will make it possible to identify you.

This study is NOT meant to evaluate you, but the capacity of the emergency centre at your facility to help you deliver critical care interventions to your patients.

#### **Aim of the Study:**

The aim of this study is to assess the status of emergency care provision in northern Somalia.

The main objective of the study is to offer a descriptive analysis of the status of emergency care in northern Somalia.

#### **Period of Study:**

The study will be conducted in Somaliland and Puntland between June and November 2018

**Study Population:**

The study will be carried out in a total of six health facilities in Somaliland and Puntland. Three health facilities in each of the region will be assessed.

**Use of Data- Privacy**

Collected data will be compiled and handled by the researchers only. Only study investigators will have access to the completed toolkits and results. The results will not contain any identifying information of the participant or the interviewer. The information will not be sold or used for any commercial purpose.

All data will be stored on a password protected work computer. Data will be entered from paper copies and then checked for accuracy by a second investigator; at that time, paper copies will be destroyed.

**Consent**

Taking part in this study is completely voluntary. You may skip any questions that you do not want to answer. If you decide not to take part or to skip some of the questions you are free to withdraw at any time.

**Ethical Considerations- Potential Risks and Benefits & Data confidentiality**

There are no direct benefits to you by taking this survey and minimal risk for participating. Similarly, there are no direct benefits and minimal risk to your facility by taking part in this study. However, the benefits of the analysed data could be used to identify gaps in emergency care provision for at your facility and used as a basis to improve services in the facility.

**Compensation**

There is no compensation for participation in this health facility survey.

**Contact**

If you have any questions about the survey or the study itself, please contact: Dennis Muange: [mngden002@myuct.ac.za](mailto:mngden002@myuct.ac.za) or [+252634130024](tel:+252634130024)

**Statement of Consent:**

I have read the above information, and I am satisfied with the information given. I consent to take part in the study.

Your Signature \_\_\_\_\_

Date \_\_\_\_\_

Your Name (printed) \_\_\_\_\_

## Appendix 3: UCT Ethics approval



UNIVERSITY OF CAPE TOWN  
Faculty of Health Sciences  
Human Research Ethics Committee



Room E53-46 Old Main Building  
Groote Schuur Hospital  
Observatory 7925  
Telephone [021] 406 6492

Email: [sumayah.ariefdien@uct.ac.za](mailto:sumayah.ariefdien@uct.ac.za)

Website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms)

31 January 2018

**HREC REF: 704/2017**

**Prof L Wallis**  
Division of Emergency Medicine  
F51, OMB

Dear Prof Wallis

**PROJECT TITLE: A DESCRIPTIVE ANALYSIS OF EMERGENCY CARE PROVIDED IN NOTHERN SOMALIA (MPHIL-Candidate Dr D Muange)**

Thank you for your response letter dated 29 January 2018, addressing the issues raised by the Human Research Ethics Committee (HREC).

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until the 30 January 2019.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms))

***We acknowledge that the student: Dr D Muange will also be involved in this study.***

**Please quote the HREC REF in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

Yours sincerely

**PROFESSOR M BLOCKMAN**  
**CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE**

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical

HREC 704/2017

**Appendix 4: MoH Approval:**

PUNTLAND Government  
OF SOMALIA  
Ministry of Health



حكومة بنت لاند للصومالية  
وزارة الصحة

**Garowe General Hospital  
Director office**

Ref: 1516/GGH/OD/2017

Date:21/09/2017

**To: whom it may concern**

**Subject: Authorization latter to conduct Emergency Care Preparedness Survey**

Under my Responsibility in Garowe General Hospital I want to give an Authorization to **Dr. Dennis Muange** MERT Medical Officer to Conduct an Assessment Survey in Emergency preparedness in Puntland especially in Garowe General Hospital for research study Purpose.  
All concerned personals should support him by all related information to his Assessment topic.

**Thanks and Best Regards**

Director of Garowe General Hospital  
Dr. Abdisamed Ahmed Jama

*Garowe General Hospital  
Tell: 00 252 90 7767928  
Email: Nugalhospital@gmail.com*