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Research Article

Assessment of Trauma Care in Tertiary Center, Addis Ababa Ethiopia: An Observational Study

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Abstract

Background: Trauma is the leading cause of morbidity and mortality in resource limited setting. In Ethiopia there is no well-organized trauma system which could help to decrease mortality of trauma patient. The objectives of this study were to assess infrastructure, equipment and supplies to provide essential trauma care in one of specialized center in Ethiopia.

Methodology: Institution based observational study was done from September 5 to October 5, 2019, in Addis Ababa Burn Emergency Trauma (AaBET) hospital, Addis Ababa, Ethiopia. Data was collected using WHO trauma checklist for specialized center by observation and interviewing the heads of the responsible units.

Result: The hospital had consultants in emergency medicine and critical care, neurosurgeon, orthopedician and plastic and reconstructive surgeon working 24/7/365. There were no training like ATLS but short term courses about emergency and trauma care was given to staff. The resources for resuscitation was not proportional to the patient number. There was weak communication from prehospital care and other referring hospitals. There were efforts to use paper form trauma registries, but it requires sustainable monitoring and evaluation

Conclusion: This study showed better human resource and infrastructure which were still not proportional to the number of patient with trauma. In addition, the study revealed lack of communication from prehospital care, lack of sustainable trauma registry and trauma quality improvement project in the hospital.

Keywords: *Trauma Care; WHO Trauma Assessment; Trauma Center; Resuscitation*

Introduction

Trauma is the leading cause of mortality and morbidity in the world especially in low resource setting [1-3].

Trauma care in resource limited setting is not done in well-organized systematic manner and no appropriate preventive and control measures [4,5].

Life threatening injuries mortality becomes higher in a situation where there is no organized trauma care [6].

In Ethiopia 2008 national report on road safety showed 19, 000 road traffic accidents occurred per year [7].

In Ethiopia there is no well-organized trauma system which could help to decrease mortality of trauma patient. There is no well-organized training in Ethiopia for advanced trauma life support (ATLS).

WHO, Guideline for Essential Trauma Care sets 14 Core essential trauma care services which should be available in every place for injured patient from basic to advanced level of care [8].

Objective of the Study

The objectives of the present study were to assess the infrastructure, equipment and supplies to provide essential trauma care in a tertiary center/AaBET hospital and, to delineate the human resources needs and training of health care personnel to deliver essential trauma care.

Materials and Methods

Study design

Institution based observational study.

Study area and study period

Addis Ababa Burn Emergency and Trauma (AaBET Hospital), a major trauma center in Addis Ababa, Ethiopia. It was established in 2015 as part of St. Paul millennium medical college. St Paul millennium hospital is a teaching hospital that provide care to the residents of Addis Ababa and all over Ethiopia. AaBET currently provide health care service in specialties namely; orthopedics, neurosurgery, plastic and reconstructive surgery and emergency and critical care. AaBET hospital has approximately 20 - 30,000 emergency visits to the hospital and provides an emergency and outpatient services and elective and emergency surgeries of the respective departments.

Study was done from September 5 to October 5 after ethical clearance obtained from academic affairs of AaBET Hospital.

Data was collected both through observation and interview of heads of each units and departments using modified standardized WHO checklist for essential trauma care for the speciality hospital.

Availability of trauma care resources was assessed through direct observations and one to one interviews using the validated checklists were grouped as following:

- Absent: 0
- Inadequate: 1 (Less than half of those who need this service or item receive it when needed)
- Partly adequate: 2 (Most, but not all, of those who need this service or item receive it when needed)
- Adequate: 3 (Virtually all of those who need this service or item receive it when needed) [7].

Result

Human resource

The hospital had consultants in emergency medicine and critical care, neurosurgeon, orthopedician and plastic and reconstructive surgeon. But the general surgeon was assigned from St Paul for monthly rotation for day time and the night they were on call. In addition, to the consultants, there were residents, interns available 24/7. Other staffs like nurses, lab technician, radiographer, social work, physiotherapist were available.

In the emergency room there was dedicated team assigned and lead by emergency medicine and critical care specialist. The other department consultants work with consultation from emergency department.

Training

There were no standardized training like ATLS given to the staff but there were training on emergency trauma care for nurses and Physicians.

Physical resource

The emergency department had 3 sites based on triage scale Red area 5 beds, orange area with 8 beds and yellow and green area with 30 recliners. There was 11 bed for ICU. 125 functional inpatient ward for neurosurgery, orthopedics, general surgery, plastic and reconstructive surgery for burn, pediatric were available. 4 table for operation theater work 24/7.

Blood bank was available in the hospital, got blood from blood bank daily especially PRBC. FFP was available in the store but there was no storage for platelets.

Designation	Total hired	Currently available in the hospital
Emergency medicine and critical care specialist	11	6
General surgeon	3#	1#
Neurosurgeon	6	3
Orthopedician	8	4
Plastic and reconstructive surgeons	5	5
Anesthetist	15	13
Nurses in EM	106	83
Nurses in ICU	47	36
Other Nurses in Ward, OPD, OR	148	140
Lab technician	21	20
Radiographers	21	20
Physiotherapist	21	20
Social workers	5	4
Radiologist		1#

Table 1: *Man power availability in the house at AaBET Hospital, Ethiopia.*

#: One work in rotation from st paul.

Resources for acute resuscitation

Resources for resuscitation most of them were adequate. Intubations all were done by emergency medicine and critical care residents and consultants. Chest tube, blood transfusion capability, mechanical ventilator, Bag valve mask were partially adequate. Fluid warmer and lactic acid determination is not available (Table 2).

The ratings in the table are:

- 0 (Absent),
- 1 (Inadequate; fewer than half of those who need this service or item receive it when needed),
- 2 (Partly adequate; most but not all of those who need this service or item receive it when needed), and
- 3 (Adequate; virtually all of those who need this service or item receive it when needed).

Equipment	Availability
Airway	
Oral and nasal airway devices	2
Suction device	3
Yankauer or other stiff suction tip	3
Laryngoscope and Endotracheal tubes	2
Breathing	
Stethoscope	3
Oxygen supply	3
Chest tubes	2
Pulse oximetry	2
Arterial blood gas determinations	1
Bag-valve-mask	2
Mechanical ventilator	2
Circulation	
Blood pressure cuff	3
Crystalloid	3
Blood transfusion capability	2
Urinary catheter	3
Electronic cardiac monitoring	3
Hemoglobin determination	3
Electrolyte determination	3
Lactic acid determination	0
Fluid warmer	0

Table 2: *Resources for acute resuscitation at AaBET Hospital, Ethiopia.*

Resources for management of specific injuries

The hospital had adequate capability to manage head injuries except there is lack of bed to admit patients to ward or ICU. Sometimes patients were transferred back to emergency after operation. There was no modality for ICP monitoring. There was lack of auto transfusion from chest tubes and operative capability for advanced thoracotomy.

There was portable ultrasound in emergency room for performing FAST examination. No much practice on DPL. There were adequate operative capability for laparotomy but there surgeon will be called from St Paul or may require to transfer the patient to St Paul.

C collar were partially adequate for needed patient and there were inadequate resource for fixation of spine injuries.

Resources for management of burns, wounds like antibiotics, TAT and debridement were adequate (Table 3).

Rehabilitation facilities

There were physiotherapy for recovery of extremity in wards, ICU and also as an outpatient. But there was no speech therapy, EMG, and physical medicine and rehabilitation specialist level care. Prosthetics were available at St Paul. There were full capability about discharge planning for physiotherapy (Table 4).

Physical resources to manage specific injuries	Availability
Head	
Computerized axial tomography	3
Operative neurosurgical capabilities	3
Intracranial pressure monitoring	0
Full compliance with AANS guidelines for head injury	3
Operative capabilities for neck injuries	2
Chest	
Auto Infusion from chest tubes	0
Operative capabilities for intermediate Thoracotomy	1
Operative capabilities for advanced thoracotomy	0
Abdomen	
Contrast radiography for oesophageal injuries	2
Diagnostic peritoneal lavage	0
Ultrasound	3
Mobile Ultrasound	3
Operative capabilities for laparotomy	3
Extremity	
Spine board	3
Skeletal traction	3
External fixation	2
Internal fixation	2
X ray	3
Portable radiography	1 not functional
Image intensification limb prosthetics	0
Spine	
Immobilization: C collar, backboard	2
Operative capabilities for spine management	1
Computerised axial Tomography scan (CT)	3
Magnetic Resonance imaging (MRI)	0-available at St Paul
Burns and wounds	
Topical antibiotic dressings	3
Skin grafting	2
Escharotomy	2
Debridement of wounds	3
Tetanus prophylaxis (toxoid and antiserum)	3
Medications	2

Table 3: *Physical resources to manage specific injuries at AaBET Hospital, Ethiopia.*

Rehabilitation Facilities	Availability
Physiotherapy/occupational therapy for recovery of extremity injuries	2
Full spectrum of physiotherapy	2
Full spectrum of occupational therapy	0
Prosthetics	0* at St Paul
Psychological counselling	0
Neuropsychology for cognitive dysfunction	0
Speech therapy	0
Physical medicine and rehabilitation specialist-level care	0
Electromyography	0
Specialized rehabilitative nursing	0
Discharge planning	3

Table 4: *Rehabilitation Facilities at AaBET hospital, Ethiopia.*

Safety of health personnel

There were adequate gloves, sharp disposal and PEP for HIV. but gowns googles, biological waste disposal were partially adequate (Table 5).

Safety of Health Personnel	Availability
Training in universal precautions	3
Gloves	3
Goggles	2
Sharps disposal	3
Biological waste disposal	2
Gowns	2
Post-exposure prophylaxis for HIV	3

Table 5: *Safety of Health Personnel at AaBET hospital, Ethiopia.*

Pre-hospital services

Ambulances in the hospital were used to transfer patient from hospital to hospital.

The liaison office worked to link different hospitals to send and receive patients with communication. There was problem that most patients referred from different hospitals were without communication. This with the lack of bed in the hospital, patients stay long period in the emergency room.

Administration and injury surveillance

The hospital was lead by emergency physician and the medical director was a neurosurgeon.

The hospital recorded total number of patient total admissions, length of stay, surgeries and reported to patient flow and quality office (Table 6).

Administrative and organizational functions at hospital	Availability
Trauma-related quality improvement program	1
Trauma cases integrated into broader improvement programs	1
Trauma registry with severity adjustment	1
Trauma team with pre-assigned roles in acute resuscitations	2

Table 6: *Administrative and organizational functions at AaBET hospital, Ethiopia.*

Discussion

In Ethiopia like other low income countries trauma is one of the top killer especially the young generation who are economically active [9]. Road traffic accident is the leading cause of admission among trauma patient in Ethiopia where the pooled prevalence was 31.5% [10]. Different studies indicate better and organized trauma system is required to decrease trauma related mortality and morbidity.

AaBET hospital is the first in its kind in the country dedicated for Emergency and trauma care. Assessing this hospital status for trauma care will give administrative stakeholders to focus on the areas which require improvement. To our Knowledge this is the first study to assess trauma care service at specialized center using WHO guideline for essential trauma care in Ethiopia. In the hospital there were strong team of specialists in different speciality but there were challenge to have a surgeon in the house since one surgeon should rotate from SPHMMC.

There were no organized training like ATLS because of the cost and non-availability in the country which is similar to other studies [11,12]. But there were different short-term courses given to the staff developed by Ministry of Health.

Weak communication between referring hospitals and lack of organized prehospital system were similar to other lower resource countries [13,14] and lack of enough bed for admit ion and prolonged length of stay in the emergency department were the huge challenge in the hospital.

Although there were no much problem equipment problem in the hospital, the materials available were not proportional to the number of patients like airway equipments, chest tubes mechanical ventilators. The were lack of lactic acid determination, fluid warmer, ICP monitoring and MRI (available at SPHMMC). The hospital provided emergency and critical care, neurosurgical, orthopedic, general surgery, plastic and reconstructive surgery, physiotherapy services for trauma patients.

The hospital used paper based data recording and reports were collected at the office of patient flow and quality directorate. Lack of the digital system and financial resource were the challenge to have electronic data system [15,16].

Even though this study was limited to one hospital, it provides an insight how the resource and capability of this hospital. There is a need to strength prehospital and intrahospital care in organized and systematic fashion in the country to save more life's.

Conclusion

In conclusion, this study showed better human resource and infrastructure which were still not proportional to the number of patient with trauma. In addition the study revealed lack of communication from prehospital care, lack of sustainable trauma registry and trauma quality improvement project in the hospital

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