

One year retrospective review of disease patterns and clinical outcomes of patients admitted in intensive care units of Armed Force General Teaching Hospital in Addis Ababa, Ethiopia.

Researcher: SAMUEL HAILE(em&cc msc)

Advisor: Dr. ASSEFU W/TSAKIK (MD) ANAESTHESIOLOGIST

Mr. HAYMANOTE GEREMEW (msc), lecturer

Department: Emergency Medicine

**ADDIS ABABA UNIVERSITY SCHOOL OF HEALTH
SCIENCE DEPARTMENT OF EMERGENCY MEDICINE**

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January 1, 2013 upto December 30, 2014 in intensive care units of
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Abstract

Background

The intensive care unit (ICU) is a health care delivery service for patients who are very sick with potentially recoverable diseases. They can benefit from more detailed observation, monitoring and treatment than is generally available in the standard lying-in ward or department.

Objective: To assess disease pattern and outcome of admissions into the ICU of Armed Force Teaching Hospital, Addis Ababa, Ethiopia.

Methods

A one-year retrospective study will be conducted from January 1, 2013 to December 30, 2014. The study will be carried out in February 2015 consisted of looking at the master registry and daily records of patients admitted in the intensive care unit of Armed Force General Teaching Hospital. The case report will also be examined. A record of the patients demographic characteristics, duration of stay in the ICU, and pattern of morbidity and mortality will be made. The data will be presented as frequency (%) or mean and histograms. Categorical data will be analysed using the chi square test where appropriate.

Result

During the study period 280 patients were admitted to ICU. Male patients comprised the majority of the study population. Male to female ratio of 3: 1 the mean age of the study population was 30 years with interquartile range of 21-35 years.

Discussion

In this study disease characteristics and mortality rate of patients admitted in ICU of AFGH hospital shows TBI had the major admission accounts for 25(8.9%), the second most admission is DKA, 18(6.3%) from these patients transferred to ward is 16(88.9%), and, the third commonest admission is MI 17(6.1%).

Conclusion and Recommendation

In this study TBI was the most frequent admission diagnosis for all age groups accounting for 25(8.9%), followed by DKA which is responsible for 12(12.9%) admissions and concerning the outcome of the patient admitted to ICU death accounts for 82(29.3%).

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ABBREVIATIONS

AFGH-armed force general hospital.

CVP-Centralvenous pressure.

CVC- Central venous catheters

CDC- Centre for Disease Control

ECG- Electrocardiography.

ICU- Intensive Care Unit.

IDC- international disease classification

PICU- Paediatric Intensive Care Unit

SICU- Surgical Intensive Care Unit

SSI- Surgical site infection

TBI-traumatic brain injury

WHO-World Health Organization

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Chapter I: INTRODUCTION

1.1. Background

The modern concept of intensive care is said to have been pioneered by an anaesthesiologist in Denmark over half a century ago during the polio pandemic (1). Since then, intensive care units (ICUs) have significantly improved the quality of care and outcomes of critically ill and injured patients, predominantly in high resource settings (2, 3, 4).

The main purpose of the ICU is to prevent mortality by intensively monitoring and treating critically ill patients who are considered at high risk of mortality. This, however, comes at a huge cost to all the parties involved: the hospital, the personnel, and the care givers of patients (5). It is usually only offered to patients whose condition is potentially reversible and who have a good chance of surviving with intensive care support. Since these patients are critically ill, the outcome of intervention is sometimes difficult to predict. In critical care medicine, intensive care unit (ICU) results can be assessed on the basis of outcomes such as “death” or “survival” by means of indicators such as mortality rates. Evaluation of the outcomes of medical interventions can assess the efficacy of treatment, making it possible to take better decisions, to further improve quality of care, to standardize conduct, and to ensure effective management of the high-level resources needed to deliver intensive care services thereby optimizing resource utilization (6).

Although mortality in patients depends on many factors such as demographic and clinical characteristics of population, infrastructure and non-medical factors (management and organization), case mix, and admission practice, it is also affected by ICU performance (4).

The intensive care unit (ICU) is a health care delivery service for patients who are critical with potentially recoverable diseases. They can benefit from more detailed observation, monitoring, and treatment than is generally available in the standard lying-in ward or department (8).

In sub-Saharan Africa, ICUs have varying qualities and quantities of infrastructure necessary for the provision of proper critical care services (6,7). The reported disease characteristics and mortality rates of patients admitted to ICUs in sub-Saharan Africa vary widely from one

Population to another (11, 12, 13). In a study of severe head injury patients in the ICU of National Hospital Abuja in Nigeria, the mortality rate was 68.4%, (14) while in another study of neurological and obstetric patients, the mortality rates were 43.5% and 33% respectively (15,16). A similar study of critical care obstetric patients in Burkina Faso revealed mortality rate of 60%, (17) while the mortality rate in the general ICU population in Uganda was found to be 25% (18).

Ethiopia is a low-income country in East Africa with a population of 90 million people, is provided by numerous clinics in the country side, and hospitals located mostly in larger towns. The total number of hospitals in Addis Ababa city is 52 (health indicators, FMOH:EFY 2001) out of the total 52 hospitals about 10 of them public, the rest about 42 hospitals are run by private investors and non-profit organizations couldn't get any literature how many of them have ICU. These are public Access hospitals with government funding, and the with specialized ICU care for Patients with critical illness within the public system. In general, patients pay a standard fee scaled to income for hospital admission whether or not it also includes ICU admission; ability to pay is not a factor in deciding the ICU admission. A small number of private hospitals with Semi-tertiary capacity provide specialized ICU care; however these services are not freely accessible to the general public. Some hospitals have ICU services that operate with varying levels of equipment and staff.

The regional hospitals in the respective zones usually send their sickest patients to these referral hospitals for ICU and other specialized care. The disease patterns and clinical outcomes of the patients admitted in the ICU of AFGH are unknown. In this study the aim is to describe the disease patterns and clinical outcomes of patients admitted to the ICUs of AFGTH.

1.2 Statement of problem

Intensive care has become very important in the management of critically sick patient. ICU is a part of the hospital where critically ill patients who require advanced airway, respiratory, and hemodynamic supports are usually admitted with the aim of achieving an outcome better than if the patients were admitted into other parts of the hospital.

The main problem of the ICU department of AFGTH is the nurses will work by six month rotation and they are new to managing ICU patients so this will have influence and gap on the outcome of patient who admitted in intensive care unit so The intension of this study is,

1-There is no study done on patterns and outcome of ICU patients in AFGTH.

2-To study/identify the contributing factor for good or poor outcome of patients in the ICU.

1. 4. Significance of the study

These ICUs are dedicated patient care areas at AFGTH, specifically Free for Military Personnel and their family for caring critically ill patients and injured patients. They serve all medical, surgical and trauma patients of adult and paediatrics. This provides the higher referral service for patients coming from other Army referral hospitals and health centres. The importance of this study is

1/There is no data on disease patterns and clinical outcomes of the patients admitted in the ICU of AFGTH are could not come across study searching pub med and other web site and survey. Therefore the primary intent of this study will be to assess the morbidity pattern and outcome of admissions in the ICU of Armed Force Teaching Hospital, Addis Ababa, Ethiopia.

2/ the result used as base line to improve quality of service.

3/ based on the outcome to construct additional ICU in the hospital

CHAPTER TWO

Literature Review

Critical care medicine and critical care nursing involved in Scandinavia in the early 1950s to coordinate respirators and healthcare professionals with special skills in advanced life support.

The term intensive care unit was coined in the United States in 1958, in connection with the organisation of the first special care units. Initially the critical care was focused on problems of the heart and lungs and on life-support efforts for patients who other disciplines considered being “hopelessly ill patient” (19).

The development of new medical procedures, expensive technology, specialised clinical care, and pharmacological treatment of critical care patients over the years has allowed the survival

of more patients, with complex illnesses and extensive injuries. Precise definitions of “ICU patient” and “intensive care” are lacking, but,

intensive care is mainly a concept indicating a specific level of care. The patients in the ICU are seriously sick patients, are usually a heterogeneous group of patients, and have high morbidity. ICUs are organised in many different ways depending on the underlying patient groups and where they are located in hospital, source, intense, and labour demanding environment that consumes substantial hospital and social resources for a minority (19). The physician, anaesthetist assess provides care for critically ill patients pre and post-surgical patients and those needing airway management, special nutrition and therapy including the control of infection (20). The diagnosis and treatment of patients with acute life-threatening diseases with a purpose to restore them to their previous health and quality of life is the goal of the ICU (21).

Intensive care units (ICUs) in most of the developed world are high-technology facilities with the most (22) advanced medical technology, electronic monitoring, mechanical ventilation and other life-support measures, as well as up-to-date drugs and highly trained and skilled personnel. In the tropics, however, various levels of care for the critically ill have been described, and intensive care in the developing world has been defined as doing the best for the critically sick with the

resources available (23,24). Caring for the critically sick patient is a challenge in developing countries, where health needs often outstrip available resources (22,23) Necessary equipment is scarce and often malfunctions, (25,26) and trained manpower is limited. Intensive care in such settings is reduced to high dependency nursing care, (23) yet the patients are critically sick, need intensive care, and so cannot be turned away from the hospitals.

In sub-Saharan Africa the availability of intensive care unit (ICU) services is limited by a variety of factors, including lack of financial resources, lack of available technology and well-trained staff (27). Admission patterns and outcome in some ICUs in developing countries have been described previously, and all reports show evidence of the need for improvement in funding, manpower, training and equipment (28, 29, and 30).

In sub-Saharan Africa, ICUs have varying qualities and quantities of infrastructure necessary for the provision of proper critical care services (9, 10). The reported disease characteristics and mortality rates of patients admitted to ICUs in sub-Saharan Africa vary widely from one population to another (11, 12 and 13). In a study of severe head injury patients in the ICU of National Hospital Abuja in Nigeria, the mortality rate was 68.4%, (14) while in another study of neurological and obstetric patients, the mortality rates were 43.5% and 33% respectively (15, 16). A similar study of critical care obstetric patients in Burkina Faso revealed a mortality rate of 60%, (17), while the mortality rate in the general ICU population in Uganda was found to be 25% (18).

Traditionally the outcome after intensive care has focused largely on mortality (3). This may not be an adequate overall measure as the mortality rate for patients in the ICU depends on many of reasons including the underlying diagnostic category. The mortality increases during and after intensive care, but after two years it parallels that of the general population (5).

In Ethiopia previous study shows which is done at Black Lion Teaching Hospital in patterns of medical admission in to MICU from 1985-2000 acute infection and cardiovascular disease accounted for half of the entire critical care admission with infectious disease accounted for 30% among specific diagnoses diabetic ketoacidosis was the leading cause of admission followed by acute myocardial infection and severe and complicated malaria each accounting for (7, 8, 9, 10), and (9.3) of all admissions respectively.

Trends of admission over the sixteen year period showed steady increase in relative frequency of acute complication of non-communicable disease consisting of diabetes, acute myocardial infarction and stroke while infectious disease showed interspersed peak of admission conceding with epidemic.

The overall mortality of the medical ICU was 32%with proportionally more female death 34.8, severe and complicated malaria was the leading cause of death (10.3%) followed by tetanus (6.4%) the increase in relative and absolute frequency of acute complication of non-communicable disease most probably heralds on emerging epidemic of non-communicable disease related to life style change in the urban well to do in addition to existing problems of infectious disease of poverty.

CHAPTER THREE

Objective of the study

3.1 General Objective

To assess the morbidity pattern and outcome of admitted patients in the ICU of Armed Force Teaching Hospital, Addis Ababa, Ethiopia.

3.2 Specific Objectives

- 1-To describe the demographic characteristics of patients admitted in ICU at AFGTH.
- 2-To assess the disease pattern of ICU patients.
- 3-To assess outcome of patients admitted in ICU.

CHAPTER FOUR: METHODOLOGY

4.1. Study design and study period

A one year retrospective review of patients admitted to the ICU was reviewed from January 1 2013 to December 31 2014.

4.2. Study area

The study was conducted at ICU, AFGTH, and Addis Ababa, Ethiopia. AFGTH is one of the biggest Military hospitals in the country; it has 545 beds and is located at the centre of the Addis Ababa city in Lideta Sub city. The hospital receives referred patients from all military hospitals and health centres and provides local emergency service.

4.3. Study variables

4.3.1 Dependent variables: - Disease patterns and Outcome of patients.

4.3.2 Independent variables: age, sex, ethnicity, religion, ICU characteristics and length of stay.

4.4. Source of Population

All admissions to the ICU in the study period were included.

4.5. Selection and evaluation of study subjects

A Selection and Evaluation Method was a case-series study of all admissions using patient registers book.

4.6. Sample size determination

One year data (January 1, 2013 to December 31, 2014) from the admission and discharge registration book

4.7. Inclusion and Exclusion Criteria

4.7.1. Inclusion criteria

Patients who admitted in the ICU eligible and included in this study.

4.7.2. Exclusion criteria:

Paediatric patient excluded from the study.

4.8. Data Collection and processing

Data on socio-demographic variables, diagnosis during admission, and outcome of patients collected from patients registration book admitted to the ICU.

Study data, including basic demographics and primary diagnoses, is transferred from the handwritten data into an Excel spreadsheet (Microsoft Corporation) and then manually coded.

4.9. Data entry and analysis

Data entry and analysis done by using EPI info version 6 for data entry and SPSS version computer 17.0 software for data analysis. The data is double checked and cleaning will be done. Procedure, frequency, and univariate functions will be performed to check for any outliers and to clean the dataset. The descriptive statistics including the total number of patients admitted to ICU, gender distribution, age groups, ethnicity and religion is calculated. Trained Nurses will be review, attendance registers, and nurses' report books. Separate information obtained on the basic characteristics of the ICUs, including human resources and available medical equipment. The information recorded on a structured questionnaire that developed by the investigator based on the elements intended to study.

Additional study data included: 1) the frequencies and average length of ICU stay for each IDC diagnosis category; 2) the rates and causes of ICU deaths; and 3) the in-ICU mortality rates for each diagnoses. The generated data compiled by frequency table, charts and graphs.

4.10. Ethical consideration

Ethical consideration

Permission to carry out the study was obtained from the institutional review board of Addise Ababa university collage of health science, school of medicine, department of emergency medicine. And the research title evaluated and approved by the research department board of ARMED FORCE GENERAL TEACHING HOSPITAL. To ensure confidentiality name and any other personal identities were not used during data collection.

Dissemination of the result

The study result was presented to Addise Ababa university faculty of medicine, department of emergency medicine and document was disseminated to all responsible bodies in the study ar

Operational Definitions

Intensive care unit is a health care delivery service for patients who are very sick with potentially recoverable diseases.

Outcome is something that happens as a result of an activity or process.

Admission is the right or permission to enter a place.

ICU Mortality is calculated as the number of deaths of patients given a particular diagnoses divided by the total number of patients with that diagnosis.

Disease pattern is concerned with the study of factor determining and influencing the frequency and distribution of disease, injury and other health related events and their cause in a defined humane population, also the sum of knowledge gained in such study.

CHAPTER FIVE

ICU patient demographic

During the study period 280 patients were admitted to ICU. Male patient comprised the majority of the study population. Male to female ratio of 3: 1 the mean age of the study population was 30 years with interquartile range of 21-35 years as shown in table 2

Table 1: Socio-demographic characteristics of patients admitted at the ICU in Armed Force Teaching Hospital, Addis Ababa, Ethiopia (January 2013 - December 2014).

Socio demographic variables	Female		Male		Total
	No	%	No	%	
Age Group (years)					
15-19	13	4.6%	50	17.8%	22%
20-29	14	5%	56	20%	25%
30-39	20	7.1%	46	16.4%	24%
40-49	13	4.6%	29	10.4%	15%
>50	9	3.2%	30	10.7%	14%
Total	69		211		
Ethnicity					
Amhara	38	13.5%	94	33.5%	47%
Oromo	16	5.7%	47	16.7%	22%
Tigray	13	4.6%	35	12.5%	17.1%
Gurage	1	0.5%	6	2.1%	3%
Somali	2	0.7%	6	2.1%	2.8%
Welayeta	0	0%	6	2.1%	2.1%
Others	1	0.5%	15	5.3%	6%
Total	71		209		100%
Religion					
Orthodox	50	17.9%	126	45%	63%
Muslim	8	2.9%	33	11.8%	14.7%
Protestant	12	4.3%	39	14%	18%
Catholic	0	0%	7	2.5%	2.5%
Others	0	0%	5	1.8%	1.8%
Total	70		210		100%

Top ICU diagnosis and disease categories by age group

TBI was the most frequent admission diagnosis for all age group accounting for 25 (26.9%), followed by DKA which is responsible for 12 (12.9%) admissions and CLD and bronchial asthma had the lowest ICU admission.

Non communicable disease categories (trauma, DKA, MI, CHF, CLD, HTN) accounted major admission. as shown below on table 3

Table 2: Top 10 ICU diagnoses by age group admitted at the ICU in Armed Force Teaching Hospital, Addis Ababa, Ethiopia (January 2013 - December 2014).

IDC Category	Male		Female		Average Length of ICU stay in day	Recovered		Deaths in ICU		Total
	No	%	No	%		No	%	No	%	
TBI	25	8.9%	-	0%	6.28	18	72%	7	28%	100%
DKA	12	4.2%	6	2.1%	3.33	16	88.9%	2	11.1%	100%
MI	15	5.4%	2	0.7%	4.12	15	88.2%	2	11.8%	100%
CHF	9	3.2%	4	1.4%	3.77	5	38.5%	8	61.5%	100%
HTN	5	1.9%	3	1.1%	3.00	5	62.5%	3	37.5%	100%
SBO	6	2.1%	2	0.7%	8.63	3	37.5%	5	62.5%	100%
Diabetic	7	2.5%	1	0.4%	3.00	7	87.5%	1	12.5%	100%
Stroke	6	2.1%	1	0.4%	5.86	5	71.5%	2	28.5%	100%
CLD	4	1.4%	3	1.1%	3.00	1	14.3%	6	85.7%	100%
B.asthma	4	1.4%	2	0.7%	3.33	4	66.7%	2	33.3%	100%

Clinical outcome of patient admitted in ICU

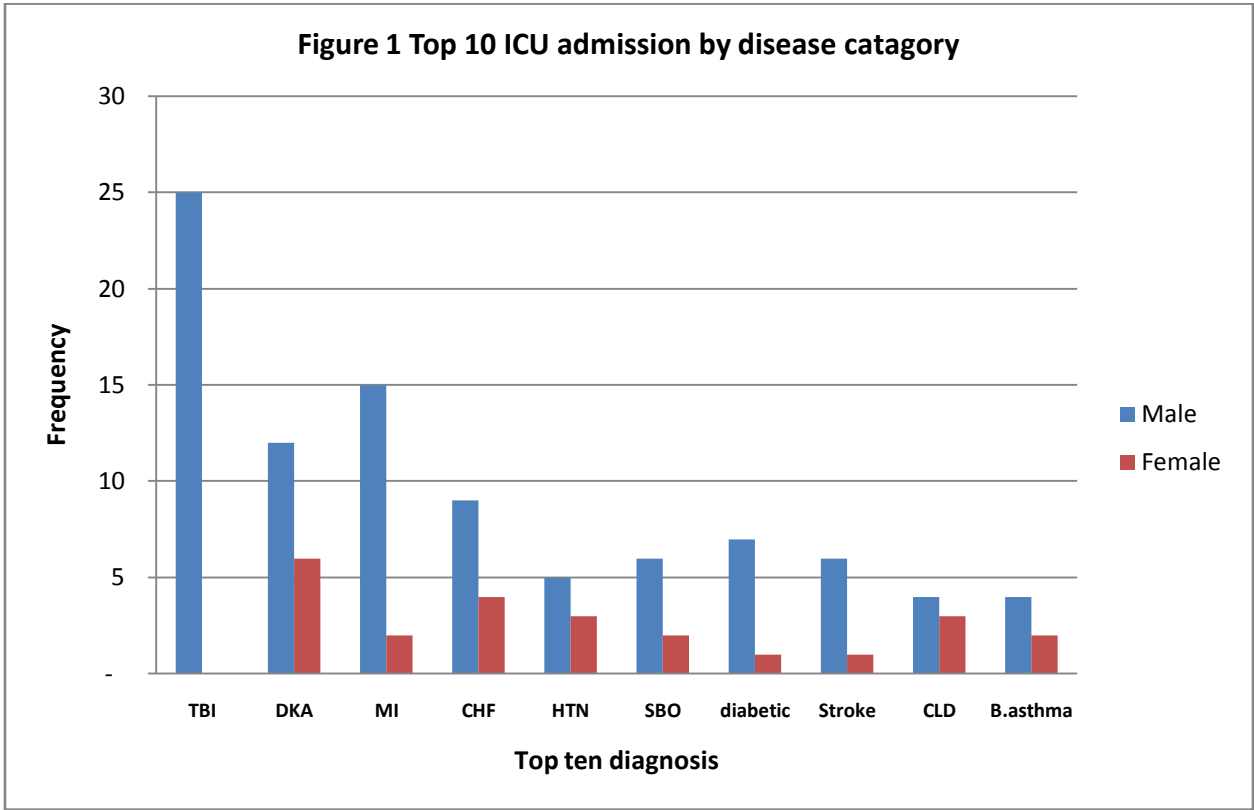
During the study period 280pt were admitted in ICU,from these patient 194(69.3%) patients transferred to ward, and the mortality rate is, 82(29.3%) as shown table, the main cause of death is CHF,TBI,andCLD,HTN and CLD as shown in table 5, and the outcome not indicated or unknown are included below in table4.

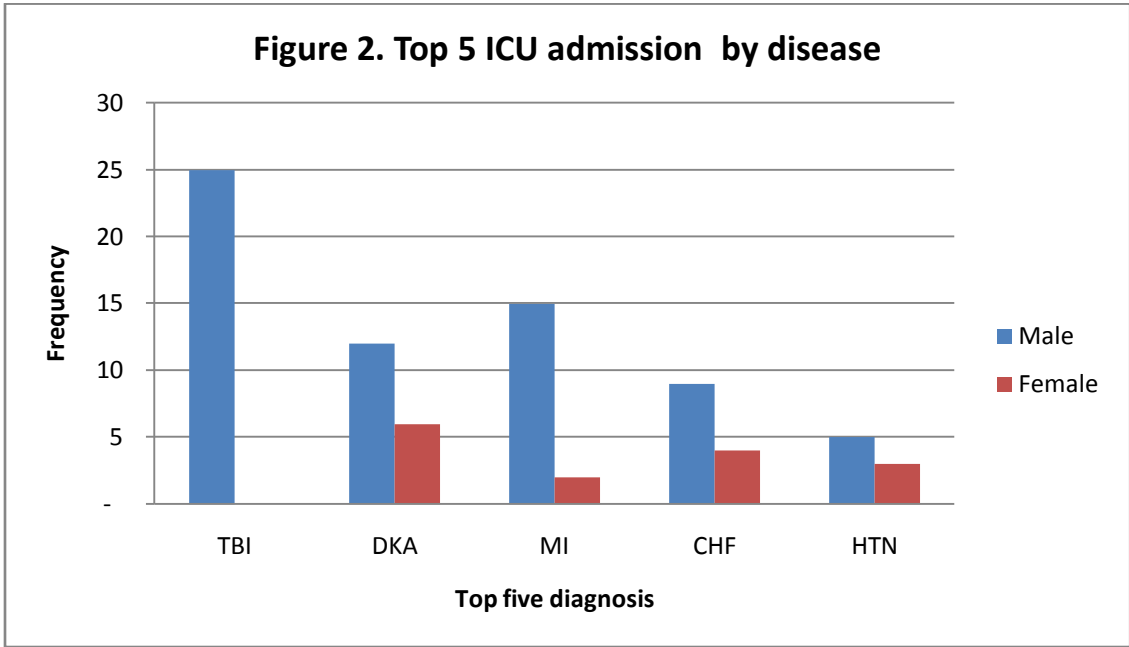
Table 3.Clinicaloutcome of admitted patients in-ICU at Armed Force Teaching Hospital, Addis Ababa, Ethiopia(January 2013 - December 2014).

Outcome	Number of patients		Total no of admission	%
	Male	Female		
Transferred to ward	152	42	194	69.3%
Death	54	28	82	29.3%
Out come not indicated	3	1	4	1.4
Total	209	71	280	100%

Table 4 Main Cause of Death

Diagnosis	Total No of admission	No death	Total in %
CLD	7	6	85.7%
SBO	8	5	62.5%
CHF	13	8	61.5%
HTN	8	3	37.5%
SEVERE ASTHMA	4	2	33.3%





CHAPTER SIX

DISCUSSION

AFGH has generally 540 beds and 10 ICU beds; the ratio of ICU beds to hospital beds 1:54 this ratio is below internationally recommended standard, and the hospital has two mechanical ventilators, four cardiac monitors, one portable ultrasound, and one infusion pump, and the ICU has no ABG analysis, capnographic, CVP monitoring capacity. This shows that AFGH has significant lack of necessary resources and infrastructure for the provision of high quality intensive care to critically sick patients. AFGH ICU staffing has 4 internists (they are working by 2 months), 3 surgeons, 1 anesthesiologist, 12 ordinary nurses and one trained master emergency medicine and critical care specialist. Similar to the published literature on the state of ICU in other developing countries (33, 34, 40-43) I found that none of the ICUs component reviewed meets the minimum standard of basic requirements of the intensive care unit, as per multinational consensus or professional bodies recommendation (32, 44).

In this study disease characteristics and mortality rate of patients admitted in ICU of AFGH hospital shows TBI had the major admission accounts for 25 (8.9%), the second most admission is DKA, 18 (6.3%) from these patients transferred to ward is 16 (88.9%), and, the third commonest admission is MI 17 (6.1%), and). From the top ten ICU diagnosis high mortality rate accounts by CLD, which had (85.7%), next high mortality rate recorded by SBO which had (62.5%), the third high mortality rate accounts (61.5%) by CHF. The fourth HTN which is 37.5%, and the fifth high mortality rate recorded by severe asthma by 33.3%.

In sub-Saharan Africa, ICUs have varying qualities and quantities of infrastructure necessary for the provision of proper critical care services (9, 10). The reported disease characteristics and mortality rates of patients admitted to ICUs in sub-Saharan Africa vary widely from one population to another (11, 12, 13). In a study of severe head injury patients in the ICU of National Hospital Abuja in Nigeria, the mortality rate was 68.4% (14) while in another study of neurological and obstetric patients, the mortality rates were 43.5% and 33% respectively (15, 16). A similar study of critical care obstetric patients in Burkina Faso revealed mortality rate of 60% (17), while the mortality rate in the general ICU population in Uganda was found to be 25% (18). The regional practice of restricting admission of potentially infectious patients to ICU unit may have also resulted in the triage of even critically ill patients with communicable disease to lower levels of care inflating the proportion of non-communicable disease in the ICU, for

example all of the ICU in Tanzania place some limit on admission of patients with TB, HIV, hepatitis C, regardless of acuity.

The patient population in some studies shows younger is compared with patient admitted to ICU, in most developed world (28,29) a similar demographic finding to other studies of ICU in sub-Saharan Africa which have reported predominately young age ICU population (34,45,30,31). The overall young population and male predominance in this study, may in some extent reflect traumatic brain injury long shown to have a working age more predominance. Other disease also affects medium age, however I did not address admission decisions making in this study.

Non communicable disease accounted for most of ICU admission, with trauma alone consuming over 20% highlighting the growing burden of the non-communicable disease with sub-Saharan Africa as shown in other studies (35,36)

Intracranial injury was the most common reason for ICU admission adult, and overall population and carried a substantial in ICU mortality, similar to finding in previous studies in other developing country (30, 37, 38), among the top ten ICU diagnosis patient with non TB pneumonia had the highest in ICU mortality, potentially because these were HIV/AIDS, PCP known to carry a high in ICU mortality, even in area of high facility (39).

CHAPTER SEVEN

7.1 CONCLUSION & RECOMMENDATION

In this study TBI was the most frequent admission diagnosis for all age group accounting for 25(8.9%), followed by DKA which is responsible for 12(12.9%) admissions and concerning the outcome of the patient admitted to ICU death accounts for 82(29.3%), this shows high mortality rate, so this can be due to severely limited infrastructure, personnel, and resource, make it difficult or impossible to provide optimum care to critically ill patient and likely to contributing to the dauntingly high mortality rate so the concerned bodies must give special attention to solve the problem.

7.2 limitations of the study

The limitations of this study include the retrospective design relative paucity of the clinical data available in the patient registration book. The available data only supported categorization of patient by primary diagnosis and the specific means by which the clinical arrived to these diagnoses is unclear and also the lack of referral data on patient admitted to the ICU limit the study.

Appendix.I

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Appendix II

Questionnaire

The purpose of this questionnaire is to study the demography, ICU characteristics and disease patterns and outcomes in patients who are admitted to intensive care unit (ICU) of Armed Force Teaching Hospital, Addis Ababa, Ethiopia. The responses will not be used for other purposes than research. So you are kindly requested to give your responses honestly.

Adata collection form for January 2013 to December 2014.

Part one socio demographi characterstics			
NO	QUESTION	CODE	REMARCK
001	Age in years	-----years	
002	Gender	1-male 2-Female	
003	Unit	1-urbane 2-Rural	
004	Marital status	1-Naver married 2-maried 3-divorced 4-seprated	
Part two Base line information			
050	Date of admission in ICU	----//----//---(DD/MM/YY)	
051	Date of transfer	----//----//---(DD/MM/YY)	
052	Source of refeal	1-self 2-health center 3-private 4-athers	
053	ICU admission	1-first admission 2-second admission 3-unknown	
Part three information during admission			
0200	Diagnosis during admission	Specify	
0201	Clinical out come	1-transfer 2-died 3-transferto another hospital 4-no record	