ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE

RESEARCH ON

Pattern and outcome of Adult medical Emergency Department Admissions at Yekatit12 Hospital, Addis Ababa

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN EMERGENCY MEDICINE AND CRITICAL CARE NURSING

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Abstract

Background Informationon pattern and outcome of adult medical ED admissions is scarce in Ethiopia.

Objective The main objective of this study wasto assess the patterns and outcomes of adult emergency medical admissions to ED of Yekatit 12 Hospital**.**

Methodology The study design was retrospective cross sectionalstudy of all adult medical emergency patients admitted to ED from September 2013 to Auguest 2014 at Yekatit 12 hospital, Addis Ababa.

Results: There were a total of 711 adult medical ED admissions. The average adult medical ED admission per month was 64. The majority of adult medical ED admissions were due to non-infectious diseases (53.6%, N= 381) whereas infectious diseases accounted for over one-third. The leading causes of adult medical ED admissions were DKA, Pneumonia, AGE with hypovolemic states, CHF and acute asthmatic exacerbations. The crude death rate in the adult medical ED is 3.9% and the mean length of stay is 2 days.

Conclusions: The pattern of adult medical ED admission in Yekatit 12 hospital is variable. Higher proportion of admissions was due to NCDs. Diabetic Ketoacidosis, Pneumonias, AGEs with hypovolemic states, cardiovascular emergencies and acute asthmatic attacks are also among the leading causes. There is a need for action to improve the readiness of the health care to respond to these prevailing medical emergencies. Medical ED outcome was found to be affected by certain demographic and clinical characteristics of patients. Medical ED mortality was low in the study setting.

Key words Pattern, Outcome , Adult Medical Emergencies and Emergency Departement

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List of abrevations

AGE-------Acute GasteroEnteritis

CCU ----Critical Care Unit

CHF------Congestive Heart Failure

DAMA-----Discharge Againist Medical Advice

DKA--------Diabetic Ketoacidosis

ED----------Emergency Departement

ENT---------- Ear Nose Throat

GI----------Gastro Intestinal

GYN------- Gynacology

ICU----------Intencive Care Unit

IRB---------Inistiutiotional Review Board

NCD--------Non Comunicable Disease

OBS-------Obstetrics

OPD-------- Out Patient Departement

RTA-------Road Traffic Accident

TO--------Transfer Out

1. INTRODUCTION

"Medical Emergency" is defined as a situation when the patient requires urgent medical care to prevent loss of life or limb and initiate action for the restoration of normal healthy life (1).

An emergency medicine department is well recognized and all hospitals must be able to provide basic and advanced life support through their emergency services to the patients in need. With emergency department admissions accounting for about 40% of all hospital admissions in most countries, managing and improving processes in the Emergency Medical Departementis crucial to both care quality and operational profitability(1).

In many hospitals and health facilities, the emergency department is most often the gateway for many patients. The patterns of medical conditions for which patients visit the emergency rooms and/or departments often reflect the magnitude of different health problems in the society. The awareness and knowledge of the spectrum of medical conditions at the emergency room will also help in healthcare planning and provision of essential health services in the department such as equipment, hospital space and other needs both by the patients and health care providers.(2)

The pattern of medical admissions varies amongst different regions of the world and this depends on many factors including the prevalent medical diseases in the region. In the past, communicable diseases accounted for most of the morbidity and mortality among medical admissions across Africa.

This depend on their traditional life style including dietary habit , poor hygiene and lifestyle. Currently a global trend towards non-communicable diseases has been documented in various studies. Non-communicable diseases include hypertension, diabetes mellitus, malignancies, cerebrovascular diseases, coronary heart disease, congestive heart failure, and chronic kidney disease.(3)

Published data done in England including the National Confidential Enquiry into Patient Outcome and Death reports suggests that delays in review of patients and in obtaining senior opinion can contribute to avoidable deaths. This would suggest that medical patterns of work should be designed to improve outcomes. The data also suggests that patientswho are admitted to hospital either at weekends as an emergency or out of routine working hours have a higher mortality .Previous small studies done in England suggest that patterns of care delivery with greater Consultant involvement may be associated with better outcomes(4)

It is important to understand that bed availability affects Emergency Departement length of stay and patient disposition. Information regarding this relationship could help develop strategies to reduce Emergency Departement overcrowding. Also, if patient disposition varied with hospital occupancy, then there would be clear evidence that hospital overcrowding could lead to reduced quality of Emergency Departement care.(5)

Common denominators of any successful emergency care are; availability of adequate physical facilities, equipment and supply of all life saving drugs and surgical items, immediate professional attention after arrival in the hospital ED (emergency department), continued medical support till the patient is in the Emergency Departement, speedy diagnosis and resuscitation so as to make it possible for integrating a patient into an existing system of patient care services in the institution, lists of policy, procedure and protocols should be in practice for the management of every emergency situation in relation to treatment, imaging technique, laboratories services, blood transfusion, customer services, code and disaster management and others are also important(1).

1.2.Rationale for the study/ statement of the problem

Emergency medical care in Ethiopia is at its early age of development and information on the patterns of emergency medical admissions to Emergency Departments (ED) in Ethiopian hospital setting is scarce. Understanding of the patterns of emergency medical admissions in the hospital EDs however is essential for better planning of resources required to better respond to the more prevalent emergency medical conditions presenting to the EDs among the population being served by the hospitals.

Evaluation of Emergency Departement medical admissions and its outcome is required to indicate the level of quality of medical care given. This study, aimed at determining the the pattern and outcomes of adult medical Emergency Departement admissions in a referral hospital in Addis Ababa will shed light on the patterns and outcome of adult medical Emergency Departement admissions. Information generated through this evaluation will be used to improve the human resource

planning, Emergency Departement medical service arrangement and readiness. The gaps between the Emergency Departement patient need and medical care services was also identified in this study.

Identification of the critical determinants of adult ED admissions and their outcomes is essential to further enhance the service quality standards in the adult ED. The output of this study was used by hospital managers, ED staffs and policy makers to focus on the most at

risk population groups or on most common causes of adult medical ED admissions for planning and ED services

2.LITERATURE REVIEW

2.1 Patterns of Emergency Admissions

A number of studies have confirmed that there has been a steady increase in the absolute number of acute medical admissions as well as the hospital admission rate for defined populations over the last decade.The increase in the number, and rate, of admissions is particularly pronounced for acute (or emergency) medical admissions and is less apparent with acute surgical admissions or arranged/ waiting list admissions. The increase in emergency medical admissions has been consistently found in studies based in a number of countries (UK, Australia and New Zealand) as well as reviews undertaken at both regional and local hospital levels.(6)

In the UK, Kendrick (1996) has also identified that most of the rise in acute medical admissions is in relation to higher hospitalization rates for elderly people with cardiac or respiratory conditions. The analysis by the Kings Fund/NHS Trust Federation examined the changes in the number of admissions in six NHS hospitals in the UK . The report also concluded that an increase in hospitalizations in relation to respiratory or cardiac conditions was primarily responsible for the increase in the number of admissions in the UK.(6)

Acute admissions comprise 60% of all medical admissions in New Zealand.Most of the increase in acute admissions is primarily related to an increase in medical admissions among the elderly, and primarily for cardiac or respiratory conditions.Probable reasons for the increase in acute admissions include: demographic changes, increased numbers in ethnic minority groups, reduced socio-economic status of the population, increased smoking and alcohol consumption, changing societal patterns of care, economic incentives for health care organizations, iatrogenic causes and artefactual explanations.Possible causes of the increase in acute medical admissions

include: more available hospital beds,increased numbers of readmissions, increasing distance for patients to the nearest hospital associated with the closure of some hospitals, changes in the prevalence of illness, increased expectations ofpatients. (6)

The health of adults in sub-Saharan Africa (sSA) is becoming an increasingly important priority in global health policy. Recent studies show that levels of adult mortality (i.e. death between the ages of 15 and 60) are 4_40 times higher in SSA than in developed countries. The pattern of illnesses responsible for the high mortality among adults in sSA has not been well characterized. The World Health Organization (WHO) predicts that by 2020, the causes of disease and death in SSA will have undergone a significant shift towards endemic non-communicable diseases and away from infectious diseases. This shift will necessitate changes in the deployment of resources, both human and physical, to deal with new health challenges.(7)

A study from Nigeria that included 2377 patients has revealed that the highest proportion of admissions was in the 30-39 years age group (17.6%), followed by 40-49 years (17.0%) and 20-29 (16.7%) age groups.Based on specialty, the distribution of all admitted patients Infectious diseases accounted for the highest incidence of admissions (1132; 47.6%). This was followed by diseases of the cardiovascular system (414; 17.4%), central nervous (227; 9.5%) and endocrine (193; 8.1%) systems, respectively. The least proportion of admissions was accounted for by dermatological conditions (4; 0.2%).(2)

Another study conducted at University of Harcourt teaching Hospital, Nigeria that assessed the profile and outcome of medical emergencies among 7246 patient presented to emergency room has shown that 1256 (17.3%)) had medical emergencies. This indicates that medical emergencies account for a significant proportion of all emergencies.Infectious diseases accounted for 274(21.8%) of emergencies while non communicable diseases in the

cardiovascular 195(15.5%), renal 105(8.4%), neurological 224(17.8%), endocrine 163(13.0%), and gastrointestinal (hepatobiliary)163(13.0%) systems were the other prevalent emergencies .(8)

There is a study done in Ethiopia on quality of emergency care at Gonder University Referral Hospital.This study assessed the disease profile, level of patient satisfaction and determinants of quality emergency care. With a growing focus on disease control with emergency care and non-communicable diseases, medical emergency care is becoming a medical specialty in many developed countries while managed sporadically in the developing countries. The major reasons for emergency OPD visits are gastroenteritis/diarrhea, lower respiratory infections, malaria, ischemic heart disease, septicemia, and injuries. Public violence among men and domestic violence to women that are commonly seen in young people are also important causes of emergency department visits .(9)

Currently in Ethiopia, cardiovascular admissions- notably due to ischemic heart disease- have risen in the last two decades and it is reported that there are no referral facilities with in 100 km . Persons who experience pain and other symptoms as life threatening, men and older patients, persons who are triaged for the more advanced illnesses, those nearer to the hospital, patients with psychiatric disorders,and asthmatics visit emergency clinics more frequently than the normal population. In some cases, patients report more often at the beginning of the week than on the weekends .(9)

Perceived urgency of disease, a younger population, females, non-attended patients during the daytime, a longer duration of the illness, and non-traumatic injuries are the group of patients who visit the emergencyOPD for a non-urgent care.The most common diagnosis in the emergency OPD was injury seen in 140 (14.5%), 95%CI: 12.4%-16.8%, patients. Gastrointestinal disorders took the next greater share with 126 (13.1%), 95%CI: 10.9%-15.5%, patients followed by respiratory diseases 115 (11.9%), 95%CI: 9.4%-14.6%, and obstetric/gynecologic emergencies (11.0%), 95%CI: 8.9%-13%. Cardiovascular problems were also significant and were observed in 55 (5.7%) of the patients. Cancers of any form were also observed in 39 (4%) of the patients .(9)

At the time of arrival at the emergency OPD, 422(43.8%), 95%CI: 40.6%-46.8%, patients were very sick or in critical condition while a similar proportion, 416 (43.2%), 95%CI: 40.1%-46.2%, were moderately sick. A total of 125 (13.0%), 95%CI: 10.7%-15.2%, of the patients were in good condition. Five hundred eight (52.8%) patients were managed in the emergency unit while the rest were either admitted, 452 (46.9%) to the respective wards or referred, 3(0.3%) to another facility. The patient's stays in the emergency department ranged from 1-2 hours (29.3%), 95%CI:25.2%-33.7%, to as long as 24 hours or more (17.5%) 95%CI: 13.8%- 21.1%. The mean duration ofthe stay in the emergency department was 16.9 hours.(9)

2.2 Outcomes of emergencymedicaladmissions

In one of the objectives of the World Health Organization (WHO), pattern of death statistics is important scientific information that should be available for constant evaluation of available health services as an integral part of the managerial process in health care delivery. The health system of a country needs to be adjusted to patterns of morbidity and mortality to mitigate the income-erosion consequences of prolonged ill-health and premature death of adults.(10)

From a study done in Nigeria tertiary health center the total number of patients attendance in Accident and Emergency department for 2years (2011-2012) was 3,162, consisting of 1959 (62.0%) males and 1203 (38.0%) females with a male to female ratio 1:6:1. There was a higher Accident and Emergency attendance of males compared to females. Total death recorded over the period was 122 with a crude mortality rate of 3.9% age ranged 15-87years with mean of 52.04 + 18.7years. Male deaths were 76 (62.0%) age ranged 15 to 87years with mean of 51.9 + 19.9years. The female deaths were 46 (38%) age ranged 18 to 80years with means of 52.3 + 16.7years. The male to female death ratio was 1:7:1 and there was no statistical significant difference between the mean age for deaths in both genders (P-value = 0.92). The crude mortality rate for male and female were 3.9% and 3.8% respectively. Majority of deaths occurred below 65years of age with equal but higher number of deaths occurring in the young and middle age, each recorded 43 (35.2%) totalling 87 (70.4%). Medical causes of death with 92 (75.4%) were predominant when compared to surgical causes of death with 30 (24.6%) stroke with 16 (13.1%) deaths and road traffic accident (RTA) equally 16 (13%) deaths were the highest clinical causes of deaths. Deaths from non communicable disease with 98 (80.3%) are far more than deaths from communicable disease with 24 (19.7%).(10)

There is also another study done at Nigeria, out of 1256 medical emergencies attending the University of Port Harcourt Teaching hospital (UPTH) Port Horcourt, the crude mortality rate was 127death (10.2%). The majority contributors to mortality were HIV_AIDS related infectious disease 22.4%, hypertension related heart disease 18.4%, and stroke 15.7%. Other contributors to mortality were renal failure 8.8%, chronic liver disease 12.8% and hematologic malignancies 9.6%. (8)

3.OBJECTIVES

3.1. General Objective

The main objective of this study was to assess the patterns and outcomes of adult emergency medical admissions to Emergency Departement of Yekatit 12 Hospital, Addis Ababa.

3.2. Specific objectives

1. To determine patternof adult medical emergency admissions to Emergency Departement of the hospital
2. To assess outcomes of emergency medical admissionsto Emergency Departement of the hospital
3. To assess the length of stay in adult emergency medical admissionsto Emergency Departement of the hospital
4. To asses the socio-demographic determinants(age,sex,recidence) of the outcome of emergency medical admissions to ED.

4. METHODS

4.1Study Setting

The study setting wasYekatit 12 hospital, a general referral hospital in Addis Ababa. The catchement population is 1.5 million. The hospital has total of 3 ED rooms with 22 beds. The hospital is currently staffed with 30 specialists,52GPs 280 nursing staffs, 33 Laboratory staffs, 8radiographers, 13pharmacy staffs. Annual outpatient load of the hospital is 262,080 and 4,320 admissions per year.

The hospital has separate ED for adults, pediatric and Gyn-Obstetrics. The adult medical ED is collocated with adult surgical ED.

4.2 Study design:

The study design was crossectional retrospective study of all adult medical emergency patients admitted to ED from September 2013 to Auguest 2014.

4.3 Study population

The study population for this study were all adult patients admitted to ED with emergency medical conditions.

4.4 Inclusion and Exclusion criteria

4.4.1 Inclusion ctiteria

- All adults who have medical problem are included in this study.

4.4.2 Exclusion criteria

- Those who have non traumatic and traumatic surgical Emergencies ,
- Gyn\Obs,ENT, Dental, Psychiatric, Ophthalmologic
- Age <15 years

4.5 Sample size determination and sampling procedure

Since the objectives of the study was to determine the pattern and outcome of adult ED admissions during specified one year period, no specific sampling procedure was employed. The records of all adult medical emergency patients admitted to the ED during the specified time period was reviewed.

4.6 Variables

4.6.1 Dependent variable:

The dependent variable for the study was the outcome of adult medical Emergency Departement admission.

4.6.2 Independent variables

The independent variables of the study include demographic variables (age, sex, residence, etc), initial diagnosis, main organ system involved(Cardiovascular, renal, GI, Neurology,...etc), infectious disease, non-infectious disease, initial senior consultations, referral.

4.7 Operational definitions:

- Acute admissions_ admitting a patient with a disease of rapid onset severe symptoms and brief duration.
- Medical emergency was defined as a condition where in patients presented with acute illness /accident with in 48 hrs and chronic patients with acute exacerbations with in 48 hrs,
- unstable patients- such as patients with grossly abnormal vital signs or unconsciousness, and metabolic disturbances
- Infectious disease or communicable disease_any disease that can transmitted from one person to another. This may occur by direct physical contact, by common handling of an object that can picked up

infective microorganisms through a disease carrier, or by spread of infected droplet coughed or exhaled into air.

- Non infectious disease or noncomunicabledisease _are diseases which is not transmitted from one person to another. This may be hearditary, due to environmental changes, some intrinsic factors(eg hormonal changes), dietary habbits, use of prossesed foods and the like.
- Resuscitation _the restoration of a person who appeare to be dead. It depends upon the revival of cardiac and respiratory function.
- Iatrogenic causes_ a condition that has resulted from treatement , as either an unforsene or inevitable side effect.

4.8 Data collection procedures:

The sources of data for the study were the ED registers and medical record charts of clients admitted to adult ED. Data were collected using structured checklist for medical record review developed in reference to ED register, medical record charts and other standardized tools from similar studies. The check list was pretested in ED of similar hospital in Addis Ababa. Trained clinical nurses were used to collect the data. The principal investigator has supervised the data collection process.

4.9 Data Management and Data Analysis procedures:

Data were checked for completeness and edited daily after collection, double entered into pre prepared data entry template by data entry clerks. Data were analysed using SPSS version 20.0. Descriptive statistics were generated for pattern of adult ED medical admissions and outcome variables of death, discharge, discharged against medical advice and transferred to other hospitals. Pattern of adult medical ED admissions were described by socio demographic and clinical characteristics. Independent variables that are significantly associated with outcome variables were further examined in multivariate analysis.

4.10 Ethical consideration:

Permission to carry out the study was obtained from the Institutional Review Board (IRB) of Addis Ababa University College of health science, school of medicine, department of emergency medicine.To ensure confidentiality, names and any other personal identifiers were not used during data collection and analysis.

4.11 Dissemination of the result

The study result was presented to Addis Ababa University, Faculty of Medicine department of emergency medicine and documents was disseminated to all responsible bodies in the study area.

5. RESULTS

5.1 Adult Emergency Department visits and ED Admissions

A total of 6548 adult patients have visited the adult ED of Yekatit 12 Hospital during the study period and there were total of 1542 adult ED admissions during the same period. Out of these, 711 (46%) patients were adult medical ED admissions and met the study inclusion criteria. The remaing 831 (54%) were admitted to other adult EDs (surgical ED, Orthopedics ED, Burn Unit, ENT and Dental Units) and excluded from the study.

5.2 Socio-demographic characteristics of patients admitted to adult ED

The mean (±S.D.)age of the patients admitted to adult ED of the hospital during the study period is 41 (±17)years. Over two-thirds (N=452) of the patients were in the age range of 15 -44 Years. The male to female ratio of adult ED admissions was almost equal (1: 1.04). The majority (92.4%) of the admitted patients were from urban areas (Table 1).

Table 1: Socio-demographic Profile of adult patients admitted to the Medical ED at Yekatit 12 hospital: September 2013 –August 2014

Characteristics		Frequency	Percent
Age Group	15-24	100	14.1
	25 -34	198	28.0
	35 -44	154	21.8
	45-54	89	12.6
	55-64	71	10.0
	65+	95	13.4
	Missing	4	0.6
Sex	Male	349	49.1
	Female	362	50.9
Residence	Urban	657	92.4
	Rural	48	6.8
	Missing	6	.8

5.3 Baseline Clinical characteristics of patients admitted to adult ED

As shown in the following table (Table 2), nearly half (47%, N= 334) of the patients were presented to the ED as self-referral whereas the remaining patients were referred to the hospital from other health facilities. It was their first visit to the hospital's adult ED for the large majority (78.6%, N=559) of the patients who were admitted to the adult medical ED.

Table 2: Clinical Charateristics of patients admitted to the adult ED at Yekatit 12 hospital: September 2013 –August 2014

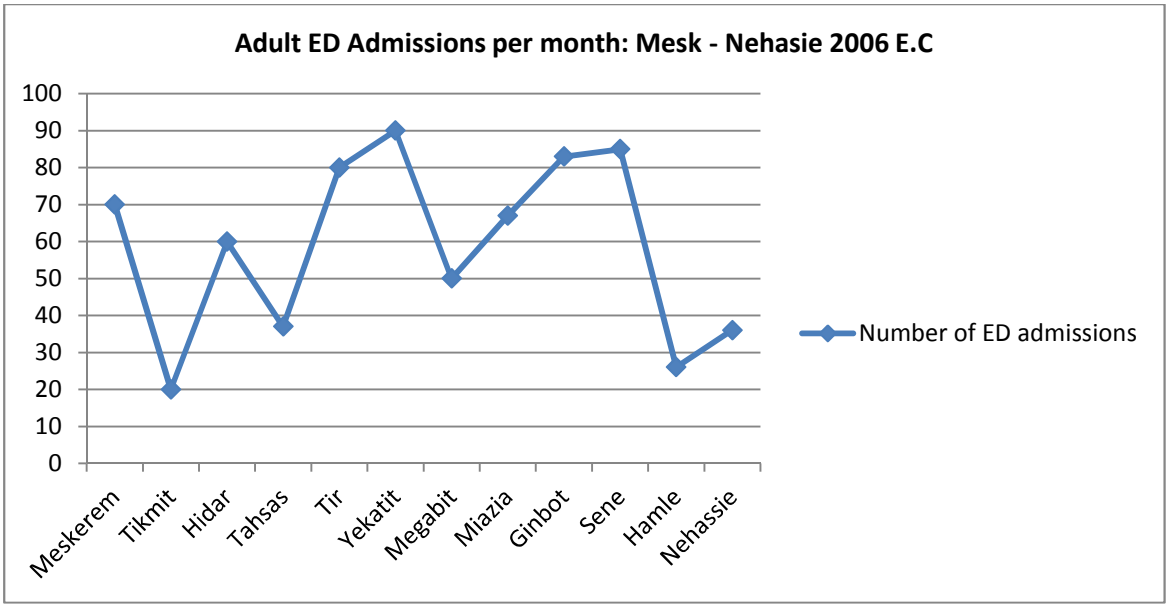
Clinical Characteristics		Frequency	Percent
Source of Referral	Self	334	47.0
	public HC	159	22.4
	Private HF	169	23.8
	Public Hospital	29	4.1
	Other	20	2.8
	Total	711	100.0
Frequency of ED Visit	First	559	78.6
	Repeat visit	136	19.1
	No Record	16	2.3
	Total	711	100.0
Level of Consciousness at ED presentation	Fully conscious	509	71.6
	Some degree of LOC	59	8.3
	Commatose	47	6.6
	Not evaluated	85	12.0
	Total	711	100.0
Vital Signs status at initial ED evaluation	Normal	321	45.1
	Derranged	336	47.3
	No record	47	6.6
	Total	711	100.0
Known Chronic Medical Illness	Yes	325	45.7
	No	232	32.6
	No record	146	20.5
	Total	711	100.0

Quite large majority of the patients (71.6%) were fully conscious at ED presentation, but their vital signs were deranged in nearly half (47.3%, N =336) of the cases. Most patients (45.7%) were also having a known chronic medical illnesses.

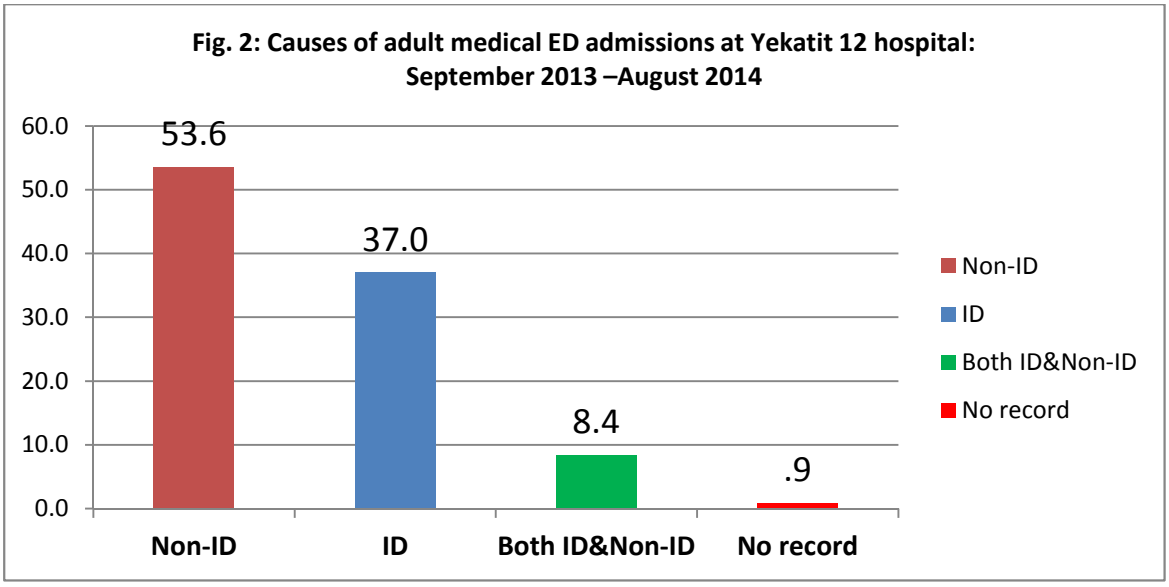
5.4 Patterns and Spectrum of adult Medical ED admissions

The number of adult ED admissions per month was variable with a peak admissions in the months between January –February. The average adult medical ED admissions per month was 64.

Figure 1: Adult ED Admissions per month at Yekatit 12 Hospital: September 2013 – August 2014



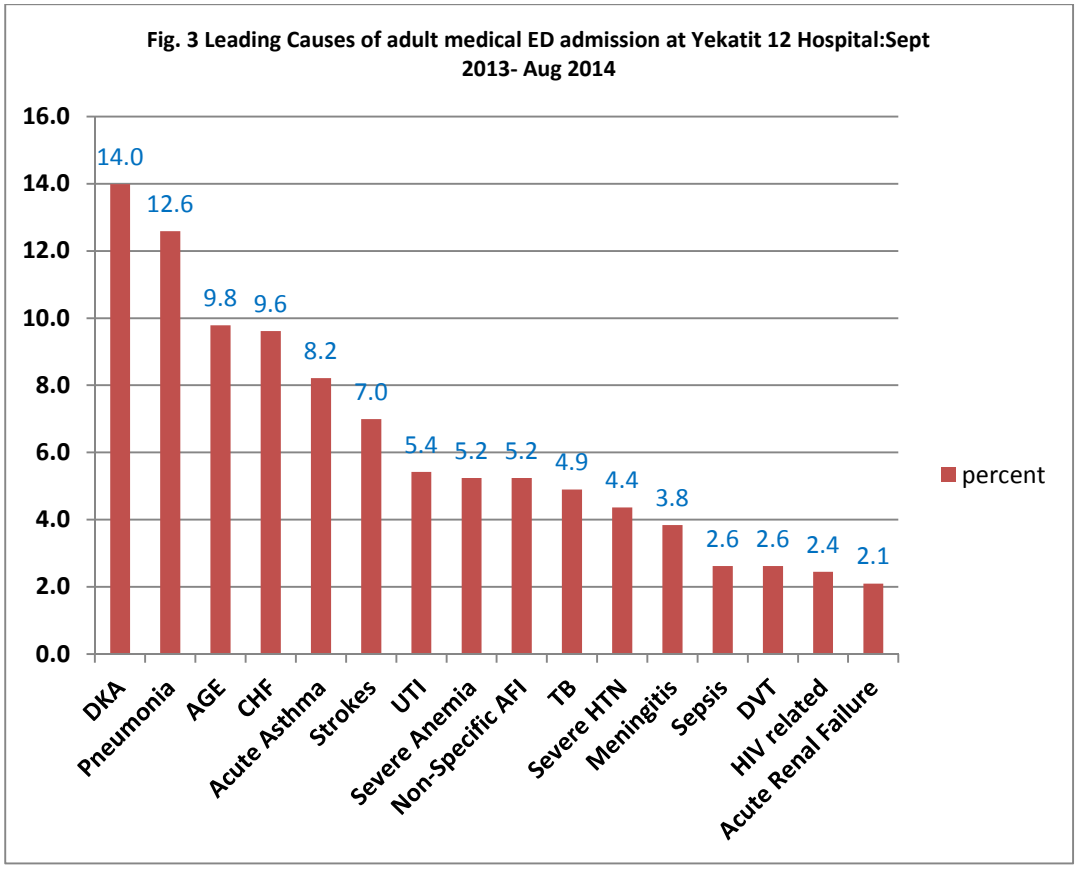
Overall, the majority of adult medical ED admissions were due to non-infectious diseases (53.6%, N= 381) whereas infections diseases accounted for over one-third (Figure 2).



Among the infectious diseases, punemonias of different severity (20.5%, N=72), acute infectious gastro-enteritis with hypovolemic states (15.9%, N=56), urinary tract infections (8.8%, N =31), non-specified acute febrile illnesses (8.5%, N =30) and serious forms of tuberculosis (8%, N=28) were among the top 5 leading causes of adult medical ED admissions. Pyogenic meningitis, Sepsis/septic shock, HIV-related infections and malaria were less frequent causes of medical ED admissions.

Among the non-infectious diseases, Diabetic Keto-acidosis is the leading cause of adult medical admissions (22.3%, N=80) followed by congestive heart failure (15.3%, N=55) and acute asthmatic exacerbations/acute attacks (13.1%, N=47). Cerebrovascular accidents/strokes (11.1%), severe anemias requiring transfusions (8.4%), severe hypertension/hypertensive urgencies(7.0%), Deep venous thrombosis (4.2%), acute renal failure (3.3%), ischemic heart diseases/MI (2.8%) and decompensated CLDs (2.2%) were also significant causes of adult medical ED admissions.

Overall, DKA, pneumonia, AGE, CHF, acute asthma, strokes, UTIs, severe anemias, non-specific AFI and TB were among the top 10 leading causes of adult ED admissions (Figure 3).



Nearly one-third of the cases were having multiple organs/systems involvement by the time of ED admissions (Table 3).

Table 3: Main organ systems affected at ED admissionat Yekatit 12 Hospital: Sept 2013- Aug 2014

Main Organ System	Frequency	Percent
Multiple Organ System	224	31.5
Respiratory	111	15.6
Gasto-intestinal/ hepatobilliary	98	13.8
Cardiovascular	81	11.4
Endocrine	72	10.1
Neurologic	66	9.3
Heamatologic/ oncologic	28	3.9
Renal/Urogenital	24	3.4
Dermatologic/Allergy	7	1.0
Total	711	100

5.5 Outcome of adult medical ED admissions and length of stay

The large majority of patients admitted to adult medical ED are either improved and dischareged (39.0%, N=277) or admitted to Ward/ICUs. The crude death death rate in the adult medical ED is 3.9% (Table4).

Table 4: Outcome of adult medical ED admissions at Yekatit 12 Hospital: Sept 2013- Aug 2014

Outcome of ED Admission	**Frequency**	**Percent**
Improved and discharged	277	39.0
Admitted to Ward or ICU	289	40.6
Died in ED	28	3.9
DAMA	9	1.3
Transferred or referred to other hospital	38	5.3
No record	70	9.8
Total	**711**	**100.0**

The mean length of stay in adult medical ED of the hospital is 2 days, with two-thirds of patients only staying 72 hours (73.7%, N=524) and 14.3% of the cases having less than 24 hours of stay (Table 5).

Table 5: Length of Stay in Adult medical ED at Yekatit 12 Hospital: Sept 2013- Aug 2014

Length of Stay	Frequency	Percent
<24 Hours	102.0	14.3
1-3 days	422.0	59.4
3-7 days	102.0	14.3
> 1 week	15.0	2.1
Missing	70.0	12.2
Total	711	100.0

5.6 Outcome of adult medical ED admissions by demographic and clinical characteristics of patients

As shown in the following tables, the outcome of patients admitted to adult medical ED was found to vary with certain demographic and clinical charcteristics of the patients. Adult medical patients in the younger age group (15 -34 years) were found to have more favourable outcomes compared with the older (65+ years) patients. Nearly half (47%) of patients in the age group of 15 -34 years were successfully managed and discharged improved from ED, whereas only 20% of those above 65 years of age were discharged improved. The crude ED mortality was found to be highest (5%) in the 45 -64 years of age and least (3.0%) in patients aged 15 -34 years (P=0.005). Highest ward/ICU admission rate of 57.9% was observed for the elderly patients (65+years) compared to the younger age groups.

Female patients were found to have more favourable outcomes compared to male patients but not statistically significant. The proportion of patients who were discharged improved was higher among female patients (46.3%) compared to male patients (31.3%). Further more, crude ED mortality among male patients (5.2%) was almost twice that of female patients(2.8%), but not statistically significant (P=0.146). Patients from urban areas were found to have higher discharge rate of 40% and lower ED mortality of 3.8% compared with patients from rural areas who were having higher admission rate to wards/ICU (54.2%) and higher mortality (4.2%).

Table6 :Outcome of adult medical ED admissions by Demographic characteristics of patientsat Yekatit 12 Hospital: Sept 2013- Aug 2014

Characteristics			Outcome of ED Admission						Total
			Improved/ Discharged	Admitted to Ward or ICU	Died in ED	DAMA	transferred or referred to other hospital	No record	
Age	15-34	N	140	100	9	3	16	21	298
		%	47.0%	33.6%	3.0%	1.0%	5.4%	7.0%	100.0%
	35-44	N	56	70	7	3	8	8	154
		%	36.4%	45.5%	4.5%	1.9%	5.2%	5.2%	100.0%
	45-64	N	62	63	8	1	10	15	160
		%	38.8%	39.4%	5.0%	.6%	6.3%	9.4%	100.0%
	65+	N	19	55	3	2	4	11	95
		%	20.0%	57.9%	3.2%	2.1%	4.2%	11.6%	100.0%
Gender	Male	N	109	163	18	4	16	32	348
		%	31.3%	46.8%	5.2%	1.1%	4.6%	9.2%	100.0%
	Female	N	167	125	10	5	22	25	361
		%	46.3%	34.6%	2.8%	1.4%	6.1%	6.9%	100.0%
Residence	Urban	N	263	261	25	9	34	54	657
		%	40.0%	39.7%	3.8%	1.4%	5.2%	8.2%	100.0%
	Rural	N	12	26	2	0	4	3	48
		%	25.0%	54.2%	4.2%	0.0%	8.3%	6.3%	100.0%

Higher ED death rate was observed among patients who were admitted to ED during their first visit compared with repeat visitors (4.1% Vs1.5%, $p<0.05$). Statistically significant difference was also observed in ED outcomes of patients with deranged vital signs and those with normal vital signs at initial ED presentation. Patients with deranged vital signs at initial ED presentation were found to have higher ED mortality rate compared with patients with normal vital signs (6.5% Vs 2.1%, $p<0.05$) and higher admission rate to ward/ICUs (43.8%) compared with patients with normal vital signs (27.7%), $p<0.05$.

The outcome of ED admission was also worst among patients who were in coma at initial ED presentation with the highest (21.3%) ED death rate compared with patients with some degree of loss of consciousness (5.1%) and patients who were fully conscious at initial ED presentation (2.4%) with $p<0.05$. The ED outcome was found to be comparable between patients with known chronic medical illness and those without.

Table 7: Outcome of Adult ED Admissions by Clinical Characteristics of Patients at Yekatit 12 Hospital: Sept 2013- Aug 2014

Characteristics			Outcome of ED Admission						Total
			Improved/Discharged	Admitted to Ward or ICU	Died in ED	DAMA	transferred or referred to other hospital	No record	
First or repeat visit	First	N	222	222	23	9	32	44	559
		%	39.7%	39.7%	4.1%	1.6%	5.7%	7.9%	100.0 %
	Repeat visit	N	52	64	2	0	5	12	136
		%	38.2%	47.1%	1.5%	0.0%	3.7%	8.8%	100.0 %
	No record	N	2	0	2	0	0	0	4
Vital signs at presentation	Normal	N	132	129	4	4	23	25	321
		%	41.1%	40.2%	1.2%	1.2%	7.2%	7.8%	100.0 %
	Derranged	N	122	147	22	5	13	25	336
		%	36.3%	43.8%	6.5%	1.5%	3.9%	7.4%	100.0 %
	No record	N	21	13	1	0	2	7	47
		%	44.7%	27.7%	2.1%	0.0%	4.3%	14.9%	100.0 %
Level of consiousness	Fully Conscious	N	211	211	12	6	22	41	509
		%	41.5%	41.5%	2.4%	1.2%	4.3%	8.1%	100.0 %
	Some degree of LOC	N	16	29	3	2	7	2	59
		%	27.1%	49.2%	5.1%	3.4%	11.9%	3.4%	100.0 %
	Commatose	N	7	27	10	0	3	0	47
		%	14.9%	57.4%	21.3%	0.0%	6.4%	0.0%	100.0 %
	Not evaluated	N	42	19	2	1	5	13	85
		%	49.4%	22.4%	2.4%	1.2%	5.9%	15.3%	100.0 %
Known chronic medical illness	Yes	N	128	144	7	3	13	29	325
		%	39.4%	44.3%	2.2%	.9%	4.0%	8.9%	100.0 %
	No	N	93	92	8	3	20	12	232
		%	40.1%	39.7%	3.4%	1.3%	8.6%	5.2%	100.0 %
	No record	N	54	53	12	3	5	15	146
		%	37.0%	36.3%	8.2%	2.1%	3.4%	10.3%	100.0 %

Patients who were admitted to the adult ED with the diagnosis of infectioius diseases were found to have better ED outcome compared with those admitted due to non-infectioius diseases. ED mortality was 3.4% in the infectioiusdisease group and it was 4.5% in the non-ID group (p = 0.03).

Patients who were evaluated by a consultant/senior physician were found to have poor ED outcome with ED mortality of 5.4%compared with those patients who were note evaluated with mortality of 3.4% ($p < 0.005$). Ward/ICU admission rate was also higher (60.3%)among those evaluated by a consultant/senior physician compared with those patients who were note evaluated (34.9%, $p < 0.05$).

Higher ED mortality was observed in ED patients with length of stay of <24 hours (4.7%) compared with those with length of stay in ED of > 1 week (0.0%, $p = 0.04$).

Table 8. ED outcome by cause of ED admission, consultant evaluation and length of stayat Yekatit 12 Hospital: Sept 2013- Aug 2014

			Outcome of ED Admission		
			Improved/Discharged	Admitted to Ward or ICU	Died in ED
Cause of ED Admission	ID	N	105	113	9
		%	39.9%	43.0%	3.4%
	Both ID and Non-ID	N	22	24	0
		%	36.7%	40.0%	0.0%
	Non-ID	N	150	152	17
		%	39.4%	39.9%	4.5%
	no record	N	0	0	0
		%	0.0%	0.0%	0.0%
Evaluation by consultant	Yes	N	43	111	10
		%	23.4%	60.3%	5.4%
	No	N	230	166	16
		%	48.4%	34.9%	3.4%
Length of StayOS	<24 Hours	N	21	56	4
		%	24.7%	65.9%	4.7%
	1-3 Days	N	187	188	20
		%	44.3%	44.5%	4.7%
	4-7 Days	N	55	32	3
		%	53.9%	31.4%	2.9%
	>7 Days	N	7	4	0
		%	46.7%	26.7%	0.0%
Total		N	270	280	27
		%	43.3%	44.9%	4.3%

6.DISCUSSION

6.1 Patterns of Adult medical ED amission

This study revealed that the number of adult medical ED admissions in Yekatit 12 hospital varies between months with pick admission rates during hot and dry seasons consistent with other similar studies from hospital in Nigeria (2). The adult medical ED admissions in this study were also found to be increasing progressively with age to reach peak at 40 years. This is consistent with similar studies conducted to determine the medical ED admission patterns in Nigeria (2) and reflecting higher burden of diseases in economically productive age group .

Non-infectious diseases were found to be more frequent causes of adult ED admissions compared with the infectious diseases in this study and this is similar with findings from other studies (2,8).This is particularly alarming as it could be reflecting the rising epidemics of Non-Communicable Diseases (NCDs) in the study area related with changes in lifestyle.

Among the NCDs, diabeticketo-acidosis, congestive heart failure and acute asthmatic attacks were found to be the top three leading causes of adult medical ED admissionsin the hospital. The rising NCDs burden in hospitals have been observed in similar studies conducted in other countries as well (1,3,4).

Major infectious diseases were also found to be an important causes of adult medical emergencies in the study setting and this finding is consistent with similar studies (2,8). Of note is that pneumonias of various degree of severity, infectious gastroenteritis with hypovolemic state and UTI were among the leading causes of medical emergency medical admissions.

6.2 Outcome of Adult medical ED amission and length of stay

This study clearly showed mixed outcomes of adult ED medical admissions. Higher proportion of the cases required admissions to the wards/ICUs indicating the seriousness of the medical emergencies. Over one-third of the adult ED admitted patients were successfully managed at ED and discharged improved. The crude ED mortality rate of 3.9% is much lower than the findings of similar studies conducted in Nigeria (2). This could be due to differences in disease patterns and quality of ED care between these two settings.

The mean length of stay in medical ED of 2 days is shorter than what has been reported elsewhere (2,8). This could be related to higher admissions to wards and ICUs, and better responses to ED treatments.

This study also revealed that younger medical ED patients were found to have better ED outcomes compared with the older patients similar to what has been observed by other studies (8). This is due to the fact that elderly patients will have serious diseases related to weak immunity and limited cardio-respiratory reserves.

There was no any statistically significant difference in ED outcome of male and female patients as indicated in our study. Other studies did not also show any significant differences.

Patients who were admitted to ED following their first ED visit were found to have higher ED mortality rates compared with repeat visitors in this study. This could be related with the fact that repeat visitors could have been admitted to ED for a similar illness in the past and well aware of the cause of their emergency illness.

The study also found out that poor outcome was associated with level of consciousness at ED presentation. ED mortality was found to be highest among comatose patients compared with patients who were fully conscious

at ED presentation. This is consistent with findings of other studies in Nigeria and simply indicating the seriousness of the patiens conditions even at presentation. It is quite clear that comma is a poor prognostic sign in general. Similary the study also revealed that patients with deranged vital signs at initial ED presentation were found to have poor outcomes with higher ED mortality rate. Derangement of vital signs is again an indication of a serious illness.

Patients who were admitted to the adult ED with the diagnosis of infectioius diseases were found to have better ED outcome compared with those admitted due to non-infectioius diseases. ED mortality was lower in the infectioiusdisease groupthan NCD group. This finding is similar with the results of other systematic studies and could possibly be due to the difficulties in instituting the proper managent of emergencies due to major NCDs.

Evaluation by a consultant/senior physician was found to be linked with poor ED outcome in this study and this is in stark contrast with findings from other studies (3). This could be related to differences in timing of consultant evaluation and also seriousness of the illness for whom senior physician was consulted. In EDs, it is usually difficult to have consultant always and consultants are usually contacted for only seriously ill patients after primary interventions have been taken. But, timely consultations could improve ED outcomes in general.

The higher ED mortality observed in ED patients with length of stay of <24 hours (4.7%) compared with those with length of stay in ED of > 1 week (0.0%) in this study could reflect the increased survival of adult ED patients after the first 24 hours in ED.

7. CONCLUSIONS

The pattern of adult medical emergency admissions in Yekatit 12 hospital is variable and indicate higher proportion of medical ED admissions were due to NCDs possibly reflecting the rise in NCDs burden. Diabetic Ketoacidosis, a largely preventable medical emergency condition is a leading cause of ED admissions. Cardiovascular emergencies and acute asthmatic attacks are also among the leading causes. There is a need for action to improve the readiness of the health care to respond to these NCDs.

Pnuemonias, AGEs with hypovolemic states, UTIs, AFIs and TB are among the leading causes of infectious medical emergency admissions.

Medical ED outcome was found to be affected by certain demographic and clinical characteristics of patients. Over 80% of emergency medical ED admissions are either improved/discharged or require further managemet in ICU or general ward setting. Medical ED mortality was low in the study setting.

8. RECOMMENDATIONS

The adult medical ED readiness should take into account the prevailing rising burden of medical emergencies due to both NCDs and major IDs. But, the hospital management and the staffs of the ED should emphasize on the importance of educating their patients and families on risk reduction to prevent the occurrence of NCD related medical emergencies.

Proper management protocols for the commonest NCDs-related medical emergencies must be developed and implemented in the adult medical EDs to improve outcome. In particular, hospital readiness is required to properly manage DKA, pneumonias, and acute asthmatic attacks.

Similar studies are required to fully understand the ED admission patterns in both public and private hospitals in the city.

9. STRENGTHS OF THE STUDY

This study is able to shed a light on the pattern and outcomes of adult medical ED admissions in our setting where such information was scarce.

10. LIMITATIONS OF THE STUDY

This study has several limitations. First, the study was limited to assessing pattern and outcome of ED admissions due to adult medical emergencies. It did not assess the status of all other EDs in the hospital to give complete picture of the pattern and outcome of ED admissions in all the departments. Secondly, the study did not assess the outcome of those adult emergency medical patients admitted to either ICU or wards.

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12. Data collection Tools

Part I: Socio-demographic Characteristics			
NO	QUESTIONS	CODE	REMARK
101	Age in Years	____Years	
102	Gender	1.Male 2.Female	
103	Residence	1.Urban 2.Rural	
104	Marital Status	1.Never Married 2.Married 3.Divorced 4.Separated 5.Widow/Widower	
105	Educational Status	1. No education 2. Primary(1-6) 3.Seconadry(7-12)4.Tertiary(>12)	
Part II: Baseline Information			
201	Date of arrival to adult ED	---/----/----- (DD/MM/YY)	
202	Date of Admission to ED	---/----/----- (DD/MM/YY)	
203	Source of Referral	1. Self 2. Public Health Center 3. Private Health Facility 4. Another Public Hospital 5. Others (Specify)	
204	First visit or repeat	1. First vist 2. Repeat 3. Unknown	
Part III: Baseline Clinical and Laboratory Information at admission			
301	Level of Consciousness at presentation	1. Fully conscious and OTT 2. Some degree of LOC 3. Commatose 4. Not evaluated/not recorded	

302	Vital signs at presentation	1. Normal 2. Deranged (specify: _____) 3. Not recorded	
303	Known Chronic Medical illness	1. Yes (Specify) 2. No 3. No record	
304	Initial Diagnosis at ED	1. Infectious (Specify _____) 2. Non-infectious (Specify ____)	
305	Main organ Systm affected by the disease	Specify: _____	
306	Baseline Laboratory tests performed at presentation	List and indicate those abnormal	
Part IV: Information during the ED admission			
401	Diagnosis at Admission	Specify: _____	
402	Treatments given	Specify: _____	
403	Evaluation by Consultant/Senior Physician	1. Yes 2. No	
404	Outcome of ED admission	1. Improved and discharged 2. Admitted to General Ward or Critical care/ICU 3. Died in ED 4. DAMA 5. Transferred/Referred to another hospital for further management 6. No record	
405	Date of specific outcome	---/----/----- (DD/MM/YY)	
406	Length of Stay in ED		

13. DECLARATION

I, Tigist Fitsumbirhan, the principal investigator of this study, do hereby declare that this thesis is original work and that it has not been submitted partially or in full by any other person for an award of a degree in any other institution.

Name of the Investigator: Tigist Fitsumbirhan Signature: ----------Date--------

Name of Advisor: Dr Muluwork Tefera Signature: ----------Date --------

Name of Examiner: Ato Haymanot Geremewu Signature: ----------Date --------