

## Pattern and Clinical outcome of Adult Emergency Department Admissions in Selected Government Hospitals in Addis Ababa.2023Gc

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### Abstract

**Background:** The pattern of medical admissions varies amongst different regions of the world, depending on many factors, including the prevalent medical diseases in the area. The causes of morbidity and mortality in sub-Saharan African regions are predicted to undergo a significant shift towards endemic, no-communicable diseases. A gradual change in lifestyle and improvement of socioeconomic status of third-world countries are causing substantial changes in patterns and clinical outcomes of adult emergency department admissions in selected government hospitals in Addis Ababa. The previously recognized public health problems.

**Objective:** The main aim of this study is to assess the spectrum of patterns and outcomes of adult emergency medical admissions to the Emergency Department of selected government hospitals in Addis Ababa.

**Method:** A cross-sectional retrospective study was conducted of all adult medical emergency patients admitted to Minilik Comprehensive Specialty Hospital, Yekatit 12, and Ras Desta hospitals to E.D. from October 2022 to November 2023 E.C.

**Result:** Regarding the pattern of adult emergency admission, noninfectious diseases account for over half of 1080 (52.5%), followed by infectious diseases, which account for 801 (38.9%), and mixed infectious and noninfectious account for 134 (6.5%) of the total cash flow. Among the noninfectious diseases, Diabetic Keto-acidosis is the leading cause of adult medical admissions, which accounts for about 105 (9.7%), and congestive heart failure 101 (9.4%). Among the infectious diseases, pneumonia of different severity 171 (21.3%), acute contagious gastroenteritis with hypovolemic states 122 (15.2%), urinary tract infections 58 (7.3%), non-specified acute febrile illnesses 57 (7.1%) were found to be the leading infectious causes of E.D. admission. Most patients admitted to adult medical EDI were 848 (41.2%) Improved and discharged, followed by those admitted to the General Ward or Critical care/ICU, which accounts for about 801(38.9%) of total admissions. The crude death rate at adult emergency department admission was 80 (3.9%).

**Keywords:** Emergency admission pattern, Clinical outcome.

## 1. Introduction

### 1.1. Background

A medical emergency" is a situation where the patient requires urgent care.

Medical care to prevent loss of life or limb and initiate action to restore an everyday, 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 department is crucial to care quality and operational profitability [1].

The emergency department is often the gateway for many patients in hospitals and health facilities. The patterns of medical conditions for which patients visit the emergency rooms and departments usually reflect the magnitude of different health problems in society. The awareness and knowledge of the spectrum of medical conditions in the emergency room will also help in healthcare planning and the provision of essential health services in the department, such as equipment, hospital space, and other needs by the patients and healthcare 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, infectious diseases accounted for most of the morbidity and mortality among medical admissions across Africa. This depends on their traditional lifestyle, including dietary habits, poor hygiene, and lifestyle. Currently, a global trend towards non-communicable diseases has been documented in various studies [2]. Non-communicable diseases include hypertension, diabetes mellitus, malignancies, cerebrovascular diseases, coronary heart disease, congestive heart failure, and chronic kidney Disease. [3] Published data in England, including the National Confidential Enquiry into Patient Outcome and Death reports, suggest that delays in reviewing patients and obtaining senior opinions can contribute to avoidable deaths. This would suggest that medical work patterns should be designed to improve outcomes [4].

The data also suggests that patients admitted to the hospital either at weekends as an emergency or out of routine working hours have a higher mortality rate, suggesting that care delivery patterns with greater consultant involvement may be associated with better outcomes [4]. It is essential to understand that bed availability affects the Emergency Department's length of stay and patient disposition. Information regarding this relationship could help develop strategies to reduce Emergency Department overcrowding. Also, if patient disposition varied with hospital occupancy, there would be clear evidence that hospital overcrowding could lead to reduced quality of Emergency Department care. [5] Common denominators of any successful emergency care are availability of adequate physical facilities, equipment, and supply of all lifesaving drugs and surgical items, immediate professional attention after arrival in the hospital E.D. (emergency department), continued medical support till the patient is in the Emergency Department, speedy diagnosis and resuscitation 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 about treatment, imaging. Technique, laboratory services, blood transfusion, customer services, code and Disaster management and others are also important [1].

## 1.2. Problem statement

The health of adults in sub-Saharan Africa is becoming an increasingly important priority in global health policy. Over the last three decades, the number of emergency admissions for defined populations has constantly increased. Adult mortality, death between the ages of 15 and 60, is 4 to 40 times higher in sub-Saharan Africa than in developed countries [3, 5].

The causes of morbidity and mortality in sub-Saharan African regions are predicted to undergo a significant shift towards endemic non-communicable diseases. A gradual lifestyle change and socioeconomic status improvement in third-world countries are causing substantial changes in previously recognized public health problems. Public violence, including violence against women, is also becoming a significant cause of emergency department visits. Moreover, a poorly organized emergency medical service system where prehospital services are lacking in several places calls for considering modifications of the adapted healthcare delivery system. In other words, the

healthcare delivery system of a country must be adjusted to patterns of morbidity and mortality to mitigate and minimize the consequences of prolonged ill health and premature death of adults [6, 7]. Information related to the spectrum and patterns of emergency conditions for which clients visit the emergency departments and their clinical outcomes often indicates the actual magnitude of different health problems in a community. Furthermore, such information is essential in healthcare planning and provision of critical health services, including critical resources like equipment, hospital space, and other logistics [8, 9].

However, little has been known about the spectrum, pattern, characteristics, and clinical outcomes of local-community emergency problems for which they visit emergency rooms in Ethiopia. With this regard, this study is designed to assess the spectrum, pattern, characteristics, and clinical outcomes of emergency department admissions among adult people who visited E.D.s of the selected government hospitals of Addis Ababa, which ultimately contribute to work done to reduce the ever-growing mortality and complications secondary to emergencies.

## 1.3. Significance of the study

This paper is intended to assess the patterns and outcomes of adult emergency medical admissions to the Emergency Department of selected government hospitals in Addis Ababa. It will also provide a descriptive analysis of the types of emergency visits and outcome variables of death, discharge, discharge against medical advice and transfer to other hospitals. Patterns of adult medical E.D. admissions will be described regarding socio-demographic and clinical characteristics, and additional factors significantly associated with outcome variables will be determined. The results of this study are expected to be used by decision-makers and health planners in prioritizing emergency medical problems and designing interventions to improve patient outcomes.

## 2. Literature review

### 2.1. Spectrum and Patterns of Emergency Admissions

Several 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 number and rate of admissions increase is particularly pronounced for acute (or emergency) medical admissions. It is less apparent with acute surgical admissions or arranged/ waiting list admissions. The rise in emergency medical admissions has been consistently found in studies in several countries (U.K., Australia, and New Zealand), and reviews have been undertaken at regional and local hospital levels. [10] In the UK, Kendrick (1998) has also identified that most of the rise in acute medical admissions is due to higher hospitalization rates for older adults with cardiac or respiratory conditions. The Kings Fund/NHS Trust Federation analysis examined the changes in the number of admissions in six NHS hospitals in the U.K. The report also concluded that an increase in hospitalizations for respiratory or cardiac conditions was primarily responsible for the rise in the number of admissions in the U.K. [10].

Acute admissions comprise 60% of all medical admissions in New Zealand. Most of the increase in acute admissions is primarily related to the rise in medical admissions among older people 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 socioeconomic status of the population, increased smoking and alcohol consumption, changing societal patterns of care, economic incentives for health care organizations, iatrogenic causes, and art factual explanations. Possible causes of the increase in acute medical admissions include more available hospital beds, increased numbers of readmissions, and increased distance for patients to the nearest hospital associated with the closure of some hospitals, changes in the prevalence of illness, and increased expectations of patients. [10]. 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 no 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. [11]

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 with 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. D dermatological conditions accounted for the most minor proportion of admissions (4; 0.2%). [6]

Another study conducted at the University of Harcourt Teaching Hospital, Nigeria that assessed the profile and outcome of medical emergencies among 7246 patients presented to the 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 no 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. [12]. A study was done in Ethiopia on the quality of emergency care at Gonder University Referral Hospital. This study assessed the disease profile, patient satisfaction level, and quality emergency care determinants. 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 developing countries. The significant 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 against women that are commonly seen in young people are also Important causes of emergency department visits. [13]

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 within 100 km. Persons who experience pain and other life-threatening symptoms, men and older patients, persons who are triaged for more advanced illnesses, those nearer to the hospital, patients with psychiatric disorders, and asthmatics visit emergency clinics more frequently than the average population. Patients sometimes report more often at the beginning of the week than on the weekends. [13]

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 groups of patients who visit the emergency for 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 more significant 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. [13].

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. 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 24 hours or more (17.5%) 95%CI: 13.8%- 21.1%. The mean duration of the stay in the emergency department was 16.9 hours. [13]

## 2.2. Outcomes of Emergency Medical Admissions

As one of the objectives of the World Health Organization (WHO), the pattern of death statistics is crucial scientific information that should be available to constantly evaluate 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. [14]

From a study done in Nigeria's tertiary health center, the total number of patients attending the Accident and Emergency department for 2years (2011- 2012) was 3,162, consisting of

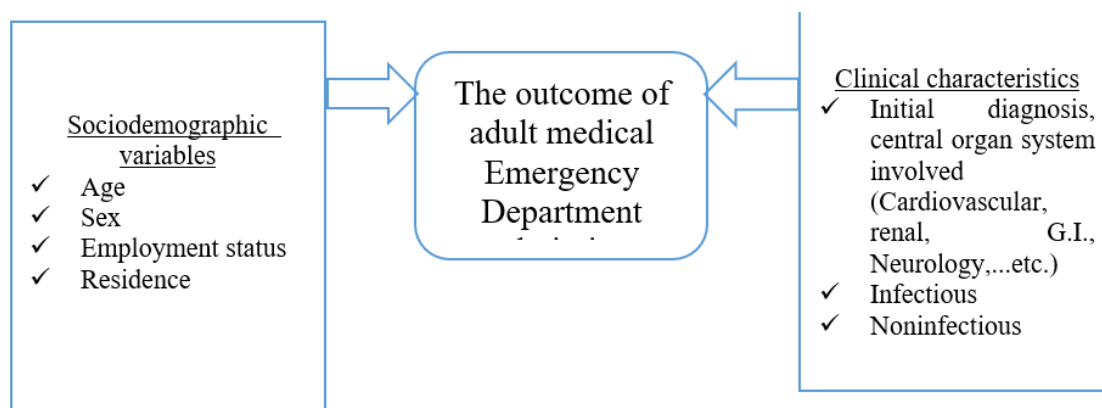
1959 (62.0%) males and 1203 (38.0%) females with a male to female ratio 1:6:1. There was a higher Accident and Emergency attendance of males compared to females. The total number of deaths recorded over the period was 122, with a crude mortality rate of 3.9%, and age ranged from 15- 87 years with a mean of 52.04 + 18.7 years. [14] Male deaths were 76 (62.0%), and ages ranged from 15 to 87 years, with a mean of 51.9 + 19.9 years. The female deaths were 46 (38%) ages ranging from 18 to 80 years, with means of 52.3 + 16.7 years. The male-to-female death ratio was 1:7:1, and there was no statistically significant difference between the mean age for deaths in both genders (P-value = 0.92). [14]

The crude mortality rates for males and females were 3.9% and 3.8%, respectively. The majority of deaths occurred below 65 years of age, with an equal but higher number of deaths occurring in the young and middle age; each recorded 43

(35.2%), totaling 87 (70.4%). Medical causes of death with 92 (75.4%) were predominant when compared to surgical causes of death with 30 (24.6%) strokes with 16 (13.1%) deaths and road traffic accidents (RTA) equally 16 (13%) deaths were the highest clinical causes of death. Deaths from non-communicable diseases with 98 (80.3%) are far more than deaths from infectious diseases with 24 (19.7%). [14].

There is also another study done in Nigeria; out of 1256 medical emergencies attending the University of Port Harcourt Teaching Hospital (UPTH) Port Harcourt, the crude mortality rate was 127 deaths (10.2%). The majority of 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%. [12].

### 2.3. Conceptual Framework



**Figure 1:** Conceptual framework (adopted from literature and modified by the researchers).

### 3. Objective

#### 3.1. General Objective

The main objective of this study was to assess the spectrum of patterns and outcomes of adult emergency medical admissions to the Emergency department of selected government hospitals in Addis Ababa.

#### 3.2. Specific Objective

- To determine the pattern of adult medical emergency admissions to the Emergency department of selected government hospitals in Addis Ababa.
- To assess outcomes of emergency medical admissions to the Emergency Department of selected government hospitals in Addis Ababa.
- The purpose of this study is to determine the factors that influence the patient outcome of emergency medical admissions to the Emergency departments of selected government hospitals in Addis Ababa.

### 4. Methodology

#### 4.1. Study area and period

This retrospective study was conducted in Minilik Comprehensive Specialty Hospital, Yekatit 12, and Ras Desta hospitals for patients admitted from October 2022 to November 2023, within the city of Addis Ababa, the capital of Ethiopia.

Addis Ababa was chosen as the study setting due to its diverse population, representing various socioeconomic backgrounds and cultural contexts. The city is known for its well-established healthcare infrastructure, making it a suitable location to access many emergency patients.

The city's public hospitals maintain electronic medical record systems, which streamline the data collection process for this study. These records contain detailed information on patient demographics, medical history, investigation results, diagnoses, and outcomes after intervention.

#### 4.2. Study Design

The study design was a cross-sectional retrospective study of all adult medical emergency patients admitted to Minilik Comprehensive Specialty Hospital, Yekatit 12, and Ras Desta hospitals to E.D. from September 1, 2022, to November 1 2023 E.C.

#### 4.3. Study Population

This study's population was all adult patients admitted to Minilik Comprehensive Specialty Hospital, Yekatit 12, and Ras Desta hospitals, E.D., with emergency medical conditions.

#### 4.4. Inclusion/exclusion criteria

##### 4.4.1. Inclusion criteria

All adults who have emergency medical problems were included in this study.

##### 4.4.2. Exclusion criteria

- Gyn\Obs, ENT, Dental, Psychiatric, Ophthalmologic
- Age < 18 years old
- Incomplete medical records

#### 4.5. Sample size and sampling technique

Since our research objective was to determine the pattern of emergency admission in the source population at Yekatit 12 Hospital Medical college, Minilik Comprehensive Specialty Hospital and Ras Desta Hospitals, all medical records of patients who visited those hospitals who have complete medical records be included by using a convenience sampling technique. Convenience sampling is a qualitative research sampling strategy that involves selecting participants based on their accessibility and availability to the researcher. Rather than being drawn randomly from a more significant population, participants in this strategy are picked because they are readily available to the researcher.

The total number of selected patients who fulfilled the inclusion criteria was 2058. Eight hundred sixty-nine patients were found at Yekatit 12 Hospital Medical College; 811 were chosen from Minilik Comprehensive Specialty Hospital, and the remaining 378 were from Ras Desta Hospital.

#### 4.6 Data collection method

The study's sources of data were the E.D. registers and medical record charts of clients admitted to adult E.D. of Melinik Comprehensive Specialty Hospital, Yekatit 12 and Ras Desta hospitals. Data was collected using a structured checklist for medical record review developed based on the E.D. register, medical record charts and other standardized tools from similar studies.

#### 4.7. Data quality control

The investigators followed the appropriateness of the methodologies. The principal investigators carried out data collection, and in addition, data collecting volunteers were selected from nursing staff who are working in the E.D. of selected hospitals. After two days of training with regard to the overall objective of the study, each segment of the questionnaire was given to each data-collecting volunteer before collecting data, and the full address of the principal investigators was given to every data-collecting volunteer.

Every difficulty during data collection was correctly addressed and timely. Every questionnaire filled out was checked for completeness before being received by the data-collecting volunteer.

#### 4.8. Study Variables

Dependent Variable

The outcome of the Adult Medical Emergency Department

Independent Variables

##### ◆ Sociodemographic variables

- Age
- Sex

- Religion
- Marital Status
- Income
- Residence
- ◆ Clinical characteristics
- Initial diagnosis
- Central organ system involved (Cardiovascular, renal, G.I., Neurology,...etc.)
- Infectious
- Noninfectious
- ◆ Factors Associated with quality of care
- Initial senior consultations
- The time gap between diagnosis and initiation of treatment
- Availability of Lab and imaging service

#### 4.9. Data analysis technique

Data was entered and analyzed using SPSS. The investigators exclusively cleaned the data. The analysis's results were presented using tables and graphs. Descriptive statistics were generated for a pattern of adult E.D. medical admissions and outcome variables of death, discharge, discharge against medical advice, and transfer to other hospitals. Patterns of adult medical E.D. admissions will be described by socio-demographic and clinical characteristics.

#### 4.10. Operational definition

**Acute admissions:** Admitting a patient with a disease of rapid onset severe symptoms and brief duration.

**Medical emergency:** a condition wherein patients presented with acute illness /accident within 48 hrs and chronic patients with acute exacerbations within 48 hrs,

**Unstable patients,** such as patients with grossly abnormal vital signs or unconsciousness and metabolic disturbances

**Infectious or contagious disease:** Any disease transmitted from one person to another. This may occur by direct physical contact, everyday handling of an object that can pick up infective microorganisms through a disease carrier, or the spread of Infected droplets coughed or exhaled into the air.

**Noninfectious disease or no communicable disease:** These are diseases that are not transmitted from one person to another. This may be hereditary due to environmental changes, some intrinsic factors (e.g., hormonal changes), dietary habits, use of processed foods, etc.

**Resuscitation:** The restoration of a person who appears dead. It Depends upon the revival of cardiac and respiratory function.

**Iatrogenic causes:** A condition that has resulted from treatment treatments, either an unforeseen or inevitable side effect.

#### 4.10 Ethical clearance

Before data collection, proposal approval was obtained from the Department of Public Health Research Committee, the Department of Medicine, and advisors. All information collected from patients was kept confidential and used only for the intended purpose. Personal information, including names of patients, was not included in the questionnaire. The investigator stored completed questionnaires

**5. Result**

**5.1. Introduction**

In this section, we provide the Sociodemographic profile of the study participant, emergency department admission pattern, and patient outcome in adult patients who were admitted at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital, and Ras Desta Hospital.

**5.2. Sociodemographic profile of study participant.**

Among the total of 2058 study participants, 1117 (54.3) were male, and 940 (45.7%) were female, which indicates the number

of male patients was slightly higher than that of females. Regarding age distribution, the majority of patients, 741 (36%) and 621 (30.2%), admitted to the emergency unit of Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital and Ras Desta Hospital were between the ages of 19-30 year and 30-50 year respectively. Regarding residency, the majority of the study participants, 1213 (58.9%), were urban residents, and the remaining 845 (41.1%) were rural residents.

**Table 1:** Sociodemographic profile of study participant.

Variable	Categories	Frequency	Percent (%)
Sex	Male	1117	54.3
	Female	940	45.7
Age	13-18 year	113	6
	19-30 year	741	36
	30-50 year	621	30.2
	Above 50 year	572	27.8
Occupational Status	Not employed	254	12.3
	Government worker	1012	49.2
	Private worker	792	38.5
Marital status	Single	769	37.4
	Married	1289	62.6
Residence	Urban	1213	58.9
	Rular	845	41.1

**5.3. Baseline Clinical characteristics of patients admitted to adult E.D.**

Most patients, 789 (38.3%) and 748 (36.3%) admitted to E.D., were self-referred and referred from public health centers. In addition, 1647 (80%) was their first visit to E.D. and 189 (9.2%) were found to be their repeated visit. Among the total of 2058 patients, 1698 (82.6%) were fully conscious, whereas 173 (8.4%) were found to have Some degree of loss of

consciousness (LOC), and 103 (5%) were comatose. Additionally, 1314 (63.8%) were found to have deranged vital signs, and 645 (31.3) were found to have typical vital signs. A total of 377 (18.3%) were found to have known medical illness in which diabetes mellitus (D.M.) was the major contributor, 211 (56%), followed by hypertension and asthma, which accounts for about 98 (26%) and 61 (16.2%) respectively. Table 2.

**Table 2:** Baseline Clinical characteristics of patients admitted to adult E.D.

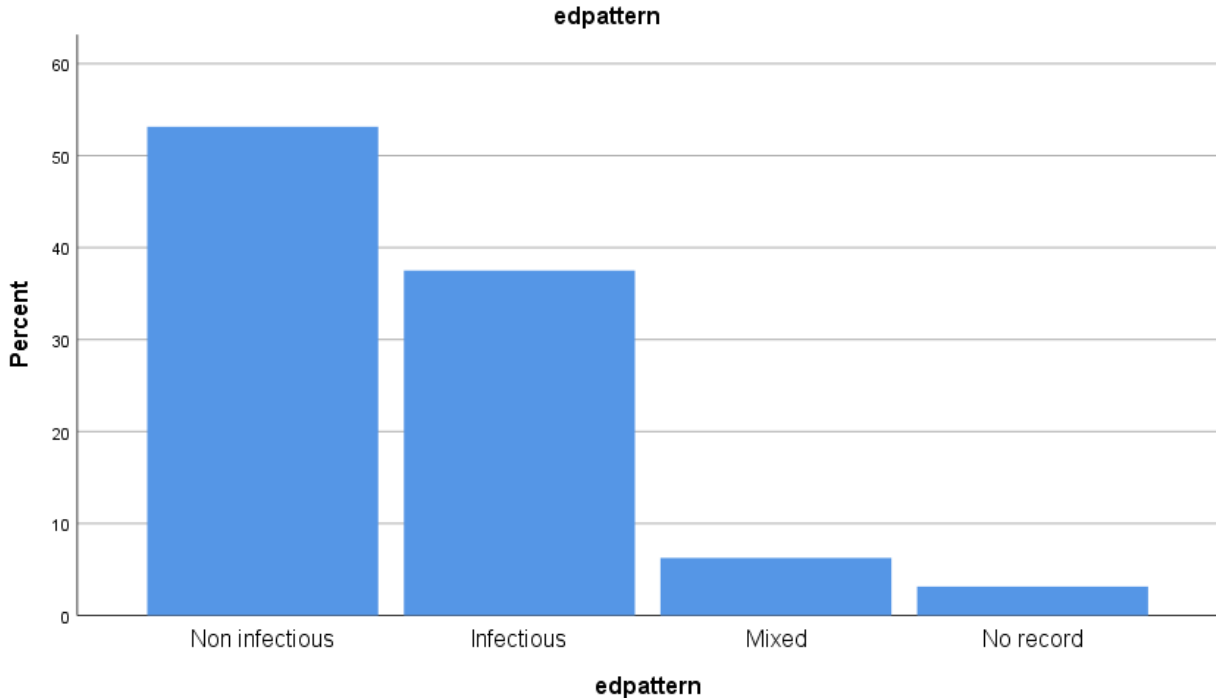
Clinical Characteristics		Frequency	Percentage
Source of Referral	Self	789	38.3
	public HC	748	36.3
	Private HF	311	15.1
	Public Hospital	210	10.2
Frequency of E.D. Visit	First Visit	1647	80
	Repeat	189	9.2
	Unknown	222	10.8
Level of Consciousness at Presentation	Fully conscious	1698	82.6
	Some degree of LOC	173	8.4
	Comatose	103	5
	Not recorded	84	4
Vital signs at presentation	Normal	645	31.3
	Deranged	1314	63.8
	Not recorded	99	4.9
Known Chronic Medical Illness	Yes	377	18.3
	No	1681	81.7
Type of chronic illness	Hypertension	98	26

	DM	211	56
	Asthma	61	16.2
	Malignancy and Other	7	3.8

#### 5.4. The Adult Emergency Department Admissions pattern in selected Government Hospitals in Addis Ababa

About the pattern of adult emergency admissions, noninfectious diseases account for over half, 1080 (52.5%), followed by infectious diseases, 801 (38.9%), and mixed infectious and

noninfectious accounts for 134 (6.5%) of the total case flow of emergency admissions at Yekatit 12 hospital medical college, Melenik comprehensive specialized hospital and Ras desta hospital (Figure 2).



**Figure 2:** Adult Emergency Department Admissions Pattern in selected Government Hospitals in Addis Ababa.

Among the noninfectious diseases, Diabetic Keto-acidosis is the leading cause of adult medical admissions, which account for about 105 (9.7%), congestive heart failure 101 (9.4%), Cerebrovascular accidents/strokes 87 (8.1%), acute asthmatic exacerbations/acute attacks 86 (7.99%), severe hypertension/hypertensive urgencies 76 (7.0%), severe anemias requiring transfusions 69 (6.4%), Deep venous thrombosis 51 (4.8%), acute renal failure 41 (3.8%), ischemic heart diseases/MI 35 (3.3 %) and decompensated CLDs 27 (2.5%) were also significant causes of adult medical E.D. admissions at Yekatit 12 hospital medical college, Melenik comprehensive specialized hospital and Ras desta hospital.

Among the infectious diseases, pneumonia of different severity (171 (21.3%), acute infectious gastroenteritis with hypovolemic states (122 (15.2%), urinary tract infections (58 (7.3%), and non-specified acute febrile illnesses (57 (7.1%) were found to be the leading infectious causes of E.D. admission at Yekatit 12 hospital medical college, Melenik comprehensive specialized hospital and Ras desta hospital.

Regarding organ involvement, organ involvement accounts for 531 (25.8%) of E.D. admission, followed by Respiratory 379 (18.4%), cardiovascular (CVS) 242 (11.7%) and Haematologic 226 (11%), found to be the central organ systems involved in patients with E.D. admission. (Table 3).

**Table 3:** Main organ systems affected by E.D. admission at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital and Ras Desta Hospital.

The central organ system is affected	Frequency	Percentage (%)
Multi-organ involvement	531	25.8
CVS	242	11.7
Respiratory	379	18.4
Renal	108	5.2
Neurology	138	6.7
Gastrointestinal	176	8.6
Endocrine	155	7.5
Haematologic	226	11
Dermatologic/Allergy	103	5
Total	2058	100

**5.5. Clinical outcome of Adult Emergency Department Admissions in selected Government Hospitals in Addis Ababa.**

The large majority of patients admitted to adult medical E.D. at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital and Ras Desta

Hospital were 848 (41.2%) Improved and discharged, followed by those admitted to the General Ward or Critical Care/ICU, which accounts for about 801 (38.9%) of total admissions. The crude death rate at adult emergency department admission was 80 (3.9%).

**Table 4:** Clinical outcome of Adult E.D. admissions at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital, and Ras Desta Hospital.

The outcome of E.D. Admission	Frequency	Percentage (%)
Improved and discharged	848	41.2
Admitted to General Ward or Critical care/ICU	801	38.9
Died in ED	80	3.9
DAMA	33	1.6
Transferred or referred to another hospital	88	4.3
No record	208	10.1

The majority of the patients, 1214 (59%), have stayed for 1-3 days, followed by those who have stayed for < 24 hours, which

accounts for about 300 (14.6%), whereas only 63 (3%) and no record were found in 233 (11.3%) of patients.

**Table 5:** Length of Stay in Adult Medical E.D. admissions at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital and Ras Desta Hospital.

Length of Stay in E.D.	Frequency	Percentage (%)
< 24 hour	300	14.6
1-3 days	1214	59
3-7 days	288	14
> 1 week	63	3
No record found	233	11.3
Total	2058	100

**5.6. The outcome of adult medical E.D. admissions by demographic and clinical characteristics of patients.**

The outcome of patients admitted to adult medical E.D. was found to vary with specific demographic and clinical characteristics of the patients. Adult medical patients in the younger age group (13 -18 years) were found to be 98(86.7%), which indicates a more favorable outcome compared to which they were successfully managed and discharged improved from E.D. with the older (50+ years) patients in which only 163 (28.5%) were discharged improved.

Female patients were found to have more favorable outcomes compared to male Patients, but not statistically significant. The proportion of patients who were Discharged improved was higher among female patients, 433 (46.1%) compared to 415 (27.2%) male. Patients. Furthermore, crude E.D. mortality among male patients 53 (4.7%) was Almost twice that of female patients 27 (2.9%), but not statistically significant (P=0.299). Patients from urban areas were found to have a higher discharge rate of 574 (47.3%) and Lower E.D. mortality of 43 (3.5%) compared with patients from rural areas who had Higher admission rate to wards/ICU 343 (40.6%) and higher mortality 37 (4.4%) but not statistically significant (P=0.299). (Table 6).

The crude E.D. mortality was highest at 33 (5.8%) in patients above 50 years (P=0.005). The highest ward/ICU admission rate of 301 (48.5%) was observed for the elderly patients (50+ years) compared to the younger age groups 7 (6.2%).

**Table 6:** Outcome of adult medical E.D. admissions by Demographic characteristics of patients at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital and Ras Desta Hospital.

Variable group		Patient outcome				DAMA	Total
		Improved and discharged	Admitted to ICU	Died in E.D.	No record /Transferred		
Age	13-18	98 (86.7%)	7 (6.2%)	2(1.7%)	5(4.4%)	1(0.9%)	113
	19-30	321 (43.3%)	261(35.2%)	19(2.6%)	134(18%)	6(8%)	741
	30-50	266 (42.8%)	301(48.5%)	26(4.2%)	24(3.9%)	4(0.6%)	621
	>50	163(28.5%)	232	33(5.8%)	122(21.3%)	22(3.8%)	572
Sex	Male	415(27.2%)	449(40. 2%)	53 (4.7%)	179 (16%)	21(1.9%)	1117



	Female	433(46.1%)	352 (37.4)	27 (2.9%)	116 (12.3%)	12 (1.3%)	940
Residence	Urban	574 (47.3%)	458 (37.8%)	43 (3.5%)	114 (9.4%)	24 (1.9%)	1213
	Rular	301 (35.6%)	343 (40.6%)	37 (4.4%)	155 (18.3%)	9 (1%)	845

A higher E.D. death rate was observed among patients who were admitted to E.D. during their first visit compared with repeat visitors, 69 (4.4%) Vs. 8 (4.2%), but was not statistically significant,  $p < 0.15$ . Patients with deranged vital signs at initial E.D. presentation were found to have a higher E.D. mortality rate compared with patients with typical vital signs 77 (6.3%) Vs. 3 (0.4%),  $p < 0.05$  and higher admission rate to ward/ICUs 569 (46.4%) compared with patients with typical vital signs 214 (33.2%),  $p < 0.05$ .

The outcome of E.D. admission was also worse among patients who were in a coma and those who had some degree of LOC at initial E.D. presentation, with the highest E.D. death rate of 63 (61.1%) and 17 (9.8%) compared with patients who were fully conscious at initial E.D. presentation 3 (0.1%) with  $p < 0.05$ . The E.D. outcome was found also worse among patients with known chronic medical illness 57 (15.1%) compared to patients without known chronic medical illness 13(0.8%) with  $p < 0.05$ . (Table 7).

**Table 7:** Outcome of Adult E.D. Admissions by Clinical Characteristics of Patients at Yekatit 12 Hospital Medical College, Melenik Comprehensive Specialized Hospital and Ras Desta Hospital.

Variable		Clinical outcome					Total
		Improved and discharged	Admitted to ICU	Died in ED	DAMA	No record	
Frequency of E.D. Visit	First Visit	741 (47.5%)	733 (47%)	69 (4.4%)	-	16 (1%)	1559
	Repeat	69(36.5%)	26 (13.8%)	8 (4.2%)	2010.6 %)	66 (34.9%)	189
	Unknown	38 (17.1%)	42 (18.9%)	3(1.4%)	13(5.9%)	127 (5.7%)	222
Vital sign	Normal	421 (65.3%)	214 (33.2%)	3(0.4%)	-	7 (1%)	645
	Deranged	377 (30.8%)	569 (46.4%)	77 (6.3%)	27 (2.2%)	176 (14.4%)	1226
	Not recorded	50 (50.5%)	18(18.2%)	-	6(6%)	25(25.2%)	99
Level of Consciousness at Presentation	Fully conscious	761(47.3%)	657(40.8%)	3(0.1%)	7(0.4%)	190(11.8%)	1610
	Some degree of LOC	53 (30.6%)	67 (38.7%)	17 (9.8%)	24 (13.9%)	12 (6.9%)	173
	Comatose	7 (6.8%)	31 (30%)	63 (61.1%)	2 (1.9%)	-	103
	Not evaluated	27 (32.1%)	46 (54.9%)	-	-	21 (25%)	84
Known chronic medical illness	Yes	122 (32.4%)	131 (34.7%)	57(15.1%)	18(4.8%)	49(%)	377
	No	726(45.6%)	670(42.1%)	13(0.8%)	15(0.9%)	169(10.6%)	1593

## 6. Discussion

The adult medical E.D. admissions in this study were also found to increase progressively with age, reaching a peak between the ages of 19 and 30. This is consistent with similar studies conducted to determine the medical E.D. admission patterns in Nigeria [2] and reflects the higher burden of diseases in the economically productive age group. Noninfectious diseases were found to be more frequent causes of adult E.D. admissions compared with infectious diseases in this study, and this is similar to findings from other studies [2, 8]. This is particularly alarming as it could reflect the rising epidemics of No communicable Diseases (NCDs) in the study area related to changes in lifestyle. Among the NCDs, diabetic keto, congestive heart failure, and cerebrovascular accident (stroke) were found to be the top three leading causes of adult medical E.D. admissions in the hospital. Similar studies conducted in other

countries have also observed the rising burden of NCDs in hospitals [1, 3, 4].

Major infectious diseases were also found to be important causes of adult medical emergencies in the study setting, and this finding is consistent with similar studies [2, 8]. Of note is that pneumonia of various degrees of severity, infectious gastroenteritis with hypovolemic state, and UTI were among the leading causes of medical emergency admissions. This study clearly showed mixed outcomes of adult E.D. medical admissions. A higher proportion of the cases required admissions to the wards/ICUs, indicating the seriousness of the medical emergencies. Over one-third of the adult E.D. admitted patients were successfully managed at E.D. and discharged improved. The crude E.D. 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 E.D. care between these two settings. The mean stay in medical E.D. of 2 days is shorter than reported elsewhere [2, 8]. This could be related to higher admissions to wards and ICUs and better responses to E.D. treatments. This study also revealed that younger medical E.D. patients had better E.D. outcomes than older patients, which is similar to what has

been observed by other studies [8]. This is because elderly patients will have serious diseases related to weak immunity and limited cardiorespiratory reserves.

The study also found that poor outcome was associated with the level of consciousness at E.D. presentation. E.D. mortality was found to be highest among comatose patients compared with patients who were fully conscious at E.D. presentation. This is consistent with findings of other studies in Nigeria and indicates the seriousness of the patient's condition even at presentation. A comma is a poor prognostic sign in general. Similarly, the study also revealed that patients with deranged vital signs at initial E.D. presentation were found to have poor outcomes with higher E.D. mortality rates. Derangement of critical signs is again an indication of a severe illness.

## 7. Conclusions

The pattern of adult medical emergency admissions in Yekatit 12 Hospital, Melenik Comprehensive Specialized Hospital, and Ras Desta Hospital is variable. It indicates that a higher proportion of medical E.D. admissions were due to NCDs, possibly reflecting the rise in the burden of NCDs. Diabetic Ketoacidosis, a largely preventable medical emergency condition, is a leading cause of E.D. admissions.

Pneumonia, AGEs with hypovolemic states, UTIs, and AFIs are among the leading causes of infectious medical emergency admissions. Medical E.D. outcome was affected by specific demographic and clinical characteristics of patients. Over 80% of emergency medical E.D. admissions are either improved/discharged or require further management in the ICU or general ward setting. Medical E.D. mortality was low in the study setting.

## 8. Recommendation

Adult medical E.D. readiness should take into account the rising burden of medical emergencies due to both NCDs and major IDs. However, hospital management and the E.D. staff should emphasize the importance of educating their patients and families on risk reduction to prevent the occurrence of NCD-related medical emergencies. To improve outcomes, proper management protocols for everyday NCD-related medical emergencies must be developed and implemented in adult medical E.D.s. In particular, hospital readiness is required to manage DKA, pneumonia, and stroke properly.

## 9. Strengths and limitations of the study

This study sheds light on the pattern and outcomes of adult medical E.D. admissions in our setting, where such information was scarce as a limitation study was limited to assessing the pattern and outcome of E.D. admissions due to adult medical emergencies. It did not evaluate the status of all other E.D.s in the hospital to give a complete picture of the pattern and

outcome of E.D. admissions in all the departments. Secondly, the study did not assess the outcome of those adult emergency medical patients admitted to ICU or wards.

## ACRONYMS

AGE.....	Acute Gastroenteritis
CCU.....	Critical Care Unit
CHF.....	Congestive Heart Failure
DAMA.....	Discharge Against Medical Advice
DKA.....	Diabetic Ketoacidosis
E.D.....	Emergency Department
ENT.....	Ear Nose Throat
ICU.....	Intensive Care Unit
NCD.....	No communicable Disease
RTA.....	Road Traffic Accident
SSA.....	Sub-Saharan Africa
UK.....	United Kingdom

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