Original article

Medical Admissions and Outcomes at Saint Paul's Hospital, Addis Ababa, Ethiopia: a retrospective study

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Abstract

Background: Globally, trends of medical admission have been changing. This study was carried out to assess the current trend of medical admissions and outcomes in Ethiopia.

Methods: Retrospective review of 840 records of patients admitted to medical ward of Saint Paul hospital during April 1, 2012-March 31, 2013 was done. Ethical approval was obtained from the IRB of the hospital. Data on demographic profiles, reasons for admission, final diagnosis, length of hospital stay and treatment outcomes were recorded by physicians on structured format developed for this purpose. The data were entered & analysed using SPSS software version 20.

Results: Most of the patients were from Addis Ababa. The mean age of patients was 40.9±17.7 years, 470 (56%) of the patients were females and 71% were married. Non-communicable diseases (NCDs) contributed to 51.1% of admissions. Communicable diseases were dominant diagnosis for those groups in 35-44 years of age while non-communicable diseases were dominant diagnosis for those 45-54 years of age and above. The three most common reasons for immediate admission to the hospital were pneumonia 188 (22.4%), tuberculosis 177 (21.1%) and heart failure 134 (16.0%). And the major diagnoses for underlying illnesses during admissions were found to be AIDS 177 (21.1%), hypertension 102 (12.1%), diabetes mellitus 102 (12.1%), atherosclerotic cardio vascular disorders 86 (10.2%), gastrointestinal disorders 56 (6.7%), valvular heart diseases 51 (6.1%), and renal failure 46 (5.5%). Mean duration of stay in medical wards was 12.3 (+/-10) days and it is comparable for communicable diseases and non-communicable diseases. Two third of the medical admissions (66.4%) were discharged improved while mortality was close to one fourth (24.2%). Communicable diseases contributed to two thirds of the mortality (15.6%).

Conclusion: Non-communicable diseases were the major cause of admission to the hospital while communicable diseases contributed to two thirds of the overall mortality predominantly among the younger patients. Health professionals, policy-makers and health planners should recognize the higher morbidity and hospital burden from non-communicable diseases and the higher mortality from communicable diseases. [*Ethiop. J. Health Dev.* 2016; 30(1):50-56]

Key words: Medical admission, communicable and non-communicable, morbidity, mortality, Ethiopia

Introduction

The major causes of admission to medical wards in developing countries were recorded to be communicable diseases, while non-communicable diseases (NCDs) are major causes of admission in developed countries (1-3). Looking forward however, World Health Organization (WHO) predicts that by 2020, causes of diseases as well as deaths in sub-Saharan Africa will substantially transits towards NCDs and away from infectious diseases (1).

The pattern of medical disease diagnoses varies in different regions of the world. A changing pattern towards non-communicable disease has been observed in various studies from different countries including developing countries (2, 3). However, this has not been well studied among adults in sub-Saharan Africa (4).

Before 21st century, infectious diseases accounted for most of the morbidities and mortalities among medical admission facilities across Africa (5). However, as a result of the epidemiologic transition, non-communicable diseases like cardiovascular diseases, hypertension and diabetes mellitus are attaining prevalence of heightened proportion possibly due to change in life style like sedentary life and obesity (2, 3). A Nigerian study from federal medical center of Asab, November 2005-October 2007 analysed 1860 patients' records and found that causes of admissions in order of importance were hypertension, diabetes mellitus, and HIV /AIDS (6).

Several studies from Ethiopia in the remote past analysed medical admissions reported that infectious diseases were the leading causes of medical admissions. One of these is a study conducted at Princess Tsehai Memorial Hospital, from 1964 to 1967reported that acute febrile illnesses, gastrointestinal infections, pulmonary infections as the leading causes of medical admissions (5). The other study conducted at Gondar Teaching hospital from 1971 to 1972 revealed that of the 35% admissions due to medical conditions, 34.4% were due to communicable diseases (7). Likewise, a study conducted at Tikur Anbesa Hospital has revealed that only 6.6% of medical admissions were due to cardiovascular disorders (8).

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Hence, the aim of this study was to assess the existing pattern and outcome of medical admissions at the St. Paul's hospital.

Methods

Study design and period: A retrospective, longitudinal study was conducted at Saint Paul's hospital millennium medical college. Medical records from 2012 to 2013 were reviewed. Saint Paul Hospital is one of the specialized referral public hospitals in Addis Ababa with a bed capacity of about 350, of which 71 beds are allocated to medical wards. The hospital has outpatient and inpatient wards that provide different services including intensive care unit. The hospital receives referrals from all over the country.

All complete records of patients admitted to the medical ward during the study period were included and reviewed.

Data collection and instrument: Physicians were trained to complete data collection format to record relevant data. A total of 840 records of patients admitted to the hospital medical ward during the study period were included in the study.

The aim of this study was to assess causes, and outcomes of patients' admissions to the hospital. The data included patient demographic characteristics, reason(s) for admission (i.e. principal/provisional diagnosis at discharge), any additional diagnosis, and outcome of admission to Saint Paul's hospital, and duration of hospital stay. Co-morbidities were also included. The diseases were categorized using Version 10.0 of the WHO International Classification of Diseases (ICD) coding system (9). Diseases were classified into communicable and non-communicable categories based on the definitions used by the WHO and the Centres for Disease Control and Prevention (10, 11).

Data entry, processing and analysis: Data were entered into and analysed using IBM SPSS Statistics 21 and Excel 2013.Descriptive analysis was carried out using standard univariate techniques and reported as percentages with Odds ratios (OR) with 95%confidence intervals (95% CI), means with standard deviation (SD) or medians with interquartile range (IQR). Univariate analysis for categorical data was done using Chi- square test. We considered p-value less than 0.05 to indicate statistical significance and all tests were two-sided.

Ethical clearance: Ethical clearance was obtained from institutional review board (IRB) of Saint Paul Hospital Millennium Medical College. Permission was also obtained from the hospital administration to retrieve and review patients' records. Following permission, records were reviewed since patient consent was not necessary. We kept all information obtained confidential and data was used only for the purposes of this study.

Results

A total of 840 patients were admitted to the medical wards of Saint Paul's Hospital Millennium Medical College during April 1, 2012-March 31, 2013. The mean age of patients was 40.9±17.7 years and the median age was 37 years. Most of the patients 470 (56%) were females and more than 70% were married and residents of Addis Ababa. Four hundred and thirty nine (52.3%) were paying patients while the rest were under free medical care (Table 1).

Table 1: **Socio-demographic characteristic of the patients, 2012/2013 (N= 840)**

Variables	Frequency	Per cent
Age		
15-24	150	17.9
25-34	212	25.2
35-44	159	18.9
45-54	113	13.5
55-64	80	9.5
65+	126	15.0
Mean (SD)	40.94 (17.73)	
Sex		
Male	370	44.0
Female	470	56.0
Marital status (n=566)		
Single	156	27.6
Married	402	71.0
Other	8	1.4
Address		
Addis Ababa	590	70.2
Out of Addis Ababa	250	29.8
Type of services		
Free service	401	47.7
Paying	439	52.3

Disease pattern: Non-communicable diseases (NCDs) contributed to 429 (51.1%) of the overall admissions while communicable diseases contributed to 376 (44.8%) of the admissions (Table 2). Final diagnosis was not settled in 35 (4.1%).

It was found that, the main reasons for immediate admissions to the hospital were pneumonia 188 (22.4%), tuberculosis 177 (21.1%) and heart failure 134(16.0%) (Table2).

Table 2: **Pattern of medical admissions by gender, SPH, 2012/2013 (N= 840)**

Diagnostic group	Total n (%)	Male n (%)	Female n (%)	95% CI
Communicable vs NCDs				
Communicable diseases	376 (44.8)	167 (20.4)	209 (25.5)	0.78-1.4
Non-communicable diseases (NCDs)	429 (51.1)	193 (23.5)	236 (28.8)	0.8-1.4
Diagnosis not settled or missing	35 (4.1)	10 (1.1)	25 (3.0)	
Pulmonary and Infectious Diseases				
HIV/AIDS	177 (21.1)	71 (8.5)	106 (12.6)	0.58-1.1
Tuberculosis	177 (21.1)	86 (10.2)	91 (10.8)	0.9-1.8
Pneumonia	188 (22.4)	81 (9.6)	107 (12.7)	0.69-1.3
Bronchial asthma/COPD	14 (1.7)	6 (0.7)	8 (1.0)	0.34-2.8
HIV related OIs other than TB	22 (2.6)	10 (1.2)	12 (1.4)	0.45-2.5
Other infectious diseases	86 (10.2)	52 (6.2)	34 (4.0)	1.33-3.3
Cardiovascular, Neurologic Disorders and CV risk factors				
Heart failure	134 (16.0)	46 (5.5)	88 (10.5)	0.42-0.9
Atherosclerotic CV disorders (IHD, CVA, PAD)	86 (10.2)	48 (5.7)	38 (4.5)	1.1-2.7
VHD	51 (6.1)	14 (1.7)	37 (4.4)	0.25-0.86
Hypertension	102 (12.1)	45 (5.4)	57 (6.8)	0.66-1.5
Other CV disorders	37 (4.4)	14 (1.7)	23 (2.7)	0.39-1.5
Diabetes Mellitus	102 (12.1)	56 (6.7)	46 (5.5)	1.1-2.5
Other neurologic disorders	21 (2.5)	10 (1.2)	11 (1.3)	0.49-2.8
Gastrointestinal Disorders	56 (6.7)	29 (3.5)	27 (3.2)	0.8-2.4
CLD with complications	32 (3.8)	21 (2.5)	11 (1.3)	1.2-5.3
Hematology and oncologic disorders	10 (1.2)	3 (0.4)	7 (0.8)	0.14-2.1
Renal failure	46 (5.5)	17 (2.0)	29 (3.5)	0.4-1.4
Poisoning and psychiatric disorders	13 (1.5)	3 (0.4)	10 (1.2)	0.1-1.4

The major diagnoses for underlying illnesses during admissions were HIV/AIDS for 177 (21.1%), hypertension for 102 (12.1%), diabetes mellitus for 102 (12.1%), atherosclerotic cardiovascular disorders for 86 (10.2%), gastrointestinal disorders for 56 (6.7%), valvular heart diseases for 51 (6.1%), and renal failure for 46 (5.5%) of the patients.

As shown in Figure 2, admissions to hospital because of HIV/AIDS and tuberculosis were mainly among those below the age of 45 years, while the distribution of pneumonia, gastrointestinal disorders and renal failure remained relatively uniform across age groups.

There is no statistically significant difference between male and female. As can be seen in Figure 1, the peak age for communicable diseases is 25 -34 years, which declines across ages older than 34 years. For non-communicable diseases, the proportion continued to increase until its peak age group of 55-64 years. Communicable diseases were the dominant diagnosis in the category of 35-44 years of age while non-communicable diseases were the dominant among those 45-54 years of age and above.

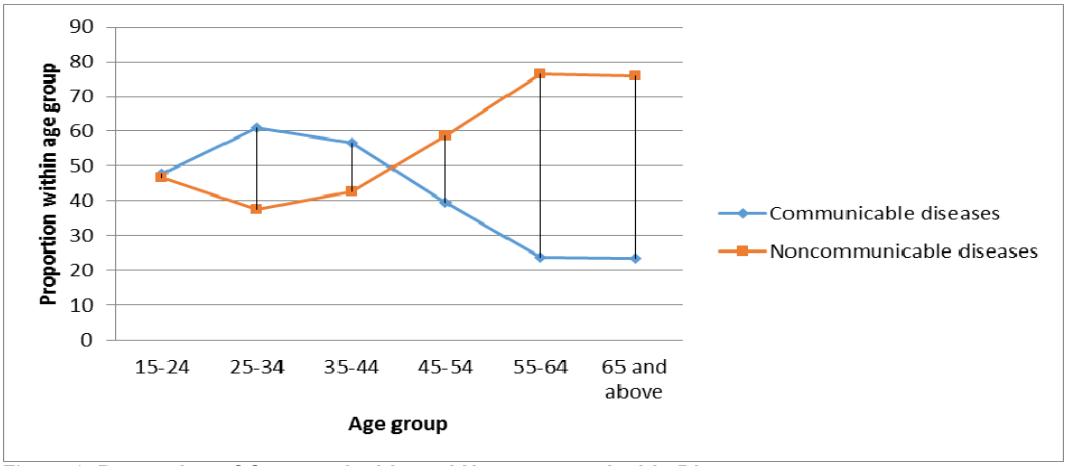

Figure 1: **Proportion of Communicable and Non-communicable Diseases across age groups**

Similarly, valvular heart disease showed declining trend with increasing age. However, the proportion of heart failure, hypertension, atherosclerotic cardiovascular and related disorders and diabetes showed an increasing trend after the age of 45 years as shown in Figure 2.

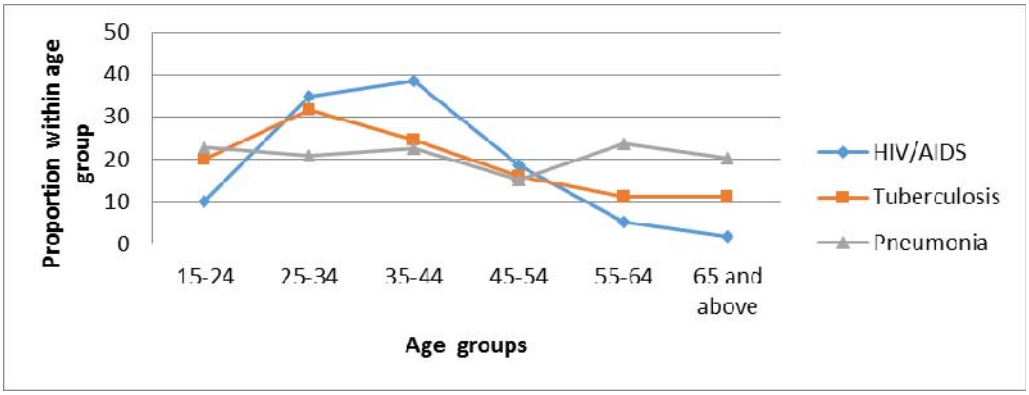

Figure 2A: **Proportion of major Communicable diseases by age group**

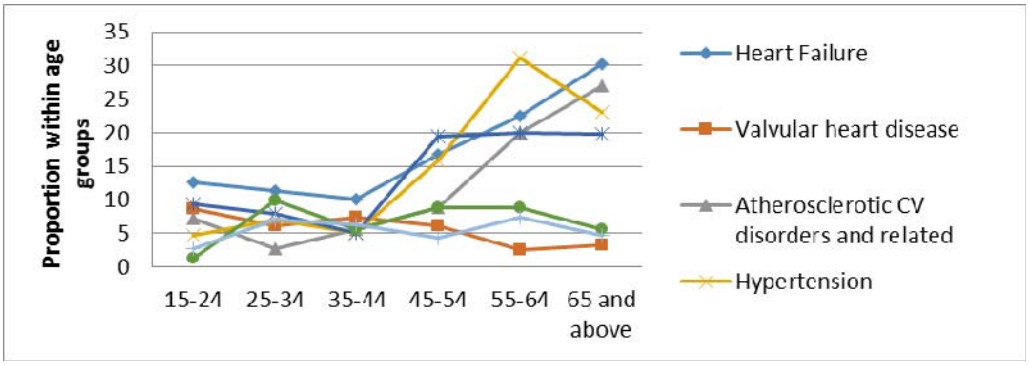

Figure 2B. **Proportion of Major NCDs by age group**

Duration of Hospital Stay: The mean duration of stay in the medical wards was 12.3 (+/-10) days [95% CI: 11.6 – 13.0]. The duration of hospital stay for 589 (70%) of patients was0-14 days while 55 (6.6%) patients stayed in the wards for one or more month. The remaining 196 (23.3%) stayed for 15-28 days.

The mean duration of hospital stay for non-communicable diseases (12.4 +/- 9.72 days) is similar to that of communicable diseases (12.36 +/- 10.48 days). The mean hospital stay was longest among the communicable diseases in those with tuberculosis (13.45 +/- 11.56 days) or HIV/AIDS (12.75 +/- 9.66 days). Among those admitted for the non-communicable diseases, those admitted with chronic liver diseases with complications (17.6 +/- 15.46 days), atherosclerotic cardiovascular diseases like stroke and ischemic heart disease (12.9 +/- 8.2 days) and diabetes mellitus with complications (13.36 +/- 10.06) had the longer hospital stay.

Outcome of the Hospital Admission: Two third of the medical admissions (66.4%) were discharged with improved outcome. The overall mortality was close to one fourth (24.2%). Communicable diseases contributed to two thirds of the mortality (15.6%) while those discharged with improved outcome were predominantly those admitted with non-communicable diseases requiring longer hospital stay. Those whose condition did not change or has deteriorated at discharge constituted for 6% and those referred to other centers were 3.2% of the medical admissions.

Mortality was significantly higher in the age groups 25 – 34 years [OR 1.72 (1.2-2.85)] and 35 - 44 years [OR 1.75 (1.1-3.0)] as shown in Table 3. There is no significant difference between male and female. Mortality was significantly higher in those admitted primarily with communicable diseases than those with non-communicable diseases. Those patients with admission diagnoses of HIV/AIDS, tuberculosis, pneumonia, and other HIV related opportunistic infections had significantly higher mortality. In contrast, those with diabetes mellitus at admission had significantly lower mortality.

Table3: **Mortality by gender, age group and confirmed diagnostic group, SPH, 2012/2013**

Variable	Mortality	
	N (%)	COR (95% CI)
Gender (N = 840)		
Male	86 (10.5)	1.05 (0.76-1.4)
Female	113 (13.8)	1.00
Age groups (N = 199)		
15-24	27 (18.0)	1.00
25-34	58 (27.4)	1.72 (1.2-2.85)
35-44	44 (27.7)	1.75 (1.1-3.0)
45-54	24 (21.2)	0.51 (0.44-1.5)
55-64	19 (23.8)	0.30 (0.36-1.4)
65+	27 (21.4)	0.48(0.44-1.5)
Confirmed Diagnostic group		
Communicable vs NCDs		
Communicable diseases	124 (63.3)	2.55 (1.84-3.54)
Non-communicable diseases (NCDs)	68 (34.7)	1.00
Pulmonary and Infectious Diseases		
HIV/AIDS	74 (38.5)	3.1 (2.17-4.42)
Tuberculosis	62 (32.3)	2.1 (1.44-2.97)
Pneumonia	61 (31.8)	1.79 (1.25-2.56)
Other HIV related OIs	17 (8.9)	11.88 (4.33-32.64)
Other infectious diseases	23 (12.0)	1.2 (0.72-2.0)
Cardiovascular, Neurologic Disorders and CV risk factors		
Heart failure	24 (12.1)	0.7 (0.4 -1.1)
Atherosclerotic CV disorders (IHD, CVA, PAD)	16 (8.0)	0.7 (0.4-1.3)
VHD	7 (3.5)	0.5 (0.2-1.1)
Hypertension	17 (8.5)	0.6 (0.4-1.1)
Diabetes Mellitus	5 (2.5)	0.3 (0.1-0.7)
Gastrointestinal Disorders		
CLD with complications	11 (5.5)	1.7 (0.8-3.6)
Renal failure	12 (6.0)	1.1 (0.6-2.3)

***Others:** Bronchial asthma/COPD (2), Other CV disorders (3), other neurologic disorders (4), Haematology and oncologic disorders (1), Poisoning and psychiatric disorders (1)

Heart failure, atherosclerotic cardiovascular disorders, diabetes mellitus and Chronic liver diseases with complications are significantly more common in males while valvular heart disease was significantly more common cause of admission in females than males.

Discussion

This study showed that Non-communicable diseases (NCDs) were predominant reasons for admission to the hospital. This finding is in agreement with similar studies on hospital admissions conducted in Nigeria and South Africa and recently in Sudan (2, 6, 12, 13).

However, previous studies from Addis Ababa and Gondar in Ethiopia have indicated that the major reasons for medical admissions were communicable diseases (5, 7, 8). A systematic review of Medical causes of admissions to hospital among adults in Africa by Etyang et al, infectious and parasitic diseases followed by circulatory disorders were the major causes of admission to hospitals (14).

Similarly, previous studies carried out in Jimma, Ethiopia, Sudan and Pakistan indicated that communicable diseases were more prevalent (15-17). Bhandari et al from Nepal also reported that non-communicable diseases accounted for less than a third of hospital admissions in non-specialist tertiary level hospitals (18).This is an indication of the changing pattern of diseases and consequent admissions. As most of the study participants are from urban area, the effect of urbanization on life style changes including reduced physical activity, dietary changes and a rise in the rate of obesity may explain the increasing proportion of non-communicable diseases. The increasing reports of higher prevalence of hypertension from Ethiopia and Sudan are supportive evidences for the rising risk factors of non-communicable diseases (2, 19-21).

The average duration of hospital stay in our study is about two weeks which is longer than what was reported in the study from Nepal, Pakistan and Sudan (16, 17). This could be explained by the fact that most communicable diseases presented later in Ethiopia and the non-communicable diseases presented with complications that require longer hospital stay. The differences in health care supplies and competence could also explain these differences. The mean duration of stay in the medical wards was comparable for communicable diseases and non-communicable diseases. This is in contrast to reports of longer hospital stay with non-communicable diseases than communicable diseases from Nepal and Nigeria (6, 12, 18).

However, similar to findings from Nigeria, the longest hospital stay among communicable diseases was for those with tuberculosis and/or AIDS. Patients with AIDS were seriously sick and majority of the AIDS patients were newly diagnosed and presented at advanced stages of the disease with opportunistic infections (4, 12, 13). From patients with non-communicable diseases, those admitted with chronic

liver disease with complications, atherosclerotic cardiovascular diseases like stroke and ischemic heart disease and diabetes mellitus with complications had the longest hospital stay. These diseases are related with disabilities and accompanying complications that require longer hospital stay than the other medical conditions (22-24).

This study also revealed high mortality (24.2%) of those admitted which is higher than reports from western world (25) and reports from Jimma, Sudan and other African countries (6, 14, 15, 26). The higher mortality, particularly from communicable diseases in our case might indicate that patients presented late in the disease course. The differences may be due to the differences in the types and severity of admitted cases. It is, however, comparable to the finding from a systematic review of other African countries where they reported as high as 23.9% and 25%mortality in communicable and non-communicable diseases, respectively (3, 14, 27).

Mortality was significantly higher in the age group 25-44 years. Communicable diseases contributed to two thirds of the in-hospital mortality. Causes of death were mainly found to be associated with HIV/AIDS, tuberculosis, pneumonia and other HIV related opportunistic infection which is in agreement with studies conducted in similar other African countries (14, 27-29).

Similar to the finding from Sudan (2), those discharged with improved outcomes were predominantly those with non-communicable diseases.

Limitation of the study: As it was a retrospective hospital-based study, problems associated with incomplete medical recordkeeping, missing data and under-reporting were encountered. We excluded records of patients with missing data. And more than 150 charts which were eligible could not be retrieved from the hospital archives. While acknowledging this shortcoming however, access to reliable data is not always feasible in resource poor countries like Ethiopia where data such as those reported here constitute the best available alternative. Another limitation was the short one-year duration of the study period; conducting such studies for a longer period of time would provide stronger evidence for these findings. In view of the above, this study may not necessarily reflect the actual disease pattern in the community as a whole. However, in spite of these limitations, this study has demonstrated the ongoing epidemiologic transition of diseases and constitutes a basis for further prospective studies on hospital admission patterns.

Conclusion:

In this study, we found that non-communicable diseases were the major cause of admission to the hospital while communicable diseases contributed to two thirds of the overall mortality, predominantly among the younger patients. Health professionals, policy-makers and health planners should be informed of the higher hospital burden of non-communicable diseases and the higher mortality from communicable diseases. Scaling up preventive measure for communicable diseases and non-communicable diseases, public awareness on the early seeking of medical care and capacity building, human or material, at all levels to address the already dominant non-communicable diseases cannot be over-emphasized.

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