

# Pattern of Medical Admissions at Enugu State University of Science and Technology Teaching Hospital: A 5 Year Review

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## Abstract

**Background:** Rapid urbanization and changing lifestyle have modified the profile and pattern of various medical disorders in many Nigerian communities. Surveys of medical admissions into various Nigerian health institutions show an increasing burden of non-communicable diseases in our communities. **Aim:** To determine the profile and pattern of medical cases admitted and their outcome in a new tertiary medical institution in South East Nigeria. **Materials and Methods:** A review of medical admissions into the Enugu State University of Science and Technology Teaching Hospital (ESUTTH), Enugu, Nigeria over 5 years between January 1, 2006 and December 30, 2010 was undertaken. Morbidity and mortality data were obtained from ward registers and subsequently medical record registers. Classifications of medical disorders were grouped using ICD 10 coding system. **Results:** A total of 3,865 case records were analyzed. Males were 2,312/3,865 (59.6%) and females 1,660/3,865 (40.2%). The age range was 14-105 years with a mean age of 54.3 (18.1) years. The 4 commonest causes of medical ward admissions were neurological disorders-850/3,865 (22%), endocrine disorders-735/3,865 (19.1%), cardiovascular disorders-718/3,865 (18.5%) and infectious diseases-604/3,865 (15.6%). The diseases encountered most were diabetes mellitus-735/3,865 (19.1%), hypertension/congestive cardiac failure-703/3,865 (18.2%), strokes-614/3,865 (15.9%) and human immunodeficiency virus (HIV)/AIDS-503 (13.1%). The overall mortality was 766/3,865 (19.8%) men-467/2,312 (20.2%); women-299/2,312 (19.3%). Strokes accounted for most of the deaths-171/766 (22.3%) followed by HIV/AIDS 127/766 (16.6%). Hypertension/cardiac failure and diabetes each accounted for 116/766 (15.1%) of all deaths. Case fatality rates for strokes and HIV/AIDS were the highest (171/614 (27.9%) and 127/503 (25.2%) respectively). Mortality rate was highest in the above 70 years age group. **Conclusion:** Non-communicable disorders are the commonest causes of medical ward admission in this tertiary institution. Efforts aimed at primary prevention will help to reduce the burden of these disorders in the community.

**Keywords:** Cardiovascular disorders, Human immunodeficiency virus, Medical ward admissions, Neurological disorders, Nigeria

## Introduction

Rapid urbanization and changing lifestyle have modified the profile and pattern of various medical disorders in many Nigerian communities. The theory of epidemiological transition<sup>[1]</sup> stresses the complex change in patterns of health and disease and on the interactions between these patterns and their demographic, economic and sociologic determinants and consequences. Surveys of medical admissions into various Nigerian health institutions indicate the rising burden of non-communicable

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diseases in our communities.<sup>[2-8]</sup> The rising prevalence of non-communicable diseases and the emergence of Human immunodeficiency virus (HIV) support the above theory (HIV may be regarded as man-made disease due to breakdown in social norms because of increasing urbanization and westernization of the Nigerian communities). This study aims to determine the profile and pattern of medical cases admitted and their mortality at the Enugu State University of Science and Technology Teaching Hospital in South East Nigeria

## Materials and Methods

### Setting

The study was carried out in the medical wards of the Enugu State University of Science and Technology Teaching Hospital (ESUTTH), Enugu, Nigeria. The hospital was upgraded to a teaching hospital in 2005, and it is the second largest health care facility in Enugu which is the capital of Enugu state. At inception the hospital had a 36-bed capacity dedicated to medical cases. However at present, the bed capacity for medical admissions is 50. Medical patients in the ESUTTH are routinely admitted into any of the female and male medical wards and come from more than 5 states of the federation. In addition, medical patients may be admitted into surgical and gynecological wards when there are insufficient bed spaces in the regular medical wards.

We undertook a 5-year review of medical admissions into the ESUTTH Enugu, Nigeria between January 1, 2006 and December 30, 2010. Morbidity data was obtained from the respective ward registers and, subsequently, medical record registers. Mortality data were also obtained from the same sources, as well as from the ward copies of death certificates. The sampling approach was to review all (100%) admissions and mortalities within the period under review. These admissions were evaluated retrospectively for patients' demographic details, duration of admission, diagnoses and outcome. In case of death, the cause (s) of death were obtained for all cases and data included date and cause of death. Only

cases admitted into the three medical wards were included. In cases of incomplete data or conflicting diagnoses such patients were excluded. For ease of classification, medical diagnoses were grouped using ICD 10 coding system.<sup>[9]</sup> ICD 10 coding was done by trained medical record officers of the medical records department of the hospital. Primary and secondary diagnosis (medical comorbidity) on discharge was recorded. In cases of repeated admissions of the same individual, they were recorded as different cases (admissions). Income, distance from the medical facility, as well as level of education of patients were not included in the hospital register thus were not included in the analysis. Data on occupation was incomplete and was not included in the analysis. Ethical clearance was obtained from the ethics committee of the Enugu State University of Science and Technology Teaching Hospital. Data was manually sorted and coded in a personal computer. Statistical analysis was done using SAS software SAS Institute, Cary, NC, USA, version 9.2.

## Results

A total of 4,447 patients were admitted during the period under review. Out of this number 582 were excluded because of incomplete data or unavailable records and the remaining 3,865 (86.9%) were analyzed. Males were 2,312 (59.8%) and females 1,553 (40.2%); the male female ratio was 1.5:1. Most patients were city dwellers 2,510 (64.9%) and the rest (34.1%) came from surrounding towns and villages. The age range was 14-105 years with a mean age of 54.3 (18.1) years (men 53.1 (18.2), and women 51.7 (17.9),  $P < 0.01$ ) and a median age was 55 years. The peak decade of admission was the 6<sup>th</sup> decade (19.8%). The number of days spent on admission ranged from 24 h to 91 days with a mean of 7.7 (6.7) days.

The total number of cases reported among the 3,865 patients admitted was 5,486. Primary diagnosis were 3,865 (70.5%) and 1,621 (29.5%) had a second or third diagnosis (medical comorbidity). The age distribution of medical disorders is shown in Table 1. The 4 commonest causes of medical ward admissions 5 primary diagnosis) were diseases of the

**Table 1: Distributions of medical disorders admitted into the medical wards of the hospital by age groups**

Disorder	<20	21-30	31-40	41-50	51-60	61-70	>70 years	Total
*NDs	26 (3.1)	41 (4.8)	64 (7.5)	145 (17.1)	203 (23.9)	206 (24.2)	165 (19.4)	850 (22)
†DM	11 (1.5)	52 (7.1)	57 (7.8)	144 (19.6)	186 (25.3)	166 (22.6)	119 (16.2)	735 (19.1)
‡CVDs	9 (1.3)	35 (4.9)	55 (7.7)	117 (16.3)	171 (23.8)	179 (24.9)	152 (21.2)	718 (18.5)
#IDs	37 (6.1)	153 (25.3)	150 (24.8)	111 (18.4)	57 (9.4)	42 (6.9)	51 (8.4)	604 (15.6)
**GITDs	28 (6.1)	105 (22.7)	65 (14.1)	87 (18.8)	72 (15.6)	65 (14.1)	40 (8.7)	462 (12)
††ResDS	4 (1.6)	31 (12.6)	33 (13.4)	48 (19.4)	45 (18.2)	40 (16.2)	46 (18.7)	247 (6.4)
Renal	12 (10.7)	30 (26.8)	19 (17)	10 (8.9)	17 (15.2)	13 (11.6)	11 (9.8)	112 (2.9)
Hematology	16 (21.9)	20 (27.4)	13 (17.8)	6 (8.2)	6 (8.2)	6 (8.2)	6 (8.2)	73 (1.9)
Dermatology	1 (7.1)	1 (7.1)	1 (7.1)	3 (21.4)	2 (14.3)	2 (14.3)	4 (28.6)	14 (0.4)
**P/E	0	1 (14.3)	1 (14.3)	3 (42.9)	2 (28.6)	0	0	7 (0.2)
Others	2 (4.7)	4 (9.3)	8 (18.6)	10 (23.3)	6 (14)	8 (18.6)	5 (11.6)	43 (1.1)
	146 (3.8)	473 (12.2)	466 (12.1)	684 (17.7)	767 (19.8)	727 (18.8)	602 (15.6)	3865 (100)

\*NDs: Neurological disorders, †DM: Diabetes, ‡CVDs: Cardiovascular disorders, #IDs: Infectious disorders, \*\*GITDs: Gastrointestinal disorders, ††ResDS: Respiratory disorders, \*\*P/E: Poisoning and evenomation

neurological disorders (NDs), diabetes (DM), cardiovascular disorders (CVDs) and infectious diseases (IDs). The peak decades of admission for the first three disorders were 6<sup>th</sup> and 7<sup>th</sup>, much lower than that of IDs which peaked at the 2<sup>nd</sup> and 3<sup>rd</sup>. Gastrointestinal disorders (GITDs) showed bimodal distribution in rates of admission. Overall, the rates of admission increased with increasing age. Other medical comorbidities reported among the patients are shown in Table 2. CVDs (primarily hypertension) were the commonest disorder occurring in people with diabetes and neurological disorders. Diabetes and hypertension occurred in 702 out the 850 (82.6%) subjects with various neurological disorders, especially stroke patients. See table 2. The third commonest comorbidity diagnosed was HIV primarily in patients with respiratory disorders.

DM was the only endocrine disorder admitted into the wards. The disease entities encountered most were DM 735 (19%), hypertension/congestive cardiac failure (HBP/CCF) 703 (18.2%), strokes 614 (15.9%) and HIV/AIDS 503 (13.1%). HIV/AIDS and strokes caused 83.3% and 72.2% of admission due to IDs and NDs, respectively. Other neurological disorders

**Table 2: Distribution of medical comorbidities (secondary diagnosis) in patients with different disorders**

	Hypertension	Diabetes	HIV	Total
*NDs	398 (30.9)	304** (100)		702
†DM	413 (32.1)			413
#IDs	127 (9.9)			127
**GITDs	155 (12.0)			155
**ResDs	113 (8.8)		29 (96.7)	142
Renal	32 (2.5)			32
Hematology	17 (1.3)			17
Dermatology	9 (0.7)		1 (0.3)	9
Others	23 (1.8)			23
Total	1287	304	30	1621

\*NDs: Neurological disorders, †DM: Diabetes, †CVDs: Cardiovascular disorders, #IDs: Infectious disorders, \*\*GITDs: Gastrointestinal disorders, \*\*ResDs: Respiratory disorders, \*\*Stroke patients with diabetes and hypertension were 167 (27.2%)

encountered were meningitis-61, status epilepticus-57, tetanus-23 and dementias-21 which made up 7.2%, 6.7%, 2.7%, and 2.5% of neurological admissions respectively. Cord lesions, rabies, Guillaine Barré syndrome, motor neuron disease and headache made up the remaining. The distribution of various disorders by age group is shown in Table 1. Rates of admissions were similar for males and females however IDs were relatively higher in women than men (16.4% vs. 15.1%) (Table not shown).

The distribution of medical admissions over the 5 years under review is shown in Table 4. For the four commonest disorders, the rates of admission and outcome did not show any clear pattern over the 5 year period. The distribution of medical admissions among urban and rural dwellers is shown in Table 3. There were significant differences between the rates of admissions for most medical disorders from urban and rural areas; however the overall difference in outcome was not significantly different.

**Table 3: Distribution of medical ward admission among urban and rural dwellers**

	Urban	Rural	P value
*NDs	561 (22.4)	287 (21.2)	<0.001
†DM	505 (20.1)	227 (16.8)	<0.001
†CVDs	448 (17.8)	266 (19.6)	<0.001
#IDs	392 (15.6)	211 (15.6)	<0.001
**GITDs	296 (11.8)	166 (12.3)	<0.001
**ResDs	153 (6.1)	94 (6.9)	<0.001
Renal	70 (2.8)	42 (3.1)	0.00
Hematology	44 (1.8)	29 (2.1)	0.08
Dermatology	10 (0.4)	4 (0.3)	0.11
**P/E	4 (0.2)	3 (0.2)	0.70
Others	27 (1.1)	26 (1.9)	0.53
Total	2510 (64.9)	1355 (34.1)	<0.001
Alive	2510 (80.8)	1074 (79.3)	
Dead	482 (19.2)	281 (20.7)	0.25

\*NDs: Neurological disorders, †DM: Diabetes, †CVDs: Cardiovascular disorders, #IDs: Infectious disorders, \*\*GITDs: Gastrointestinal disorders, \*\*ResDs: Respiratory disorders, \*\*P/E: Poisoning and envenomation

**Table 4: Distribution of medical admissions over the five year period under review**

	2006	2007	2008	2009	2010
*NDs	184 (19.5)	244 (24.6)	205 (23.6)	115 (22.2)	100 (18.7)
†DM	186 (19.7)	173 (17.4)	174 (20)	82 (15.7)	117 (21.8)
†CVDs	169 (17.9)	165 (16.6)	175 (20.1)	102 (19.5)	103 (19.2)
#IDs	165 (17.5)	173 (17.4)	109 (12.5)	78 (14.9)	78 (14.6)
**GITDs	121 (12.8)	114 (11.5)	104 (12)	74 (14.2)	49 (9.1)
**ResDs	50 (5.3)	57 (5.7)	55 (6.3)	39 (7.5)	46 (8.6)
Renal	22 (2.3)	32 (3.2)	23 (2.6)	12 (2.3)	23 (4.3)
Hematology	24 (2.5)	19 (1.9)	9 (1)	11 (2.1)	10 (1.9)
Dermatology	-	5 (0.5)	3 (0.3)	3 (0.6)	3 (0.6)
**P/E	4 (0.4)	1 (0.1)	-	-	2 (0.4)
Others	19 (2)	10 (1)	13 (1.5)	6 (1.2)	5 (0.9)
Total	944	933	870	522	536
Alive	821 (81.5)	869 (80.5)	708 (78.1)	443 (78.1)	456 (82.8)
Dead	186 (18.5)	210 (19.5)	199 (21.9)	124 (21.9)	95 (17.2)

\*NDs: Neurological disorders, †DM: Diabetes, †CVDs: Cardiovascular disorders, #IDs: Infectious disorders, \*\*GITDs: Gastrointestinal disorders, \*\*ResDs: Respiratory disorders, \*\*P/E: Poisoning and envenomation

**Table 5: Distributions of deaths caused by various medical disorders by age groups**

Disorder	<20	21-30	31-40	41-50	51-60	61-70	>70 years	Total
*NDs	3 (1.3)	9 (4)	16 (7.1)	30 (13.3)	51 (22.7)	58 (25.8)	58 (25.8)	225 (29.4)
*DM	1 (0.9)	6 (5.1)	8 (6.8)	21 (17.9)	32 (27.4)	28 (23.9)	21 (17.9)	117 (15.3)
†CVDs	3 (2.5)	2 (1.7)	9 (7.6)	19 (16.1)	25 (21.2)	32 (27.1)	28 (23.9)	118 (15.4)
#IDs	8 (5.7)	31 (22.3)	42 (30.2)	24 (17.3)	11 (7.9)	10 (7.2)	13 (9.4)	139 (18.1)
††GITDs	9 (10)	15 (16.7)	14 (15.6)	16 (17.8)	17 (18.9)	5 (5.6)	14 (14.7)	90 (11.6)
**ResDS	1 (2.4)	3 (9.7)	4 (9.8)	6 (14.6)	9 (22)	13 (31.7)	5 (12.2)	41 (5.4)
Renal	3 (14.3)	4 (19)	1 (5.8)	0	0.5 (23.8)	6 (28.6)	2 (9.5)	21 (2.7)
Hematology	0	2 (20)	4 (40)	1 (10)	0	1 (10)	2 (20)	10 (1.3)
Dermatology	0	0	1 (100)	0	0	0	0	1 (0.1)
**P/E	0	1 (100)	0	0	0	0	0	1 (0.1)
Others	0	0	3 (100)	0	0	0	0	3 (0.4)
	28 (3.7)	72 (9.4)	102 (13.3)	118 (17.3)	150 (19.8)	153 (20)	143 (18.8)	766 (100)

\*ND: Neurological disorders, \*DM: Diabetes, †CVDs: Cardiovascular disorders, #IDs: Infectious disorders, ††GITDs: Gastrointestinal disorders, \*\*ResDS: Respiratory disorders, \*\*P/E: Poisoning and evenomation

**Table 6: Distributions of medical admissions and death by gender and age groups**

	Males		Females		Total
	Alive	Dead	Alive	Dead	
<20	77 (83.7)	15 (16.3)	41 (75.9)	13 (24.1)	146
21-30	218 (86.7)	33 (13.1)	183 (82.4)	39 (17.6)	473
31-40	219 (76)	69 (24)	145 (81.5)	33 (18.5)	466
41-50	325 (81.9)	87 (19.6)	241 (84)	46 (16)	684
51-60	358 (80.4)	87 (19.6)	259 (80.4)	63 (19.6)	767
61-70	345 (77.7)	99 (22.3)	229 (80.9)	54 (19.1)	727
>70 years	303 (76.4)	92 (23.3)	156 (75.4)	51 (24.6)	612
	1845 (78.9)	467 (20.2)	1254 (80.7)	299 (19.3)	3865

The mortality pattern is shown in Tables 5-7. The overall mortality was 19.8% with more preponderance in men than women (20.2% vs. 19.3%  $P = 0.47$ ). It increased with increasing age. The mean age of deceased patients was significantly higher than in those who survived (54.2 (18.6) vs. 52.2 (17.9) years;  $P = 0.01$ ). Among the survivors the mean age was lower in women than men (51.4 (17.6) vs. 52.7 (18.1).  $P = 0.02$ ). There was no significant difference between the ages of men and women who died though women were younger (men 55 (8.1) vs. 53 (19)  $P = 0.001$ ). The mortality rates of different disorders in different age groups are shown in Tables 5-7. GITDs mortality peaked at 51-60 years while most disorders mortality peaked after 60 years.

Strokes accounted for most of the deaths (22.3%) followed by HIV/AIDS (16.6%) as shown in Table 6. CVDs and DM each caused 15.1% of ward mortality. HIV/AIDS was the predominant cause of death in the IDs group (91.4%). Similarly strokes caused 76% of NDs related deaths.

Furthermore, the case fatality rates for strokes and HIV/AIDS were the highest (27.9% and 25.2% respectively). Mortality rate was highest above 70 years and different for men and women- Table 7. Below the age of 30 mortality rates were higher for women than men. The highest mortality rates were

**Table 7: Distributions of common causes of medical admissions**

Disorder	Admitted	Died	% of ward admissions	% of ward deaths
Strokes	614	171 (27.9)	15.9	22.3
*HBP/CCF	703	116 (15.1)	18.2	15.1
**DM	735	116 (15.1)	19	15.1
HIV	503	127 (16.6)	13	16.6

\*HBP/CCF: Hypertension and congestive cardiac failure, \*\*DM: Diabetes, HIV: Human immunodeficiency virus

in women less than 20 years and above 70 years, as well as in men 31-40 years of age. Patients 61 years and above accounted for 34.4% of all admissions, and 38.7% of all deaths. Generally however, peak decades of admission also corresponded with peak decade of mortality.

## Discussion

Omran<sup>[1]</sup> coined the term “epidemiological transition” four decades ago. His theory stressed the demographic, biologic, sociologic, economic and psychologic ramifications of transitional processes in populations such as ours. Conceptually, it focused on the complex change in patterns of health and disease and on the interactions between these patterns and their demographic, economic and sociologic determinants and consequences. There is an ample evidence to document this transition in which degenerative and man-made diseases are displacing infections as the primary causes of morbidity and mortality, at least among adults, in many Nigerian communities.<sup>[3-11]</sup> The major findings in this study: Firstly, a high rate of non-communicable disorders; secondly, high rates of neurologic and HIV/AIDS related deaths in a medical ward (HIV may be viewed as man-made disease due to breakdown in social norms occasioned by rules due to increasing westernization of the Nigerian communities) support the above theory as it relates to Nigerian populations.

The mean ages of admission and male to female ratio in this study were similar to some studies in the country<sup>[7,11]</sup> but in

others they were different.<sup>[2]</sup> The three non-communicable disorders (neurologic, cardiovascular and diabetes mellitus) were the commonest disorders admitted into the medical wards causing 59.6% of admissions and 60.1% of deaths. The admission rate of these disorders increased with age, and peaked at 6<sup>th</sup> and 7<sup>th</sup> decades. The frequency of disorders such as DM 19.1%, HBP/CCF 18.2%, strokes 15.9% were similar to reports by Ike *et al.*,<sup>[11]</sup> where HBP/CCF and strokes accounted for 18.8% and 15.9% of all medical ward admissions. High prevalence of hypertension and related disorders have been reported in a community based study by Onwubwere *et al.*,<sup>[3]</sup> as well as several other hospital based studies.<sup>[4-11]</sup> The rates of neurological and DM admissions were as the same as in similar studies in the region.<sup>[12]</sup>

Strokes accounted for 72.2% of all neurological admissions into the medical ward, similar to 77.6% found in Kano<sup>[13]</sup> but much higher than 61.6% of neurological admissions in Port Harcourt.<sup>[14]</sup> In another report from Port Harcourt, CVDs, endocrine and renal diseases were the commonest causes of admission, a pattern quite different from the present study where renal disease was the 6<sup>th</sup> commonest cause.<sup>[8]</sup> In previous studies, the proportion of HIV/AIDS admissions varied widely from 3-26.1% in different institutions surveyed. These findings are similar to 13.1% found in this present study.

Of note in this study is the proportion of young people less than forty years (NDs 15.4% DM 16.4% and CVDs 13.9%) revealing the increasing prevalence of non-communicable disorders. NDs caused relatively twice the number of deaths as DM and CVDs and two and half times more than GITDs. As expected, most of the patients (68.5%) with IDs were between 20 and 50 years. This may be explained by the high proportion of HIV/AIDS in this sub group. This trend in the young portends a great epidemiological and economic burden for the future. The proportion of geriatric admissions (34.4%) was less than 41% reported in Port Harcourt<sup>[5]</sup> but higher than 11.1% reported in Ilorin and 11.5% in Kenya.<sup>[15]</sup>

Case fatality rates for strokes and HIV/AIDS were the highest (27.9% and 25.2% respectively) hence the need for targeted interventions to combat the menace of these disorders in our communities. Different from this study is a report from Benin<sup>[2]</sup> where HIV/AIDS related disorders were the most common cause of mortality (43.5%) followed by endocrine disease principally DM.

The general findings of this study showed the growing rates of non-communicable disorders and HIV/AIDS. CVDs, DM and stroke have shared pathophysiological mechanisms hence targeted efforts towards primary preventions in one area will affect the others. The creation of national awareness days for diabetes, hypertension strokes as well national kidney days are some of the efforts currently been taken by policy makers and other stake holders to create awareness and screen for these disorders thus encouraging early detection and primary

prevention. The high rates of HIV/AIDS admissions may reflect its high prevalence in sub Saharan Africa. The establishment of a HIV/AIDS dedicated clinic in the hospital as well the use of electronic media for dissemination of information about the infection may also be contributory. The high rate of admission may also reflect the growing acceptance of orthodox medicine in the treatment of HIV/AIDS.

### Limitations

This study has some limitations. Medical record keeping in the hospital was done manually. Data on educational and socioeconomic status of the patients were not available, hence their impact on the health seeking behavior and pattern of medical admission could not be studied. This made data collection time consuming and laborious, and in some cases, to loss of data. Sometimes required data were completely inaccessible because folders or registers were torn or mutilated. Changes made to patient diagnoses in the course of their hospital stay following laboratory findings may not be reflected in the final diagnosis or as a medical comorbidity. Causes of death were only clinically evaluated instead of autopsies.

### Conclusion

The commonest causes of medical ward admissions were neurologic disorders, diabetes mellitus cardiovascular diseases and infectious diseases. Efforts aimed at primary prevention will help to reduce the burden of these disorders in the community.

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