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Mortality Pattern at the Adult Medical Wards of a Teaching Hospital in Sub-Saharan Africa

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Abstract: The global burden of diseases, due to medical disorders is enormous with wide geographical variations. Periodic reviews of morbidity and mortality could show new trends and may provide information for the planning and evaluation of country's health care delivery services. Ideally, national registration of deaths should provide this data but such are not readily available in many developing countries and in hospital review of deaths is then a viable option. We retrospectively studied causes of deaths at the medical wards of the University of Ilorin Teaching Hospital, Nigeria between January 1996 and December 2005 (10 years). Seventeen thousand six hundred and fifty patients were admitted during the study period, out of which 4220 consisting of 1596 females (37.8%) and 2624 males (62.2%) died, giving a mortality rate of 23.9%. The male to female ratio was 1.6:1. Infections were responsible for 1501 deaths (35.6%) with Tuberculosis (TB) and Acquired Immunodeficiency Syndrome (AIDS) either alone or as co-infection being the commonest (16.5%). Chronic medical diseases such as stroke (8.8%), chronic liver disease (6.64%), heart failure (5.4%), chronic kidney failure (5.3%) and diabetes mellitus (4.99%) were next to infections. Cancers (7.1%) contributed significantly to mortality in our patients. There were few deaths from malaria (0.14%), typhoid fever (0.99%), tetanus (1.8%) and coronary artery disease (0.14%). Community interventions targeted at interrupting transmission of these infections and population screening for early detection of hypertension, diabetes, chronic kidney disease and cancers should be vigorously pursued.

Key words: Causes of death, medical ward, diseases, global, TB/AIDS, Nigeria

INTRODUCTION

With rapid economic development and improvement in living condition, nutrition and health care, many developing countries have witnessed a gradual decline of death from infectious diseases and emergence of chronic medical diseases as leading causes of death (Sen and Bonita, 2000; Yusuf *et al*., 2001). The global burden of diseases due to medical disorders is enormous with wide geographical variations. It has been projected that by year 2020 the prevalence of non-communicable diseases will parallel that of the communicable diseases in developing nations, which will have to contend with double burden of the 2 groups of diseases (Murray and Lopez, 1996; Yach *et al*., 2004). Many developing countries and countries in epidemiological transition have experienced a rapid deterioration of their chronic diseases risks and mortality profiles. Indeed, Cardiovascular Disease (CVD) is the leading worldwide cause of death in all developing regions with the exception of sub-Saharan Africa, where infectious diseases still accounts for many deaths (Yusuf *et al*., 2001; Steyn *et al*., 2005; Gaziano, 2005).

Earlier studies in the 1970s and 1980s, which attempt to describe the pattern of morbidity and mortality in Africa relied solely on in-hospital data (Adetuyibi *et al*., 1976; Ayeni, 1980; Amakiri *et al*., 1997). This was because of dearth of valid data on vital statistics as a result of inefficient system for national registration of deaths. Although, the in-hospital mortality may not be a true reflection of deaths from various causes in the general population, it may give insight into the burden of diseases in the community and may be valuable in evaluating health care delivery systems of the country. It is an important tool for effective health planning. This study was aimed, at providing information on current trends in causes of death in the medical wards of a teaching hospital in sub-Saharan Africa. How it compares with mortality pattern of other developing and developed nations are discussed.

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MATERIALS AND METHODS

This retrospective study, was carried out to examine the causes of death in the Adult Medical Wards of University of Ilorin Teaching Hospital (UITH), Ilorin over a 10 year period (1996-2005). The hospital is a tertiary health institution strategically located in the North Central zone of Nigeria with bed capacity of 515. One hundred and ten of the bed spaces are dedicated to the medical admissions.

Data were obtained from hospital death register and case records of all patients who died during the period under review. Information obtained included, age, sex, occupation, principal diagnosis, duration of hospital stay, primary cause of death, type of previous treatment and post-mortem examination. Most of the patients were referred either from private and/or government hospitals while, some had self-referral or were brought by relatives in emergency situations. The data were analyzed using the SPSS statistical software version 15 and mean ± SD was generated for continuous variables. Student t-test was used to compare means of continuous variables while, chi-square test was used to test significance of difference between two proportions. $p<0.05$ was taken as a measure of statistical significance.

RESULTS

Seventeen thousand six hundred and fifty patients (males = 10040 (56.9%) and females = 7610 (43.1%) were admitted during the study period, out of which 4220 consisting of 1596 females (37.8%) and 2624 males (62.2%) died, giving a mortality rate of 23.9%. The male to female ratio was 1.6:1. Mortality rate was significantly higher ($Chi^2 = 62.5$, $p = 0.0001$) in males (26.1%) than in females (20.97%). The age of the dead patients ranged between 14 and 92 years with a mean of 46.8±18.5 years. Mean age of the deceased females (46.9±19.4 years) was similar to that of the male patients (46.7±17.9 years), $p = 0.87$.

The age and sex distribution of the dead patients is presented in Table 1. Majority (65.9%) of the victims were in the 3rd and 5th decade of life (20-59 years). While, 4.4% of the patients were below 20 years, 15.9% were 70 years and above. The age distribution is similar between males and females. Mean duration of hospital stay before demise was significantly ($p = 0.006$) longer in the females (15.7±26 days) than in males (10.9±17.7 days).

Causes of deaths according to various systems are shown in Table 2. Infectious diseases were the leading causes of death in our medical wards accounting for 35.6% of all deaths. They were followed by diseases affecting the nervous system (13.2%), gastrointestinal system and liver (11.3%), cardiovascular system (8.6%), neoplasms (7.1%), renal diseases (7.0%) respiratory tract (6.8%) and endocrine diseases (5.0%), respectively. Others included haematological disorders (3.4%) and miscellaneous causes (2.1%). Deaths from infections are displayed in Table 3. TB and HIV either alone or as co-infection were responsible for 16.5% of mortality in our patients while, septicaemia with foci in various systems caused 11.3% of all deaths. Infections of the nervous system, tetanus and typhoid fever lead to 4.9, 1.8 and 0.99% of all deaths, respectively. Malaria caused very few deaths (0.14%) among these patients.

Mortality from nervous and gastrointestinal systems disorders are shown in Table 4 and 5, respectively. Stroke was the predominant cause of death from the nervous system. There were few cases of neuro-degenerative diseases such as Parkinson's disease (0.33%) and dementia (0.24%). In the gastrointestinal system, chronic liver disease caused most of the deaths (6.64%). Acute viral hepatitis (1.4%) and diarrhoea disease (1.4%) also, caused significant number of deaths.

Table 1: Age and sex distribution of the study group

Age group (years)	Males No	Males (%)	Females No	Females (%)	Total	(%)
10-19	102	2.4	84	2.0	186	4.4
20-29	430	10.2	283	6.7	713	16.9
30-39	449	10.6	264	6.3	713	16.9
40-49	413	9.8	258	6.1	671	15.9
50-59	486	11.5	198	4.7	684	16.2
60-69	354	8.4	228	5.4	582	13.8
70-79	264	6.3	179	4.2	443	10.5
≥80	126	3.0	102	2.4	228	5.4
Total	2624	62.2	1596	37.8	4220	100.0

Table 2: Shows systemic distribution of causes of death

Causes of death	Males No	Males (%)	Females No	Females (%)	Total	(%)
Infections	898	21.3	603	14.3	1501	35.6
Nervous system	339	8.0	216	5.2	555	13.2
Gastrointestinal and liver	346	8.2	130	3.1	476	11.3
Cardiovascular	215	5.1	148	3.5	363	8.6
Neoplasms	155	3.7	143	3.4	298	7.1
Renal	199	4.7	97	2.3	296	7.0
Respiratory	190	4.5	98	2.3	288	6.8
Endocrine	146	3.5	64	1.5	210	5.0
Haematological	69	1.6	75	1.8	144	3.4
Miscellaneous	67	1.6	22	0.5	89	2.1
Total	2624	62.2	1659	37.8	4220	100.0

Table 3: Causes of death from infectious diseases

Causes	Frequency	(%)
Septicaemia	476	11.30
Tuberculosis	344	8.20
HIV*	284	6.70
TB*/HIV*	66	1.60
Meningitis	206	4.90
Tetanus	78	1.80
Typhoid fever	42	0.99
Malaria	6	0.14
Total percentage of all deaths	1501	35.60

*TB: Tuberculosis, HIV: Human Immunodeficiency Virus

Table 4: Causes of death from nervous system

Causes	Frequency	(%)
Stroke	372	8.80
Spinal cord disease	54	1.30
Encephalitis	34	0.80
Organic brain syndrome	34	0.80
Space occupying lesion	16	0.38
Seizure	14	0.33
Parkinson's disease	14	0.33
Dementia	10	0.24
Myasthenia gravis	7	0.17
Total percentage of all deaths	555	13.20

Table 5: Causes of death from gastrointestinal system and liver

Causes	Frequency	(%)
Chronic liver disease	280	6.64
Acute viral hepatitis	60	1.40
Diarrhoea disease	60	1.40
Obstructive jaundice	27	0.64
Gastrointestinal bleeding	22	0.50
Peptic ulcer disease	11	0.26
Gastric outlet obstruction	11	0.26
Amoebic liver abscess	5	0.12
Total percentage of all deaths	476	11.30

Table 6: Causes of death from cardiovascular system

Causes	Frequency	(%)
Heart failure	228	5.40
Acute pulmonary oedema	36	0.85
Hypertensive encephalopathy	43	1.00
Cardiac arrhythmias	31	0.73
Infective endocarditis	19	0.45
Myocardial infarction	6	0.14
Total percentage of all deaths	363	8.60

Table 7: Deaths from neoplasms

Causes	Frequency	(%)
Primary liver cell cancer	101	2.400
Leukaemias	42	0.995
Lymphomas	20	0.470
Prostatic cancer	18	0.430
Breast cancer	18	0.430
Stomach cancer	14	0.330
Bladder cancer	14	0.330
Colonic cancer	13	0.310
Bronchial cancer	13	0.310
Thyroid cancer	12	0.280
Intra-abdominal malignancy	12	0.280
Choriocarcinoma	8	0.190
Nervous system metastasis	7	0.170
Testicular cancer	6	0.140
Total percentage of all deaths	298	7.100

Table 6 and 7 shows cardiovascular causes of death and mortality from malignant neoplasms, respectively. Heart failure of diverse aetiologies especially from hypertension and hypertensive encephalopathy were the main cardiovascular causes of death. Myocardial infarction was seen in few cases (0.14%). Primary Liver Cell Cancer (PLCC) was commonest cancer in these patients. This was followed by myelo-proliferative and lympho-proliferative disorders. Other causes of deaths are presented in Table 8. They included chronic renal failure (5.3%), acute hyperglycaemic emergencies (3.6%), respiratory failure (2.7%), anaemia (1.9%), acute renal failure (1.7%), multiple organ failure (1.66%), cor-pulmonale (1.4%) and pleural effusion (1.2%), respectively. Ninety Seven percent of the patients had received one form of orthodox treatment or the other and only 3% had traditional remedies before hospital admission. Only about 0.6% of the patients had post mortem examination.

Table 8: Other major causes of death

Causes	Frequency	(%)
Chronic renal failure	223	5.30
Acute renal failure	73	1.70
Diabetic ketoacidosis	151	3.60
Diabetic foot ulceration	39	0.92
hypoglycemia	20	0.47
Respiratory failure	114	2.70
Cor-pulmonale	60	1.40
Pleural effusion	49	1.20
Lobar pneumonia	27	0.64
Bronchial asthma	11	0.26
Anaemia	81	1.90
Snake bite	40	0.95
Sickle cell anaemia	17	0.40
Multiple organ failure	70	1.66
others	52	1.20
Total percentage of all deaths	1027	24.30

DISCUSSION

Our study showed that infectious, cerebrovascular, hepatic, cardiovascular, kidney and endocrine diseases were the leading causes of death in our medical ward. Majority of the deaths occurred in the age group 20-59 years, which is the most economically productive segment of the society. This has negative implications for the development of the nation. Historically, deaths from infectious diseases have been the major causes of death in developing nations of the world (Gwarkin *et al*., 1999). Recently, there are strong indications that death from infectious diseases are on the decline while, chronic medical diseases are increasingly being recognized as significant causes of morbidity and mortality (Yusuf *et al*., 2001). However, the resurgence of TB and HIV pandemic has altered this trend with infections still causing most of the deaths (Ogunbodede, 2004).

TB and HIV either alone or as co-infections were the most frequent (16.5%) causes of death in our medical wards followed by septicaemias. The high prevalence (11.3%) of septicaemia may be due to poor health seeking behaviours among these patients as up to 97% of them have had one form of orthodox medication or the other prior to presentation. This often involves self medication and indiscriminate use of antimicrobial agents, which encourage bacteria drug resistance. Our findings contrast sharply results of some earlier studies in Nigeria, which either implicated systemic hypertension or cerebrovascular disease as the leading causes of death

(Adetuyibi *et al*., 1976; Ayeni, 1980). However, our result is in accord with that of recent studies (Agomuoh and Unachukwu, 2006; Sani *et al*., 2007) from other parts of Nigeria, which showed infectious diseases to be the leading cause of death. Nevertheless, unlike our study and that of Agomuoh Unachukwu (2006) that found TB and HIV to be the most frequent infectious causes of death, Sani *et al*. (2007) found infections other than TB/HIV to be the commonest causes of mortality. Also, many studies in Africa before 1990 (pre-HIV era) showed that infectious diseases such as bacteria pneumonias, meningitis, malaria and tetanus were the main causes of death (Naraqi and Gena, 1989; Petit and Van Ginneken, 1995). Our findings are also, similar to that of Harries and Mvula (1995), which revealed TB/HIV to be the most frequent (49%) causes of deaths in a medical ward in Malawi, East Africa. The upsurge of TB/HIV cases may also be attributable to availability of anti-retroviral drugs, of which our hospital serves as one of the referral centres in Nigeria. Unlike the scenario in industrialized nations of the world and some developing nations like China where Coronary Artery Disease (CAD) is responsible for most of the deaths (Daniel *et al*., 1999; He *et al*., 2005), only 0.14% of our patients died from this disease. Diabetes mellitus and hypertension were the 2 most common non-communicable diseases in these patients. Hypertension is the commonest cause of heart failure and stroke in our environment (Kadiri, 2000). Recent studies in Nigeria have hinted that there is gradual worsening of cardiovascular risk profiles because of improved living conditions and sedentary lifestyles (Glew *et al*., 2002, 2004). High mortality from stroke (8.8%) seen in this study may be a consequence of increase prevalence of type 2 diabetes mellitus and hypertension, which are often diagnosed when the patients present with complications of the disease.

Chronic liver disease contributed significantly to mortality in our wards. Hepatitis B virus infection and ethanol abuse are the leading causes of liver disease in Nigeria (Okeke *et al*., 2002). It is envisaged that the recent inclusion of Hepatitis B vaccination as part of routine immunization in children is capable of reducing deaths from liver diseases. Kidney diseases also contributed significantly to mortality in these patients. Chronic glomeluronephritis, hypertension and diabetes mellitus are implicated in most cases of end stage renal diseases in Nigeria (Chijioke and Aldeniyi, 2003; Alebiosu *et al*., 2006). Malignant neoplasms especially PLCC, lymphomas and leukaemias significantly caused death in the patients studied.

Duration of hospital stay was significantly longer in females than in males. One study in Nigeria (Garko *et al*., 2003) has suggested a relationship between length of hospital stay and mortality with patients who died having a shorter hospital stay than those who survived. Many of our patients died before the 5th day of admission, which may reflects the health seeking behaviours of the patients. They generally present late in the course of the illness because of ignorance, poverty and paucity of health facilities. Post mortem examinations are often unacceptable to our patients because of cultural and religious beliefs. Majority of the causes of deaths were based on clinical and ancillary investigations.

CONCLUSION

TB and HIV either alone or as co-infection are the commonest causes of death in our medical wards. The complications of hypertension and/or diabetes mellitus in form of stroke, heart failure and chronic kidney diseases also contributed significantly to mortality due to non-communicable diseases. There were few deaths due to malaria, typhoid fever, tetanus, sickle cell, peptic ulcer and coronary artery diseases. It is also, noteworthy that hepatic failure from chronic liver disease is a common cause of death in our environment. The foregoing underscore the urgent need for community interventions targeted at interrupting TB, HIV and hepatitis B transmission with provision of free treatment for patients who are infected with these diseases. Population screening for detection of hypertension, diabetes mellitus, cancers and chronic kidney diseases in the early asymptomatic stages should be vigorously pursued. The modification of lifestyle, which involves dietary adjustment and regulars exercises is required to reduce risks of deaths from cardiovascular and cerebrovascular diseases in the population. The importance of post mortem examination to confirm causes of death in our wards should be stressed to religious and traditional leaders in our environment for the education of their followers.

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