

Medical Causes of Death among the Elderly in a Tertiary Hospital in South East Nigeria

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ABSTRACT

Background: There are few data on morbidity and mortality patterns among the elderly in Africa, especially in Sub-Saharan Africa (SSA). The aim of this study was to determine the causes of death among the elderly population in the internal medicine wards of a tertiary health institution in South East Nigeria.

Methods: This was a retrospective study conducted on patients 60 years and older, who died in the medical wards of the University of Nigeria Teaching Hospital between January 1995 and January 2010. Relevant information was obtained from their case notes and death certificates.

Results: Six thousand, two hundred and fifty patients died during the period of this study. Out of this, 1941 were aged ≥ 60 years, giving a death rate of 31.1%; 63.1% were males, 36.9% were females. The mean age at death for the males was 69.9 ± 7.9 years and for the females 69.1 ± 7.5 years ($p < 0.033$). The overall mean age at death was 69.6 ± 7.7 (range 60–102) years. The most common diagnosis at death among the men was stroke (11%), chronic kidney disease (5.7%) and diabetic complications (5.5%). Among the women, it was stroke (8.4%), heart failure (3%) and chronic kidney disease (2.5%).

Conclusion: The three most common causes of death among males and females were chronic non-communicable diseases. The importance of the prevention, early diagnosis and appropriate treatment of the underlying diseases and their complications cannot be overemphasized.

Keywords: Death, elderly, medical causes, South East Nigeria

Causas Médicas de Muerte entre los Ancianos de un Hospital Terciario en Nigeria Suroriental

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RESUMEN

Antecedentes: Hay pocos datos sobre la morbilidad y los patrones de mortalidad entre los ancianos en África, especialmente en el África Subsahariana (ASS). El objetivo de este estudio fue determinar las causas de muerte entre la población anciana en las salas de medicina interna de una institución terciaria de la salud en Nigeria Suroriental.

Métodos: Se trató de un estudio retrospectivo realizado en pacientes de 60 años o más de edad, que murieron en las salas médicas del Hospital Docente Universitario de Nigeria entre enero de 1995 y enero de 2010. Se obtuvo información relevante de sus historias clínicas y certificados de defunción.

Resultados: Seis mil doscientos cincuenta pacientes murieron durante el período de este estudio. De estos, 1941 fueron de edad ≥ 60 años, para una tasa de mortalidad de 31.1%. El 63.1% eran varones, y el 36.9% eran mujeres. La edad media de muerte para los varones fue de 69.9 ± 7.9 años y para las hembras 69.1 ± 7.5 años ($p < 0.033$). La edad media general de muerte fue de 69.6 ± 7.7 años (rango 60–102). Los diagnósticos más comunes de muerte entre los hombres fueron el accidente cerebrovascular (11%), la enfermedad renal crónica (5.7%) y las complicaciones diabéticas (5.5%). Entre las mujeres, fueron el accidente cerebrovascular (8.4%), la insuficiencia cardíaca (3%), y la enfermedad renal crónica (2.5%).

Conclusión: *Las tres causas de muerte más comunes entre varones y hembras fueron las enfermedades crónicas no transmisibles. Resulta poco todo cuanto se pueda decir para enfatizar la importancia de la prevención, diagnóstico precoz y tratamiento apropiado de las enfermedades subyacentes y sus complicaciones.*

Palabras claves: muerte, ancianos, causas médicas, Nigeria Suroriental

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INTRODUCTION

Ageing is often associated with increasing disease and disability, especially chronic diseases. This is supported by morbidity and cause of death statistics (1). For example, ageing is the most powerful risk factor for cardiovascular disease (2). The observed trend in developed countries is that the elderly population is on the increase. Demographers, however, predict that by the year 2020, 70% of the world's elderly population will be found in developing countries (3). The costs associated with this increase in older adults are going to be enormous and have huge implications for both the developed and developing countries. But, the impact may be felt more in the developing countries that overall have fewer resources to deal with an ageing situation (4).

In the past four decades, Africa has witnessed increasing urbanization and changing lifestyles. These are factors which have in turn raised the incidence of non-communicable chronic diseases, especially cardiovascular diseases. At the same time, social disintegration and inequality, compounded by dwindling economies in many countries in Sub-Saharan Africa (SSA) have seriously hindered the response to these diseases (5). Infectious diseases – especially HIV/AIDS and tuberculosis – are also common.

In SSA, non-communicable diseases are the most common causes of death in patients aged 60 years and above (6). Ischaemic heart disease (IHD) was the most common cause of death in elderly men accounting for about 13.4% of deaths while cerebrovascular accident (CVA) was the most common in elderly women accounting for 17% of deaths (6). However, infectious diseases are also common causes of death in this age group in SSA. Lower respiratory tract infections were the third most common causes of death in both genders, accounting for 6.5% of deaths in males and 5.6% in females (6).

Elderly patients constitute a high proportion of in-patient medical admissions in Nigeria. They account for 41% of the admissions to the medical wards (7). Mortality among this group is also high accounting for 26.7% and 22.8% of deaths, respectively, in two separate studies from the south and middle belt regions of Nigeria (7, 8). Stroke, 19.8%, sepsis, 16.5% and lower respiratory tract diseases 8.1%, were the three most common diagnoses at death (8). Infectious diseases accounted for 38.2% of all the diagnoses (8).

There are very few studies generally on mortality and morbidity patterns among the elderly in Nigeria and most SSA countries. In this region, where this study was conducted, geriatric services are non-existent. In Nigeria, the percentage of

the population over 60 years of age was put at 5.13% in the 1991 census (9). There is no national policy on the welfare or social security packages for the senior citizens in Nigeria and most countries in SSA. There are also no geriatric hospitals in the country.

This paper therefore examines in-hospital mortality among the elderly patients admitted to the internal medicine wards at a tertiary institution in order to determine the patterns and causes of death and help draw the attention of policy-makers to the elderly and their health problems.

SUBJECTS AND METHODS

This was a retrospective cross-sectional study conducted from January 1995 to January 2010 on patients aged 60 years and above who died in the adult medical wards of the University of Nigeria Teaching Hospital (UNTH), Enugu. The University of Nigeria teaching hospital is a tertiary health institution strategically located in the South East zone of Nigeria. This hospital is located among the Ibo-speaking ethnic group of Nigeria. It serves approximately a quarter to a third of the Nigerian population which is currently estimated to be 158.2 million (10). The hospital receives patients from Enugu State (where it is located), and from neighboring states of Kogi, Anambra, Ebonyi, Abia and Imo. Enugu State covers an estimated area of 7161 km (10).

The internal medicine wards (where this study was conducted) has 120 beds. All the patients admitted to the internal medicine wards of the UNTH during the study period – whose case notes and death certificates were available in the archives of the hospital registration room – were included. The case notes were classified according to the year of admission. All the cases found during the study period were included. The dependent variables in this study were: the reasons for admission and causes of death, while the explanatory variables included the sociodemographic characteristics of the patients in the case notes reviewed. Autopsy was not done on any of the patients.

During the data collection, two interns reviewed the case notes of the patients admitted to the medical wards, the ward registration books and the death certificates. The data collectors were trained on how to complete the structured data collection format prepared for the study. The causes of death were documented from the registration book and death the certificates and then sorted using the International Classification of Diseases (ICD) version ten, 2007 (11). The data obtained were entered into SPSS version 17.0 and analysed. X² tests of asso-

ciation were done wherever appropriate, p -values < 0.05 were taken to be statistically significant. Ethical clearance was obtained from the hospital ethics committee. The confidentiality of personal information was maintained during the data collection, analyses and interpretations. The following operational definitions were used in the study:

- Diseases causing death are the primary diagnoses given as the causes of death.
- Systemic cause of death is the system to which the primary disease belongs.

RESULTS

A total of 6250 patients died in the medical wards during this period. Of these, 1941 were aged 60 years and above giving a crude mortality rate of 31.1%. Among these elderly population, 1225 (63.1%) were men. The male to female ratio was 1.7 to 1. The age of the patients ranged from 60 to 102 years. The mean age of the patients was 69.6 ± 7.7 years. The mean age at death for the females was significantly lower than that for the males, 69.1 ± 7.5 years, as against 69.9 ± 7.9 years ($p = 0.033$). The highest number of deaths, 563 (29%), occurred in the age group 60 to 64 years (Table 1).

Table 1: Sociodemographic characteristics of the patients

Sociodemographic variables (n = 1941)			
Gender	n (%)	Mean age in years (SD)	<i>p</i>
Male	1225 (63.1)	69.9 (7.9)	0.033
Female	716 (36.9)	69.1 (7.5)	
Total	1941 (100)	69.6 (7.7)	
Age range (years)	Male, n (%)	Female, n (%)	Total, n (%)
60–64	339 (17.5)	224 (11.5)	563 (29.0)
65–69	268 (13.8)	155 (8.0)	423 (21.8)
70–74	302 (15.6)	149 (7.7)	451 (23.3)
75–79	147 (7.6)	111 (5.7)	258 (13.3)
≥ 80	169 (8.7)	77 (4.0)	246 (12.7)
Total	1225 (63.1)	716 (36.9)	1941 (100)

X^2 12.436, df 5, $p < 0.029$

The most common systemic causes of death among these patients were the diseases of the circulatory system, 650 (33.4%). This was followed by miscellaneous conditions (*ie* those with non-specific diagnoses and few spondylopathies and other musculoskeletal disorders, 249 (12.9%). Infections and parasitic diseases, 203 (10.4%), diseases of the genitourinary system, 191 (9.8%), diseases of the digestive system, 162 (8.4%) and, diseases of endocrine/nutritional and metabolic system, 155 [8%] (Table 2).

Overall, there was a significant association between the gender of the patients and the causes of death according to the various systems ($\chi^2 = 27.943$, $p < 0.002$). The most common clinical condition causing death in both genders was cerebrovascular accident (CVA), accounting for 377 (19.4%) of all the deaths. This was followed by chronic kidney disease (CKD), 160 (8.2%) and cardiac failure; especially from hypertensive heart disease, 155 (7.9%). Others were: diabetes mellitus and its complications 150 (7.7%), septicemia 130 (6.7%), chronic liver disease 113 (5.8%) and the pneumonias 58 (3%). Among the men, the three most common causes of death were CVA, 214 (11%), CKD, 111 (5.7%) and diabetes mellitus and its complications, 108 (5.5%). In the females, CVA, 163 (8.4%), cardiac failure, 59 (3%) and CKD 49 (2.5%) were the most common (Table 3).

DISCUSSION

This is a retrospective cross-sectional study spanning a period of 16 years (January 1995 to January 2010). The results showed a crude mortality rate of 31.1%. This is high compared with a similar study in the middle belt of Nigeria, which showed a crude mortality rate of 22.8% (8). Mortality from other parts of the world in a similar age group ranged from 16.4% to 20% (12–14). The wide variations in the mortality rates among the different studies can be attributed to several factors ranging from: the degree of hospital specialization, patients' characteristics, financial constraints, late presentation (most patients having gone to prayer houses and traditional

Table 2: Association of the gender of the patients with systemic causes of death

ICD Category	Systemic causes of death	*Gender		
		Male	Female	Total
A or B	Infections/parasitic disease	139 (7.2)	64 (3.3)	203 (10.5)
C	Malignant neoplasm	58 (3.0)	32 (1.6)	90 (4.6)
D	Anaemia/haematological	19 (1.0)	13 (0.7)	32 (1.7)
E	Endocrine/nutritional and metabolic	113 (5.8)	42 (2.2)	155 (8.0)
G	Disease of the nervous system	50 (2.6)	32 (1.6)	82 (4.2)
I	Disease of the circulatory system	381 (19.6)	269 (13.8)	650 (33.4)
J	Disease of the respiratory system	72 (3.7)	55 (2.8)	127 (6.5)
K	Disease of the digestive system	112 (5.8)	50 (2.6)	162 (8.4)
M/O	Spondylopathies and other musculoskeletal system/miscellaneous conditions	145 (7.5)	104 (5.4)	249 (12.9)
N	Diseases of the genitourinary system	136 (7.0)	55 (2.8)	191 (9.8)
#Total		1225 (63.2)	716 (36.8)	1941 (100)

*Number (%), $X^2 = 27.943$, df = 10, $p < 0.002$

Table 3: Common specific diseases causing death among the elderly

Disease	n (%)	Male, n (%)	Female, n (%)
Cerebrovascular accident	377 (19.4)	214 (11)	163 (8.4)
Chronic kidney disease	160 (8.2)	111 (5.7)	49 (2.5)
Cardiac failure	155 (7.9)	96 (4.9)	59 (3.0)
Diabetes mellitus/complications	150 (7.7)	108 (5.5)	42 (2.2)
Septicaemia	130 (6.7)	88 (4.5)	42 (2.2)
Chronic liver disease	113 (5.8)	81 (4.2)	32 (1.6)
Pneumonias	58 (3.0)	37 (1.9)	21 (1.1)
Meningoencephalitis	37 (1.9)	19 (1.0)	18 (0.9)
Anaemia	29 (1.5)	18 (0.9)	11 (0.6)
Tuberculosis	27 (1.4)	26 (1.3)	1 (0.1)
Hepatoma	27 (1.4)	16 (0.8)	11 (0.6)
Acute kidney injury	23 (1.2)	18 (0.9)	5 (0.3)
Cardiopulmonary failure	267 (13.7)	188 (9.4)	79 (4.1)

n = Number of cases

A non-specific condition generally termed respiratory failure/cardiopulmonary failure with some musculoskeletal conditions accounted for 13.7% of the deaths: 9.4% in the men and 4.1% in the women.

medical healers prior to their admission), and the severity of their illness at the time of their presentation (15–17). Other contributing factors are: poor emergency response, the unavailability of the facilities crucial to the examination and management of very ill patients and unavailability of very important medications. There exist – in many developing nations – a very poor or no social service to care for the older citizens. As a result, they are solely dependent on their children and relatives for their upkeep and the settlement of their health-care bills (8, 18).

The patients' mean age at death in this study was 69.6 ± 7.7 years. This is lower than that from the developed nations (12, 13, 15, 19). The higher mean age at death in the elderly populations of the industrialized nations compared to ours is due to a higher standard of living, better healthcare facilities, population health-seeking behaviour and a general higher life expectancy. The males' deaths constituted 63.1% of the mortality in our study. The mean age at death in the males (69.9 ± 7.9 years) was higher than in the females (69.1 ± 7.5 years), $p < 0.033$. This difference is difficult to explain, as there are conflicting reports from some studies that reported equal mean age (20). Generally, in this study, there is evidence to suggest that hospital deaths were more in the older males than females and, earlier observations had shown that females tend to live longer than males (21, 22). Nevertheless, at older age, females reported greater numbers of morbidity and disability and the use of healthcare facilities when compared to males (22).

The diseases of the circulatory system (33.4%) were the most common causes of the deaths in our study. These were followed by infectious and parasitic diseases (10.4%) and the diseases of the genitourinary system (9.8%). This pattern was maintained in both genders except that in the females, the diseases of the genitourinary and respiratory systems were each responsible for 2.8% of the deaths and were the third most common causes of the deaths. Cerebrovascular accident (circulatory system) was the commonest disease causing death

overall (19.4%) – 11% in men and 8.4% in women. This is similar to the findings from Ilorin, South West Nigeria, in which the same system accounted for almost a-quarter of the deaths with strokes being the most common diagnosis at death. The second and third most common diseases in the same study were sepsis/infection and lower respiratory diseases, respectively (8).

The observations of these studies are in line with those of some previous studies, which showed that stroke is becoming the greatest killer disease in Africa and often affects all the age groups (23, 24). In South Africa, cardiovascular diseases were the primary causes of death accounting for 43% of the deaths in people 60 years and above. Ischaemic heart disease and stroke were the two leading causes of death in the South African study, with the order reversed for men and women (25). In the industrially advanced countries of Europe and North America, the three leading causes of deaths in people 65 years and above were: heart diseases, malignant neoplasm and cerebrovascular accidents (23, 26).

The changes in peoples' lifestyles and dietary habits are two distinct features that have been particularly reported to account for the increase in the number of cardiovascular disorders being experienced in most developing countries (25, 29). The finding of 19.4% stroke mortality in the present study is most likely the tip of the iceberg, as several cases of stroke in Africa rarely get to the hospitals before the patients' deaths (23). The explanations for these cases include: the poor transportation systems, limited access to healthcare and neurodiagnostic facilities, deficient acute interventional therapy, the dearth of medical experts, the poor medical interpretations of the symptoms of stroke in the communities and, the continued use of traditional and alternative healers (23). It is important to note that hypertension and diabetes mellitus or the combinations of both in an individual are the most common aetiologic agents of stroke in SSA. This underlines the importance of these two non-communicable diseases as the causes of high morbidity and mortality in Africa (28, 29).

In the present studies, infectious diseases, mostly septicaemia, were the second most common systemic causes of the deaths. This finding is similar to what has been documented by other hospital-based studies in Nigeria (8, 16, 17, 24, 30, 31). The reasons proposed for this pattern in SSA include: the alterations in the structure and functions of the respiratory tract with ageing making them susceptible to infection, the fall in the immunity level associated with ageing, poverty, high level of illiteracy, the abuse of antibiotics and poor sanitation (16, 30, 32). When the elderly fall sick, they often become extremely weak and bed-bound. This can lead to decubitus ulcers. If they stop eating or drinking, dehydration may set in, thereby necessitating the insertion of intravenous lines, urinary catheters, and nasogastric tubes for feeding, all of which increase the risk of infection (16). The ageing of the immune system and the reduced level of personal hygiene from frailty also make older people vulnerable to sepsis and infection (16). It was therefore not surprising that those infectious diseases, which are

preventable, accounted for 10.4% of the mortality documented in this study.

Worthy of note is the impact of chronic kidney disease as an important cause of death among the elderly population in this study, accounting for 8.2% of all the deaths. It was the second most common disease causing death in the males (5.7% of all the deaths) and the third in the females (2.5% of all the deaths). Chronic glomerulonephritis, hypertension, and diabetes mellitus are the most common causes of chronic kidney disease in SSA and in Africa as a whole (33–38). This underscores the increasing burden of communicable diseases, on the existing background of predominant infectious disease, as important causes of morbidity and mortality of the elderly in SSA.

Other important causes of the deaths in this study were: cardiac failure accounting for 7.9% of the deaths (4.9% in the males and 3% in the females), diabetes mellitus and its complications accounting for 7.7% of the deaths (5.5% in the males and 2.2% in the females) and chronic liver disease accounting for 5.8% of the deaths (4.2% in the males and 1.6% in the females). Overall, congestive cardiac failure was the third most common conditions causing death among this elderly population. Hypertensive heart disease, cardiomyopathies and various valvular diseases are the most common causes of heart failure in SSA and the major contributors to the deaths of our patients (39, 40).

The prevalence of diabetes mellitus in SSA is rising rapidly especially with the increasing age and the westernized lifestyles of the people. This prevalence is estimated to rise by 80% in 20 years' time (41). Most of the diabetic patients died from septicaemia, mostly from diabetic foot ulcer, hyperglycaemic hyperosmolar coma, diabetic ketoacidosis and cerebrovascular accident (29, 42). Chronic hepatitis B and C virus infection and chronic alcohol ingestion are the leading causes of chronic liver disease in our environment with most of the patients dying from the complications of hepatic encephalopathy, bleeding oesophageal varicies, sepsis and the complications of associated primary liver cell carcinoma (43, 44).

Other contributing causes of death include: meningoen- cephalitis (1.9%), anaemia from various causes (1.5%), he- patoma (1.4%), tuberculosis (1.4%) and acute kidney injury (1.2%). It is important to mention that the contribution of tu- berculosis (TB) could be underestimated in this study as those with open TB were usually admitted on the chest ward, which is under another department (community medicine). It is also important to note the relatively low prevalence of HIV-in- fection (0.8%), leukaemia (0.8%), and carcinoma of the prostate (0.6%) as the causes of deaths in this sample of patients. These diseases are important causes of death among the young and middle-aged in SSA (45, 46). A relatively large number of the patients in this study (13.7%, Table 3) were documented to have died from cardiorespiratory failure of unspecified causes. This underlines the importance of educating doctors in SSA regarding the standard documentation of the causes of death

especially in an environment where autopsy is infrequent be- cause of sociocultural factors.

CONCLUSION

The mortality amongst the elderly patients admitted to the hos- pital in this study is high. Non-communicable diseases were the most common diagnoses at their deaths. The impact of communicable diseases (infections/parasitic diseases) as sys- temic causes of death was also strong emphasizing the dual burden of communicable and non-communicable diseases in SSA. There might be the need for healthcare givers to pay more attention to the older patients with the signs and symp- toms suggestive of stroke, chronic kidney disease, diabetes mellitus and sepsis.

More efforts are needed to decrease the growing num- ber of cardiovascular risk factors being experienced in many developing countries because of the influence of western cul- ture.

One limitation of this study is its hospital-based nature. There were also no postmortem reports to corroborate the clin- ical diagnoses. However, hospital-based reports, have their usefulness especially, in our setting, where effective national basic data collation tools are not easily available. Community- based studies on the patterns of morbidity and mortality among the aged are needed to look at the relevance of our finding within the context of a larger community. Continuing medical education would help in training healthcare personnel, parti- cularly doctors on the appropriate documentation of both the primary, secondary and other associated causes of deaths in the elderly.

AUTHORS' NOTE

The authors declare no conflict of interest.

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