

# AIDS Mortality in a Tertiary Health Institution: A Four-Year Review

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Africa contains 70% of adults and 80% of children living with AIDS in the world and has buried 75% of the 21.8 million worldwide who have died of AIDS since the epidemic began. Nigeria, the most populous country in Africa, has 5.8% of her adult population having HIV infection at the end of 2003.

We reviewed the causes of death among AIDS patients in Aminu Kano Teaching Hospital Kano, Nigeria over four years.

Four-hundred-fifty-five (9.9%) of the 4,574 adult medical admissions were due to HIV/AIDS-related diagnosis. HIV/AIDS admissions increased progressively from 45 cases in 2001 to 174 in 2004. HIV/AIDS caused 176 deaths over the period giving an HIV-related mortality of 38.7%. This also showed a gradual increase from 24 deaths in 2001 to 61 deaths in 2004. The most common causes of death were tuberculosis (33.4%), septicemia (23.8%), advanced HIV disease (9.1%), meningitis (7.4%), other pulmonary infections (5.1%) and Kaposi's sarcoma (4.5%).

The present dismal situation of patients living with HIV/AIDS calls for enhanced strategies to decrease the mortality trend observed. With the introduction of affordable highly active antiretroviral therapy (HAART) in several centers in Nigeria, it is hoped that infected patients can be made to live longer.

**Key words:** HIV/AIDS ■ mortality

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## INTRODUCTION

It is now 25 years since the initial recognition of the acquired immunodeficiency syndrome (AIDS) among homosexual men in the United States.<sup>1,2</sup> While initially limited, infection with the human immunodeficiency virus (HIV) has literally exploded over the past two decades to become the worst epidemic of the 20th century. The impact of this disease on human suffering, cultures, demographics, economics and even politics has been felt in nearly every society across the globe.

Unfortunately, the end is not in sight, and the epidemic continues to spread relentlessly into new areas and to consolidate in many other more recently affected locations. In some countries in sub-Saharan Africa, the AIDS epidemic is already having a dramatic effect on depopulation and decreased fertility.

Africa contains 70% of adults and 80% of children living with AIDS in the world and has buried 75% of the 21.8 million worldwide who have died of AIDS since the epidemic began.<sup>3</sup>

HIV is now deadlier in sub-Saharan Africa than war itself; in 1998, 200,000 Africans died in war, but more than 2 million died of AIDS.<sup>4</sup> Because of its widely destabilizing effect superimposed on an already fragile and complex geopolitical system, AIDS became the key issue for human security in sub-Saharan Africa.

Sub-Saharan Africa is considered to have an estimated adult AIDS prevalence of 8.0%.<sup>5</sup> Nigeria, by far the most populous country in sub-Saharan Africa, has 5.8% of her adult population having HIV infection at the end of 2003.<sup>6</sup>

In this era of highly active antiretroviral therapy (HAART), mortality has decreased substantially among HIV-infected people with access to HAART.<sup>7</sup> Unfortunately, treatment with HAART has not become widely available in developing countries, including Nigeria, due to cost and lack of a clinical infrastructure. Only 17,000 HIV/AIDS patients in Nigeria were receiving antiretroviral therapy by 2003.<sup>6</sup>

Apart from viral load and degree of immunosup-

pression, which could influence pattern of presentation of AIDS patients, AIDS presentation and mortality vary from region to region.

Although several studies have been carried out in Nigeria where the dominant contributory role of HIV/AIDS to adult mortality has been highlighted,<sup>8-10</sup> no study has been done, to the best of our knowledge, specifically addressing the specific causes of mortality in adult Nigerians with HIV/AIDS. We set out to determine the number of deaths due to HIV/AIDS in our hospital as well as the actual causes of death in order to plan strategies to curtail mortality from this condition.

## PATIENTS & METHODS

Between January 2001 and December 2004 (four years), we reviewed the mortality pattern of adult AIDS patients in Aminu Kano Teaching Hospital (AKTH) Kano, Nigeria. The data were obtained from our admission and discharge/death registers, patients' case records, and our weekly as well as quarterly mortality reviews.

AKTH is a 250-bed tertiary health institution in northwestern Nigeria and is one of the centers selected by the Nigerian federal government in 2003 for providing free antiretroviral (ARV) drugs to AIDS patients. It therefore serves as a major referral health center for AIDS patients in northwestern Nigeria. While some of the patients were self-referred, most of them were referred from private clinics, government hospitals or primary healthcare centers.

Patients considered were those with symptomatic AIDS. The diagnosis was made when there was evidence of AIDS defining opportunistic infection or malignancy, positive ELISA antibody test and Western blot confirmation (or double-positive ELISA antibody test when Western blot was not available), and existence of  $\geq 2$  major and one minor sign in the absence of known cause of immunosuppression.<sup>11</sup> Information obtained from the record includes age, sex, diagnosis and duration of hospital stay as well as the cause(s) of death. The causes of death considered were the direct causes of death, since the originating antecedent cause of death (defined as "the disease or injury that initiated the train of morbid events leading directly to death or the circumstances of the accident or violence that produce the fatal injury"<sup>12</sup>) is the same in all the patients—in this case, AIDS.

All statistical analysis was carried out with aid of a computer analysis

using Statistical Package for Social Sciences (SPSS), version 10.

## RESULTS

During the four-year study period, there were a total of 4574 admissions into the adult medical wards of AKTH. Four-hundred-fifty-five (9.9%) were due to HIV/AIDS-related diagnosis. The number of admissions attributable to HIV/AIDS increased progressively from 45 cases in 2001 to 174 in 2004, as shown in Figure 1. Over the same period, 176 HIV/AIDS patients died, giving a HIV related mortality of 38.7%.

This also showed a gradual increase from 24 deaths in 2001 to 61 deaths in 2004 (Figure 1). Figure 2 depicts the age distribution of patients who died of HIV/AIDS, where a peak incidence was recorded in the 31–40-year age group (38.2%). There were 105 males and 71 females with a male:female ratio of 1.5:1.

The underlying cause of death in AIDS patients is shown in Table 1. Tuberculosis (TB) either as disseminated TB 35 (19.8%) or pulmonary TB 24 (13.6%) was among the leading causes of mortality. Septicemia was the second most common cause of death (23.8%). Other causes include advanced HIV disease (16, 9.1%), meningitis (13, 7.4%), nontuberculous pneumonia (9, 5.1%), Kaposi's sarcoma (8, 4.5%) and others. The diagnoses of septicemia, meningitis and pneumonia were based on microbiological culture of the blood, cerebrospinal fluid (CSF) and sputum, respectively, in addition to clinical evidence.

**Table 1. Underlying causes of AIDS-related mortality**

S/Number	Underlying Cause of Death	Number	Percentage
1.	Tuberculosis	59	33.5
2.	Septicemia	42	23.9
3.	Advance HIV disease	16	9.1
4.	Meningitis	12	6.8
5.	Pneumonia	9	5.1
6.	Severe gastroenteritis	9	5.1
7.	Kaposi's sarcoma	8	4.5
8.	Chronic renal failure	5	2.8
9.	Non-Hodgkins lymphoma	3	1.7
10.	Cerebrovascular disease	3	1.7
11.	Acute renal failure	1	0.6
12.	HIV associated nephropathy	1	0.6
13.	Hepatocellular carcinoma	1	0.6
14.	Cancer of cervix	1	0.6
15.	Pyogenic liver abscess	1	0.6
16.	Peptic ulcer disease	1	0.6
17.	Severe anemia	1	0.6
18.	Encephalitis	1	0.6
19.	Primary CNS lymphoma	1	0.6
	<i>Total</i>	176	100

## DISCUSSION

This study describes the pattern of AIDS-related adult mortality in a sub-Saharan African city. Although hospital mortality is generally high in adult medical wards in less-developed countries,<sup>13,14</sup> AIDS-associated mortality was proportionately higher (38.7%) when compared to mortality from other causes (23.4%) in our hospital. It further demonstrated a continuous increase in number of cases of HIV/AIDS-related admissions and deaths over the period of this study. The median survival time in hospital was about eight days for the majority of patients similar to observations in Abidjan, Côte d'Ivoire, where 38% of HIV/AIDS patients died in hospital within a median survival period of one week.<sup>15</sup> In developed countries, availability of potent HAART has significantly improved survival.<sup>16</sup>

Mortality rates were higher in females (42.8%) than in males (36.3%). Reports from Tanzania have indicated HIV/AIDS to be responsible for 14–36% of male deaths and 30–45% of female deaths for those aged 30–59 years.<sup>17</sup> Women also died at a younger age than both men and women dying of other causes. In comparison to developed countries, less-developed countries, particularly in sub-Saharan Africa, have different environmental conditions that favor infectious diseases to be more common.<sup>16</sup> Confounding factors such as less-adequate nutrition promote a more frequent challenge to the immune system. The spectrum of diseases that contribute to mortality are therefore dominated by opportunistic and other infectious causes. The diagnoses of the causes of death were based on clinical and laboratory data. Unfortunately, in none of our cases was an autopsy performed because of the frequent need to

promptly bury the deceased by relations in keeping with religious customs.

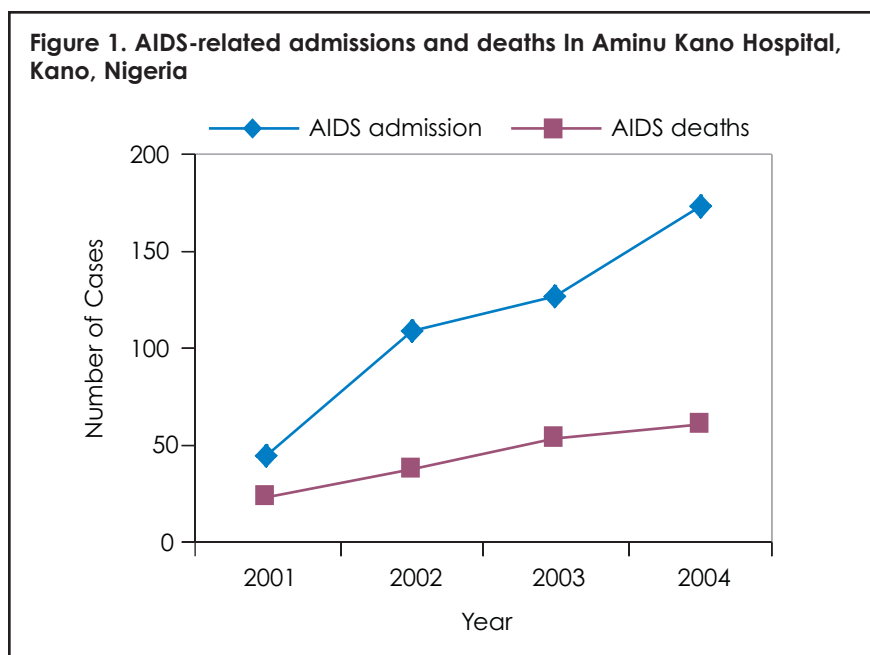
As a group, TB was the most common underlying cause of death, accounting for 33.4% of deaths in accordance with findings in other African countries where TB is responsible for about one-third of deaths.<sup>15,18</sup> In these communities, even with standard treatment, one year mortality is between 20–40%.<sup>16</sup> Factors responsible for the higher mortality include greater treatment failure rate partly due to poor compliance, and fear of the diagnosis of AIDS may delay utilization of health services. Life-threatening side effects of treatment are also more common in HIV-infected individuals.<sup>16</sup> The most pertinent indicator of poor disease outcome in our patients was low CD4 count (<200 cell/ $\mu$ l) in keeping with the established decrease in CD4 count in active TB.<sup>19</sup>

Septicemia, one of the most serious AIDS-related complications in clinical practice, is associated with a high mortality even in developed countries.<sup>7,20</sup> It caused 42 (23.8%) deaths in this study. A wide variety of infectious foci, including lungs, middle ear, kidneys and skin, among others, were noted, and death occurred despite vigorous resuscitation, antibiotic treatment and supportive care. Several of the patients with septicemia and shock had a short survival time in hospital, with gram-negative bacteria or opportunistic fungi being isolated in an appreciable number of them.

HIV-infected persons in Africa typically show a more rapid progression than infected persons in other regions of the world.<sup>16-22</sup> Sixteen (9.1%) patients died from advanced HIV disease, characteristically with marked wasting and CD4 cell count <50 cell/ $\mu$ l in absence of other potentially fatal AIDS indicator conditions.

Epidemiological investigation has documented a wide variety of HIV-associated brain pathology, said to occur in up to 80% of individuals who die of AIDS.<sup>23</sup> They arise from direct or indirect effects of the virus, opportunistic infectious agents, and complications of treatment or neoplasms. Meningitis was the most common central nervous system (CNS) cause of death in nine patients (7.3%). In six patients, bacteria were responsible, two were viral in origin and in one patient, India ink preparations demonstrated yeasts of *Cryptococcus neoformans* in the CSF.

Central nervous system (CNS) lesions, even though



more frequent in HIV infection acquired through blood product transfusion,<sup>23</sup> were present in three cases (1.7%). They were all instances of cerebrovascular disease diagnosed on the basis of clinical findings and the results of computerized tomography (CT) imaging. There was one case of AIDS dementia complex consistent with HIV encephalitis in a young adult male with no history of intravenous drug use. Another patient was diagnosed with primary CNS lymphoma, which responded poorly to chemotherapy.

AIDS-associated malignancies are increasingly being identified in late stages of the disease in sub-Saharan Africa.<sup>5,24</sup> Kaposi's sarcoma has become more common in men and women<sup>5,25</sup> and caused eight deaths (4.5%) in the present study. Although diagnosis was confirmed from biopsy of cutaneous lesions, extensive visceral involvement was observed in majority of patients who also documented low CD4 cell counts. Of the three patients that died of non-Hodgkin's lymphoma, two had the diffuse large-cell variant, while one developed primary effusion lymphoma. All of these are known to be commonly associated with AIDS.<sup>5</sup> One man who died of hepatocellular carcinoma was seropositive for both HIV-1 and hepatitis B virus markers, stressing the importance of comorbidity as a possible predictor of poor disease outcome.<sup>7</sup>

Among the HIV-associated renal diseases, some data indicate a striking racial predominance of blacks in HIV-associated nephropathy (HIVAN).<sup>26</sup> Only one patient died of this condition even though five (2.8%) and one (0.6%), respectively, died of chronic and acute renal failure. There is need to detect and treat renal complications early because they are well recognized to have a substantive impact on the course and prognosis of patients with HIV infection.<sup>27</sup>

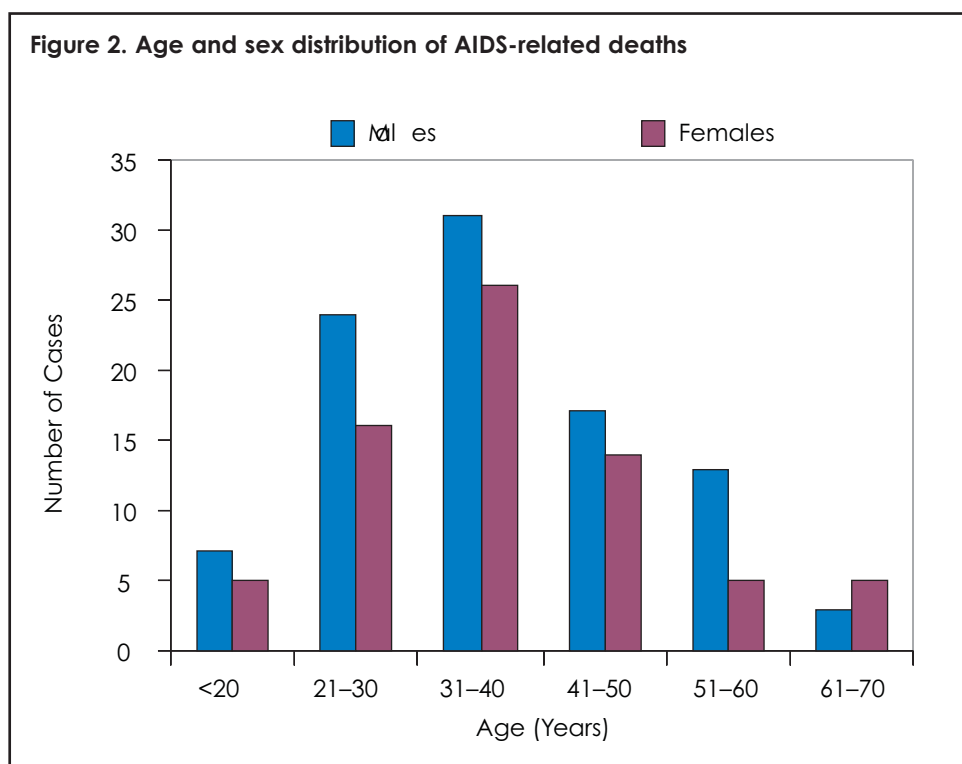
This study has shown that HIV/AIDS is still a major cause of morbidity and mortality in our hospital. The causes of death reflect the variety of infections and malignancies as well as other forms of organ involvement that affect HIV/AIDS patients. The present dismal situation of adult patients living

with HIV/AIDS calls for enhanced strategies to decrease the mortality trend observed in sub-Saharan Africa. This requires sustainable efforts by the federal, state and local governments to prevent further infections through effective interventions. Since poor healthcare and delayed utilization of health services play a role in short survival periods in developing countries,<sup>16</sup> communities should aim at educating the public of the health consequences of the disease. By improving the quality of available care through provision of curative treatment of commonly associated conditions, prophylaxis of opportunistic infections and antiretroviral drugs, it is hoped that infected individuals can be made to live longer. With the introduction of affordable HAART in several centers in Nigeria, assistance from foreign governments and institutions, it is hoped that infected patients can be made to live longer. Further studies are however needed to ascertain other determinants of AIDS-related mortality in our environment.

## REFERENCES

- Centers for Disease Control and Prevention. Pneumocystis pneumonia—Los Angeles. *MMWR*. 1981;30:250.
- Centers for Disease Control and Prevention. Kaposi's sarcoma and Pneumocystis pneumonia among homosexual men—New York City and California. *MMWR*. 1981;30:305.
- UNAIDS. AIDS epidemic update. Joint United Nations Programme on HIV/AIDS. December, 2000.
- DeCock KM, Weiss HA. The global epidemiology of HIV/AIDS. *Trop Med Intern Health*. 2000;5:A3.
- Thomas JO. Acquired immunodeficiency syndrome-associated cancers in sub-Saharan Africa. *Semin Oncol*. 2001;28: 198-206.

**Figure 2. Age and sex distribution of AIDS-related deaths**



## AIDS-RELATED DEATHS IN A TERTIARY HEALTH INSTITUTION

6. UNAIDS report on the global HIV/AIDS epidemic. Joint United Nations Programme on HIV/AIDS. July, 2004.
7. Lewden C, Salmon D, Morlat P, et al. Causes of death among human immunodeficiency virus (HIV) infected adult in the era of potential anti-retroviral therapy: emerging roles of hepatitis and cancers, persistent role of AIDS. *Int J Epidemiol.* 2004;23; [e-pub ahead of print].
8. Ogun SA, Adelowo OO, Familoni OB, et al. Spectrum and out-come of clinical diseases in adults living with AIDS at the Ogun State University teaching Hospital. *East Afr Med J.* 2003;80:513-517.
9. Ogun SA, Adelowo OO, Familoni OB, et al. Pattern and outcome of Medical admissions at the Ogun State University Teaching Hospital Sagamu – a three year review. *West Afr J Med.* 2000;19:304-308.
10. Anteyi EA, Idoko JA, Ukoli CO, et al. Clinical pattern of Human immunodeficiency virus in pulmonary tuberculosis patients in Jos, Nigeria. *Afr J Med Med Sci.* 1996;25:317-321.
11. Acquired Immunodeficiency Syndrome in the adult. *Nig Bul Epid.* 1992; 2:4-6.
12. World Health Organization. Manual of international statistical classification of diseases (ICD 10), injuries and causes of death; revision 1992.
13. Garko SB, Ekweani CN, Anyiam CA. Duration of hospital stay and mortality in the medical wards of Ahmadu Bello University Teaching Hospital, Kaduna. *Ann Afr Med.* 2004;2:63-71.
14. Mandong BM, Madaki JK. Mortality in a Nigerian Teaching Hospital: Experience at Jos University Teaching Hospital (JUTH) 1995–1999. *Highland Medical Research Journal.* 2002;1:16-18.
15. Lucas SB, Hounnou A, Peacock C, et al. The mortality and pathology of HIV infection in a West African city. *AIDS.* 1993;7:1569-1579.
16. Boerma JT, Nunn AJ, Whitworth JG. Mortality impact of the AIDS epi-

- demic: evidence from community studies in less developed countries. *AIDS.* 1998;12(Suppl 1):S3-S14.
17. Boerma JT, Ngalula J, Ingingo R, et al. Levels and causes of adult mortality in rural Tanzania with special reference to HIV/AIDS. *Health Trans Rev.* 1997; 7(Suppl 2):63-74.
18. Leroy V, Msellati P, Lepage P, et al. Four years of natural history of HIV-1 infection in African Women: a prospective cohort study in Kigali (Rwanda), 1988-1993. *J Acquir Immune Defic Syndr.* 1995;9:415-421.
19. Shafer RW, Bloch AB, Larkin C, et al. Predictors of Survival in HIV-infected tuberculosis patients. *AIDS.* 1996;10:269-272.
20. Chu SY, Buehler JW, Lieb L, et al. Causes of death among persons reported with AIDS. *Am J Public Health.* 1993;83:1429-1432.
21. Kitayaporn D, Tansuphasuvadikul S, Lohsomboon P, et al. Survival of AIDS patients in the emerging epidemic in Bangkok, Thailand. *J Acquir Immune Defic Syndr.* 1990;4:1111-1116.
22. Morgan D, Maude GH, Malamba SS, et al. HIV disease progression and AIDS defining disorders in rural Uganda. *Lancet.* 1997;350:247-250.
23. Davies J, Everall IP, Weich S, et al. HIV-associated brain pathology in the United Kingdom: an epidemiological study. *AIDS.* 1997;11:1145-1150.
24. Pintado V, Lopez-Dupla JM, Valencia ME, et al. Neoplasms associated with human immunodeficiency virus infection. Study of the clinical course of 70 patients. *Med Clin (Barc).* 1994;102:118-119.
25. Ahmed A, Isa MS, Garba HA, et al. Influence of HIV infection on presentation of Kaposi's Sarcoma. *Trop Doct.* 2001;31(1):42-45.
26. Weiner NJ, Goodman JW, Kimmel PL. The HIV-associated renal diseases: current insight into pathogenesis and treatment. *Kidney Int.* 2003;63:1618-1631.
27. Balow JE. Nephropathy in the context of HIV Infection. *Kidney Int.* 2005;67:1632-1633. ■

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