

AIDS mortality in Uganda: circumstances, factors and impact of death *



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Abstract

HIV/AIDS is a serious problem in sub-Saharan Africa. The disease affects the most sexually active adults of the population, who belong to the most productive age groups, and some of whom are breadwinners. The paper uses data from a baseline survey of six districts of Uganda to study the circumstances, factors and impact of death due to AIDS. While high proportions of patients of AIDS or related diseases use health facilities, most deaths occur at home. Deaths due to AIDS or related diseases are associated with sex, age, marital status, type of marriage, education, occupation and ethnicity. The worst effect of AIDS deaths on the household is lack of finance.

The AIDS epidemic appears to have begun in the late 1970s or early 1980s among homosexuals and male bisexuals and intravenous drug users in the USA and among men and women with multiple sexual partners in some regions of the Caribbean and in Central Africa (Abbas 1993). By mid-1993 about 14 million people had been infected with HIV since the beginning of the pandemic and at least one million of them were children (Blake 1993); it was assumed that about 8.8 million persons in sub-Saharan Africa were infected with HIV, and this accounted for 68 per cent of the world total.

The most affected region in sub-Saharan Africa is the contiguous belt stretching from Uganda, Zaire and Rwanda in Central Africa to Zambia, Malawi and Zimbabwe in the south and in parts of South Africa, a belt of countries inhabited by only two per cent of the world's population (Caldwell and Caldwell 1993). In Zambia, for example, estimates based upon the 1992 HIV sentinel surveillance system on women attending antenatal clinics revealed a 34 per cent prevalence of HIV infection among individuals aged 15-45 years in urban areas; and about 600,000-700,000 adults (14.4-16.5% of the population) are estimated to be infected throughout the country (Fylkesnes, Brunberg and Msiska 1994). HIV/AIDS is spreading rapidly with an estimated 556,000 people, in a population of 40 million, already infected in South Africa (Waldman 1995). By December, 1995 the reported AIDS cases in Uganda numbered 48,312 (STD/ACP 1996). These high rates of infection imply high levels of morbidity and mortality.

* We are grateful for useful comments by Shail Jain of the Australian National University, and financial assistance from SAREC-SIDA and Rockefeller Foundation in collection and analysis of data as well as preparation of the paper. Makerere University and the Australian National University provided the office and computing facilities.

This level of the epidemic in Sub-Saharan Africa has been achieved almost entirely by heterosexual transmission which explains at least 93 per cent of all adult cases. Additionally, perinatal transmission is a growing problem in sub-Saharan Africa because large numbers of

women in reproductive ages are seropositive. It has been estimated that a seropositive mother has about a 30 per cent risk of transmitting the virus to her baby (Abbas 1993).

AIDS, which is the last stage of infection with HIV, can take more than ten years to develop and most people die within three years of being diagnosed with it (*World AIDS Day Newsletter* 1994). Although the disease has no cure and it is 100 per cent fatal, infected persons seek treatment from health units and traditional healers. Keogh et al. (1994) found that over three-quarters of AIDS patients in Rwanda considered it worthwhile going to hospital for assistance, compared to 17 per cent consulting traditional healers. In Ghana, hospitals and clinics ranked highest (86.6%) among sources of treatment attended by AIDS patients, followed by traditional healers (8.5%) and spiritual or faith healing (1.4%) (Anarfi 1995).

Some AIDS patients fear seeking health care because of misconceptions about health providers. In Uganda, for example, people have a belief that AIDS patients are given tablets in health units which shorten their lives (Konde-Lule, Musagara and Musgrave 1993) leading to many AIDS patients staying at home. Other patients feel isolated when put in separate wards at health units. It is reported that in the Kagera region of Tanzania, some AIDS patients who did not want their condition to be revealed refused to be admitted to hospitals and those who learnt of the separate wards later abandoned the AIDS ward and returned home (Lwihula et al. 1993).

Studies by Kennedy et al. (1989), Kruzich, Hopkins and Wood (1989), Butters et al. (1992) and Bourez et al. (1993) have shown that persons with HIV/AIDS get treatment from health units but they and their caregivers demonstrate an extraordinary commitment to living and dying at home. Some of the reasons for hospitalization include long periods of sickness with difficult symptom management, exhaustion amongst immediate caregivers and loss of a partner (Goldstone et al. 1995).

Several authors have argued that since AIDS infection in sub-Saharan Africa is mainly heterosexually transmitted the number of males infected is almost equal to that of females (Kambou et al. 1992; Tanne 1992; Caldwell et al. 1993). However a number of studies have reported more women infected than men in Africa. Anarfi (1995), in a study about conditions and care of AIDS victims in Ghana, found 72 per cent of the patients females, 77 per cent of whom ranged between 20 and 29 years old. In Uganda, a review of passive AIDS surveillance has shown almost equal numbers of clinical cases reported in men and women but other studies (e.g. Berkley et al. 1990) have shown that women are more likely to be HIV infected than men. Similar findings were reported in Zaire by N'Galy et al. (1988) and Ryder et al. (1990). A study in Rwanda showed that women are 1.4 times more likely to be HIV-infected than men (Rwandan HIV Sero-prevalence Study Group 1989). Reasons given for higher prevalence among females include more efficient transmission from men to women than from women to men, sexual behaviour favouring men having more sexual partners, and exposure to infection of both sexes at different ages (Berkley et al. 1990).

In Sub-Saharan Africa the highest rate of HIV infection is among sexually active young women, less than 35 years old. The 15-24-year-old women are more likely to be infected than men in the same age group (Johnson 1992), and men are infected at a later age, suggesting that women have their first intercourse earlier and have older sexual partners than men. Between 1987 and 1993 there were five HIV-infected women, 15-19 years old, for every one HIV-infected man in Zimbabwe (Ankrah, Nkumbi and Lubega 1994). In Burundi the peak age of infected females was 20-29 years compared to 30-34 years for males (Nunn 1989). In Uganda 80 per cent of those infected with HIV are 15-45 years of age (Topouzis 1994). A study in Rakai district of Uganda placed the mean and median ages of seropositive women at 27 and 24 years respectively, and the corresponding years for males were 33 and 28 years.

There is evidence that the prevalence rate of HIV-infection is highest in the most advanced social classes. For example, a study of sero-prevalence in a large textile industry in Kinshasha, Zaire, revealed that the HIV infection rate for executives was 5.3 per cent as against 4.6 per cent for foremen, and almost double the 2.8 per cent rate for workers (Over 1992). A national survey of HIV cases in Rwanda revealed an infection rate of 30 per cent among the urban adults with more than primary schooling compared to 20.8 per cent for those with less education. Studies in Zambia confirmed that the epidemic is striking disproportionately the groups with the highest level of productive skills, and human capital; this is also true for Uganda (Ndongko 1996). In Tanzania, a woman's HIV risk increased with both her education and the male partner's education (Kapiga et al. 1994). It is not clear whether this group of people is more represented than other groups in the population or their numbers are over-represented in the samples researchers used, because their data were more available. In Rwanda women married to farmers and army men have a relatively low prevalence of infection (Allen et al. 1991).

The AIDS epidemic varies with marital status. For example, in Uganda and Zambia, about two-thirds of the AIDS victims are married (Peltzer et al. 1989; Ankrah et al. 1992). On the other hand in Rwanda women in legal marriages had a substantially lower prevalence of infection (21%) than those in common law unions (33%) perhaps because the unions were more likely to be polygamous than the legal marriages. However those in legal and common law marriages were less likely to be infected than those who were single, divorced, widowed or separated (46%). Also, women cohabiting with a male partner were at a significantly lower risk of infection than single mothers (Allen et al. 1991). In Tanzania HIV sero-positivity was significantly lower among young women and women in non polygamous marriages (Kapiga et al. 1994) while in Bujumbura, Burundi, most female AIDS patients were separated or widowed (Nunn 1989).

HIV/AIDS affects not only the patient but also the biological and social family. The infected individual experiences the psychological distress caused by the illness, and later death. On the part of the family, more time and money are spent on the AIDS patient, thereby reducing the time the adult caretakers spend working, and reducing family consumption and savings (Ndongko 1996). For example some female carers have to give up or reduce their income-earning activities and thus become more dependent on the family themselves (Anarfi 1992a). Families experience financial crisis as a result of trying to cope with the disease (Anarfi 1995) and when the adult dies the care of the orphans is left to the extended family and friends. Furthermore, after the death, the remaining household members face the cost of mourning and funeral arrangements. In Africa funeral expenses are sometimes higher than medical costs (Ndongko 1996). For example, in Zaire, the average out-of-pocket costs of funeral and wake for a pediatric AIDS death in Kinshasha has been estimated at \$320, equivalent to 11 months of an ordinary person's income and several times greater than the cost of 25 days in hospital for treatment (Davachi et al. 1988).

Since AIDS mostly affects the sexually active adults of the population who are also the most productive, it kills members of the family who are breadwinners for numerous dependants, both children and elderly parents, leaving them with no means of support. When the infected person dies, the household not only loses his or her time and skills but also may lose property like land and other assets which the patient might have acquired. In a Ghanaian study 40 per cent of AIDS-affected households reported loss of labour, five per cent loss of income and five per cent being forced to restrict the area of cultivation (Anarfi 1992b). This may result in high child malnutrition and stopping of schooling, and breaking up of the household. For example in a study in central Kampala, 16 per cent of the households surveyed reported the death from AIDS of a father or a mother, and of the households that reported orphans 47 per cent lacked school fees compared to ten per cent in households without

orphans (Muller and Abbas 1990). In Zambia, widows face the loss of property and children at the hands of their in-laws after the death of their husbands and those whose husbands died of AIDS are treated the worst (*AIDS Analysis Africa* 1994).

This paper presents data for six Uganda districts with varying incidence of HIV/AIDS and examines the various circumstances, factors and impact of death.

Data source and method

The data source of this paper is a multi-phase study entitled 'Evolution of household composition and family structure under conditions of high mortality in Uganda'. The study was conducted in six districts of Uganda: Mbale and Iganga in the east, Masaka in the south, Mbarara and Kabale in the southwest and Hoima in the west. The six districts represent six big ethnic groups: the Bagisu in Mbale, Baganda in Masaka, Basoga in Iganga, Banyankore in Mbarara, Bakiga in Kabale, and Banyoro in Hoima, representing well over 50 per cent of Uganda's population (Republic of Uganda 1994).

A total of 1797 households were sampled from both urban and rural households that had experienced death in the past ten years before the survey, since the first HIV case was identified in Rakai in 1992 (Serwadda et al. 1985). The smallest administrative unit, the Local Council (LC) equivalent to a village, was used as the primary sampling unit. For each selected LC, households that had experienced death were selected and surveyed.

The survey used a structured questionnaire with eight sections. Information was collected on the background characteristics of households, contribution of members to the welfare of their households, mortality since the household was formed, orphanhood and orphan care arrangements, migration and behaviour patterns of widows and widowers, current patient care in the household, attitude towards illness and death in the community, and fertility. The information used in this paper came from the section on mortality with the following questions: name of the dead person, sex, age at death, year of death, cause or symptoms the dead person showed before death, length of sickness, action taken about the illness, where the person died, and changes caused by the death in the households.

The data are limited in three ways. First, the study did not include respondents from northern Uganda who belong to the non-Bantu ethnic groups. All the districts covered comprise Bantu-speaking groups, who are similar in culture. The exclusion of the non-Bantu Ugandans limits the data when ethnicity is examined as a factor of HIV/AIDS. The second weakness is in the definition of AIDS. Many people define AIDS in respect to body emaciation, but thinness as one of the manifestations of AIDS can be deceitful since Africa has about eleven diseases, including tuberculosis, which cause weight loss (*AIDS Weekly* 1994). This definition may result in an overestimation of the extent of the epidemic. However, a comparison of verbal autopsy and laboratory tests in Masaka district revealed close results. This is perhaps because most people know the symptoms of HIV/AIDS and are most likely to be correct in their reports on the disease. Another weakness of the data is that a household which has existed and been exposed for a longer duration will have more deaths recorded than others. The data do not include the period of the household's existence. To make the comparisons between respondents' characteristics possible, it is assumed that for each characteristic, the average age of a household is the same, which may not be true.

Deaths in the household

Since the formation of the 1797 households, a total of 3980 deaths were reported to have occurred averaging over two deaths per household. The causes of death were divided into two categories: causes due to AIDS or related diseases which accounted for 48.9 per cent, and non-AIDS diseases responsible for 51.1 per cent.

Table 1 shows the causes of death before they were collapsed in two groups. The causes of death are diarrhoea, malaria, measles, AIDS, accidents, AIDS-related diseases and other causes. AIDS was responsible for 25.4 per cent of male deaths and 30.1 per cent of female deaths while AIDS-related diseases accounted for 8.6 per cent of male and 10.6 per cent of female deaths. AIDS accounted for a big proportion of deaths in age groups 15-29 and 30-49 with higher percentages of female than male deaths in both age groups. AIDS related deaths followed a similar pattern.

Table 1
Per cent distribution of cause of death by age and sex

Cause of death	0-4		5-14		15-29		30-49		50+		Overall	
	M	F	M	F	M	F	M	F	M	F	M	F
Diarrhoea	12.5	9.7	7.6	6.2	8.6	7.6	5.6	5.1	2.7	4.0	7.4	7.0
Malaria	20.3	20.8	27.1	24.8	10.7	9.6	8.1	9.7	10.5	15.8	12.8	14.0
Measles	22.2	21.8	13.6	17.7	-	0.5	0.1	-	0.3	-	5.8	6.6
AIDS	5.2	5.5	2.5	1.8	38.8	47.4	42.4	46.5	10.0	9.6	25.4	30.1
Accidents	2.6	1.5	4.2	2.7	14.7	2.6	10.4	2.2	6.7	3.4	8.6	2.3
AIDS-related	10.2	11.7	9.3	12.4	6.3	8.9	7.8	10.2	10.5	13.0	8.6	10.6
Other causes	27.0	29.0	35.6	34.5	20.9	23.4	25.6	26.3	59.3	54.2	59.5	29.4
Total	100	100	100	100	100	100	100	100	100	100	100	100
Number	463	403	118	113	414	582	695	411	371	117	2088	1686

Circumstances of death

The circumstances of death include length of illness, action taken on illness and place of death, and can be seen in Table 2. The table shows that more of the AIDS or related deaths occurred at home (75%) than other causes (60.6%), and the reverse pattern for the deaths in hospitals and health centres. This result is consistent with the findings from Tanzania that AIDS patients are often mistreated by hospital staff and decide to be sick at home and then die there (Lwihula et al. 1993). Also research in Kenya by Kamenyi and Ndung'u (1994) on dental auxiliaries and in Uganda by Baguma (1992) on medical students indicates negative attitudes towards AIDS patients, largely because workers lack adequate training in handling the patients. Another reason may be that most patients with terminal illness demand to die at home for cultural reasons, and some relatives want to avoid the trouble of transporting their remains. The high percentage of patients going to the hospitals and health centres is a reflection of the high level of use of health facilities by the population.

Table 2 shows that a negligible proportion of deaths took place at a traditional healer's place. Although most of the Uganda population is either Christian or Muslim, the traditional healers attract many people to their shrines. For instance, since the AIDS epidemic several spiritual healers in different parts of Uganda (e.g. in Masaka and Tororo) have attracted thousands of HIV/AIDS afflicted persons seeking cure. One would have expected the table to show a sizable proportion of AIDS patients having visited traditional healers for assistance against the mysterious disease and an appreciable percentage of them dying near them. The explanation for the low figures may be connected with what Ankrah et al. (1990) observed in their study of 20 Ugandan traditional healers: they initially claimed and tried to cure AIDS but failed and their popularity waned. Also the low percentages may be related to the reluctance

of the respondents to admit that they consulted traditional healers against their Christian or Muslim beliefs.

The sizable percentage of deaths where no action to take the patient for treatment was reported (11.8% for non-AIDS and 4.5% for AIDS cases) is quite surprising in a society which has been known to care for its patients (Ntozi 1995). The reason may be that either the disease was not taken seriously or relatives felt that the patient was beyond help. It is also possible that the inaction is a reflection of poverty in the households.

Table 2 also shows the length of the illness undergone by the deceased. Half the people who suffered from AIDS or related sickness died in under one year, and a quarter of them took over two years to die. In contrast over three-quarters (79%) of those suffering non-AIDS illnesses took less than one year to die. This is an expected result consistent with the observation that AIDS lasts for several years before the patient dies (Caldwell, Orubuloye and Caldwell 1992; *AIDS Weekly* 1994).

Table 2
Per cent distribution of circumstances of illness by cause of death for the six districts

Count	X2 test	Hospital or health centre	Traditional healer	Home	No action taken	Total	p
Action taken on illness							
AIDS or related diseases	87.0	1.2	5.5	4.5	1.9	1868	0.000
Non-AIDS related	75.0	1.6	5.9	11.8	5.7	1954	
Place of death							
AIDS or related diseases	23.9	0.2	75.2	0.0	0.7	1869	0.000
Non-AIDS related	35.2	2.1	60.6	0.0	2.1	1954	
Length of illness							
AIDS or related diseases	< 1 yr.	1 yr.	2-4 yrs.	5-9 yrs.	9+ yrs.		
AIDS or related diseases	50.9	23.8	21.8	3.0	0.5	1830	0.000
Non-AIDS related	79.3	7.3	8.8	2.7	1.9	1762	

Causes of deaths by selected factors

Questions were asked on the characteristics of deceased persons and responses are presented in Tables 3 to 7. These characteristics are represented in tables as variables of HIV infection. Table 3 shows the association between age and sex and death. Of the total 2088 male deaths, 46.5 per cent were due to AIDS or related diseases while the corresponding percentage of the 1686 females dead, was 52.4. However, of the total 1853 dead from AIDS and related causes, more males (52.3%) than females (47.7%) were affected.

Table 3
Per cent distribution of cause of death by age at death and sex

	AIDS + AIDS related	Non-AIDS related	Number
0	34.9	65.1	272
1-4	31.1	68.9	594
5-9	24.0	76.0	146
10-14	29.4	70.6	85
15-19	48.2	51.8	193

20-24	63.5	36.5	370
25-29	70.9	29.1	460
30-34	69.6	30.4	448
35-39	68.6	31.4	287
40-44	48.8	51.2	213
45-49	58.2	41.8	158
50-54	38.8	61.2	129
55-59	39.3	60.7	61
60-64	20.9	79.1	115
65+	23.0	77.0	243
All	49.1	50.9	3774
Male	AIDS + AIDS related	Non-AIDS related	Number
0	36.3	63.7	146
1-4	31.5	68.5	317
5-9	24.7	75.3	77
10-14	31.7	68.3	41
15-19	31.1	68.9	74
20-24	55.1	44.9	156
25-29	70.6	29.4	211
30-34	69.0	31.0	248
35-39	66.5	33.5	194
40-44	47.9	52.1	144
45-49	52.3	47.7	109
50-54	35.2	64.8	91
55-59	44.2	55.8	43
60-64	16.9	83.1	77
65+	23.1	76.9	160
All	46.5	53.5	2088
Female	AIDS + AIDS related	Non-AIDS related	Number
0	33.3	66.7	126
1-4	30.7	69.3	277
5-9	23.2	76.8	69
10-14	27.3	72.7	44
15-19	58.8	41.2	119
20-24	69.6	30.4	214

Table 3 continued

Female	AIDS + AIDS related	Non-AIDS related	Number
25-29	71.1	28.9	249
30-34	70.5	29.5	200
35-39	73.1	26.9	93
40-44	50.7	49.3	69
45-49	71.4	28.6	49
50-54	47.4	52.6	38
55-59	27.8	72.2	18
60-64	28.9	71.1	38
65+	22.9	77.1	83

All	52.4	47.6	1686
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X² test p= 0.0000

Table 4 shows the factors of district of residence and ethnicity by sex. The highest proportions of males and females dead from AIDS or related causes were reported in Masaka, 67.2 per cent for males and 75.1 per cent for females; and the lowest percentages were reported in Hoima for females (27.5%) and Mbarara for males (27.6%). Ethnically, most males (63.7%) and females (70.7%) were killed by AIDS or related disease among the Baganda while the Banyoro males (27.1%) and Banyankore females (31.5%) suffered least.

Table 4
Per cent distribution of cause of death by sex, district and ethnicity

DISTRICT	AIDS + AIDS related	Non-AIDS related	Number	X ² test p= 0.1221
Hoima				
Males	27.5	72.5	298	0.4653
Females	30.5	69.5	220	
Iganga				
Males	40.1	59.9	304	0.3203
Females	44.4	55.6	225	
Kabale				
Males	43.4	56.6	389	0.0941
Females	50.0	50.0	278	
Masaka				
Males	67.2	32.8	521	0.0063
Females	75.1	24.9	473	
Mbale				
Males	50.9	49.1	271	0.1221
Females	56.9	43.1	304	
Mbarara				
Males	28.3	71.7	237	0.8734
Females	27.6	72.4	203	

Table 4 continued

All districts				
Males	46.2	53.8	2120	0.0002
Females	52.3	47.7	1703	
Ethnicity	AIDS + AIDS related	Non-AIDS related	Number	X ² test p= 0.1221
Bagisu				
Males	51.8	48.2	255	0.1574
Females	58.3	41.7	218	
Basoga				
Males	38.6	61.4	272	0.2410
Females	44.1	55.9	186	
Baganda				
Males	63.7	36.3	471	0.0304
Females	70.7	29.3	392	
Banyankore				
Males	29.0	71.0	176	

Females	31.5	68.5	168	0.6039
Bakiga				
Males	43.3	56.7	356	
Females	46.5	53.5	243	0.4329
Banyora				
Males	27.1	72.9	255	
Females	31.6	68.4	190	0.2986
Others				
Males	50.1	49.9	335	
Females	58.2	41.8	306	0.0419
All				
Males	46.2	53.8	2120	
Females	52.3	47.7	1703	0.0002

Displayed in Table 5 is the cause of death by marital status, type of union and district. Overall, the six districts reported that of the adults, the widowed and separated suffered most (62.2%) from AIDS or related deaths while the married suffered least. The married persons in polygamous unions died more from the AIDS related causes than those monogamously married. These findings are in agreement with those of Nunn (1989) in Bujumbura. On the district basis, the results show that Iganga, Kabale and Mbale follow the same pattern as the overall picture. Masaka district with the highest percentage reported more married persons to have died than the never-married; in Hoima the widowed and separated suffered least; while the results of Mbarara show that more of the never-married died from AIDS or related causes than the other diseases.

Table 6 shows that both businessmen (69.5%) and businesswomen (80.2%) died most from AIDS or related diseases. The next occupations to suffer from AIDS or related deaths were formal employment (78%) for females and self-employed male technicians (56.5%). Male students (33.8%) and female children (32.4%) recorded the lowest proportions of deaths due to AIDS or related diseases.

Table 5
Per cent distribution of cause of death by marital status, type of marriage and districts

	Never married	Monogamous union	Polygamous union	Widowed/separated	Chi-square Value of P
All districts					
AIDS + AIDS related	57.7	53.7	57.5	62.2	
Non-AIDS related	42.3	46.7	42.5	37.8	
Total	100.0	100.0	100.0	100.0	
Number	515	1091	589	188	0.0000
Hoima					
AIDS + AIDS related	32.8	31.3	40.2	31.3	
Non-AIDS related	67.2	68.7	59.8	68.8	
Total	100.0	100.0	100.0	100.0	
Number	58	163	82	16	0.0187
Iganga					
AIDS + AIDS related	50.0	56.3	44.6	54.5	
Non-AIDS related	50.0	43.7	55.4	45.5	
Total	100.0	100.0	100.0	100.0	
Number	46	151	92	33	0.0000

Kabale					
AIDS + AIDS related	50.0	47.2	33.9	56.3	
Non-AIDS related	50.0	52.8	66.12	43.8	
Total	100.0	100.0	100.0	100.1	
Number	92	229	62	32	0.03052
Masaka					
AIDS + AIDS related	75.0	75.1	81.7	84.5	
Non-AIDS related	25.0	24.9	18.3	15.5	
Total	100.0	100.0	100.0	100.0	
Number	152	152	219	58	0.0000
Mbale					
AIDS + AIDS related	62.8	60.2	51.0	66.7	
Non-AIDS related	37.2	39.8	49.0	33.3	
Total	100.0	100.0	100.0	100.0	
Number	121	118	96	30	0.0167
Mbarara					
AIDS + AIDS related	41.3	30.8	40.0	36.8	
Non-AIDS related	58.7	69.2	60.0	63.2	
Total	100.0	100.0	100.0	100.0	
Number	46	117	35	19	0.0151

Table 6
Per cent distribution of cause of death by occupation and sex

	AIDS + AIDS related	Non-AIDS related	Number
Subsistence farmers			
Male	40.8	59.2	397
Female	60.0	40.0	552
Technicians and self employed			
Male	56.5	43.5	200
Female	66.7	33.3	52
Formal employment			
Male	54.5	45.5	200
Female	78.0	22.0	82
Others			
Male	69.5	30.5	256
Female	80.2	19.8	131
Business			
Male	40.8	59.2	625
Female	43.8	56.2	516
Chi-square			
Male			0.0000
Female			0.0000

The results associating education and cause of death are given in Table 7. For both sexes, the proportion of deaths due to AIDS or related causes was highest in those with post-primary education and least among the uneducated. The bivariate analysis gives a significant association between AIDS or related deaths and education.

Table 7
Per cent distribution of cause of death by level of education and sex

	None	Primary	Secondary	Post Sec	Total	Chi-square
Both sexes						
AIDS + AIDS related	36.4	58.9	60.2	60.8	1407	
Non-AIDS related	63.6	41.1	39.8	39.2	1222	
Number	670	1319	561	79	2629	0.0000
Males						
AIDS + AIDS related	31.3	53.2	56.5	54.9	729	
Non-AIDS related	68.7	46.8	43.5	45.1	750	
Number	323	744	361	51	1479	0.0000
Females						
AIDS + AIDS related	41.2	66.3	67.0	71.4	791	
Non-AIDS related	58.8	33.7	33.0	28.6	726	
Number	347	575	200	28	1150	0.0000

The above factors are related to the cause of deaths in a logistic regression model. As in bivariate analysis the cause of death is classified into two categories, deaths due to AIDS or related diseases, and deaths from non-AIDS causes. The independent variables are age, sex,

marital status, type of marriage, level of education, ethnicity and district. Based on the findings of the bivariate analysis, a reference category was selected for each variable.

The first factor to consider is sex. Table 8 shows that females were 1.5 times more likely to die of AIDS than males and the result is significant. This finding is in line with results of other researchers (e.g. Berkley et al. 1990; Lucas and Walker 1991; Ray 1991; Erwin 1993; Oppong 1995) that females are more vulnerable to AIDS than males. These authors have explained the pattern as due to women being poorer and more easily exploited than men. Secondly, the biological structure of the female organs allows more exposure to the virus during sexual intercourse than the sexual organs of males (Persson 1994).

A second factor of AIDS death is age. Using age 5-19 as the reference category it is observed that those younger and older are more vulnerable to HIV than persons in ages 5-19 except age 50 and above. The most susceptible age group is 20-39 which is 2.5 times more likely to be infected than age 5-19. Other studies have found that persons of this age range are more infected than other ages because of being most sexually active (Nunn 1989). Not surprising, the least susceptible age group was 60 and above since males and females of these ages are the least sexually active.

A variable combining marital status and type of union is related to death from AIDS or related diseases. The widowed and divorced or separated are significantly more likely to die of the disease than those monogamously married. The results are expected since the spouses of some of the widowed had died of AIDS, and the non-AIDS widows would probably be in advanced ages. The results are consistent with patterns in USA and New Zealand where widowhood is positively associated with high mortality (Morgan 1989; New Zealand 1981).

It is not surprising that the polygamously married were more likely to die of AIDS than the monogamously married, given the higher risk of exposure of the former. However, the risks of death of a polygamist are not significantly higher than those of a monogamist.

The level of education is another variable examined in relation to AIDS deaths. Not surprisingly, Table 8 shows that the educated have higher risk of AIDS deaths than the uneducated. Those with primary education are most likely to die of AIDS, even more than those with post-primary education. The explanation for this pattern is that the most highly educated have more access to AIDS prevention facilities such as condoms and information than those with primary education.

Regarding occupation as a variable of AIDS death, the subsistence farmers were made the reference category. It can be seen that other occupations were more likely to die of AIDS than farmers: business people are twice as likely to die of AIDS. This result agrees with the early theory that HIV infection was associated with business as an occupation which generated wealth and tended to increase the number of sexual partners. However, results from Rakai do not agree with this (Kirunga 1996).

A further variable of AIDS death is ethnicity. With the Banyoro as reference category, all other groups were significantly more likely to die of AIDS. This finding is expected because the epidemic was least felt in Hoima. Similarly the Baganda of Masaka had suffered most from the disease because the epidemic is most advanced in Masaka district. With the exception of Mbarara, the district pattern is similar to that of ethnicity. Although the Banyankore are shown by Table 8 to be more at risk of AIDS death than the Banyoro, people in Mbarara, dominated by the Banyankore, are less likely to die of AIDS than in Hoima, dominated by the Banyoro. The changing results may be due to other ethnic groups such as the Baganda and the Bakiga in Hoima.

Table 8
Results of logistic regression where AIDS or related diseases as a cause of death is the dependent variable

Variable	B	S.E.	df	Sig	R	Exp(B)
Sex						
Males	.0000	-	1	-	-	1.0000
Females	.3976	.1080	1	.0002	.0620	1.4882
Age			5	.0000	.1818	
0-4	.2790	.7241	1	.7000	.0000	1.3218
5-19	.0000	-	1	-	-	1.0000
20-39	.9062	.2150	1	.0000	.0820	2.4748
40-49	.3039	.2772	1	.2189	.0000	1.3552
50-49	-.0863	.2806	1	.7583	.0000	.9173
60+	-.7299	.2706	1	.0070	-.0419	.4820
Marital status			3	.0729	.0180	
Never married	-.1218	.1299	1	.3485	.0000	.8854
Monogamous	.0000	-	1	-	-	1.0000
Polygamous	.0891	.1211	1	.4618	.0000	1.0932
Widowed/separated	.4479	.2033	1	.0276	.0308	1.5650
Level of education			3	.5147	.0000	
None	-	-	1	-	-	1.0000
Primary	.1770	.1369	1	.1962	.0000	1.1936
Secondary	.0723	.1672	1	.6653	.0000	1.0750
Post sec	-.0373	.2927	1	.8986	.0000	.9634
Occupation			4	.0000	.0779	
Farmers	.0000	-	1	-	-	1.0000
Technicians	.2912	.1725	1	.0915	.0168	1.3380
Formal employment	.4247	.1765	1	.0161	.0355	1.5291
Business	.6957	.1545	1	.0000	.0779	2.0051
Ethnicity			6	.0000	.1792	
Banyoro	.0000	-	1	-	-	1.0000
Bagisu	.9087	.1929	1	.0000	.0819	2.4811
Basoga	.7322	.2092	1	.0005	.0584	2.0796
Baganda	1.4814	.1670	1	.0000	.1596	4.3991
Banyankore	.2465	.2397	1	.3038	.0000	1.2795
Bakiga	.3941	.1752	1	.0245	.0319	1.4830
Others	1.0813	.2221	1	.0000	.0849	2.9484
District			5	.0000	.1787	
Hoima	0.0000	-	1	-	-	1.0000
Iganga	.3463	.1712	1	.0431	.0211	1.4138
Kabale	.5908	.1419	1	.0000	.0572	1.8054
Masaka	1.4748	.1380	1	.0000	.1547	4.3702
Mbale	1.0339	.1436	1	.0000	.1032	2.8119
Mbarara	-.0029	.2002	1	.9886	.0000	.9971
Constant	-1.5280	.2444	1	.0000		

Impact of death on household

It is important to assess the impact of death on the households. Table 9 gives some of the changes that were reported to have occurred following the death in the household. Overall, lack of funds is the leading effect of death in a home irrespective of the disease. This is more of a serious problem for the households that have experienced AIDS or related deaths than non-AIDS deaths. The pattern is similar in Iganga, Masaka and Mbale districts. However, financial problems are more serious in households hit by non-AIDS deaths than AIDS or related ones in Hoima and Mbarara, probably because the two districts are the least affected by AIDS deaths.

The second overall effect of death in households is social depression. On average this effect is felt more with the non-AIDS than the AIDS deaths. In Hoima social depression is the leading problem of both AIDS and non-AIDS deaths. The households that complained of splits due to death are negligible in all districts except Kabale. This implies that households are still together despite the recent epidemic. Unexpectedly, sizable proportions of respondents reported neither AIDS nor non-AIDS death impact on households in all the districts. Perhaps these deaths occurred a long time ago before the AIDS epidemic became serious. Another category of death that may not have a serious effect on the household would be those of very old people who were not productive or babies whose presence could be missed without economic problems.

Table 9
Per cent distribution of cause of death by changes in a household by district

	Lack of funds	Social depression	Household split	No effect	Others	Total	N	X ² test p=
All districts								
AIDS + AIDS related	54.4	16.1	3.7	19.2	6.6	100.0	1869	
Non-AIDS related	41.3	24.0	3.1	25.6	6.0	100.0	1953	0.0000
Hoima								
AIDS + AIDS related	17.4	38.3	0.7	29.5	14.1	100.0	149	
Non-AIDS related	20.4	31.3	1.9	36.7	9.8	100.1	368	0.16955
Iganga								
AIDS + AIDS related	63.5	18.9	0.9	9.5	7.2	100.0	222	
Non-AIDS related	49.8	32.9	1.3	11.7	4.2	99.9	307	0.00239
Kabale								
AIDS + AIDS related	62.7	7.1	10.4	18.8	1.0	100.0	308	
Non-AIDS related	63.2	5.8	6.7	22.8	1.4	99.9	359	0.32394
Masaka								
AIDS + AIDS related	62.4	6.8	1.4	23.5	5.8	99.9	705	
Non-AIDS related	40.8	14.2	1.4	36.7	6.9	100.0	289	0.0000
Mbale								
AIDS + AIDS related	47.8	27.6	5.2	10.5	8.8	99.9	362	
Non-AIDS related	35.8	32.9	3.8	18.2	9.3	100.0	313	0.0044
Mbarara								
AIDS + AIDS related	35.8	25.2	4.9	25.2	8.9	100.0	123	
Non-AIDS related	38.5	27.4	3.2	26.5	4.4	100.0	317	0.3650

Conclusion

From the above analysis, it is clear that a high proportion of deaths in Uganda are due to AIDS or related diseases. About half of the AIDS deaths occur after at least one year of

illness. Although most patients are taken to hospitals or health centres, a large majority of them die at home. The factors associated with AIDS mortality include sex, age, marital status, type of union, level of education, occupation, ethnicity and district of residence. The biggest impact of AIDS death on the household is lack of finance.

The findings of this study are important in that they confirm the hypothesis about the factors associated with AIDS for Uganda. The groups suffering from AIDS most can be focused on in the intervention programs to reverse the situation. For example, selected groups of women, ages and occupations can be helped while districts with low AIDS epidemic levels such as Hoima can receive a different set of AIDS programs from those in the highly AIDS-prevalent districts such as Masaka.

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