Prevalence and indicators of HIV and AIDS among adults admitted to medical and surgical wards in Blantyre, Malawi

DK Lewis, M Callaghan, K Phiri, J Chipwete, JG Kublin, E Borgstein, EE Zijlstra

Abstract

Despite high seroprevalence there are few recent studies of the effect of HIV on hospitals in sub-Saharan Africa. We examined 1226 consecutive patients admitted during two 2-week periods in October 1999 and January 2000. 70% medical patients were HIV positive, and 45% had AIDS. 36% surgical patients were HIV positive and 8% had AIDS. Seroprevalence rose to a peak among 30-40 year olds; 91% medical, 56% surgical and 80% all patients in this age group were HIV positive. Seropositive women were younger than seropositive men (median age 29 v 35, p<0.0001). Symptoms strongly indicative of HIV were history of shingles, chronic diarrhoea or fever or cough, history of tuberculosis, weight loss, and persistent itchy rash (adjusted odds ratios all over 5). Clinical signs strongly indicative of HIV were oral hairy leukoplakia, shingles scar, Kaposi's sarcoma, oral thrush, and hair loss (adjusted odds ratios all over 10). Of surgical patients with 'deep infections' (breast abscess, pyomyositis, osteomyelitis, septic arthritis, and multiple abscesses), 52% were HIV positive (OR compared with other surgical patients 2.4). Severe bacterial infections, tuberculosis, and AIDS caused 68% deaths. HIV dominates adult medicine, is a major part of adult surgery, is the main cause of death in hospital, and affects the economically active age group of the population.

Introduction

Sub-Saharan Africa is the region of the world worst affected by the HIV pandemic, with over 28 million people estimated to be living with AIDS, and perhaps 9% of the adult population infected with HIV. Adult HIV seroprevalence in Malawi was estimated to be 15% in 2001 [UNAIDS, 2002]. In 1996, seroprevalence among women at antenatal clinics in Blantyre was 32.8% [Taha et al, 1998]. In 1993 most deaths in the medical wards of Queen Elizabeth Central Hospital, Blantyre, Malawi occurred in young adults, predominantly from tuberculosis (TB), AIDS and gastroenteritis [Harries & Mvula, 1998]. HIV seroprevalence was not measured but mortality had increased compared with the same wards twenty years previously.

Studies from elsewhere in the region have measured seroprevalence among medical admissions [Ankrah et al, 1994; Temba et al, 1994; Colvin et al, 2001]. HIV seroprevalence has risen as the epidemic has worsened – for example, seroprevalence among medical admissions to Kenyatta Hospital, Nairobi rose from 19% in 1988-9 up to 39% in 1992, appearing to stabilise at 40% in 1997 [Arthur et al, 2000]. Others have examined specific wards or diseases: for example 40% of adults admitted to an Infectious Diseases ward in Abidjan in 1991 were HIV positive [Vugia et al, 1993]. Seroprevalence among inpatients with TB, including in Blantyre and Zomba, is as high as 75% [Harries et al, 1995; Grant et al, 1998; Harries et al, 1998]. There is less information about surgical patients. Of 100 adults admitted with long bone fractures in Lusaka in 1992, 32% were HIV positive, and this was thought to be representative of the general population [Kehoe & Jellis, 1994]. In 1997 seroprevalence on a South African gynaecology ward was 42%, but we found no other studies of HIV prevalence in African surgical patients [Wilkinson et al, 1999].

We aimed to determine the prevalence of HIV infection and AIDS among patients of different ages and diagnoses, and to assess clinical indicators of HIV infection, among medical and surgical inpatients at Queen Elizabeth Central Hospital, Blantyre.

Materials and Methods

For four weeks (4th to 18th October 1999, and 17th to 31st January 2000) all patients admitted to the adult (13 years and over) surgical and medical wards at QECH were reviewed. A study clinician conducted a standardised history and physical examination. Those who gave written consent had blood taken for HIV testing and were offered post-test counselling. Approval was obtained from the Research Committee of the University of Malawi College of Medicine.

Patient records were examined at discharge or death. For each patient a single, main diagnosis was made. This was the diagnosis thought to be responsible for admission: for example 56 patients had Kaposi's sarcoma (KS) but in only eleven was this the main reason for admission (Table 3). AIDS was defined according to the expanded WHO case definition for AIDS surveillance [WHO, 1994]. For the purposes of this definition only patients with proven TB were classed as having TB, not those with suspected TB under investigation.

Serum was tested with a rapid test (Abbot Determine, Dainabot Company, Tokyo, Japan, or Serocard, Trinity Biotech plc, Dublin, Eire) and an ELISA (Vironostika, Organon Teknika bv, Boxtel, Netherlands, or OrthoHIV1/HIV2, Ortho Diagnostic Systems, Rariton, NJ, USA). Samples testing positive with both the rapid test and the ELISA were regarded as HIV positive.

Data were double-entered into EpiInfo version 6.04b (CDC, USA; WHO, Switzerland) and validated, then analysed with STATA 6.0 (Stata Corporation, Texas 77840, USA). Categorical variables were compared with chi2 or Fisher's exact test. Continuous data were compared with Student's t-test if normally distributed, or Wilcoxon rank-sum test. Odds ratios (OR) were calculated and adjusted (AOR) using logistic regression. Unless stated AOR controlled for age, sex, urban or rural residence, and education level. 95% confidence intervals (CI) are given.

Results

There were 791 medical admissions during the study periods. Of these, 18 were missed by the study team and four died before assessment. Eleven declined to take part, leaving 758 medical patients who were assessed and gave blood for HIV testing. There were 486 surgical admissions during the study periods, of whom 29 were missed, and 12 declined to take part, leaving 445 included. In total there were 1277 admissions, of whom 1226 were seen, and 1203 consented to an HIV test; 23 (1.9%) declined testing. Of those consenting to the test 148, (12.3%) said that they did not wish to be offered post-test counselling.

Age was the most important demographic factor. 80% of patients aged 31 to 40 years were HIV positive (AOR 15.4, compared with patients aged 13 to 20 years). Overall 70% medical patients were HIV positive, and 45% met the expanded WHO case definition for AIDS surveillance (Table1). Seroprevalence rose to a peak among 31 to 40 year olds (89% in men, 92% in women), and then declined with increasing age.

The rise occurred earlier in women, and the group of women aged 21 to 30 years had the largest number of HIV positive patients. The pattern of AIDS prevalence was similar, reaching a peak of 66% in those aged 31 to 40 years.

In surgical patients, seroprevalence followed the same pattern as in medical patients, but at lower levels; 36% surgical patients were HIV positive and 8% had AIDS (Table 2). Seropositivity peaked at 65% in women aged 21 to 30, and 58% in men aged 31 to 40.

The median age of seronegative patients was the same (29) in men and women, but female seropositive patients were significantly younger (median age 29 years) than male seropositive patients (median age 35, ranksum p<0.0001).

HIV and diagnostic group

Most patients with proven or suspected tuberculosis (87%), and with severe bacterial infections (78%) were HIV positive, and most of these met the definition for AIDS. Sixteen patients who were being investigated for chronic cough but did not have TB proven while on the ward, were not classified as AIDS (Table 3). However seroprevalence in suspected TB was the same (87%) as in proven TB. Patients with acute gastroenteritis had a high prevalence of HIV (81%) but a relatively low prevalence of AIDS (34%).

All but one of the patients admitted primarily with Kaposi's sarcoma were HIV positive, and by definition had AIDS. Relatively few of the other surgical patients had AIDS. Among other surgical patients those with infections had the highest HIV prevalence (48%). These include superficial infections (wound infections, abscesses of the fingers and toes, lymphadenitis), so we separated those with 'deep infections' (breast abscess, pyomyositis, osteomyelitis, septic arthritis, and multiple abscesses), and compared them with all other surgical patients except those admitted with Kaposi's sarcoma. Of those with deep infections 52.2% were HIV positive (versus 31.2%, p=0.001). OR for being HIV positive if admitted with a deep infection was 2.4 (95% CI 1.4 to 4.1, AOR 2.1, p=0.01).

Seroprevalence among trauma patients was 29%, and we found no significant differences according to the type of trauma (assault, road traffic accident, burn, or other accident). The predominant type of trauma was road traffic accidents (41% and 39% of trauma in men and women respectively), and 70% trauma admissions were men. However, among trauma patients more women were HIV positive than men (41% v 24%, p=0.029). OR for being HIV positive if a female trauma patient, compared with male trauma patients, was 2.2 (p=0.031, 95% CI 1.1 to 4.5, unaltered by adjustment).

Duration of admission and mortality

HIV positive medical patients had a slightly longer length of stay than HIV negative patients (median days in hospital 3 v 2.5, ranksum p<0.0001), and seronegative patients died earlier in the admission (median day of death, Day 2) than seropositive patients (median Day 4, p=0.006). There was no difference in the length of stay (median 3 days) of HIV positive and negative surgical patients.

Seventeen surgical patients (4.7%) died in hospital (of whom two who did not have HIV testing), and they were more likely to be HIV positive than negative (OR 3.7, p=0.02, 95% CI 1.2 to 11; AOR 4.3). One third of the surgical deaths occurred among patients aged 31 to 40 years. Over half the deaths were in trauma patients (eight), with four deaths among patients with surgical sepsis, four with KS, and one other.

121 (15.7%) medical patients died: 96 of 530 (18.1%) seropositive, and 25 of 228 (11.0%) seronegative (p=0.014). OR for dying if seropositive was 1.8 (95% CI 1.1 to 2.9. AOR 2.1, p=0.003, 95% CI 1.3 to 3.5). Among seropositive patients with AIDS 70 of 340 (20.9%) died, compared with 25 of 190 (13.2%) without AIDS (OR 1.7, p=0.028, 95% CI 1.1 to 2.9; AOR 1.7). The proportion of patients dying in each age group was similar in those over 30 years (about 20%), and lower in the younger patients; but the majority of deaths occurred in the 21-40 year olds (57% all medical deaths). Severe bacterial infections (40%), TB (16%), and AIDS defining illnesses (12%) accounted for most deaths.

There was a striking difference in mortality between men and women on the medical wards. 22.3% men died compared with 9.7% women (OR if male 2.7, p<0.001, 95% CI 1.8 to 4.0), and this was unaffected by adjustment for age, urban residency, education level, and HIV seropositivity or AIDS. Most of the excess deaths appeared to be from severe bacterial infections, even though there were fewer men than women admitted with these.

Clinical indicators of HIV seropositivity

Table 4 shows clinical indicators of HIV. The demographic variables of age, sex, urban or rural residence and education level were confounding factors, so the odds ratios are adjusted for those, but controlling in addition for literacy did not alter the adjusted odds ratios. The most important demographic factor was age, as described above. Being female, living in urban areas, increased education level, and being married (compared with not living with a partner at present) were all indicators of seropositivity. Having been divorced or separated ever, and being widowed if under 40, were strongly associated with HIV.

Many factors in the medical history were strong predictors of HIV infection. The most important were a history of shingles (AOR 16.3), tuberculosis, chronic (> 1 month) diarrhoea or fever or cough, weight loss, and a persistent itchy rash. More than 83% patients with any one of these were HIV positive. Clinical signs were better indicators of seropositivity, although most signs were less frequent than the symptoms or past illnesses mentioned. All 16 patients with oral hairy leukoplakia were HIV positive, as were all except one of 44 with oral KS, and all except two of 86 with a shingles scar (OR 35.9). Other predictive signs were skin KS, oeasophageal candidiasis, oral thrush, and abnormal hair loss. All of these signs on their own were more specific indicators of HIV infection than the (not expanded) WHO case definition for AIDS surveillance (which does not rely on HIV testing). Of 360 patients who met this definition, 13.6% were HIV negative, and 29.4% did not meet the criteria of the expanded WHO definition.

Discussion

We examined 1203 adults admitted to medical and surgical wards in Blantyre. As shown previously [Harries et al, 1995] confidential HIV testing was acceptable to almost all patients (98.1%), and most wished to be offered their results. We found that 70% medical patients and 36% surgical patients were HIV positive; 45% medical patients had clinical AIDS, but relatively few surgical patients did. We believe that this is the highest prevalence of HIV recorded on a general medical ward.

Most deaths were HIV and AIDS related, and affected young, potentially economically active adults. HIV positive women were approximately six years younger than HIV positive men, as has been found in Kenya and Uganda.[Tembo et al, 1994, Arthur et al, 2000]. There is anecdotal evidence that the widowers of HIV infected women choose younger women as

their new sexual partners [Nunn et al, 1996]. It is difficult to explain the large difference in mortality between men and women: fewer men were admitted but more died. It is possible that very sick women (whose relatives expect that death is inevitable) are not brought to hospital for cultural reasons – mainly that a family will go to greater effort to find money to transport a sick man who is the main income generator. However that would result in fewer female admissions because the sickest women are not brought to hospital, and this does not appear to be the case. In most of sub-Saharan Africa HIV prevalence is higher among women, but what evidence there is indicates more rapid recent increases in male adult mortality, implying that the impact of the epidemic on men is more severe [Gregson & Garnett, 2000]. It has been suggested that women are infected younger and have slower disease progression than men. Perhaps, with their longer survival time, women are admitted more often with HIV related illnesses earlier in the course of their disease.

Medical diagnoses particularly associated with HIV (other than AIDS defining conditions) were TB [Tembo et al, 1994, Harries et al, 1995], severe bacterial infections [Gilks et al, 1990], and acute diarrhoea.[Gilks et al, 1992, Tembo et al, 1994, Arthur et al, 2000]. Of these conditions, patients with diarrhoea were less likely to meet the criteria for AIDS. Diarrhoea may represent enteric fever-like illness [Gilks et al, 1992], and perhaps many of these patients were admitted with non-typhi salmonella bacteraemia as their first HIV related illness.

Among surgical patients we found those with severe infections (mainly breast abscesses, pyomyositis, and multiple abscesses), were twice as likely as others (AOR 2.1) to have HIV. We expected that trauma patients would have a similar seroprevalence to that of the general population, yet 41% women admitted with trauma were HIV positive, and they were more likely than men admitted with trauma (AOR 2.2) to be seropositive. We do not know if this is an artefact caused by a small number (46 women, 95% CI for seropositivity 27 to 56%), or if women susceptible to trauma are for some reason at greater risk of HIV infection than other women, perhaps because of more risk taking behaviour. Women at antenatal clinic have a slightly lower seroprevalence than the general population because of reduced fertility with HIV infection, but the difference is unlikely to be more than a few percent [Kweisgabo et al, 2000, Zaba et al, 2000]. The antenatal figure of 33% in urban Malawi [Taha et al, 1998] is probably a reasonable estimate of the population seroprevalence in women of childbearing age.

As found elsewhere, seroprevalence rose with increased education [Dallabetta et al, 1993, Chao et al, 1994, Taha et al, 1998], and in urban patients [Mnyika et al, 1994]. We found that living with a sexual partner at present, having been divorced ever, and if aged under 40 being widowed, were all associated with HIV infection. A history of shingles, TB, weight loss, itchy rash, and chronic symptoms of diarrhoea, fever or cough were strongly associated with HIV. Many clinical signs were indicators of seropositivity, but oral hairy leukoplakia was pathognomonic, and disseminated KS or a shingles scar were almost pathognomonic. A history of shingles may be less reliable as a marker of actually having had shingles than finding a scar. More than 90% of patients with any one of these signs, or oral thrush or abnormal hair loss, were HIV positive. In this setting these signs individually were more specific predictors than fulfilling the criteria of the WHO case definition for AIDS surveillance, although the case definition was more sensitive than any single sign. Our results are compatible with those of a community cohort in Uganda, where shingles, oral thrush and pulmonary TB were highly predictive of HIV infection [Morgan et al, 2002].

The situation in Blantyre is likely to be similar to that in many other countries in sub-Saharan Africa, where population prevalence of HIV is the same or higher. In this setting HIV and AIDS dominate adult medicine, and are a significant factor in adult surgery. HIV is the main cause of death in patients admitted to hospital, and affects the section of the population which should be the most economically active.

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David K Lewis, Maria Callaghan, Kamija Phiri, James Chipwete, James G Kublin, Eric Borgstein, Ed E Zijlstra

University of Malawi College of Medicine, Private Bag 360, Chichiri, Blantyre 3.

Author for correspondence: Dr DK Lewis

Email: mariadavid@callaghanlewis.fsnet.co.uk

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	Age group	13-20y	21-30y	31-40y	41-50 y	51-60y	Over 60y	All ages
Men	number HIV positive / n	5 / 26	86 / 125	89 / 100	50 / 66	18 / 24	4 / 22	252 / 363
	% (95% CI)	19 (3 to 35)	69 (61 to 71)	89 (83 to 95)	76 (65 to 86)	75 (56 to 94)	18 (1 to 36)	69 (65 to 74)
	% age group with 'AIDS' (95% CI)	0	46 (38 to 55)	66 (57 to 75)	42 (30 to 55)	46 (24 to 67)	9 (1 to 22)	45 (40 to 51)
Women	number HIV positive / n	30 / 64	131 / 161	73 / 79	26 / 40	15 / 29	3 / 22	278 / 395
	% (95% CI)	47 (34 to 59)	81 (75 to 87)	92 (86 to 98)	65 (50 to 80)	52 (32 to 71)	14 (2 to 29)	70 (66 to 75)
	% age group with 'AIDS' (95% CI)	20 (10 to 30)	50 (42 to 57)	66 (55 to 77)	48 (31 to 64)	34 (16 to 53)	5 (1 to 14)	44 (39 to 49)
All	number HIV positive (n)	35 / 90	217 / 286	162 / 179	76 / 106	33 / 53	7 / 44	530 / 758
	% (95% CI)	39 (29 to 49)	76 (71 to 81)	91 (86 to 95)	72 (63 to 80)	62 (49 to 76)	16 (5 to 27)	70 (67 to 73)
	% age group with 'AIDS' (95% CI)	14 (7 to 22)	48 (42 to 54)	66 (59 to 73)	44 (35 to 54)	40 (26 to 53)	7 (1 to 15)	45 (41 to 48)

Table 1. Proportion of medical patients HIV positive and with clinical AIDS (Expanded WHO case definition for AIDS surveillance), by age group and sex. n is total number of patients in the age group.

	Age group	13-20y	21-30y	31-40y	41-50 y	51-60y	Over 60y	All ages
Men	number HIV positive / n	4 / 58	28 / 82	34 / 59	8 / 26	10 / 30	4 / 24	88 / 280*
	% (95% CI)	7 (2 to 14)	34 (24 to 45)	58 (45 to 71)	31 (12 to 50)	33 (15 to 51)	17 (1 to 33)	31 (26 to 37)
	% age group with 'AIDS' (95% CI)	0	5 (1 to 10)	10 (2 to 18)	8 (1 to 19)	3 (1 to 21)	4 (1 to 13)	6 (3 to 8)
Women	number HIV positive / n	8 / 37	39 / 60	14 / 26	5 / 19	3 / 11	0 / 11	69 / 165*
	% (95% CI)	22 (8 to 36)	65 (53 to 77)	54 (33 to 74)	26 (5 to 48)	27 (1 to 59)	0	42 (34 to 50)
	% age group with 'AIDS' (95% CI)	8 (1 to 17)	15 (6 to 24)	12 (1 to 25)	11 (1 to 26)	9 (1 to 29)	0	11 (6 to 16)
All	number HIV positive (n)	12 / 95	67 / 142	48 / 85	13 / 45	13 / 41	4/ 35	158 / 445 *
	% (95% CI)	13 (6 to 19)	47 (39 to 55)	56 (46 to 67)	29 (15 to 43)	32 (17 to 47)	11 (1 to 23)	36 (31 to 40)
	% age group with 'AIDS' (95% CI)	3 (1 to 7)	9 (4 to 14)	11 (4 to 17)	9 (1 to 17)	10 (1 to 19)	3 (1 to 8)	8 (5 to 10)

Table 2. Proportion of surgical patients HIV positive and with clinical AIDS (Expanded WHO case definition for AIDS surveillance), by age group and sex. n is total number of patients in the age group.
* One man's (HIV negative) and one woman's (HIV positive) age were not known

Diagnostic group	**Number HIV positive /n**	**% HIV**	**% AIDS**
AIDS defining illnesses*	62 / 65	95	89
Tuberculosis (proven or suspected)	94 / 108	87	75
Acute gastroenteritis	65 / 80	81	34
Severe bacterial infections**	151 / 193	78	62
Other febrile illness (malaria or no definite diagnosis)	79 / 126	63	21
Other medical problem (eg heart failure, stroke, diabetes, liver disease, gastrointestinal bleed, poisoning)	79 / 186	42	15
Total Medical patients	530 / 758	70	45
Kaposi's sarcoma	10 / 11	91	91
'Surgical sepsis' ***	67 / 141	48	11
Trauma	48 / 166	29	2
Other surgical problem (eg elective operation, cancer except Kaposi's)	29 / 116	25	4
Total Surgical patients (no diagnosis in 11 patients)	158 / 445	36	8

Table 3. Patients HIV positive by diagnostic group. Diagnosis is the main reason for admission only (one diagnosis per patient).
* AIDS defining illnesses are cryptococcal meningitis (india-ink positive CSF), Kaposi's sarcoma (obvious widespread clinical KS), chronic diarrhoea, presumptive Pneumocystis carinii pneumonia (typical symptoms and chest x-ray changes [Malin et al, 1995]), wasting syndrome and oesophageal thrush (oral thrush plus painful dysphagia). The three sero-negative patients in this category were two with chronic diarrhoea, and one with oral thrush and painful dysphagia.
** Severe bacterial infections include pneumonia, meningitis, septicaemia and empyema.
*** 'Surgical sepsis' is abscesses or pus requiring surgical drainage, anorectal disease, and wound or bone or joint infections

Clinical Indicator	Number with indicator	% HIV positive	P	Odds Ratio	[95% CI]	Adjusted OR	[95% CI]	P
Demographics								
Age 14 - 20 years	185	25		1		1		
Age 21 – 30 years	428	66	<0.001	5.8	[3.9 to 8.5]	6.9	[4.6 to 10.5]	<0.001
Age 31 – 40 years	264	80	<0.001	11.4	[7.3 to 17.8]	15.4	[9.5 to 24.9]	<0.001
Age 41 – 50 years	151	59	<0.001	4.2	[2.7 to 6.7]	6.2	[3.8 to 10.3]	<0.001
Age 51 – 60 years	94	49	<0.001	2.8	[1.7 to 4.7]	4.3	[2.4 to 7.7]	<0.001
Age over 60 years	79	14	0.042	0.48	[0.23 to 0.97]	0.58	[0.25 to 1.4]	0.211
Female	559	62%	0.001	1.5	[1.2 to 1.8]	1.5	[1.2 to 2.0].	<0.001
Urban	785	61%	<0.001	1.6	[1.3 to 2.0]	1.5	[1.2 to 2.0]	0.001
Literate	887	59%	0.46	0.86	[0.56 to 1.3]	1.3	[1 to 1.8]	0.046
8 years or more education	561	64%	<0.001	1.7	[1.4 to 2.2]	1.7	[1.3 to 2.3]	<0.001
Married (now)	710	60%	0.006	1.4	[1.1 to 1.8]	1.6	[1.2 to 2.0]	<0.001
Divorced or separated (ever)	297	75%	<0.001	2.8	[2.1 to 3.8]	3.4	[2.5 to 4.7]	<0.001
Widowed (ever)	174	62%	0.16	1.3	[0.93 to 1.8]	1.3	[0.93 to 1.9	0.12
Widowed if under age 40	58	92%	<0.001	8.4	[3.3 to 21.2]	3.7	[1.4 to 9.8]	0.008
Medical History								
Shingles	115	95%	<0.001	16.2	[7.1 to 37.1]	16.3	[7.1 to 37.5]	<0.001
Diarrhoea over 1 month	120	91%	<0.001	8.7	[4.6 to 16.4]	9.0	[4.8 to 17.0]	<0.001
Tuberculosis	140	89%	<0.001	7.4	[4.3 to 12.8]	7.6	[4.4 to 13.2]	<0.001
Weight loss	444	82%	<0.001	6.2	[4.7 to 8.2]	6.6	[4.9 to 8.8]	<0.001
Persistent itchy rash	92	87%	<0.001	5.6	[3.0 to 10.3]	5.6	[3.0 to 10.5]	<0.001
Fever over 1 month	243	84%	<0.001	5.4	[3.8 to 7.9]	5.6	[3.8 to 8.1]	<0.001
Cough over 1 month	237	83%	<0.001	4.8	[3.4 to 6.9]	5.2	[3.6 to 7.4]	<0.001
Meningitis	14	86%	0.047	4.6	[1 to 20.6]	4.4	[0.97 to 19.8]	0.055
Genital ulcer (ever)	171	82%	<0.001	4.0	[2.7 to 6.1]	4.1	[2.7 to 6.2]	<0.001
Genital discharge (ever)	187	78%	<0.001	3.2	[2.2 to 4.6]	3.7	[2.2 to 4.7]	<0.001
Daily activity impaired*	479	72%	<0.001	3.0	[2.4 to 3.9]	3.4	[2.6 to 4.4]	<0.001
Fever this illness or admission	538	71%	<0.001	2.9	[2.3 to 3.7]	2.8	[2.2 to 3.6]	<0.001
Pneumonia	114	74%	<0.001	2.3	[1.5 to 3.5]	2.4	[1.5 to 3.7]	<0.001
Night sweats	219	84%	0.001	1.5	[1.2 to 1.9]	1.5	[1.2 to 1.9]	<0.001
Abscess / drainage of pus	103	64%	0.15	1.4	[0.9 to 2.1]	1.4	[0.89 to 2.1]	0.15
Clinical Signs								
Oral Hairy leukoplakia	16	100%	<0.001	•				
Shingles scar	86	98%	<0.001	35.9	[8.8 to 147]	34.9	[4.8 to 255]	<0.001
Oral Kaposi's sarcoma	44	98%	<0.001	34.8	[8.8 to 147]	34.9	[4.8 to 255]	<0.001
Skin Kaposi's sarcoma	27	96%	0.003	20.3	[2.7 to 150]	19.3	[2.6 to 143]	0.004
Oesophageal thrush**	61	93%	<0.001	11.5	[4.2 to 32]	11.3	[4.1 to 32]	<0.001
Oral thrush	166	92%	<0.001	10.4	[5.9 to 18.2]	10.1	[5.7 to 17.6]	<0.001
Hair loss (not male pattern)	110	92%	<0.001	9.8	[4.9 to 19.5]	10.1	[5.1 to 20.3]	<0.001
WHO case definition***	360	86%	<0.001	8.1	[5.8 to 11.3]	8.3	[5.0 to 11.7]	<0.001
Looks wasted	379	83%	<0.001	5.9	[4.4 to 7.9]	6.5	[4.8 to 8.8]	<0.001
Herpes simplex	16	88%	0.027	5.3	[1.2 to 23.6]	5.1	[1.2 to 22.8]	0.003
Diffuse maculopapular rash	95	86%	<0.001	5.3	[2.9 to 9.5]	5.1	[2.8 to 9.4]	<0.001
Temperature ≥ 38.0 degrees C	324	74%	<0.001	2.7	[2.1 to 3.6]	2.6	[1.9 to 3.4]	<0.001
≥ 3 palpable lymph nodes	256	75%	<0.001	2.7	[2.0 to 3.7]	2.8	[2.1 to 3.9]	<0.001
Looks pale	293	73%	<0.001	2.6	[1.9 to 3.4]	2.6	[1.9 to 3.5]	<0.001

Table 4. Predictors of HIV seropositivity

Adjusted Odds Ratios are adjusted for age, sex, urban residence, education level reached. Odds ratios for age groups relate to age 13-20 years, and are adjusted for sex, urban residence, literacy and education level reached.

* Daily activity impaired = unable to perform normal activities over previous month

** Oesophageal thrush diagnosed presumptively if oral thrush with painful dysphagia.

*** WHO case definition for AIDS surveillance [WHO, 1994] does not rely on an HIV test (unlike the expanded WHO case definition).