

Demographic and epidemiological characteristics of HIV opportunistic infections among older adults in Nigeria.

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Abstract

Background: In view of the maturing HIV epidemic in sub-Saharan Africa, better understanding of its epidemiology among older adults is necessary in order to design appropriate care and treatment programmes for them.

Objectives: To describe the demographic and epidemiological characteristics of HIV opportunistic infections among newly enrolled patients aged 50 years and above in Ibadan, South-West Nigeria.

Methods: Analysis of data extracted from electronic records of 17,312 subjects enrolled for HIV/AIDS care and treatment between January 2006 and December 2014 at the ART clinic, University College Hospital, Ibadan.

Results: Age of the patients ranged from 18 to 90 years with a mean of 36.4 years (SD= 10.3) with older adults constituting 12.0% (2075). Among older adults, about half (52.9%) were females. Majority (59.1%) were currently married while 25.9% were widowed. Prevalence of opportunistic infections was 46.6%. The commonest opportunistic infections (OIs) were: oral candidiasis (27.6%), chronic diarrhoea (23.5%) and peripheral neuropathy (14.8%). Significant factors associated with opportunistic infections in older adults were: CD4 count less than 350 (OR=3.12, CI: 2.29-4.25) and hepatitis C virus co-infection (OR=2.17, CI: 1.14-4.13).

Conclusion: There is need for prompt response to the peculiar challenges associated with the emerging shift in the epidemiology of HIV and associated infections in sub-Saharan Africa.

Keywords: HIV/AIDS, older adults, epidemiological characteristics, opportunistic infections, Nigeria.

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Introduction

The trend in global HIV epidemic shows that the percentage of persons aged 50 years and over (older adults) living with the virus has been increasing since the past decade¹. According to the Joint United Nations Programme on HIV/AIDS, as of year 2012, the proportion ranged

from 6% in Middle East and North Africa to 9% in sub-Saharan Africa, and 33% in Western, Central Europe and North America. This phenomenon captioned “aging of the HIV epidemic” has been attributed to three factors: (i) increased life expectancy gained from antiretroviral therapy, (ii) decreased HIV incidence in younger adults, and (iii) latent risky sexual behaviours among older adults¹.

One daunting challenge to a clear understanding of the features of the disease in this population is the relative-paucity of data on HIV prevalence and sexual behaviour among older adults especially in sub-Saharan Africa (SSA). The Demographic and Health Surveys (DHS) which is the main source of such data in the SSA region

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are conducted among women aged 15-49 years and men aged 15-59 years. Thus, even if HIV sero-prevalence was to be estimated for countries that include HIV testing in the surveys, it is an impossible task to derive estimate for women aged 50 years and above. Very few countries such as South Africa², and Kenya³ have conducted national HIV survey from which prevalence among older adults has been provided. For instance, the 2014 South African survey revealed that the prevalence among persons aged 50-54 years was 13% compared to 18% in age 15-49 years². Negin et al extrapolated HIV prevalence from existing UNAIDS estimates for several sub-Saharan African (SSA) countries as part of an effort to generate the much needed data for this special group⁴. The results suggested that overall prevalence of HIV in older adults was 4.0% compared to 5.0% in 15-49 years. The findings further showed that Nigeria and four other countries (Mozambique, South Africa, Zambia and Zimbabwe) have 54% of the total number of older adults living with HIV in SSA⁴. Recent data from HIV counseling and testing centre at a teaching hospital in South Eastern Nigeria reported a prevalence of 8.2% among older adults⁵.

While HIV prevention programmes inadvertently exclude older adults (especially women), evidence from behavioural surveys in SSA point to the fact that risky sexual behaviours are prevalent coupled with poor knowledge of HIV transmission and prevention⁶. These emerging challenges have implications for HIV prevention, care and treatment programs. Incidence of HIV infection might have been as high among older adults as it was among youths but the picture was unclear because they have been more or less neglected in HIV testing and prevention programmes⁶.

Most of the current knowledge about the characteristics of HIV infection in older persons has come from the developed countries in North America^{7,8} and Europe⁹⁻¹¹. The pattern has also been described in China^{12,13} and Taiwan¹⁴. Many of these studies suggested that older and younger adults differ in terms of epidemiological and clinical features of HIV infection, response to ART and post-diagnosis survival. Heterosexual contact was the most common HIV risk factor reported among older adults^{9,12}. In addition, they have lower CD4 counts, higher prevalence of opportunistic infections, and more likely to be at an advanced stage of HIV/AIDS at first presentation^{10,11,13}. As expected, this poor health status at presentation predisposes older adults to faster disease progression, poor

treatment success and higher mortality. Metallides et al also reported higher prevalence of cardiovascular and neurological conditions among older adults, though these are health conditions associated with old age⁹.

Sub-Saharan Africa is lagging behind in terms of literature on the characteristics of HIV infection in older adults. Negin et al found that 29.6% of persons aged 50 years and above in South Africa had two or more chronic diseases compared to 8.8% in age group 18-49 years¹⁵. Meanwhile, Nyirenda et al showed that older adults in Uganda and South Africa had poorer emotional and functional wellbeing¹⁶. A review article also suggested that older Africans living with HIV have unique clinical manifestations different from those in developed countries¹⁷. In the meantime, model projections by Hotelez et al showed that the proportion of older adults with HIV in SSA will continue to rise to peak at 25% in the year 2040¹⁸. In view of this imminent burden, it is necessary to provide additional data on the epidemiology of HIV infection in older adults in the continent so that appropriate suggestions can be made for care and treatment programs. Therefore, this study describes the demographic and epidemiological characteristics of HIV infection among newly enrolled patients aged 50 years and above at the University College Hospital, Ibadan in South West Nigeria.

Methods

Study setting

This study was conducted among newly enrolled HIV/AIDS clients at the anti-retroviral clinic (ART) of the University College Hospital (UCH)/ College of Medicine, Ibadan, South-West Nigeria. The ART clinic at the UCH Ibadan was one of the first twenty five ART sites established by the Federal Government of Nigeria in 2002 to provide anti-retroviral drugs to HIV/AIDS patients. Thereafter, treatment at the clinic has been supported by President's Emergency Plan for AIDS Relief (PEPFAR) and AIDS Prevention Initiative in Nigeria (APIN). Patients recruitment, care, treatment and follow up procedures at the clinic have been described in a previous report¹⁹.

Study design

This study was a secondary analysis of data extracted from electronic records of 17,312 subjects enrolled for HIV/AIDS care and treatment between January 2006

and December 2014 at the ART clinic, University College Hospital, Ibadan, Nigeria. Of this number, 2,075 were aged 50 years and above.

Data management and analysis

Variables extracted included socio-demographic characteristics, baseline opportunistic infections, CD4 counts, viral load, hepatitis B and C status. Continuous variables were presented as mean and standard deviation while categorical variables were presented as frequencies / percentages. The Chi square test was employed to investigate homogeneity in the demographic and clinical characteristics between younger (< 50 years) and older patients (>= 50 years). Student's t-test and Mann-Whitney test (for non-normally distributed variables) was used to test for significant difference in mean values between the two groups. Stratified multiple logistic regression analysis was done to explore the epidemiological characteristics of opportunistic infections among younger patients, older patients and the total cohort. P-values less than 0.05 were considered statistically significant. Results were presented for older persons and those younger than 50 years in order to document differences in the characteristics of the two groups. For emphasis and in line with the study ob-

jective, only the results for older persons were described and discussed.

Ethical considerations

The anti-retroviral treatment program was approved by the University of Ibadan/University College Hospital Ibadan Joint Institutional Review Board (approval number-UI/IRC/04/0070). Informed consent forms were signed by all patients during enrollment procedures and included consent for data repository and use at later dates. The electronic medical record systems for the patient data is implemented on a password-protected computer system for the purpose of privacy and confidentiality of data. Patients' folders containing case report forms were kept in safe cabinets with locks in the medical records section where access is restricted to authorised persons only. The data was de-identified before analysis.

Results

Demographic characteristics

The age of the patients ranged from 18 to 90 years with a mean of 36.4 (SD= 10.3) years. Out of the total number of records, 2075 (12.0%) were aged 50 years and above. Figure 1 shows that the percentage of older patients increased from 10.3% in 2006 to 13.8% in 2010 and 15.3% in 2014 ($p < 0.001$).

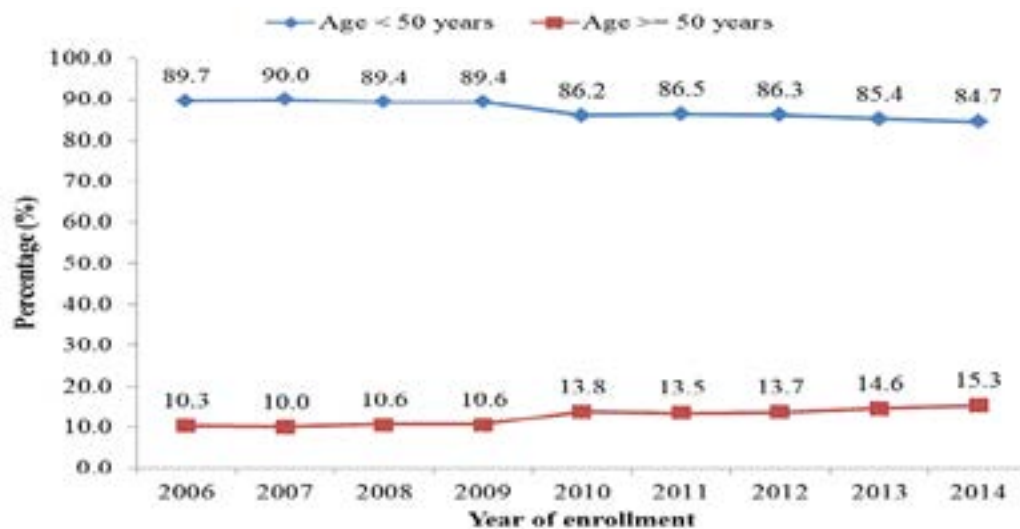


Figure 1: Trends in the percentage of older and younger patients at ART Clinic, UCH, Ibadan, Nigeria (2006-2014)

Although subsequent analyses involved both young and older patients, results are presented for the older persons only. Their background characteristics are presented in Table 1.

About half (52.9%) were females. The distribution of their marital status revealed that 59.1% were married

while 25.9% were widowed. The commonest level of education attained was secondary (36.7%) while about a quarter had tertiary level education (23.9%). Table 1 also presented data on their self-reported risk factors for HIV-infection. The most prevalent risk factor reported was heterosexual relationship (89.4%).

Table 1: Demographic characteristics of patients at the ART clinic of UCH, Ibadan, Nigeria (2006-2014)

Variables	Aged < 50 years	Aged >= 50 years	All patients	Chi square ⁺	p-value
	n=15,237	n=2,075	n=17,312		
Sex	%	%	%		
Male	29.8	47.1	31.9	251.923	<0.001
Female	70.2	52.9	68.1		
Marital Status					
Single	18.1	2.5	16.3	789.53	<0.001
Married	63.1	59.1	62.6		
Divorced/separated	10.1	12.5	10.4		
Widowed	8.7	25.9	10.8		
Education					
None	10	28.3	12.1	672.76	<0.001
Primary	26.7	31	27.2		
Secondary	38.9	20.8	36.7		
Tertiary	24.5	20	23.9		
HIV risk factors					
Heterosexual	91.1	89.4	90.9	6.41	0.011
Intravenous drug use	0.1	0.0	0.1	0.31	0.577
MSM	24 (0.2)	3 (0.1)	27 (0.2)	0.02	0.889
Blood transfusion	385 (2.5)	54 (2.4)	439 (2.5)	0.042	0.837
Unknown	521 (3.4)	97 (4.7)	618 (3.6)	8.36	0.004

+ test of significance for homogeneity of demographic characteristics between patients below 50 years and those greater than or equal to 50 years

Epidemiological characteristics of opportunistic infections

The prevalence of HIV-related and other diagnoses are summarised in Table 2. The overall prevalence of opportunistic infections among the older patients was 46.6%.

Among the specific diagnosis, candida (27.6%) and chronic diarrhoea (23.5%) were the most common. Others include peripheral neuropathy (14.8%) and chronic dermatitis (12.9%). The prevalence of hepatitis B and C was 7.8% and 3.5% respectively. The median baseline CD4 count was 177 cells/mm³.

Table 2: Epidemiological characteristics of HIV-related infections among patients at the ART clinic of UCH, Ibadan, Nigeria (2006-2014)

HIV-related diagnosis	Aged < 50 years	Aged >= 50 years	All patients	Chi square	p-value
	n=15,237	n=2,075	n=17,312		
Pulmonary tuberculosis	780 (5.1)	136 (6.6)	916 (5.5)	7.51	0.006
Candida	3773 (24.8)	573 (27.6)	4346 (25.1)	7.9	0.005
Chronic dermatitis	1646 (10.8)	268 (12.9)	1914 (11.1)	8.29	0.004
Chronic Diarrhea	2221 (18.3)	375 (23.5)	2596 (18.9)	25.09	p<0.001
Genital ulcer	464 (3.0)	50 (2.0)	514 (3.0)	2.56	0.11
Herpes simplex	149 (1.0)	23 (1.1)	172 (1.0)	0.32	0.574
Herpes Zoster	300 (2.0)	78 (3.8)	378 (2.2)	27.4	p<0.001
Peripheral neuropathy	1701 (11.2)	307 (14.8)	2008 (11.6)	23.49	p<0.001
PCP	182 (1.2)	26 (1.3)	208 (1.2)	0.05	0.818
Wasting syndrome	2417 (15.9)	418 (20.1)	2835 (16.4)		
Opportunistic infections	5999 (39.4)	967 (46.6)	6966 (40.2)	39.71	p<0.001
Other diagnosis					
Hypertension	225 (1.5)	128 (6.2)	353 (2.0)	201.28	p<0.001
Renal disease	48 (0.3)	15 (0.7)	63 (0.4)	8.38	0.004
Hx of Alcohol use	1748 (11.5)	293 (14.1)	2041 (11.8)	12.32	p<0.001
Hepatitis B surface antigen	1568 (12.2)	137 (7.8)	1705 (11.6)	29.3	p<0.001
Hepatitis C	432 (3.4)	60 (3.5)	492 (3.4)	0.017	0.897
Log10 RNA Viral load: Mean(SD)	4.66 (1.18)	4.79 (1.24)	4.68 (1.18)	T=4.179	p<0.001
Median CD4 count	203	177	199	MW=18.48	p<0.001

T student's t-test statistic; MW: Mann-Whitney test statistic

Factors associated with baseline opportunistic infections

The results of multiple logistic regression models fitted to determine the independent factors associated with opportunistic infections (OIs) in older patients are present-

ed in Table 3. Demographic variables (sex, marital status and education) were not associated with opportunistic infections. The significant factors were CD4 count less than 350 (OR=3.12, CI: 2.29-4.25) and hepatitis C virus infection (OR=2.17, CI:1.14-4.13).

Table 3: Adjusted Odds Ratio for demographic and clinical variables associated with Baseline Opportunistic infections in Younger and Older Adult HIV patients

Variables	Aged < 50 years	Aged ≥ 50 years	All patients
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex			
Male	1.00	1.00	1
Female	0.69 (0.62 - 0.76)*	0.93 (0.72 - 1.21)	0.72 (0.66 - 0.79)*
Marital Status			
Single	1.00	1.00	1
Married	0.86 (0.75 - 0.97)*	0.62 (0.19 - 1.98)	0.89 (0.78 - 0.99)*
Divorced/separated	1.63 (1.37 - 1.94)*	1.05 (0.32 - 3.47)	1.59 (1.35 - 1.87)*
Widowed	1.22 (1.03 - 1.47)*	0.90 (0.28 - 2.96)	1.22 (1.04 - 1.44)*
Education			
None	1.00	1.00	1
Primary	1.19 (1.01 - 1.40)*	1.07 (0.79 - 1.45)	1.15 (0.99 - 1.32)
Secondary	1.01 (0.86 - 1.18)	0.89 (0.63 - 1.25)	0.96 (0.84 - 1.11)
Tertiary	0.78 (0.66 - 0.92)*	0.72 (0.50 - 1.04)	0.74 (0.63 - 0.85)*
Log10 RNA Viral load	1.36 (1.30 - 1.41)*	1.07 (0.96 - 1.19)	1.31 (1.26 - 1.36)*
CD4 count < 350	2.75 (2.47 - 3.07)*	3.12 (2.29 - 4.25)*	2.79 (2.52 - 3.09)*
HbSAg	1.23 (1.08 - 1.40)*	1.06 (0.69 - 1.63)	1.22 (1.08 - 1.37)*
HCV	1.34 (1.07 - 1.69)*	2.17 (1.14 - 4.13)*	1.43 (1.16 - 1.76)*

* p<0.05

Discussion

Increased coverage of anti-retroviral therapy in sub-Saharan Africa is projected to affect the age structure of HIV epidemic thereby resulting in larger proportion of older adults¹⁸. The multiplier effects of this unfolding age structure have implications for social support and health systems. Health systems need to be abreast with the challenges and plan adequately for the peculiar healthcare needs of these older persons. An understanding of the epidemiology of HIV infection among older adults is necessary in order to design appropriate care and treatment guidelines required to guarantee good quality of life. This study provides data on the epidemiological characteristics of HIV infection among older adults in Nigeria.

The results showed that among newly enrolled HIV-infected persons in almost a decade, more than 1 out of every ten is an older adult. This proportion is similar to that reported in USA⁷ and in a multi-centre study conducted in 9 SSA countries²⁰ but lower than 22.5% reported from Eastern China¹². The higher proportion in the Chinese

may be explained by the peculiar demographic and epidemiological features of the Zhejiang province where the study was conducted. Prevalence of sexually transmitted infections was high due to risky sexual practices especially among tourists and migrants from different parts of the country¹².

We found that the proportion of older adults has increased steadily between 2009 and 2014. The rise in percentage of older adults may be due to new infections in this population or recent diagnosis of persons who have been infected long before they reached older adulthood. It may also be explained by late manifestation of symptoms, usually at advanced stages, prompting the need to seek health care. Some studies have suggested that risky sexual behaviour is also common in this age group and as a result, new infections could be going on undetected until symptoms begin to appear²¹. With the availability of ART, the population of older adults with HIV is bound to increase. It is therefore necessary to anticipate this upsurge and make proper plans for the healthcare and treatment needs of this sub-population.

The gender distribution among older adults was almost balanced between males (47%) and females (53%) unlike the younger age group in which females constituted about two-thirds. The reasons for this are not very obvious because even if mortality were to be considered, it is higher among males. This finding may be an indication of on-going new infections in older adults at a rate higher among men than women. Evidence from qualitative data among older adults in SouthWestern Nigeria showed that sexual relationships persist till older age and men are believed to be naturally polygynous in Africa^{22,23}. HIV surveillance and prevention activities need to be extended to older adults apart from the current focus on youth and persons in reproductive age.

Opportunistic infections such as tuberculosis, oral candidiasis, chronic dermatitis, chronic diarrhoea diseases, and herpes zoster were prevalent among older adults. As expected, the same trend applies to non-communicable diseases such as hypertension and renal disease. These results confirmed the differences in the epidemiological characteristics with respect to OIs and co-morbidities in HIV-infected older adults^{11-14,21}. Apart from possible low immunity in older ages, a higher prevalence of opportunistic infections in newly enrolled older adults with HIV may be an indication of late presentation and advanced stage of infection. Older adults are rarely diagnosed with HIV via routine counselling and testing because of their unwillingness to test voluntarily. Besides, testing facilities are usually patronised mostly by youth and women of reproductive age because HIV prevention activities are concentrated among them. As long as there are no manifest symptoms, HIV infected older adults may not present for voluntary HIV counselling and testing. HIV prevention, testing and counselling programmes need to adopt newer strategies to reach this population group. Besides, in order to slow down the progression to AIDS and poorer outcomes among older HIV patients, early commencement of ART might be necessary.

Results from the multivariate analysis showed that only CD4 count and hepatitis C virus infection co-infection were the significant factors in older adults. This epidemiological pattern has implication for survival and other treatment outcomes such as viral suppression and immunological response. A previous study at the same health facility showed that the risk of early mortality (within

6 months of enrollment) was 32% higher among older adults¹⁹. The effect of these factors on treatment outcome (immunological and viral response) requires further evaluation.

Strength and limitations

This study explored an area of discourse that will continue to generate further investigations especially given the fact that anti-retroviral treatment is lifelong; as well as the unfolding demographic and epidemiological transitions in developing countries. The limitations of this study emanate from the fact that routine electronic medical records were analysed. For instance, the electronic records do not contain data on other variables such as sexual behaviour, drug use, and health seeking behaviour. Some of these factors could have shed more light on the characteristics of older adults living with HIV in SouthWest Nigeria.

Conclusion

The proportion of older adults among HIV-infected persons in SouthWest Nigeria is increasing. The prevalence of opportunistic infections is very high and associated with baseline CD4 count and hepatitis C co-infection. HIV prevention, care and treatment programmes should provide timely response to the peculiar challenges associated with this trend.

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Conflict of interest disclosure

The authors declare that potential conflict of interest does not exist.

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