Prevalence and factors associated with severe depressive symptoms in older West African people living with HIV: the West Africa IeDEA collaboration

Charlotte Bernard (Charlotte.bernard@u-bordeaux.fr)
INSERM U1219

Hélène Font
INSERM U1219 ISPED Univ Bordeaux

Zélica Diallo
services des maladies infectieuses et tropicales Treichville hospital

Richard Ahonon
Centre de prise en charge de recherche et de formation (CePREF) Yopougon hospital

Judicaël Malick Tine
services des maladies infectieuses et tropicales hopital Fann

Franklin N'guessan Abouo
services des maladies infectieuses et tropicales Treichville hospital

Aristophane Tanon
service des maladies infectieuses et tropicales Treichville hospital

Eugène Messou
Centre de prise en charge de recherche et de formation (CePREF) Yopougon hospital

Moussa Seydi
Service des maladies infectieuses et tropicales Fann Hospital

François Dabis
INSERM U1219 ISPED Univ Bordeaux

Nathalie de Rekeneire
INSERM U1219 ISPED Univ Bordeaux

Research article

Keywords: HIV, Aging, Depression, Sub-Saharan Africa

Posted Date: March 11th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-16712/v1

Version of Record: A version of this preprint was published on September 10th, 2020. See the published version at https://doi.org/10.1186/s12888-020-02837-0.

Abstract

Background To encourage successful aging, the psychological domain must not be neglected. As depression, one of the most common psychiatric disorders in PLHIV, has negative impact on both mental and physical health, the prevalence and the factors associated with the presence of severe depressive symptoms in older PLHIV living in West Africa need to be well understood.

Methods Data from PLHIV aged ≥50 years old and on ART since ≥6 months were collected in three clinics (two in Côte d'Ivoire, one in Senegal) participating to the West Africa International epidemiological Databases to Evaluate AIDS (IeDEA) collaboration. The severity of the depressive symptoms was measured using the Center for Epidemiological Studies Depression scale (CES-D) and associated factors were identified using logistic regression.

Results The median age of the 334 PLHIV included in the study was 56.7 (53.5-61.1) years old, 57.8% were female and 87.1% had an undetectable viral load. The prevalence of severe depressive symptoms was 17.9% [95% Confidence Interval: 13.8 - 22.0]. PLHIV with severe depressive symptoms were more likely to have no professional activity, and to be current or former tobacco smokers but were less likely to be overweight or obese.

Conclusions The prevalence of severe depressive symptoms is high among older PLHIV living in West Africa. How to integrate the measurement and the management of depressive symptoms in the standard of care should be investigated, both for older PLHIV on ART but also for newly diagnosed older patients, in order to achieve the 90-90-90 objectives.

Background

As HIV infection is now a chronic disease in most settings including sub-Saharan Africa (SSA), (1) patients living with HIV (PLHIV) have a lifespan comparable to the one observed in the general population. Older HIV patients experienced complications in the physiological domain because of compromised immune system with the involution of thymus, ART side effects and polypharmacy. (2) However, to facilitate successful aging, the psychological and the social domains must not be neglected. (3)

Among psychological complications, depression emerges as a public health issue. (4) Depression is one of the most common psychiatric disorders in PLHIV (5) and has a high prevalence in PLHIV on ART living in SSA (major depressive disorder pooled prevalence: 13% and severe depressive symptoms prevalence varied between 14% and 32%). (6) Depression is associated with suboptimal HIV treatment outcomes (delayed HIV diagnosis, ART initiation, poor ART adherence, lack of viral suppression, and increased AIDS-related mortality), (7,8) but depression remains commonly under-diagnosed in SSA. (5,9) However, in western countries, untreated depression in PLHIV has also been related to increased cognitive complaints and negative consequences in multiple aspects of quality of life. (10–12) In addition to aging related problems, these medical and psychological factors may be exacerbated in older PLHIV. (13)

Even if the concern on depression in African PLHIV substantially increased since a few years, studies focusing on older PLHIV living in SSA are scarse. Given the negative impact of depression on mental and physical PLHIV health, it is important to identify associated factors to provide insights for clinical interventions. In this context, the present study aimed to describe the prevalence and identify factors associated with the presence of severe depressive symptoms in PLHIV aged 50 years and above living in West Africa.

Materials And Methods

Study design

This study is a part of an ancillary study project within the West Africa network of the International epidemiological Databases to Evaluate AIDS (IeDEA) of the US National Institutes of Health (https://www.iedea.org/regions/west-africa/). (14) This study was conducted in two different countries, in three urban clinics with a large case load of PLHIV and selected by convenience: the infectious and tropical disease department of the Treichville University Hospital, and the referral public clinic (CePReF) in Yopougon Attié Hospital (Abidjan, Côte d'Ivoire) and the infectious and tropical disease department of the Fann University Hospital (Dakar, Senegal). The inclusion period of the study occurred between February 2016 to November 2017. This analysis is based on the baseline data of a 2-year longitudinal study evaluating different aspects of aging with HIV (cognition, physical function, depression and frailty) with a follow-up still ongoing.

Study population

Patients were eligible if they were living with type-1 HIV, 50 years old or older and on ART since at least 6 months. We excluded patients having an history of cerebral opportunistic infection, a neurological pathology (history of stroke or Parkinson disease), a current disabling opportunistic infection, a meningitis, a sensitivo-motor paralysis, a psychiatric illness (including psychotropic treatment), a cancer under treatment or a respiratory or cardiac insufficiency.

Severity of depressive symptoms

The severity of depressive symptoms was evaluated with the Center for Epidemiological Studies Depression scale (CES-D), a 20-item self-report scale assessing the occurrence of depressive symptoms during the past week using a 4-point lickert scale. (15) Due to variability in patients' literacy, each item was read aloud by a trained doctor or nurse. A translation of items in the national language other than French was used if necessary. The CES-D has already been validated among a variety of populations in both high and resource-limited settings. (15–17)

Other covariates

Data were collected through basic questions and medical examination. Patients' sociodemographic characteristics as age, gender, level of education, marital status and professional activity were recorded.

Concerning HIV medical data, the initial clinical stage was defined using the Centers for Disease Control and Prevention (CDC) definition (A, B or C). Baseline Nadir CD4 and more recent CD4 were presented in two categories (≤ 200 vs > 200 cells/µl and < 500 vs ≥ 500 cells/µl, respectively). The composition of the initial and current ART treatment was presented through a categorical variable (TDF/3TC/EFV vs other combination). The duration of HIV disease was calculated as the delay in months between the first positive serology date and the study's inclusion date. Adherence to ART was defined as the percentage of tablets the patient declared to take over 7 days (in comparison to the prescribed total number of tablets over this period).

Substance use was evaluated through basic questions for tobacco and drugs (current, former or never). Alcohol consumption was evaluated with the AUDIT-C. A score ≥ 3 for men or ≥ 4 for women was considered as current drinking.

The Body Mass Index (BMI) was considered in two categories: low or normal BMI (low when < 18 kg/m², normal between 18 to 24 kg/m²) and high when ≥ 25 kg/m². Patients were also asked if they had ever been diagnosed with these comorbidities: hypertension, diabetes, hyperlipidemia, C or B hepatitis, tuberculosis, migraine, arthrosis, or other. A variable "comorbidities" has been created with three categories: absence, only one, or more than one comorbidity. Histories of trauma and neurologic diseases were also documented.

Measures of functional status

Activities of the daily living (ADL) (18) and Instrumental activities with daily living (IADL) (19) scales were used to evaluate the autonomy of the patients. The final ADL and IADL scores range from 0 to 6 and 0 to 4, respectively (0 indicating the lowest degree of autonomy).

Statistical analysis

The characteristics of the study sample were described using median and interquartile range (IQR) for continuous variables, numbers and proportions for categorical variables.

For the analyses, a total score ≥ 17 for men and ≥ 23 for women was used to define presence of severe depressive symptoms. (20) In order to describe the five most reported depressive symptoms among depressed PLHIV, we used the factorial structure described by Sheehan et al, (21) grouping the items 1, 2, 5, 7, 11, 13 and 20 as somatic symptoms, the items 3, 6, 14, 17 et 18 as depressive affects, the items 4, 8, 12 and 16 as negative affects and the items 9, 10, 15 et 19 as interpersonal deficit. For this analysis, each item was recoded in two categories: significant presence of the symptoms (≥ 3 days) or no (≤ 2 days). As the expression of depression could be different between females and males, we identified which symptoms were significantly the most reported according to gender, using Chi-2 tests.

The prevalence of severe depressive symptoms was reported and factors associated with the presence of severe depressive symptoms were evaluated using logistic regression analyses. Before conducting logistic regression analyses, a multivariable Random Forest imputation of missing data was performed.

As no significant difference was observed between the two databases (with and without missing data), we used the database with imputed missing data for these analyses. In the multivariable regression model, we included all variables associated with the dependent variable with a p-value ≤ 0.2 in univariable analyses. The “inclusion centers” variable was included as a cofounder in each model. Unbalanced variables (85%/15%) were excluded from the multivariable analyses. The final model was obtained with a descending step by step selection and we considered significant associations at $p < 0.05$. The goodness of fit of the final model was evaluated with the Hosmer-Lemeshow test ($p > 0.05$). Statistical analyses were computed using R software.

Results

Characteristics of the sample

A total of 334 patients were included in our study. The median (IQR) age was 56.7 (53.5–61.1) years old. Among them, 34.7% were aged 60 years and older, 57.8% were female, and 50.6% had a primary or less level of education. Almost half of them lived in couple (46.4%) and were active (53.6%) (Table 1).

Table 1. Characteristics of the study population according to the severity of depressive symptoms

	No severe depressive symptoms		Severe depressive symptoms				
	N	%	N	%	p	N	%
TOTAL	274	(82.0)	60	(17.9)		334	(100.0)
Socio-demographic data							
Age	180	(65.7)	38	(63.3)	0.73	218	(65.3)
50–59							
≥60	94	(34.3)	22	(36.7)		116	(34.7)
Gender	109	(39.8)	32	(53.3)	0.05	141	(42.2)
Male							
Female	165	(60.2)	28	(46.7)		193	(57.8)
Education level	142	(51.8)	27	(45.0)	0.34	169	(50.6)
Primary or less							
Secondary or more	132	(48.2)	33	(55.0)		165	(49.4)
Marital Status	125	(45.6)	30	(50.0)	0.54	155	(46.4)
In couple							
Alone	149	(54.4)	30	(50.0)		179	(53.6)
Professional activity	153	(55.8)	26	(43.3)	0.08	179	(53.6)
Active							
Non active	121	(44.2)	34	(56.7)		155	(46.4)
HIV Clinical data							
Clinical disease stage at ART initiation							
A	86	(31.4)	14	(23.3)	0.42	100	(29.9)
B	145	(52.9)	37	(61.7)		182	(54.5)
C - AIDS	39	(14.2)	9	(15.0)		48	(14.4)
Unknowm	4	(1.5)	.	.		4	(1.2)

Table 1. Characteristics of the study population according to the severity of depressive symptoms							
Duration of infection (months) 0.08							
[6–69[	75	(27.4)	8	(13.3)		83	(24.9)
[69–108[	69	(25.2)	14	(23.3)		83	(24.9)
[108–141[	65	(23.7)	16	(26.7)		81	(24.3)
≥141	65	(23.7)	22	(36.7)		87	(26.0)
Nadir CD4					0.02		
>200	106	(38.7)	14	(23.3)		120	(35.9)
≤200	158	(57.7)	45	(75.0)		203	(60.8)
Missing	10	(3.6)	1	(1.7)		11	(3.3)
Most recent CD4					0.38		
≥500	141	(51.5)	27	(45.0)		168	(50.3)
<500	130	(47.4)	32	(53.3)		162	(48.5)
Missing	3	(1.1)	1	(1.7)		4	(1.2)
Detectable Viral load	27	(9.9)	16	(26.7)	<0.0001	43	(12.9)
Missing	47	(17.2)	9	(15.0)		56	(16.8)
Initial ART combinaison 0.11							
3TC + TDF + EFV	72	(26.3)	10	(16.7)		82	(24.6)
Other	200	(73.0)	50	(83.3)		250	(74.9)
Missing	2	(0.7)	.	.		2	(0.6)
Actual ART combinaison 0.06							
3TC + TDF + EFV	151	(55.1)	25	(41.7)		176	(52.7)
Other	123	(44.9)	35	(58.3)		158	(47.3)
Adherence to ART (yes)	261	(95.3)	54	(90.0)	NA	315	(94.3)

Table 1 (continued)							
						TOTAL	
	Not severe depressive symptoms		Severe depressive symptoms		p		
Substance use							
Current drinkers	18	(6.6)	7	(11.7)	NA	25	(7.5)
Tobacco use (current/former)	39	(14.2)	18	(30.0)	0.004	57	(17.1)
Drug consumption	4	(1.5)	2	(3.3)	NA	6	(1.8)
Anthropometric and medical data							
Overweight/obesity	114	(41.6)	13	(21.7)	0.004	127	(38.0)
Comorbidities	119	(43.4)	23	(38.3)	0.61	142	(42.5)
None							
One	97	(35.4)	21	(35.0)		118	(35.3)
More than one	58	(21.2)	16	(26.7)		74	(22.2)
History of trauma (yes)	18	(6.6)	4	(6.7)	NA	22	(6.6)
History of neurological disease (yes)	37	(13.5)	11	(18.3)	0.33	48	(14.4)
Inclusion centers 0.31							
CePREF, Abidjan	93	(33.9)	15	(25.0)		108	(32.3)
ITDD, Abidjan	140	(51.1)	37	(61.7)		177	(53.0)
ITDD, Dakar	41	(15.0)	8	(13.3)		49	(14.7)

A large majority of patients had an undetectable viral load (87.1%); half of them having CD4 ≥ 500 (50.3%) and 60.8% a Nadir CD4 < 200. The median (IQR) duration of HIV infection was 108 months (68.9–141.0). Fourteen percent (14.4%) were on C stage at ART initiation. Concerning ART treatment, 25% and 52.7% received the standard combination for their initial and current treatment (according to the national treatment guidelines), respectively. The patients reported a high adherence to ART (94.3%).

Few patients reported substance use (< 8%), except for tobacco (current/previous) (17.1%).

Concerning other medical issues, 38% were overweight or obese, 35.3% reported one comorbidity in addition to their HIV disease and 22.2% more than one.

In terms of the ADL and IADL instruments, 97.0% and 99.1% of the patients got the maximum score (6 or 4, respectively).

Prevalence of severe depressive symptoms

The prevalence of severe depressive symptoms was 17.9% [95% Confidence Interval (CI): 13.8–22.0]. Among the PLHIV with severe depressive symptoms (N = 60), 80% reported somatic symptoms, 73.3% depressive affects, 71.7% negative affects and 40% interpersonal deficit. The 5 most reported symptoms (Fig. 1) were: “not enjoying life” (70%), “being unhappy” (66.7%), “being restless” (63.3%), “feeling depressed” (58.3%) and “sadness” (56.7%). Compared to males, females reported more frequently the following symptoms: “being restless” (78.6% vs 50%, p = 0.02), “crying spells” (42.9% vs 18.7%, p = 0.03), “sadness” (71.4% vs 43.7%, p = 0.03) and “not enjoying life” (82.1% vs 58.4%, p = 0.05). They also reported more frequently that their life is a failure (71.4% vs 40.6%, p = 0.02).

Factors associated with severe depressive symptoms

In univariate models (Table 2), having a longer duration of the disease ≥ 141 months (OR = 3.2; 95%CI: 1.3–7.6), a Nadir CD4 ≤ 200 (OR = 2.1; CI95%: 1.1–4.2) and a detectable viral load (OR = 3.1; 95%CI: 1.5–6.3) were significantly associated with the presence of severe depressive symptoms. PLHIV with severe depressive symptoms were also more likely to be current or former tobacco smokers (OR = 2.5; 95%CI: 1.3–4.9) but were less likely to be overweight or obese (OR = 0.4; 95%CI: 0.2–0.7). Having no professional activity tend to be associated to severe depressive symptoms (p = 0.07).

In the multivariate model, having no professional activity (adjusted OR (aOR) = 1.9; 95%CI: 1.1–3.5), being current or former tobacco smokers (aOR = 2.2; 95% CI: 1.1–4.3) and having an abdominal obesity (aOR = 0.4; 95%CI: 0.2–0.8) remained associated with the presence of severe depressive symptoms.

Table 2: Factors associated with severe depressive symptoms in the study population				
Variables	Univariable models		Multivariable model	
	OR (95%CI)*	p-value	aOR (95%CI)*	p-value
Age		0.71		
50–59 years old	1			
≥60 years old	1.12 (0.62–2.01)			
Gender		0.09		
Men	1			
Women	0.61 (0.35–1.08)			
Level of education		0.53		
Primary or less	1			
Secondary or more	1.21 (0.67–2.16)			
Marital status		0.62		
In couple	1			
Single	0.87 (0.49–1.52)			
Professional activity		0.07		0.03
Active	1		1	
Non active	1.67 (0.95–2.95)		1.92 (1.069–3.45)	
Duration of HIV infection				
[6–69[	1			
[69–108[	1.91 (0.75–4.83)	0.17		
[108–141[	2.31 (0.93–5.78)	0.07		
≥141	3.16 (1.31–7.60)	0.01		
Clinical disease stage				
A	1			
B	1.31 (0.63–2.72)	0.46		
C	1.23 (0.47–3.22)	0.67		
Nadir CD4		< 0.0001		
>200	1			

Table 2: Factors associated with severe depressive symptoms in the study population		
≤200	2.14 (1.09–4.16)	
CD4		0.36
≥500	1	
<500	1.30 (0.74–2.29)	
Viral load		0.002
Undetectable	1	
Detectable	3.10 (1.53–6.31)	
Initial ART combination		0.10
3TC + TDF + EFV	1	
Other	1.84 (0.88–3.84)	
Actual ART combination		0.06
3TC + TDF + EFV		1
Other	1.75 (0.99–3.09)	
Adherence to ART (no)	3.09 (0.96–9.91)	0.06

Table 2
(continued)

Variables	Univariable models		Multivariable model	
	OR (CI 95%)*	p-value	aOR (CI 95%)*	p-value
Alcohol consumption	1.89 (0.74–4.77)	0.18		
Tobacco (current/former)	2.53 (1.30–4.91)	0.01	2.18 (1.09–4.35)	0.03
Drug consumption	1.94 (0.34–11.04)	0.45		
BMI		0.01		0.01
Normal / underweight	1		1	
Overweight/obesity	0.38 (0.19–0.75)		0.41 (0.21–0.82)	
Comorbidities				
No	1			
Only one	1.18 (0.61–2.27)	0.62		
More than one	1.65 (0.79–3.43)	0.18		
History of trauma (ref.: no)	0.99 (0.32–3.07)	0.99		
History of neurological disease (ref.: no)	2.30 (0.95–5.59)	0.07		

aOR: adjusted Odd Ratio; ART: antiretroviral; BMI: Body Mass Index; CI: confident interval; OR: Odd ratio;

Discussion

In the present study, in a large sample of PLHIV aged 50 years old and above, the presence of severe depressive symptoms is observed in almost 18% of the patients. The severity of depressive symptoms seems to be more related to social (ie having no professional activity) and behavioral (ie being current or former tobacco) aspects. Unexpectedly, having an abdominal obesity seems to be a protective factor at the occurrence of depressive symptoms.

Recent publications from western countries reported variable results for the prevalence of severe depressive symptoms in older PLHIV. Among PLHIV aged 50 years or above living in Portugal, 23.9% presented chronic anxiety or depression. (22) In PLHIV aged between 56 to 65 years old living in the United States, the prevalence of severe depressive symptoms was 28.2%. (10) As different scales and

different cut-off even for a given scale were used, the comparison of the data are limited. When using the same scale and the same cut-off, a prevalence of 18% was observed in PLHIV living in Senegal but being younger than our patients. (23) However, the prevalence of depressive symptoms is high and could not be neglected. In the context of the 3 × 90 objectives, screening and management of mental health disorders, including depression, has been listed as a research priority to improve timely diagnosis, ART initiation, retention and viral suppression. (24) Recent data have also reported a 24% increased risk of mortality in older PLHIV who are depressed. (25)

Based on western countries studies, older PLHIV had to face different type of problems: stigma (26) and concerns about disclosure. (27) They also have some uncertainty about how ageing, HIV and treatment affect health in the long term. (27) The chronic aspect of the disease status and the increase of potential comorbidities with age could play an important role in PLHIV related-depression, as observed in other chronic diseases. (28) Further studies are needed to better understand the reality of aging experience in PLHIV living in SSA.

In accordance with other studies conducted in middle-aged PLHIV living in SSA, (29,30) poor social conditions seem to be an important factor associated with depressive symptoms. In South Africa, it was shown that unemployed PLHIV could have a 3-fold risk to present severe depressive symptoms. (29) Even we did not document any information about income, being unemployed is often indirectly related to a lack of income. Acting as a stressor, low income could lead to difficulties to financially support health expenses, particularly the one due to other comorbidities which are more likely to be numerous when PLHIV are getting older.

Concerning tobacco consumption, prior studies have documented an association between current cigarette smoking or nicotine dependence and the presence of severe depressive symptoms in middle-aged PLHIV living in western countries (31–33) but also with a diagnosis of major depression in older PLHIV living in Brazil. (34) As older PLHIV living in SSA are more likely to be regular smokers and as tobacco consumption is often under-estimated, (35) it is important to identify those patients to screen depression. Even few data are available about previous smokers among older PHHIV, those individuals might also be vulnerable and should be screened for depression.

The association between BMI and depression in PLHIV is not systematically explored and makes no consensus. (36–38) A low BMI could be an indirect marker of loss of appetite, one of the most reported symptoms in HIV related-depression. In the social representation, HIV infection and mental illness are also often associated with thinness. Being overweight or obese could be in some ways protective against bad mood or stigmatization but further investigations are needed to depict this point.

As observed in other studies conducted in SSA in middle-aged PLHIV, no effect of gender was observed. (23,39,40) However, the expression of depressive symptoms seems to be different in women and men, which is an important information for the clinicians for identifying depressed patients.

Concerning HIV clinical data, a longer duration of the disease and a lower Nadir CD4 are associated in univariate model with the presence of severe depressive symptoms. The impact of physical and emotional difficulties on the lived HIV experience should not be underestimated. In addition to actual problematic of living with HIV, long-time survivors might have to face different problematic compared to those diagnosed more recently (i.e. confusion about surviving so far, mourning of friends or family members lost to AIDS). (41) The link with viral load could not be further investigated in our sample because of an important proportion of missing data. More studies are needed.

As depression having deleterious effects on PLHIV but is a modifiable condition, we encouraged the screening and the management of depression in older PLHIV living in SSA. Promising results from culturally-sensitive psychotherapeutic intervention (42) or group-based counseling intervention (43) using task-shifting in middle-aged PLHIV living in SSA have already been reported. As older PLHIV are less likely to be engaged in behavioral health treatment for depression than younger PLHIV, (44) it is important to also adapt psychotherapeutic interventions to the older PLHIV specific needs.

To our knowledge, this study represents the first opportunity to describe the prevalence of severe depressive symptoms in a large sample of older PLHIV in West Africa. However, the generalizability of the results and the comparison with other studies could be limited as we included PLHIV from urban sites being on ART since at least 6 months with hospital-based study sites. Second, the presence of depressive symptoms has been evaluated in the literature with a number of different tools having different psychometric validities, which leads to substantial variability in the measurements, (6) so results may not be generalizable across tools. Third, even HIV stigma is still a major social problem in PLHIV, we did not collect data on this issue but the impact of stigma on psychosocial well-being of PLHIV has already be shown to be associated with depression in SSA (39) and should not be under-estimated even in older PLHIV. Fourth, even high pooled sensitivity and specificity was observed for the CES-D in African studies, (45) a full clinical evaluation was not included in our scientific protocol to validate a major depressive disorder. As an interviewer-administered approach was used and despite the full training of the staff, social-desirability bias might not be completely avoided. Finally, the cross-sectional design of the present study cannot provide information on causal direction.

Conclusions

The prevalence of severe depressive symptoms is high among older PLHIV living in West Africa, representing a serious problem for the organization of care and follow-up of PLHIV.

Further studies in older PLHIV are needed to describe in more details the phenomenon and better understand the reality of aging experience in PLHIV living in SSA. Since depression has deleterious consequences on PLHIV lives, how to integrate the measurement and the management of depressive symptoms in the standard of care should be investigated both for older PLHIV on ART but also for newly diagnosed older patients, in order to guarantee 90-90-90 achievement. Finally, psychotherapeutic intervention, adapted to older PLHIV specific needs, should be developed.

Abbreviations

ADL	Activities of Daily Living
AIDS	A*cquired Immune Deficiency Syndrome*
aOR	Adjusted Odd Ratio
ART	Antiretroviral Therapy
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CES-D	Center for Epidemiological Studies Depression scale
CI	Confident Interval
HIV	Human Immunodeficiency Virus
IADL	Instrumental Activities of Daily Living
IeDEA	International epidemiological Databases to Evaluate AIDS
IQR	Interquartile Range
OR	Odd Ratio
PLHIV	People Living with HIV
SSA	Sub-Saharan Africa

Declarations

Ethics approval and consent to participate

The protocol has been approved by the national ethic committee of each participating country: National Committee for Research Ethics (CNER), a department of the Ministry of Health and Public Hygiene in Abidjan, Cote d'Ivoire and the National Ethics Committee for Health Research (CNERS), a department of the Ministry of Health and Social Affairs in Dakar, Senegal.

Consent for publication

All the patients gave their written consent before being included in the study.

Availability of data and material

Complete data for this study cannot be posted in a supplemental file or a public repository at this current time because of scientific reasons here explained. This cross-sectional analysis is part of a 2-year longitudinal study evaluating different aspects of aging with HIV (cognition, physical function, depression and frailty) with a 2-year follow-up which ended in December 2019. Cross-sectional analyses on cognition and frailty and longitudinal analyses on these topics including depression are currently in progress and thus data couldn't be posted at this time.

Competing interests

The authors have no conflicts of interest to disclose

Funding

Supported by the National Institute of Mental Health (NIMH), National Cancer Institute (NCI), the Eunice Kennedy Shriver National Institute of Child Health & Human Development (NICHD) and the National Institute of Allergy and Infectious Diseases (NIAID) of the U.S. National Institutes of Health (NIH), as part of the International Epidemiologic Databases to Evaluate AIDS (IeDEA) under Award Number U01AI069919. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Authors' contributions

CB, NdR and FD designed the study. CB coordinated the study, supervised the data management, conducted the statistical analyses and wrote the first draft. HF and NdR helped in the statistical methodology and analyses and also gave comments on the first draft. ZD, FNA, RA and JMT realized the inclusion of the patients and collected the data under the supervision of AT, EM and MS. All authors helped in the interpretation of the data, read and approved the final manuscript.

Acknowledgements

The IeDEA West Africa region: Site investigators and cohorts:

Adult cohorts: Marcel Djimon Zannou, CNHU, Cotonou, Benin; Armel Poda, CHU Souro Sanou, Bobo Dioulasso, Burkina Faso; Fred Stephen Sarfo and Komfo Anokeye Teaching

Hospital, Kumasi, Ghana; Eugene Messou, ACONDA CePReF, Abidjan, Cote d'Ivoire; Henri Chenal, CIRBA, Abidjan, Cote d'Ivoire; Kla Albert Minga, CNTS, Abidjan, Cote d'Ivoire; Emmanuel Bissagnene, and Aristophane Tanon, CHU Treichville, Cote d'Ivoire; Moussa Seydi, CHU de Fann, Dakar, Senegal; Akessiwe Akouda Patassi, CHU Sylvanus Olympio,

Lomé, Togo. Pediatric cohorts: Sikiratou Adouni Koumakpai-Adeothy,_CNHU, Cotonou, Benin; Lorna Awo Renner, Korle Bu Hospital, Accra, Ghana; Sylvie Marie N'Gbeche, ACONDA CePReF, Abidjan, Ivory Coast; Clarisse Amani Bosse, ACONDA_MTCT+, Abidjan, Ivory Coast; Kouadio Kouakou, CIRBA, Abidjan, Cote d'Ivoire; Madeleine Amorissani Folquet, CHU de Cocody, Abidjan, Cote d'Ivoire; François Tanoh Eboua, CHU de Yopougon, Abidjan, Cote d'Ivoire; Fatoumata Dicko Traore, Hopital Gabriel Toure, Bamako, Mali; Elom Takassi, CHU Sylvanus Olympio, Lomé,Togo; Coordinators and data centers: François Dabis, Elise Arrive, Eric Balestre, Renaud Becquet, Charlotte Bernard, Shino Chassagne Arikawa, Alexandra Doring, Antoine Jaquet, Karen Malateste, Elodie

Rabourdin, Thierry Tiendrebeogo, ADERA, Isped & INSERM U1219, Bordeaux, France. Sophie Desmonde, Julie Jesson, Valeriane Leroy, Inserm 1027, Toulouse, France. Didier Koumavi Ekouevi, Jean-Claude Azani, Patrick Coffie, Abdoulaye Cissé, Guy Gnepa, Apollinaire Horo, Christian Kouadio, Boris Tchounga, PACCI, CHU Treichville, Abidjan, Côte d'Ivoire.

References

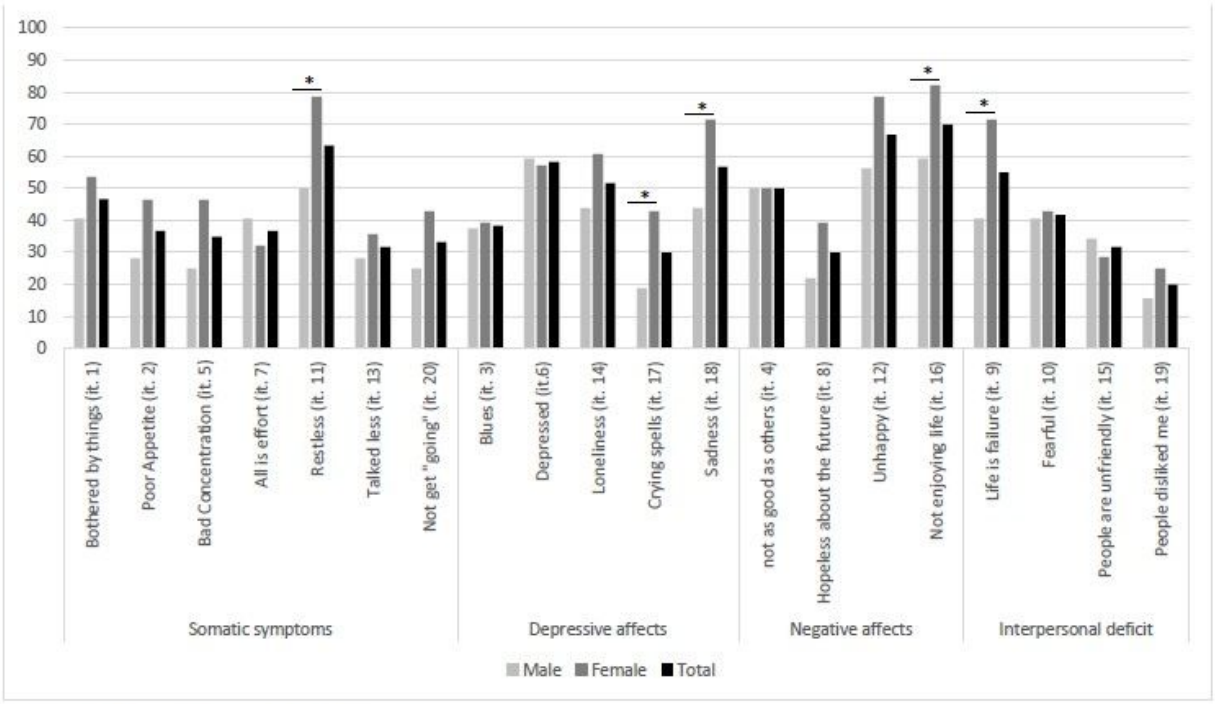
1. Deeks SG, Lewin SR, Havlir DV. The end of AIDS: HIV infection as a chronic disease. Lancet Lond Engl. 2 nov 2013;382(9903):1525-33.
2. Vance D, McGuiness T, Musgrove K, Orel NA, Fazeli P. Successful aging and the epidemiology of HIV. Clin Interv Aging. juin 2011;181.
3. Young Y, Frick KD, Phelan EA. Can Successful Aging and Chronic Illness Coexist in the Same Individual? A Multidimensional Concept of Successful Aging. J Am Med Dir Assoc. févr 2009;10(2):87-92.
4. Marg L, Heidari O, Taylor J, Marbley C, Scheibel S, Hagan R, et al. A multidimensional assessment of successful aging among older people living with HIV in Palm Springs, California. AIDS Res Hum Retroviruses [Internet]. 23 août 2019 [cité 26 août 2019]; Disponible sur: https://www.liebertpub.com/doi/10.1089/AID.2019.0048
5. Abas M, Ali G-C, Nakimuli-Mpungu E, Chibanda D. Depression in people living with HIV in sub-Saharan Africa: time to act. Trop Med Int Health. déc 2014;19(12):1392-6.
6. Bernard C, Dabis F, de Rekeneire N. Prevalence and factors associated with depression in people living with HIV in sub-Saharan Africa: a systematic review and meta-analysis. 2017. :PLoS ONE 12(8): e0181960.

7. Kingori C, Haile ZT, Ngatia P. Depression symptoms, social support and overall health among HIV-positive individuals in Kenya. Int J STD AIDS. 1 mars 2015;26(3):165-72.
8. Kinyanda E, Hoskins S, Nakku J, Nawaz S, Patel V. The prevalence and characteristics of suicidality in HIV/AIDS as seen in an African population in Entebbe district, Uganda. BMC Psychiatry. 2012;12:63.
9. Berhe H, Bayray A. A: Prevalence of Depression and associated factors among people living with HIV/AIDS in Tigray, North Ethiopia: a Cross Sectional Hospital based study. Int J Pharm Sci Res. 2013;4(2):765-75.
10. Rooney AS, Moore RC, Paolillo EW, Gouaux B, Umlauf A, Letendre SL, et al. Depression and aging with HIV: Associations with health-related quality of life and positive psychological factors. J Affect Disord. mai 2019;251:1-7.
11. Coleman CL. Health related quality of life and depressive symptoms among seropositive African Americans. Appl Nurs Res. févr 2017;33:138-41.
12. Leserman J. Role of Depression, Stress, and Trauma in HIV Disease Progression: Psychosom Med. juin 2008;70(5):539-45.
13. Grov C, Golub S, Parsons J, Brennan M, Karpiak S. Loneliness and HIV-related stigma explain depression among older HIV-positive adults. AIDS Care. mai 2010;22(5):630-9.
14. Egger M, Ekouevi DK, Williams C, Lyamuya RE, Mukumbi H, Braitstein P, et al. Cohort Profile: the international epidemiological databases to evaluate AIDS (IeDEA) in sub-Saharan Africa. Int J Epidemiol. oct 2012;41(5):1256-64.
15. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. 1977;1:385-401.
16. Yang H-J, Soong W-T, Kuo P-H, Chang H-L, Chen WJ. Using the CES-D in a two-phase survey for depressive disorders among nonreferred adolescents in Taipei: a stratum-specific likelihood ratio analysis. J Affect Disord. 1 nov 2004;82(3):419-30.
17. Cheng S-T, Chan ACM. The Center for Epidemiologic Studies Depression Scale in older Chinese: thresholds for long and short forms. Int J Geriatr Psychiatry. mai 2005;20(5):465-70.
18. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. STUDIES OF ILLNESS IN THE AGED. THE INDEX OF ADL: A STANDARDIZED MEASURE OF BIOLOGICAL AND PSYCHOSOCIAL FUNCTION. JAMA. 21 sept 1963;185:914-9.
19. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. The Gerontologist. 1969;9(3):179-86.
20. Fuhrer R, Rouillon F. The french version of the Center for Epidemiologic Studies. Depression Scale 4(3) 163-166 [Internet]. 1989 [cité 13 sept 2012]. Disponible sur: http://www.ncbi.nlm.nih.gov/pubmed?term=Fuhrer%20rouillon%201989
21. Sheehan TJ, Fifield J, Reisine S, Tennen H. The Measurement Structure of the Center for Epidemiologic Studies Depression Scale. J Pers Assess. juin 1995;64(3):507-21.

22. Serrão R, Piñero C, Velez J, Coutinho D, Maltez F, Lino S, et al. Non-AIDS-related comorbidities in people living with HIV-1 aged 50 years and older: The AGING POSITIVE study. Int J Infect Dis. févr 2019;79:94-100.
23. Poupard M, Ngom Gueye NF, Thiam D, Ndiaye B, Girard PM, Delaporte E, et al. Quality of life and depression among HIV-infected patients receiving efavirenz- or protease inhibitor-based therapy in Senegal. HIV Med. mars 2007;8(2):92-5.
24. Yotebieng M, Brazier E, Addison D, Kimmel AD, Cornell M, Keiser O, et al. Research priorities to inform “Treat All” policy implementation for people living with HIV in sub-Saharan Africa: a consensus statement from the International epidemiology Databases to Evaluate AIDS (Ie DEA). J Int AIDS Soc. janv 2019;22(1):e25218.
25. So-Armah K, Gupta S, Kundu S, Stewart J, Goulet J, Butt A, et al. Depression and all-cause mortality risk in HIV-infected and HIV-uninfected US veterans: a cohort study. HIV Med. mai 2019;20(5):317-29.
26. Emlet CA, Brennan DJ, Brennenstuhl S, Rueda S, Hart TA, Rourke SB. The impact of HIV-related stigma on older and younger adults living with HIV disease: does age matter? AIDS Care. 3 avr 2015;27(4):520-8.
27. Rosenfeld D, Ridge D, Catalan J, Delpech V. Age and life course location as interpretive resources for decisions regarding disclosure of HIV to parents and children: Findings from the HIV and later life study. J Aging Stud. août 2016;38:81-91.
28. Clarke DM, Currie KC. Depression, anxiety and their relationship with chronic diseases: a review of the epidemiology, risk and treatment evidence. Med J Aust. 6 avr 2009;190(7 Suppl):S54-60.
29. Kitshoff C, Campbell L, Naidoo S. The association between depression and adherence to antiretroviral therapy in HIV-positive patients, KwaZulu-Natal, South Africa. Afr Fam Pr. 2012;54(2):145-50.
30. Akena DH, Musisi S, Kinyanda E. A comparison of the clinical features of depression in HIV-positive and HIV-negative patients in Uganda. Afr J Psychiatry. mars 2010;13(1):43-51.
31. Benard A, Bonnet F, Tessier J-F, Fossoux H, Dupon M, Mercie P, et al. Tobacco addiction and HIV infection: toward the implementation of cessation programs. ANRS CO3 Aquitaine Cohort. AIDS Patient Care STDs. juill 2007;21(7):458-68.
32. Webb MS, Vanable PA, Carey MP, Blair DC. Cigarette smoking among HIV+ men and women: examining health, substance use, and psychosocial correlates across the smoking spectrum. J Behav Med. oct 2007;30(5):371-83.
33. Cropsey KL, Willig JH, Mugavero MJ, Crane HM, McCullumsmith C, Lawrence S, et al. Cigarette Smokers are Less Likely to Have Undetectable Viral Loads: Results From Four HIV Clinics. J Addict Med. févr 2016;10(1):13-9.
34. Carmo Filho A do, Fakoury MK, Eyer-Silva W de A, Neves-Motta R, Kalil RS, Ferry FR de A. Factors associated with a diagnosis of major depression among HIV-infected elderly patients. Rev Soc Bras Med Trop. juin 2013;46(3):352-4.

35. Jaquet A, Ekouevi DK, Aboubakrine M, Bashi J, Messou E, Maiga M, et al. Tobacco use and its determinants in HIV-infected patients on antiretroviral therapy in West African countries. Int J Tuberc Lung Dis Off J Int Union Tuberc Lung Dis. nov 2009;13(11):1433-9.
36. Kinyanda E, Hoskins S, Nakku J, Nawaz S, Patel V. Prevalence and risk factors of major depressive disorder in HIV/AIDS as seen in semi-urban Entebbe district, Uganda. BMC Psychiatry. 2011;11:205.
37. Myezwa H, Hancock JH. Investigating the Interaction between Disability and Depressive Symptoms in the Era of Widespread Access to ART. J AIDS Clin Res [Internet]. 2016 [cité 31 janv 2020];7(7). Disponible sur: https://www.omicsonline.org/open-access/investigating-the-interaction-between-disability-and-depressive-symptoms-inthe-era-of-widespread-access-to-art-2155-6113-1000584.php?aid=74448
38. Zoungrana J, Dembélé JP, Sako FB, Siranyan S, Traore J, Sawadogo A, et al. Depression and HIV: Epidemiological and clinical aspects at the Bamako University Hospital (Mali). Médecine Santé Trop. mai 2017;27(2):186-9.
39. Endeshaw M, Walson J, Rawlins S, Dessie A, Alemu S, Andrews N, et al. Stigma in Ethiopia: association with depressive symptoms in people with HIV. AIDS Care. 2014;26(8):935-9.
40. Asangbeh SL, Sobngwi JL, Ekali GL, Eyoum C, Msellati P. Predictors of depression among patients on art in a rural health district in North West Cameroon. AIDS Care. févr 2016;28(2):205-8.
41. Owen G, Catalan J. 'We never expected this to happen': narratives of ageing with HIV among gay men living in London, UK. Cult Health Sex. janv 2012;14(1):59-72.
42. Nakimuli-Mpungu E, Wamala K, Okello J, Alderman S, Odokonyero R, Mojtabai R, et al. Group support psychotherapy for depression treatment in people with HIV/AIDS in northern Uganda: a single-centre randomised controlled trial. Lancet HIV. mai 2015;2(5):e190-199.
43. Petersen I, Hanass Hancock J, Bhana A, Govender K. A group-based counselling intervention for depression comorbid with HIV/AIDS using a task shifting approach in South Africa: a randomized controlled pilot study. J Affect Disord. avr 2014;158:78-84.
44. Moore RC, Marquine MJ, Straus E, Depp CA, Moore DJ, Schiehser DM, et al. Predictors and Barriers to Mental Health Treatment Utilization Among Older Veterans Living With HIV. Prim Care Companion CNS Disord [Internet]. 2 févr 2017 [cité 30 août 2019];19(01). Disponible sur: http://www.psychiatrist.com/PCC/article/Pages/2017/v19n01/16m02059.aspx
45. Tsai AC. Reliability and Validity of Depression Assessment Among Persons With HIV in Sub-Saharan Africa: Systematic Review and Meta-analysis. JAIDS J Acquir Immune Defic Syndr. août 2014;66(5):503-11.

Figures



*Significant difference between male and female

Figure 1

Frequency of depressive symptoms reported by the patients in the whole study sample and according to gender