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Neurocognitive Profile of People Living with Human Immunodeficiency Virus Initiating Treatment in Kinshasa in the Dolutegravir Era, Democratic Republic of Congo

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Abstract

Context: Antiretroviral therapies improve the prognosis of NeuroAIDS contrasting with a high frequency of Minor Neurocognitive Disorders (MND) even in aviremic subjects. **Objective:** The objective of this study is to present the neurological and cognitive profile of People Living with HIV (PLHIV) initiating antiretroviral treatment in Kinshasa in the era of Dolutegravir (DTG). **Methods:** This is a multicenter, cross-sectional study with a descriptive aim carried out in 16 HIV Outpatient Treatment Centers (OTC) in Kinshasa from October 4, 2021 to February 15, 2022. The International HIV Dementia Scale (IHDS) correlated with the Activities of Daily Living (IADL) scale facilitated the categorization of NeuroCognitive Disorders (NCD) of PLHIV evaluated after carrying out a summary neurological examination. **Results:** Of the 96 patients recruited, 56.3% were women with a sex ratio of 0.68. The average age was 40.1 ± 12.1 years. The secondary education level was the majority at 64.6%. Malaria (44.8%) and tuberculosis (32.3%) were more common as opportunistic infections. They were alcoholics in (30.2%). Their history was heart disease (15.6%), high blood pressure (18.8%); drug abuse (10.4%). The IHDS score was light in 55.2% of cases. The correlation between IHDS/IADL

watches asymptomatic neurocognitive impairments (ANI) in 77.1%, almost all of subjects are found with normal overall functioning (94.8%) and a disturbed neurological examination in 53.1% of cases with a predominance of motor impairments in 79.1%. **Conclusion:** In view of these results, early and systematic screening of NCD and associated factors remains necessary in our context.

Keywords

IHDS, Dolutegravir Initiation, Kinshasa, Neurological Profile, PLHIV

1. Introduction

The prognosis of Human Immunodeficiency Virus (HIV) infection and Acquired Immuno Deficiency Syndrome (AIDS) has improved dramatically since the routine use of highly active antiretroviral therapy (HAART), and even the classic neurological complications of HIV are no exception [1] [2]. Described since the start of the epidemic, they specifically referred to various opportunistic brain infections, but also to manifestations directly linked to the virus itself, the most severe forms of which led to terminal dementia, often associated with a poor prognosis [3].

Currently, these complications have become rare and only concern a minority of people who have escaped screening or with poor treatment compliance [4]. Although we are seeing an improvement in neurological damage in general, it is clear that the prevalence of Mild Neurocognitive Disorder (MND) associated with HIV remains unchanged or even increased [2].

Classified as being the second clinical manifestation found in People Living with HIV (PLHIV), neurocognitive disorders commonly called HAND (HIV Associated Neurocognitive Disorders) are present in approximately 20% to 50% of subjects with HIV [5] [6]. Its prevalence in sub-Saharan Africa is 30.4% among PLHIV on Anti Retro Viral Therapies (ART) and without therapy it is 42.4% [7]. In our settings in 2016 this prevalence was 78% of PLHIV on ART [8].

Indeed, due to its neurotropism, the immunosuppression virus causes early neurological damage, two to three weeks after its penetration into the body, while the diffusion of the majority of antiretroviral treatments is not optimal in the brain compartment considered to be one of the reservoirs and sanctuaries of the virus. This virus would therefore be the basis of the disturbances in neurocognitive functioning that can be observed at all stages of the disease, and even with immuno-virological control, thus causing insufficient suppression of the virus, and therefore progression of the disease [1] [5] [7] [9]-[14].

It is known that the advent of antiretroviral therapies improves the overall prognosis of HIV infection, including that of neurological complications, notably neurocognitive disorders. However, an increase in the prevalence of minor

forms of cognitive impairment linked to HIV has a more or less significant impact on the daily lives of PLHIV, justifying the conduct of this study.

The objective pursued in the present study is to present the neurological and cognitive profile of People Living with HIV initiating ART in Kinshasa in the era of DTG; Integrase Inhibitor (II) and new generation molecule, recommended by the WHO since 2019 as first-line treatment.

2. Methods

2.1. Study Design, Patient Settings and Samples

The present study is transversal with a descriptive aim to determine the neurocognitive profile of People Living with HIV (PLHIV) initiating ART treatment based on DTG in HIV Outpatient Treatment Centers (OTC) in Kinshasa. This study is in the same protocol as that of the Sociodemographic profile of people living with the human immunodeficiency virus starting treatment in Kinshasa, Democratic Republic of Congo which extended from October 4, 2021 to February 15, 2022 [15].

2.2. Study Population and Inclusion Criteria

The population of the present study was adults aged 18 years and over, without sexual distinction, diagnosed positive for HIV-1 at inclusion, with or without neurological complaints and having accepted the neurological evaluation and the scores of IADL/IHDS, as well as initiating ART in the OTC.

2.3. Sampling Technique

The population of the present study was recruited according to probability convenience sampling. Therefore allowing the recruiting of 119 patients, only 96 agreed to respond to the neurological assessments and evaluation to the IHDS and IADL scores.

2.4. Variables of Interest

The variables of interest monitored for the present study were: Sociodemographic (age, sex, level of education), Clinical (history and previous morbidities, clinical stage, opportunistic infections), and Neurological (neurocognitive profile, the summary neurological examination, scores from IADL4 coupled with IHDS).

2.5. Descriptions of the Categorization of HIV-Associated Neurocognitive Disorders

Neurocognitive assessment identified cognitive impairment using the International HIV Dementia Scale (IHDS), which is a neuropsychological scale assessing cognitive domains affected by HIV. Developed by Power *et al.* (1995) and adapted into French by Saktor *et al.* (2005), it is a valuable tool due to its speed and ease of use, and can therefore be used in everyday practice to identify pa-

tients who may present with NCD without needing to resort to other longer and more expensive assessments [1] [13] [16].

This is a neuropsychological scale composed of 4 tasks assessing memory and attention (Dubois 5-word test); motor speed (finger tapping test); psychomotor speed (Luria motor sequence); executive and visuo-spatial functions (drawing the clock) [13] [15].

The IHDS is rated out of 25; Immediate and delayed Dubois 5-word test (out of 10), Luria motor sequence (out of 4), Finger Tapping Test (out of 4), Clock test (out of 7), with a threshold score of 22 [13]; to categorize we divided the remaining 21 scores by three, and we therefore considered a score of 0 to 7 NCD as a score corresponding to severe NCD, 8 to 14 moderate TNC, and between 15 and 21 mild TNC.

Given the repercussions of cognitive disorders on the daily functioning of the subject, we associate it with the instrumental activity of daily living (IADL) scale, it translates into English as Instrumental activities of daily living (IADL), developed by Lawton and Brody in 1969 and translated into French in 1986 by L. Waintraub and L. Israel; very rapid use determines the degree of functional impairment of the subject [6] [17] [18].

There are several forms of this more detailed test, however the one used in the present study is the 4-item one, which allows the screening of patients with proven, progressive or undiagnosed dementia. These 4 items explore the autonomy or degree of dependence of the subject in relation to 4 practical activities of daily life [16] [17].

The NCD associated with HIV having an impact on the overall functioning of the subject and therefore on the activities of daily life, the values obtained from the IHDS score will be correlated to that of the activities of daily living scale (IADL), with a view to classifying them in [13] [16] [17]: 1) asymptomatic neurocognitive disorders; in any patient with acquired deficit in at least one cognitive field without any interference with daily living activities, 2) mild neurocognitive disorders; in any patient with acquired deficit in at least one cognitive field with slight interference in daily life activities, and 3) major neurocognitive disorders or HIV-associated dementia; described in any patient with acquired deficit in at least two cognitive fields with marked interference in the patient's autonomy.

2.6. Neurological Examination Summary

The evaluation of walking, that of tone (by passively mobilizing the limbs), of sensitivity (in both modes); the search for nystagmus (by observing eye movements from left to right and up and down), visual disturbances, language disturbances, and tremors, osteotendinous reflexes (bicipital, tricipital, patellar, achillean using of a reflex hammer) as well as that of archaic reflexes (Babinski, palmar-plantar for the first using a blunt point) and clonus (patellar and achillea using a reflex hammer) constituted our summary neurological examination.

Clinical data

History, previous morbidity and clinical stages were determined following the operational definitions in our previous studies [19] considering those which are contributory to the occurrence of cognitive disorders apart from HIV infection.

Ethical consideration

The present study was approved in its entirety by the Research Ethics Committee of the School of Public Health, Faculty of Medicine, University of Kinshasa (ESP/CE/115/2021). Authorization to access the CTAs was obtained from the competent authorities of the various institutions selected. Before inclusion, fully informed consent was obtained from each patient.

Statistical analyzes

Analyzes were carried out using SPSS software version 26 (Statistical Package for Social Sciences, IBM). Only available data was analyzed. Continuous variables were presented as mean ± standard deviation and frequency.

3. Results

During this study, we identified 96 patients out of the 119 in the overall sample and in agreement with the inclusion criteria and our variables of interest.

3.1. Sociodemographic Data

Gender

We noted that 57 subjects (59.4%) were female compared to 39 (40.6%) males, thus giving a sex ratio of 0.68, thus revealing a non-significant difference between men and women (Table 1).

Age

The average age of the patients included is 40.1 ± 12.1 years with a range of 18 to 69 years. The most represented age group (Table 1) is that of 34 to 41 years old with 29 patients (30.2%) followed jointly by those of 42 to 49 years old with 20 patients (20.8%) and of 18 to 25 years old with 15 patients (15.6%) and those aged 50 to 57 with 12 patients (12.5%) as well as those aged 58 and over 65 with 9 (9.4%).

Educational level

The majority of patients, *i.e.* 62 (64.6%), have a secondary level, followed by 15 (16.3%) patients with a primary level, university level with 11 (11.5%) patients and the illiterate ones. represented 6 (6.3%) (Table 1).

Occupation

Most of the patients 44 (45.8%) worked in the informal sector, followed by unemployed patients with 19 (19.8%), housewives represented 14 (14.6%), civil servants with 12 (12.5%) and the pro-health encountered in smaller proportions, 7 (7.3%) (Table 1).

3.2. Clinical Data

History, previous morbidities and clinical stages

Almost half of the patients 45 (46.9%) were in stage 3 of the disease, 28 (29.2%) were in stage 1, stage 2 accounted for 15 (15.8%), as well as stage 4 with 8 (8.3%) (Table 2).

Table 1. Distribution of patients according to sociodemographic parameters at inclusion.

PARAMETERS	FREQUENCY	PERCENTAGE
Sexe Of Patients (N = 96)		
Man	39	40.6
Woman	57	59.4
Age of Patient (N = 96) in Years		
18 - 25	15	16.1
26 - 33	11	19.4
34 - 41	29	33.3
42 - 49	20	19.4
50 - 69	9	11.8
Study Level (N = 96)		
No Study	6	6.3
Primary School	17	17.7
Secondary School	62	64.6
University	11	11.5
Patient Profession (N = 96)		
Official	12	12.5
Informal	44	45.8
Household	14	14.6
Health Professional	7	7.3
Without Jobs	19	19.8

Table 2. Clinical stage according to WHO.

Clinical Stage	Effectifs (N = 96)	%
Stade 1	28	29.2
Stade 2	15	15.6
Stade 3	45	46.9
Stade 4	8	8.3

The most common antecedents (Table 3) are tuberculosis with 30 (31.3%), together with sleep disorders 30 (31.3%), followed by alcoholism and dental caries which respectively represent 29 (30 .2%), and other antecedents in significant proportions including appetite disorders with 23 (24.0%), peripheral neuropathies with 21 (20.8%), as well as arterial hypertension with 18 (18.8%), low blood pressure with 16 (16.7%) and smoking 15 (15.6%). In the smallest proportions; nervousness with 10 (10.4%), rheumatism and suicidal thoughts with 6 (6.3%), ear infections and behavioral disorders respectively with 5 (5.2%), strokes amounted to 4 (4.2%), closely followed by sexual disorders and epilepsy with respectively 3 (3.1%), finally paralysis was found with 1 (1.0%).

Table 3. Distribution of patients according to medical history.

Parameters	Frequency (N = 96)	Percentage
Sleep problems	30	31.3
Sexual disorders	3	3.1
Peripheral neuropathy	20	20.8
Smoking	15	15.6
Epilepsy	3	3.1
Tooth decay	28	29.2
Paralysis	1	1.0
Suicidal ideation	6	6.3
Appetite disorders	23	24.0
Behavioral problems	5	5.2
Alcoholism	29	30.2
Tuberculosis	30	31.3
Stroke	4	4.2
Otitis	5	5.2
Rheumatism	6	6.3
Hypertension	18	18.8
Ervousness	10	10.4
Hypotension	16	16.7

The frequent previous morbidities (Table 4) were malaria with 32 (33.3%), heart disease amounted to 15 (15.6%), closely followed by arterial hypertension and tuberculosis with respectively 12 (12. 5%) as well as medication abuse with 10 (10.4%). The others in different proportions but not negligible; jointly smoking and alcoholism as well as sleep deprivation with respectively 9 (9.4%), followed by malnutrition with 5 (5.2%), epilepsy as well as sepsis with each 3 (3.1 %), encephalopathies, diabetes and stroke each with 2 (2.1%), finally jointly with the same values depression, anemia, and head trauma with each 1 (1.0%).

Although malaria is in the majority with 43 (44.8%), skin disorders in general constituted the most encountered opportunistic infections with 59 (64.3%) or skin rashes with 20 (20.8%), dermatoses at 15 (15.4%), and skin pruritus at 24 (25%), shingles at 3 (3.1%). Other disorders found in different proportions include tuberculosis with 31 (32.3%), oral candidiasis 20 (20.8%) (Table 4), urinary infections with 19 (19.8%), followed concurrently by vaginal pruritus and diarrhea with respectively 13 (13.5%), followed by vaginal mycoses with 12 (12.5%), rhinitis with 10 (10.4%). The others in smaller proportions; intestinal parasitosis with 9 (9.4%), non-specific STIs 4 (4.2%) (Table 5).

Table 4. Distribution of patients according to previous morbidity.

Parameters	Frequency	Percentage
Epilepsy	3	3.1
Encephalopathy	2	2.1
Malaria	32	33.3
Malnutrition	5	5.2
Diabete	2	2.1
High blood pressure	12	12.5
Heart disease	15	15.6
Meningitis	2	2.1
Anemia	1	1.0
Sleep deprivation	9	9.4
Drug abuse	10	10.4
Head trauma	1	1.0
Tuberculosis	12	12.5
Sepsis	3	3.1
Depression	1	1.0
Stroke	2	2.1
Smoking	9	9.4
Alcoholism	9	9.4

Table 5. Distribution of patients according to opportunistic infections at inclusion.

Parameters	Frequency	Percentage
Oral candidiasis	20	20.8
Vaginal pruritus	13	13.5
Zona	3	3.1
Diarrhea	13	13.5
Vaginal mycosis	12	12.5
Tuberculosis	31	32.3
Intestinal parasitosis	9	9.4
Non-specific STI	4	4.2
Dermatosis	15	15.6
Malaria	43	44.8
Urinary tract infection	19	19.8
Cutaneous pruritus	24	25.0
Rhinitis	10	10.4
Rash	20	20.8

3.3. Neurological Profile

Neurological examination

The neurological examination carried out in 96 patients was disturbed in 50 patients, *i.e.* 52.1% versus 46 patients, *i.e.* 47.9% of cases with a normal examination (Table 6). Among the disturbances observed, motor impairments in general were found with 76 (79.1%), distributed in descending order; osteotendinous hyperreflexia with 31 (32.3%) and hypotonia in 1 (1%), spastic hypertonia 18 (18.8%), hypotonia was found in 1 patient (1%), tremors with 15 (15.6%), walking disorders were found with 7 (7.3%) as well as clonus with 3 (3.1%). The other disorders were represented by; the return of archaic reflexes with 25 (26.0%), sensory disorders 6 (6.3%), visual disorders with 2 (2.1%), nystagmus with 3 (3.1%) finally language disorders with 1 (1%).

Table 6. Distribution of patients according to neurological profile data.

General Neurological Examination			
	Normal	46	47.9
	Disturbed	50	52.1
Summary Neurological Examination			
Motor Disorders	Walking Disorders	7	7.3
	Spastic Hypertonia/Hypotonia	19	19.8
	H Rot/Abolished	32	33.3
	Tremors	15	15.6
	Clonus	3	3.1
	Sensory Disorders	6	6.3
	Archaic Reflexes	25	26.0
	Nystagmus	3	3.1
	Visual Disturbances	2	2.1
IHDS Categorized			
	Severe	4	4.2
	Moderate	22	22.9
	Light	53	55.2
	Normal	17	17.7
IHDS-IADL			
	ANI	74	77.1
	MND	4	4.2
	HAD	1	1.0
	Normal	17	17.7
Overall Operation			
	Autonomous	91	94.8
	Dependant	5	5.2

Cognitive and autonomy assessment

The IHDS score showed mild disorders in 53 patients (55.2%), those with moderate disorders represented 22 (22.9%), the normal score was found in 17 patients (17.7%) and the severe damage with 4 (4.2%) (Table 6).

On the IADL score, almost all of the patients, *i.e.* 91 (94.8%), had normal overall functioning compared to 5 (5.2%) who presented mild to severe dependence.

Categorized HIV-associated neurocognitive disorders (*IADL/IHDS*)

The majority of patients presented asymptomatic neurocognitive disorders with 74 (77.1%), and those without neurocognitive disorders represented 17 (17.7%), followed by mild disorders with 4 (4.2%), and finally associated dementia. to HIV represents 1 (1%) (Table 6).

4. Discussion

The objective of this study was to present the neurological profile of People Living with HIV (PLHIV) initiating antiretroviral treatment in Kinshasa in the era of Dolutegravir. Ninety-six (96) PLHIV were included in this study.

The neurological examination was disturbed in almost half of the patients (52.1%). The majority of studies focus on patients undergoing therapy and do not often address the neurological examination of PLHIV. A study carried out in 2020 in Mali on neurological complications in hospitalized patients shows that neurological damage reveals HIV infection in 33.33% of cases and appears to have occurred during the infection in 61.1% of cases [20]. The literature mentions that neurological complications remain frequent, are initial in 10% of cases and occur during HIV infection in 40% to 75% of cases or 75% to 100% in autopsies [11].

As neurotropism is known [9] [11], the neurological disturbances noted in our research could be explained by primary damage linked to the virus itself, this seems plausible especially since the history of peripheral neuropathy was found among 20.8% of our patients and could have been indicative of the infection. Indeed, peripheral neuropathy or myelopathy or even encephalitis are among the primary effects of primary infection [21], they disappear spontaneously within a few weeks and constitute an indication for the initiation of antiretroviral treatment. These attacks could also be secondary to the various opportunistic infections found in our study population because more than half of our sample was at stage 3 of the infection (46.9%), in agreement with the majority of publications in our circles [1] [9] [19] [22], but they can also be associated with several other factors linked to their pre-morbid state such as hypertension (18.8%), diabetes (3.1%), heart disease via neurovascular damage and also malnutrition through oxidative stress.

Motor impairments were the majority (79.1%), with a predominance of osteotendinous hyperreflexia (32.3%); in the Malian series it was in smaller proportions 29.7%, a difference which would probably be linked to the fact that the

patients were already receiving antiretroviral treatment [20]. A study carried out in children in environments noted up to 80% of motor disorders among which osteotendinous hyperreflexia was found in 64.4% of cases.

The authors justified this high frequency by the fact that some children were not on ART and those who were would probably have developed an insidious encephalopathy before starting ART and chronic malnutrition in a developing brain [23]. Other disorders such as the presence of archaic reflexes, sensory disorders, visual disorders are found in a certain proportion, the occurrence of which would be demyelination of the white matter responsible for the disseminated lesions often encountered in the advanced stage of the disease [1] [6] [12].

They can also be the consequence of primary lesions but also of infections or opportunistic conditions underlying a diffuse encephalopathy resulting in various neurological damage [9] [11]. The literature reports that several motor disorders often accompany NCD associated with HIV [6].

The cognitive assessment using the IHDS scale showed cognitive deficits in more than 75% of cases (a mild score of 55.2%, a moderate score of 22.9% and severe impairments of 4.2%). Few studies classify cognitive disorders according to the IHDS scale. Neurocognitive deficits are more common in HIV patients than the rest of the general population [1]-[6]. It is known that neurocognitive impairments associated with HIV infection affect subcortical functions, and at more advanced stages they become cortical. The IHDS is one of the neuropsychological tests which is therefore suitable for the rapid exploration of cortico-subcortical functions [1] [2] [6].

Normal overall functioning was noted in 94.8% of patients compared to 5.2% who presented dependence. It is worth remembering that if the patient is perhaps no longer independent in certain acts of daily life, and it will be difficult for the latter to have good compliance with ART, which is the cause of the emergence of resistance to ARVs, and that TNC negatively impacts quality of life [24]. NCD associated with HIV, although minor, evolve gradually and settle into a more advanced stage through ideomotor slowing and changes in behavior such as cognitive and motor deficits associated with HIV or even dementia associated with HIV [6] [13]. Thus, the predominance of asymptomatic neurocognitive disorders found in 77.1% and motor impairments in 79.1% of cases which could raise fears of a progression towards a dementia syndrome in the absence of ART.

Our study focused on treatment-naive subjects, but most studies in general were carried out on subjects already under therapy presenting mainly asymptomatic and mild disorders. It is clear that this picture seems similar to those described in our study [1] [2] [6]. The mechanisms of HIV-associated TNC are not clearly established. Although the CNS is considered both a reservoir and a sanctuary for the virus, favoring its persistence, the literature mentions that there is the phenomenon of compartmentalization, a source of resistance, thus favoring the rapid evolution of brain lesions. It should also be noted that several other factors influence the evolution of TNC associated with HIV. In particular, the type of virus, particularly type 1, which causes more serious illnesses, the

high level of education which constitutes the cognitive reserve protecting against cognitive disorders, age over 50 years as well as certain comorbidities.

Although these disorders can be encountered at all stages of the disease, the clinical stage can also be a risk factor because neurocognitive dysfunctions become evident at more advanced stages [1]-[14], such is the case of our sample which counts approximately 75% of patients in stages 3 and 4. It would therefore be wise to carry out systematic and early screening of these disorders in any PLHIV with memory complaints emanating from themselves or those around them in our environment. This attitude would be motivated by the fact that our study population is made up of young adults with a risk of earlier aging (average age of 40.1 ± 12.1 years) with an average level of education (secondary education in majority) and a low socio-economic level (most unemployed or working in the informal sector), which moreover present a clinical disadvantage in terms of comorbidities, history and opportunistic infections.

In addition, tuberculosis (31.3%), sleep disorders (31.3%), alcoholism (30.2%), dental caries (29.2%), appetite disorder (24%), smoking (15.6%), hypertension (18.8%) and arterial hypotension (16.7%) were the most frequently encountered antecedents in our study population. Also, malaria (33.3%), like heart disease (15.6%) and drug abuse (10.4%), were frequent previous morbidities.

According to the literature and in several studies, a higher frequency of sleep disorders among PLHIV than in the general population has been described and is more likely to be linked to social and psychological conditions than to HIV infection [25]. A study evaluating sleep quality as well as risk factors among PLHIV could better understand this issue outside of this study, which is descriptive. Knowing that sleep disorders are common in patients with a neurocognitive disorder and that they increase the risk of dementia, although the biological mechanisms underlying this association remain to be elucidated [26] [27].

Indeed, sleep is an essential biological function, necessary for brain restoration and memory consolidation [28]. Brain damage, HIV and sleep disorders significantly increase the risk of suicide [26] [29].

Particular attention must therefore be drawn in the management of these patients, especially since approximately 6.3% of our sample had suicidal thoughts.

A recent study found that sleep disorders are associated with anxiety and depression, cardiovascular risk factors, and the use of various medications that may affect sleep such as benzodiazepines, corticosteroids, opioids and antidepressants. This study noted no association with specific antiretroviral drugs as would be the case with certain ARVs including Integrase Inhibitors [30]. It has also been reported that other factors such as the consumption of alcohol or over-the-counter medications play a role. However, our naive patients presented in significant proportions cardiovascular diseases (hypertension and heart disease) and drug abuse although their nature was not specified.

The literature reports that alcoholism exposes the brain to structural and functional alterations of the Papez circuit and fronto-cerebellar circuit, mainly affecting executive functions and memory capacities [31].

The Malian series shows that oral and dental conditions generally associated with HIV infection were frequent and varied, and could constitute the first clinical manifestations of HIV infection [19]. These pathologies can also be the basis of neurocognitive disorders [32].

Also, poor diet, smoking and poor dental conditions have been shown to be risk factors for cognitive disorders. Indeed, recent research has established a link between good dental health, general health, cardiovascular health and cognitive health [33]. Finally, we believe that in relation to a significant number of symptoms such as appetite disorder, sleep disorder, sexual disorder and alcoholism that these patients would have presented somatic depression, which is the prerogative of Africans [34], although not having objectively assessed depression in these patients.

Strengths and Limits of the Study

Our study made it possible to identify a neurological profile of PLHIV starting DLT treatment by defining the share of primary damage and that of other comorbidities. It is an observational study which could serve as a basis for other studies in understanding the physiopathological mechanisms of cognitive disorders in HIV and those evaluating the neuroactive properties of DTG in our environment. Being a descriptive study, it did not allow us to establish the cause and effect link between TNC and the factors present.

5. Conclusion

The neurocognitive profile of patients initiating ARV treatment is dominated by mild cognitive disorders, and the configuration of neurological disorders indicates diffuse cerebral damage. They mainly affect young adults, constituting the social layer useful for the economic development of the country. These patients are at risk of poor adherence to ART and poor quality of life. Early diagnosis and better adapted therapeutic care also focusing on the mental and physical health of patients remains an important issue.

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Conflicts of Interest

The authors declare no conflict of interest for this study.

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Collection Datasheet

CONSULTATION CENTER		
NAME OF CONSULTING SERVICE		
SERVICE ID	PATIENT IDENTIFIER IN THE DEPARTEMENT	
PATIENT ID IN WORK	**_ _ _ / RA / ARV 12 / 2021 / _ _ _ / _ _ _ _**	
PATIENT		
INITIAL OF NAME		
FIRST NAME INITIAL		
INITIAL OF POST-NAME		
TELEPHONE NUMBER		
FULL ADRESS		
PLACE AND DATE OF BIRTH		
AGE	SEX	
SIZE	WEIGTH	
BODY MASS INDEX (BMI)	TEMPERATURE OF PATIENT	
MARITAL STATUS	OCCUPATION	
LEVEL OF STUDY	RELIGION	
PROVINCE OF ORIGIN	TRIBE	
	DATE	
HIV TESTING	PLACE	
	METHOD	
EXPOSITION ANTERIEUR AUX ARV	**YES ☐**	**NO ☐**
PARTICIPANT INCLUDED IN THE SURVEY	**YES ☐**	**NO ☐**
ANTIRETROVIRAL THERAPY		
TREATMENT REGIMEN		
DATE OF INITIATION OF TREATEMENT		
HIV SUBTYPE		
MAJOR NRTI MUTATIONS		
MAJOR NNRTI MUTATIONS		
MAJOR PI MUTATIONS		
OTHER MAJOR CHANGES		

CLINICAL CONDITION AND CLINICAL STAGE OF PATIENTS				
NORMAL	The patient's vital functions are normal, and he is able to do everything without assistance.			
GOOD	The patient's vital functions are almost normal, and he is still able to walk, eat and take care of himself without assistance.			
BAD	The patient's vital functions are impaired, and he no longer able to walk, eat or care for himself without assistance.			
PRE-MORIBUND	The patient is in very poor condition, totally bedridden and has obnoxious consciousness, but is able to eat with assistance.			
MORIBUND	The patient is in very poor general condition, totally bedridden an in vigorous or deep coma.			
CLINICAL STAGE (WHO)	☐ 1	☐ 2	☐ 3	☐ 4

PERSONNAL MEDICAL HISTORY	
SPLEEP DISORDER	APPETITE DISORDER
SEXUAL DISORDER	BEHAVIOUR TROUBLE
PERIPHERAL NEUROPATHIES	ALCOHOLISM
SMOKING	TUBERCULOSIS
MENINGITIS	STROKE
EPILEPSY	OTITIS
TOOTH DECAY	RHEUMATISM
PARALYSIS	HIGH BLOOD PRESSION
SUICIDAL IDEATION	NERVOUSNESS
DATE OF LAST PERIOD	HYPOTENSION

DIAGNOSED OPPORTUNIC INFECTIONS	
ORAL CANDIDIASIS	NON-SPECIFIC STI
VAGINAL PRURIT	DERMATOSES
SHINGLES	MALARIA
DIARRHEA	URINARY INFECTIONS
VAGINAL MYCOSES	SKIN PRURITUS
TUBERCULOSIS	RHINITIS
INTESTINAL PARASITOSES	RASH
OTHER TO SPECIFY	

PREVIOUS MORBIDITY		
EPILEPSY	HEART DISEASE	HEAD TRAUMA
ENCEPHALOPATHY	SICKLE CELL DISEASE	TUBERCULOSIS
MALARIA	MENINGITIS	SEPSIS
MALNUTRITION	ANEMIA	DEPRESSION
DIABETES	SLEEP DEPRIVATION	STROKE
HIGH BLOOD PRESSION	DRUG ABUSE	SMOKING
ALCOHOLISM		

ALCOHOLISM		
Q1	How often do you drink alcohol?	never 1 time/month 2 to 4 time/month 2 to 3 time/week At least 4 times a week
Q2	How many alcoholic beverages do you consume on a typical drinking day?	1 à 2 glasses 3 à 4 glasses 5 à 6 glasses 7 à 8 glasses More than 10 glasses
Q3	How often do you drink 6 or more glasses of alcohol on a single occasion?	never Less than once a week Once a week 1 time/month Almost every time

BIOLOGICAL EXAMINATIONS OF PATIENTS		
ANALYZES	**RESULTS**	**COMMENTS**
ALT		
AMYLASE		
AST		
CD4		
VIRAL LOAD (VL)		
TOTAL CHOLESTEROL		
CREATINE		
BLOOD SUGAR		
HEMOGLOBIN		
TOTAL PROTEIN		
TRIGLYCERIDES		
UREA		

HIV DEMENTIA SCALE (see IHDS scale)			
N°	**Tests Score Max**	**Score**	**Maximum**
Q1	Dubois'5-words test: free immediate recall		5
Q2	Dubois'5-words test: cued immediate recall		0
Q3	Finger Tapping Test		4
Q4	Luria motor sequence		4
Q5	Clock drawing		7
Q6	Dubois'5-words test: free delayed callback		5
Q7	Dubois'5-words test: cued delayed recall		0
Q8	Total		25

SUMMARY NEUROLOGICAL EXAMINATION		
Q1	WALK	Normal (0) SPASTIC (1) Impossible (2)
Q2	Tone	Normal Hypertonia legs: L R et UM: L R
Q3	Sensory disorders	Absent Present
Q4	Nystagmus	Absent Present
Q5	Visuals disturbances	Absent Present
Q6	Language	Normal Aphasia Language delay
Q7	Tremors	Absent Present
Q8	Osteotendinous reflex Bicipital Tricipital Patella Achillean	Normal Exaggerated L R Polykinetics R
Q9	Archaic reflexes Babinski Palmar-mentoniere	Absent Present L R

Continued

Q10	Clonus Patella Achillean	Absent Present L R

INSTRUMENTAL ACTIVITIES OF DAILY LIVING SCALE (Short version)			
	Ability to use telephone	**Yes**	**NO**
Q1	Operates telephone on own initiative-looks up and dials numbers, etc.		
Q2	Dials a few well-known numbers		
Q3	Answers telephone but does not dial		
Q4	Does not use telephone at all		
	Mode of transportation		
Q1	Travels independently on public transportation or drives own car		
Q2	Arranges own travel via taxi, but does not otherwise use public transportation		
Q3	Travels on public transportation when accompanied by another		
Q4	Travel limited to taxi or automobile with assistance of another		
Q5	Does not travel at all		
	Responsibility for own medications		
Q1	Is responsible for taking medication in correct dosages at correct time		
Q2	Takes responsibility if medication is prepared in advance in separate dosage		
Q3	Is not capable of dispensing own medication		
	Ability to handle finances		
Q1	Manges financial matters independently		
Q2	Manages day-to-day purchases, but needs help with banking, major purchases, etc.		
Q3	Incapable of handling money		

List of Abbreviations and Acronyms

ADL: Activities of Daily Living
ANI: Asymptomatic Neurocognitive Impairment
ART: Anti-Retroviral Treatment
ARV: AntiRetroViral
CNS: Central Nervous System
DRC: Democratic Republic of Congo
DTG: DoluTeGravir

HAD: HIV Associated Dementia
HIV: Human Immunodeficiency Virus
IADL: Instrumental Activities Daily Living
IHDS: International HIV Dementia Scale
L: Left
MND: Mild Neurocognitive Disorder
NCD: NeuroCognitive Disorder
OTC: Outpatient Treatment Center
PLHIV: Person Living Human Immunodeficiency Virus
R: Right
RDT: Rapid Diagnosis Test
SSA: Sub-Saharan Africa
STI: Sexually Transmitted Infection
Stroke: Cerebral Vascular Accident
WHO: World Health Organization