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First Line Antiretroviral Therapy (ART) in Regional Hospital of Niamey (Niger): Socio-demographic Characteristics and Treatment Outcome

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Abstract: *Background:* The increasing access of PLHIV to antiretroviral treatment (ART) over the last decade has led to a substantial reduction in patient morbidity and mortality and an increase in the life expectancy of PLHIV. *Objective:* The aim of this study was to describe the sociodemographic characteristics and treatment outcome of patients living with HIV. *Methods:* This is a retrospective, descriptive and cross-sectional study carried out from 1 January 2016 to 31 December 2020. *Results:* of 253 patients 72.33% of the patients were women and 27.66% were men. 60.07% of the patients were married, 14.62% single, 13.43% widowed and 11.85% divorced, 42.68% of whom lived in a monogamous household. 84% of the patients came from the urban area. HIV/HBV and HIV/TB co-infections were 5.53% and 3.95% respectively. Clinically, 41.89% of the patients are at WHO stage II, 48.61% had an undetectable viral load. The average CD4 cells count was 270 with extremes ranging from 0 to 1818, 94.86% of patients. *Conclusion:* ART treatment is associated to age, gender and low socio-economic status and low level of education. The majority of patients are in treatment success; between WHO stages I and II, under the TDF-3TC-EFV protocol. Fewer rate of patients was in viral therapeutic failure.

Keywords: ART, PLHIV, Treatment, Outcome, Niger

1. Introduction

In 2020, UNAIDS estimated that there were 37.7 million people living with the human immunodeficiency virus (PLHIV) worldwide, of whom 1.5 million became newly infected with HIV. Approximately 680 000 people have died of AIDS-related illnesses and 27.5 million people had access to antiretroviral therapy [1].

By the end of December 2020, 27.5 million people had access to antiretroviral therapy, an increase of 7.8 million from 2010 or 73% of all people living with HIV [1].

In West and Central Africa, UNAIDS estimated that 4.7 million people were living with the human immunodeficiency virus (PLHIV), of whom 200,000 became newly infected with HIV in 2020. About 150,000 people died of AIDS-related illnesses and 3.5 million people had access to antiretroviral therapy in 2020 [1].

The increasing access of PLHIV to antiretroviral therapy (ART) over the past decade has led to a substantial reduction in patient morbidity and mortality [2] and an increase in life expectancy for PLHIV [3, 4].

In July 2014 at the 20th HIV and AIDS conference,

governments committed to achieving the 90-90-90 By 2020, 90% of people living with HIV know their HIV status, 90% of all HIV-infected people tested receive sustained antiretroviral therapy and 90% of people receiving antiretroviral therapy have sustained viral load suppression [5].

However, antiretroviral treatment is not without risk of clinical, virological and immunological failure and/or resistance with the emergence of new mutant strains.

The therapeutic and/or resistance failures observed in newly infected persons are multifactorial and pose a public health problem because it is necessary to identify their determinants and the challenges they pose and to draw lessons for management programs.

This study aimed to describe the sociodemographic characteristics and outcome of antiretroviral therapy (ART) in People Living with HIV (PLHIV) followed up at the Regional Hospital Centre of Niamey.

2. Methods and Materials

We carried out a retrospective, descriptive and cross-sectional study in the Regional Hospital Centre of Niger (Niger) from January 1, 2016 to December 31, 2020. This study took place in the HIV care unit in the internal medicine department of the Niamey Regional Hospital (Poudrière).

2.1. Inclusion and Exclusion Criteria

We included in this study population all patients of the files of active patients living with HIV (PLHIV) included and under treatment during the period of our study. All active HIV patients of both sexes aged at least 17 years included and followed up during the study period regardless of stage, patients co-infected with hepatitis B, and patients co-infected with tuberculosis.

We did not include in this study patients who died or were transferred to another Centre and patients followed for a pathology other than HIV/AIDS.

2.2. Variables

Data will be collected from the records of all PLWHA on first or second line ART on: Socio-demographic characteristics: age, sex, weight, occupation, origin, education level, marital status; Patient's treatment history: year of initiation of ART, WHO clinical stage, ART adherence, treatment protocol and progress; Biological parameters: CD4 count and viral load.

2.3. Data Collection, Entry and Analysis

As data collection techniques, we used a collection form made for the need of the study.

Data collection was done with strict respect for anonymity after an informed consent. The data were collected on a form designed for the purpose of the study. Patient confidentiality is the rule. The data collection form is anonymous.

Data analysis was performed with the software: Epi info, version 6. We calculated proportions with 95% confidence intervals (CIs). Data entry and presentation of figures with Microsoft Excel and Word 2013.

The results were expressed as frequencies for qualitative variables and as means for quantitative variables.

2.4. Ethical Consideration

We obtained the permission to conduct the study of authorities of the Regional Hospital of Niamey. Written consent of all patients was obtained prior to start into the treatment. Information collected as part of this study was confidential.

3. Results

A total of 253 cases of PLHIV were registered in the Centre during the period of this study.

The socio-demographic characteristics of patients are summarized in table 1.

The average age was 37.98 years (± 9.83) with extremes ranging from 19 to 72 years. The age range between 30 and 50 years is the majority in 69.16% of cases.

Women accounted for 72.33% (n=183) and men for 27.66% (n=70), i.e. a sex ratio of 0.88.

The average weight of the patients was 64.45 kg (± 13.66%) with extremes ranging from 35 to 124 years.

The most common socio-professional categories were: housewives (41.10%), retailers (15.01%), civil servants (10.67%), pupils and students (5.13%), hairdressers (4.74%), drivers (4.34%) and seamstresses (4.34%).

60.07% were married, 14.62% single, 13.43% widowed and 11.85% divorced, of whom 42.68% lived in a monogamous household. 83% of the patients have between 0 and 4 children.

84% of patients come from the Niamey Urban Community (urban Centre) while 16% come from other localities or regions. The Niamey IV communal district is the most represented in 38.3% of cases.

The clinical, biological characteristics and the regimen of patients are summarized in the table 2.

HIV/HBV and HIV/TB co-infections are respectively 5.53% and 3.95%.

Clinically, 41.89% of the patients were at WHO stage II.

The majority of patients (48.61% n=123) had an undetectable viral load while 11.46% (n=29) of patients were in viral therapeutic failure.

The mean viral load was 64 copies/mL with extremes ranging from undetectable viral load to over 7350000 copies/mL.

The average CD4 cells count is 270 with extremes ranging from 0 to 1818. 31.62% of the patients had a CD4 count above 350 (n=80) while 6.71% (n=17) of patients had a CD4 count below 100.

94.86% (n=240) of patients are on the first line TDF-3TC-EFV protocol.

Adherence to treatment was considered good in 72% of patients.

Table 1. *Socio-demographic Characteristics of patients.*

Characteristics	2016	2017	2018	2019	2020	Total	Frequency
Gender							
Female	36	44	40	37	26	183	72.33%
Male	17	19	12	15	7	70	27.66%
Age group							
19-33	17	20	24	16	12	89	35.17%
34-48	23	35	22	24	18	122	48.22%
49-63	12	8	6	11	3	40	15.81%
64-78	1			1		2	0.79%
Marital Status							
Single	8	8	9	7	5	37	14.62%
Divorced	2	9	5	10	4	30	11.85%
Married	38	39	32	22	21	152	60.07%
Widow's	5	7	6	13	3	34	13.43%
Occupation							
Drivers	4	4	1	2	1	12	4.74%
Hairdresser	2	4	2	2	1	11	4.34%
Seamstress	3	2	3	1	2	11	4.34%
Cultivator	2	1	1	2		6	2.37%
Student		2	4	4	3	13	5.13%
Official	4	9	4	3	7	27	10.67%
Household	23	23	23	24	11	104	41.10%
Customer	5	7	13	9	5	39	15.41%
Waitress	2	1			1	4	1.58%
Tailor	2	1				3	1.18%
Others	6	9	1	5	2	23	9.09%

Table 2. *Clinico-biological Characteristics and regimen of patients.*

Parameters	2016	2017	2018	2019	2020	Total	Frequency
Hepatitis B Negative	45	40	39	35	14	173	68.37%
Unknown	3	21	9	16	17	66	26.08%
Positive	5	2	4	1	2	14	5.53%
Tuberculosis Negative	42	49	43	44	24	202	79.84%
Unknown	10	10	7	7	7	41	16.20%
Positive	1	4	2	1	2	10	3.95%
Clinical Stages							
I	22	29	12	17	11	91	35.96%
II	23	17	27	24	15	106	41.89%
III	8	13	10	10	5	46	18.18%
IV		4	3	1	2	10	3.95%
CD4 Cells							
0-199	19	21	35	41	24	140	55.33%
200-399	10	14	10	6	5	45	17.78%
>400	24	28	7	5	4	68	26.87%
Viral load							
Undetectable VL						123	48.61%
100-1000 VL						101	39.92%
>1000 VL						29	11.46%
ART regimen							
ABC-3TC-EFV				1		1	0.39%
AZT-3TC-LPVr		1				1	0.39%
TDF-3TC-DTG				2	4	6	2.37%
TDF-3TC-EFV	51	61	51	48	29	240	94.86%
TDF-3TC-LPVr	2		1	1		4	1.58%
TDF-3TC-NVP		1				1	0.39%

4. Discussions

This study enabled us to evaluate the management of PLWHIV on ART followed up at the Regional Hospital Centre of Niamey.

This study is limited by the lack or inaccuracy of certain information in the follow-up files due to the retrospective nature of the study.

For some patients, the immunological and virological tests, including the CD4 rate and viral load, necessary for the follow-up of patients were not carried out due to a shortage of reagents and consumables or machine breakdown.

4.1. Age of the Patients

In our study, the average age of the patients was 38 years with extremes ranging from 19 to 72 years. This confirms the hypothesis that HIV is a disease that affects a relatively young and active population. These results are similar to several African series including Bezabih et al. average age of 40 years [7]; Alene et al. average age of 35 years [9]; Gahrton et al. average age of 35 years [10] and Mulisa et al. who found an average age of 34 years [8]. Lynne Swarts et al. found an average age of 35 years [13].

4.2. Gender

In this study, we noted a predominance of women (72%), indicating that the female population bears the brunt of the burden of HIV more than men. These results are close to those of Thome et al. who observed 68% of women [6], Ayalew MB et al. F/H ratio of 3:2 and Osinusi et al. who found an F/H ratio of 2:1.

This can be explained by the important and systematic screening of women through PMTCT during pregnancy but also the existence of polygamous households.

4.3. Profession

In this study, housewives predominate (41%) among people living with HIV. The results vary according to the study. Bezabih et al. found that only 2% were unemployed [7]; Mulisa et al. found that 29.06% were housewives [8]. These results prove that this pathology predominates in vulnerable groups.

4.4. Co-infections

HIV/TB co-infection is 5.5%, which is lower than those described by several studies. Thome et al (12.11%) Alene et al; Mulisa et al, Bezabih et al (10.8%) Antoine Jaquet et al [6-9, 13, 14]. Testing for co-infection with TB should be actively and systematically performed in PLWH. An Xpert test is required in all symptomatic patients or those who show signs of tuberculin impregnation.

HIV/HBV co-infection is 4%. Our results are relatively low compared to many African studies because some patients are not able to complete the additional tests for regular ART follow-up. Tests for HIV/HBV co-infection are at the expense of the patients. Thome et al (1.2%); Mulisa et al, Bezabih et al, Antoine Jaquet et al Caroline Gahrton et al found higher results [6-10].

This can be explained by the non-completeness of some follow-up examinations due to insufficient technical facilities, shortage of consumables and reagents and sometimes lack of means by patients to pay for certain examinations.

The average CD4 count at initiation of first line treatment was 142 cells/mm^3 and 74.3% of patients had a CD4 count <200 cells/mm^3 in the study by Thome et al. in Cameroon [6]. Muluneh Alene et al. report a CD4 count >100 in 39.56 of patients on second line therapy [9]. Lynne Swarts et al. reported a mean CD4 count of 230 cells/mm^3 in a South African study [13]. A study in Myanmar by Kyaw NTT et al. found that patients with WHO stage 3 and 4 diseases were associated with CD4 counts below 350 cells/mm^3 [15]. Yihun BA, Kibret GD, Leshargie observed a mean CD4 count of 410/mm in 88% of patients [16].

In our study 46.61% had an undetectable viral load Haile and Berha found an undetectable load in 84.2% of paediatric patients [11]; Endalamaw and al. found HIV treatment failure to be high [12]; virological failure is 13% according to Kyaw NTT et al [15]. Virological failure is associated with several factors such as age, gender and low socio-professional status which could be the consequence of a low level of education as reported in several African studies [15, 17-22].

5. Conclusion and Recommendations

This study shows that in PLHIV, the female population (especially housewives) predominates in all the socio-professional categories present. This study show some limitations: first some biological monitoring examination are not completed such as CD4 count and viral load; secondly the TB and hepatitis B were not screened to an important number of patients. The majority of patients are between WHO stages I and II under the TDF-3TC-EFV protocol. The majority of patients are in treatment success. Fewer rate of patients was in viral therapeutic failure. Several factors such as age, gender, low socio-professional status and low level of education are associated. These results identified the limitation in the first line antiretroviral therapy.

In our view, additional studies with greater number of patient are required to illustrate better this results.

Conflicts of Interest

All the authors do not have any possible conflicts of interest.

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