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Prevalence of Virologic Failures in Adult Patients Receiving Are Treatment at Sikasso Hospital

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Abstract

Introduction*The Human Immunodeficiency Virus (HIV) is the etiological agent of Acquired Immunodeficiency Syndrome (AIDS). Virologic failure is defined as the persistence of a viral load greater than or equal to 1000 copies based on 2 consecutive viral loads 3 months apart, after 6 months of well-conducted treatment. The aim of our study was to estimate the prevalence of virological failures in adult patients on ARV treatment at Sikasso Hospital.*

Material and methods: *This was a 12-month prospective descriptive study from January to December 2016 on adult HIV-1 patients on ARVs at least one (1) year of age who had previously had a plasma viral load in the laboratory department of Sikasso hospital. Viral loads were performed by real-time RT-PCR on Abbott M2000rt with a detection limit of 40 copies/mL.*

Results: *We conducted a study on 319 patients, 46.4% of whom were from CERKES, followed by Sikasso Hospital with 33.3%. The prevalence of failure was 27.8% at one year, 19.5% at two years, 12% at three years, and 19.4% at more than three years of antiretroviral treatment. The frequency of undetectable viral load was 57.4% at one year, 74.4% at two years, 84% at three years, and 63% at more than three. Among the patients under Trioday (TDF + 3TC + EFV) the prevalence of virologic failure was 19.5%. In patients taking Duovir-N (AZT + 3TC + NVP) the prevalence of virologic failure was 20.7%. No virological failure has been observed in Tenolam + Kaletra patients (TDF + 3TC + LPV / r). Among patients taking Duovir + Kaletra (AZT + 3TC + LPV / r) the prevalence of virologic failure was 28.7%.*

Conclusion: *The proportion of virological failures decreases with increasing duration of ARV treatment.*

Keywords: Public Health, Infectious Diseases, Epidemiology, Global Public Health

1. Introduction

The human immunodeficiency virus (HIV) is the etiological agent of Acquired Immunodeficiency Syndrome (AIDS). HIV remains a public health problem; the United Nations AIDS Organization (UN AIDS) and the World Health Organization (WHO) indicated in their 2016 annual report that 36.7 million people were living with HIV. worldwide, 17 million people on antiretroviral therapy Sub-Saharan Africa remains the most heavily affected region with 1.4 million people infected, bringing the number of people living with HIV to 26 million. The results of the last seroprevalence study of HIV infection carried out in 2012/2013 in the general population during the Mali Demography and Health Survey (EDSMV, 2012-2013), showed a drop in the prevalence rate. HIV from 1.3% to 1.1%. Mali is a country with a generalized HIV epidemic, low prevalence and a trend towards stabilization.

The harmonization of treatment poses enormous problems, difficulties in accessing qualified laboratories, and the time taken to produce results is too long. The SAMBA initiative of Professor Elène LI University of Cambridge who obtained the inventory of the year prize for a simple machine to be used at the size of a coffee machine, more accessible which allows to obtain the results of viral load in less than 90 minutes appears to be a good alternative used in Kenya, Uganda, and Malawi. Eradicating the virus throughout the body is extremely difficult, remission is possible. On the other hand, eradicating transmission, rapid diagnosis, treatment, immunovirological monitoring implemented during the same trip, plus acceptance of others are aspects that can lead us to an unexpected result while waiting for the arrival of an effective vaccine. Hence the relevance of the UN-AIDS objectives by 2030

• Zero new infections

• Zero AIDS-related deaths
• Zero discrimination

Virological failure is defined by the persistence of a viral load greater than or equal to 1000 copies on the basis of 2 consecutive viral loads 3 months apart, after 6 months of well-conducted treatment. Many virological markers have been proposed to predict the progression of HIV infection but data from several cohort studies have shown that the quantification of plasma viral RNA (viral load) is the most relevant marker. The majority of tests used use real-time PCR techniques with a quantification threshold of 40 copies/ml or 10 copies/ml for ultrasensitive techniques. [1-4].

What is the prevalence of virological failures after one (1) year of antiretroviral treatment in Sikasso? The Sikasso region has only one viral load measuring device, including the Abbott m2000rt. For a region comprising 7 circles and bordering three countries, one of which has a high HIV prevalence, notably Ivory Coast, Burkina Faso, and Guinea Conakry. The Sikasso region brings together "factors" favorable to the spread and potentiation of the impact of the epidemic: extreme poverty, illiteracy particularly among women, significant and growing internal and external migratory flows, practices risky socio-cultural practices such as levirate and sororate, risky practices at gold panning sites. Added to this are the effects of the socio-political crisis, in particular the displacement of populations fleeing the north of the country. [2]. After expanded access to antiretrovirals, it is therefore important to estimate the prevalence of failures in therapeutic protocols, particularly in Sikasso. Hence the interest of this study.

2. Methods and Goals

To assess the prevalence of virological failures among adult patients receiving ARV treatment at Sikasso hospital.

2.1 Objectives Specifies

• Describe the sociodemographic characteristics of patients
• Determine the prevalence of virological failures
• Detect factors associated with virological Failure of patients.

2.2 Patients Et Methods

Our study was carried out in the Laboratory-Blood Bank department of Sikasso hospital. This is a 12-month prospective descriptive study from January to December 2016. All HIV-infected adult patients were included in our study. -1 on ARV for at least one (1) year and previously having a plasma viral load. Viral loads were carried out by real-time RT-PCR on Abbott M2000rt with a detection threshold of 40 copies/ml.

Study parameters
• Age
• Sex

Virological data
• Plasma viral load

Therapeutic data
• Antiretroviral treatment

2.3 Aspect of Ethics

The anonymity and confidentiality of the files were respected.

2.4 Technique Used

Viral load was performed on „"Abbott RealTime HIV-1 Quantitative assay"" with ready-to-use kits for RT-PCR technique.

3. Results

Our study allowed us to include 319 patients whose viral loads were carried out in the Laboratory department of Sikasso hospital. These patients came from CERKES, USAC Koutiala, and the hospital's medicine department. 50.8% of patients were aged between 30 and 44 years. Women were the majority with a sex ratio of 0.54. In the study population, 60% were married followed by singles with 25%. The most represented socio-professional group was housewives with 41.7% followed by traders with 22%. (Table I)

Variables	Effective	Percentage
Age (Year)		
≤ 29	58	18,2
30-44	162	50,8
≥45	99	31
Total	319	100
Profession		
Housewife	133	41,7
Trader	70	22
Chauffeur	39	12,2
Farmer	35	11
Employee	26	8,1
Maneuver	16	5
Total	319	100

Table 1: Sociodemographic Characteristics

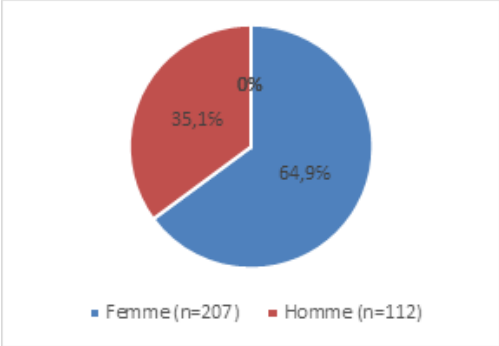

Figure 1: Distribution of Patients According to Gender

Women were the majority with a sex ratio of 0.54. (Figure 1)

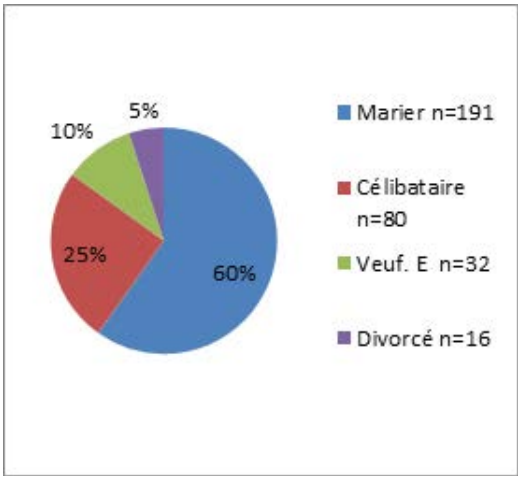

Figure 2: Distribution of Patients According to Marital Status

In the study population, 60% were married followed by singles with 25%. (Figure 2)

Service	Effective	Percentage
CERKES	148	46,4
Hospital of	106	33,3
Sikasso		
USAC	61	19,1
Koutiala		
CS Ref	3	0,9
Sikasso		
CS Ref prayer	1	0,3
Total	319	100

Table 2: Distribution of Patients According to the Requesting Service

The majority of our patients came from CERKES, i.e. 46.4%, followed by Sikasso hospital with 33.3%. (Table II) The pattern comprising 2INTI + 1INNTI was the most observed (94.4%) with 85.3% under Trioday (TDF + 3TC + EFV). The antiretroviral treatment combination containing 2 NRTI + 1 PI accounted for 5.6%. Among first-line patients, 19.6% were in virological failure. Among patients on second line, 11.1% were in virological failure. Among patients taking Trioday, 19.5% experienced virological failure. Among patients on Duovir-N, 20.7% were in virological failure. Under Tenolam + Kaletra no virological failure observed in patients. Among patients on Duovir + Kaletra, 28.7% were in virological failure. (Table III) 70% of patients had an undetectable plasma viral load. 19% of patients were in virological failure. Virological failure was estimated at 27.8% in patients with one (1) year of treatment and 19.5% at two (2) years of antiretroviral treatment. At 3 years the virological failure rate was 12% and 19.4% after three (3) years. (Table IV).

Service	Effective	Percentage
1ere line	**301**	**94,4**
Trioday (TDF + 3TC + EFV)	272	85,3
Duovir-N (AZT + 3TC + NVP)	29	9,1
2eme ligne	**18**	**5,6**
Tenolam + Kaletra (TDF + 3TC + LPV/r)	11	3,4
Duovir + Kaletra (AZT + 3TC + LPV/r)	7	2,2
Total		319

Table 3: Distribution of Plasma Viral Loads According to Antiretroviral Treatment

CV copie/ml	1ere ligne		2eme ligne		Total
	Number	%	Number	%	Number
<40	210	69,8	13	72,2	223
40-999	32	10,6	3	16,7	35
≥1000	59	19,6	2	11,1	61
Total	301	100	18	100	320

Month	Trioday		Duovir-N		Tenolam + Kaletra		Duovir + Kaletra		Total
	(TDF + 3TC + EFV)		(AZT + 3TC + NVP)		(TDF + 3TC + LPV/r)		(AZT + 3TC + LPV/r)		
CV copie/ml	Number	%	Number	%	Number	%	Number	%	Number
<40	192	70,6	18	62	9	81,8	4	57,1	223
40-999	27	9,9	5	17,2	2	18,2	1	14,3	35
≥ 1000	53	19,5	6	20,7	00	00	2	28,7	61
Total	272	100	29	100	11	100	7	100	320
CV copie/ml	Number	%	Number	%	Number	%	Number	%	Number

CVp copies/ml	Effective	Percentage
< 40	223	70
40-999	35	11
≥ 1000	61	19
Total	319	100

Month	12		24		Total		>36		Total
CV copie/ml	Number	%	Number	%	Number	%	Number	%	Number
<40	31	57,4	61	74,4	63	84	68	63	223
40-999	8	14,8	5	6,1	3	4	19	17,6	35
≥ 1000	15	27,8	16	19,5	9	12	21	19,4	61
Total	54	100	82	100	75	100	108	100	320

Table 4: Distribution of Plasma Viral Loads According to the Duration of Antiretroviral Treatment

4. Discussion

4.1 Demographics

Among the 319 patients included in our study 18.2% had an age less than or equal to 29 (≤ 29 years), 50.8% had an age between 30-44, and 31% had an age greater than or equal to 45 years (≥45 years). Women represented 64.9% of our study population. Aliou Baldé's thesis finds a high prevalence of 68% of women in their studies on virological failures of HIV-1 patients at the CEREFO center at point G The most represented socio-professional layer was housewives with 41.7% followed by traders with 22%. In the study population, 60% were married followed by singles with 25% [5-11].

4.2 Antiretroviral Treatment

94.4% of the 319 patients were on the 1st line regimen comprising 2INTI + 1INNTI, notably Trioday (TDF + 3TC + EFV) in the majority with 85.3% followed by Duovir-N (AZT + 3TC + NVP) with 9.1%. 5.6% were on the 2nd

line antiretroviral treatment combination comprising 2 NRTI+1IP, Tenolam + Kaletra (TDF + 3TC + LPV/r) with 3.4% and Duovir + Kaletra (AZT+3TC+LPV/r) with 2.2%. These regimens are in accordance with the new standards and national protocol for antiretroviral treatment of HIV and AIDS in Mali July 2016. The preferential first-line regimen under first line being Trioday (TDF+3TC+EFV) which explains this strong prevalence [12].

4.2 Plasma Viral Load

Among the 319 patients, 70% had an undetectable plasma viral load; 11% had a viral load between 40-999 and 19% were in virological failure. Our prevalence of virological failure was lower than that of Gora et al. found 56.2% undetectability and a virological failure rate of 31.2% in a study in Dakar on the virological effectiveness of antiretroviral treatment by measuring viral load. In Mali, faced with a viral load of between 50 and 1000 copies/ml (Blips* in cases of low viral load), the standards and protocols for antiretroviral treatment of HIV and AIDS July 2016 recommend checking and strengthening compliance, to check the viral load three months later, if the viral load remains below 1000 copies/ml, continue the treatment [13].

4.3 Viral Load And Antiretroviral Treatment

At one year (1 year) of antiretroviral treatment, 57.4% of viral loads were undetectable, 14.8% had a viral load between 40-999, and 27.8% were in virological failure. This result is slightly lower than that of Dagnra et al. In Togo who found 30.8% virological failure in patients after one year of ARV treatment. At two years (2 years) of antiretroviral treatment, 74.4% of viral loads were undetectable, 6.1% had a viral load between 40-999, and 19.5% were in virological failure. Péré et al. found 28.5% virological failure in their study in Bangui in the Central African Republic. Lye et al. found in 197 patients after 24 months of treatment in Dakar, Senegal, 10.25% virological failure, which is much lower than ours. At three years (3 years) of antiretroviral treatment, 84% of viral loads were undetectable, 4% had a viral load between 40-999, and 12% were in virological failure. This result is lower than that of the Baldé Thesis with 33.3% virological failure after three years of antiretroviral treatment. After more than three years (>3 years) of antiretroviral treatment, 63% of viral loads were undetectable, 17.6% had a viral load between 40-999, and 19.4% were in virological failure. This result is lower than that of the Baldé Thesis with 33.3% virological failure after more than three years of antiretroviral treatment. Among first-line patients, 19.6% were in virological failure. The failure rate among second-line patients was 11.1%. Among the 272 patients on Trioday (TDF+3TC+EFV) 19.5% were in virological failure. Among the 29 patients on Duovir-N (AZT+3TC+NVP) 20.7% were in virological failure. Among the 11 patients on Tenolam + Kaletra no virological failure observed. Among the 7 patients on Duovir+Kaletra (AZT+3TC+LPV/r) 28.7% were in virologic failure [11-14].

4.4 What Is Known About the Subject

The human immunodeficiency virus (HIV) is the etiological agent of Acquired Immunodeficiency Syndrome (AIDS). Virological failure is defined by the persistence of a viral load greater than or equal to 1000 copies on the basis of 2 consecutive viral loads 3 months apart, after 6 months of well-conducted treatment [13-16].

4.5 The Question Addressed in This Study

Prevalence of virological failures in adult patients receiving ARV treatment at Sikasso hospital.

E That This Study Brings New

- The prevalence of failures were 27.8% at one year, 19.5% at two years, 12% at three years, and 19.4% at more than three years of antiretroviral treatment.
- The frequency of undetectable viral load was 57.4% at one year, 74.4% at two years, 84% at three years, and 63% at more than three.
- Among patients taking Trioday (TDF+3TC+EFV) the prevalence of virological failure was 19.5%. In patients taking Duovir-N (AZT+3TC+NVP) the prevalence of virological failure was 20.7%. No virological failure was observed in patients receiving Tenolam + Kaletra (TDF+3TC+LPV/r). Among patients on Duovir + Kaletra (AZT+3TC+LPV/r) the prevalence of virological failure was 28.7%.
- The proportion of virological failures decreases with the increase in the duration of antiretroviral treatment, in other words the proportion of undetectable viral load incérasses with the duration of ARV trématent.

4.6 Implications for Practice, Policy or Future Research

UNAIDS goals by 2030:
- Zero new infections
- Zero AIDS-related deaths
- Zero discrimination

5. Conclusion

We conducted a study on 319 patients infected with HIV-1 who requested a plasma viral load test after at least one year of treatment and regardless of the treatment regimen (1st line or 2nd line). These patients mainly came from five sites in the Sikasso region (CERKES, Sikasso hospital, USAC Koutiala, CS ref of Sikasso, and CS ref of Kigan). The prevalence of failures was 27.8% at one year, 19.5% at two years, 12% at three years, and 19.4% at more than three years of antiretroviral treatment. The frequency of undetectable viral load was 57.4% at one year, 74.4% at two years, 84% at three years, and 63% at more than three. Among patients on Trioday (TDF + 3TC + EFV) the prevalence of virological failure was 19.5%. In patients taking Duovir-N (AZT + 3TC + NVP) the prevalence of virological failure was 20.7%. No virological failure was observed in patients receiving Tenolam+Kaletra (TDF+3TC+LPV/r). Among patients on Duovir+Kaletra (AZT+3TC+LPV/r) the prevalence of virological failure was 28.7%. The proportion of virological failures decreases with the increase in the duration of antiretroviral treatment, in other words the frequency of undetectable viral load increases with the duration of ARV treatment.

Recommendations

To clinicians

Organize better patient management in terms of biological monitoring.

At the Ministry of Health

• Maker the mans available (human, material and financial resources) for the continuity and popularization of viral load tests and also resistance genotype tests

• Facilitate access to viral load tests for patients on inclusion and under antiretroviral treatment as is done in developed countries to prevent virological failures.

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