

Virological Therapeutic Failure and Associated Factors in People Living with HIV Followed up at the Regional Hospital and University of Borgou (RHU-B) in 2019

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Abstract

Introduction: Antiretroviral treatment has made a considerable reduction in morbidity and mortality in HIV patients, but its effectiveness is compromised by the emergence of cardiovascular and metabolic diseases and also treatment failure. The goal is to study Virological therapeutic failure and the factors associated with HIV patients followed at RUH-B. **Methods:** This was a cross-sectional, descriptive and analytical study covering the period from 21st July to 21st September 2019. The study enrolled patients 18 years old and above, on antiretroviral treatment for at least 6 months. For the survey, a questionnaire and review of the medical records were used. The variable studied was virological treatment failure. Data analysis was performed using EPI-INFO version 7 and STATA 11 software. The significance level was 5%. **Results:** A total of 498 patients were included in the study. The mean age was 40 ± 9.90 years. The sex ratio was 0.3. The frequency of treatment failure was 15.3%. The factors associated with the occurrence of treatment failure were: phytotherapy, occurrence of opportunistic infections during follow-up, poor compliance with antiretrovirals, lack of weight gain and anemia during follow-up. **Conclusion:** This study had shown that treatment failure was frequent in patients. The systematic investigation for failure should be done in all people living with HIV patients on antiretrovirals.

Keywords

Virological Therapeutic Failure, Antiretroviral, Associated Factors, HIV, Parakou, Benin

1. Introduction

Antiretroviral treatment aims to make the viral load undetectable and restore immunity, which increases life expectancy, improves quality of life and reduces the risk of HIV transmission [1]. It is a lifelong treatment due to the chronicity of the HIV infection. New concerns related to this chronicity are emerging, in particular the emergence of cardiovascular and metabolic diseases but also therapeutic failure (TF) which compromises treatment efficacy, especially in the context of countries with limited resources [2]. There are many causes of TF. Among these, we can distinguish patient-related causes such as difficulties in compliance, inappropriate use of treatment, non-compliance with mealtimes, insufficient intake, absorption disorders [3] [4]; those related to the virus such as infection with a resistant strain, the occurrence of resistant virus and those related to the treatment such as drug interactions, insufficient dosages and inter-individual variability [5]. Early detection of cases and their management reduce the probability of progression of the infection and a better quality of life for HIV-infected subjects [6]. The care of people living with HIV (PLHIV) began several years ago in Benin with the existence of decentralized centers within the country. Despite the efforts made, health workers are increasingly confronted with the frequency of opportunistic infections within the population of PLHIV while they are on antiretrovirals testifying to a TF. This is a question widely studied in Africa but few studies were done on it in Benin with a quasi non-existent study in the northern part. In the Democratic Republic [7] of Congo and in Ethiopia [8] respectively 27.2% and 13.52% of PLHIV had treatment failure. The present study was initiated to identify the extent of TF as well as the associated factors for better management of patients living with HIV patient.

2. Study Site and Methods

Study sit: the study took place in the Internal Medicine department of the Regional Hospital and University of Parakou.

Type and period of study: this was a cross-sectional, descriptive and analytical study covering the period from July 21, 2019 to September 21, 2019.

Study population: all people living with HIV followed in the Internal Medicine department in 2019. All patients of both sexes, aged at least 18 years old, on antiretrovirals for at least 6 months who have given their consent were included in the study. Patients with a previous TF, transferred, lost to follow-up and unable to answer the questions were not included in the study.

Variables: the dependent variable studied was the virological TF which appeared during follow-up. Virological failure was defined as a viral load ≥ 1000 copies/mL after 6 months of treatment with or without clinical manifestations. The independent variables concerned sociodemographic data, lifestyle, clinic, biology, treatment and evolution.

Technique and data collection tool: data collection was done by using the consultation register, face-to-face interview, clinical and anthropometric exami-

nation. A data collection sheet and other appropriate tools were used.

Data processing and analysis: The data had been entered using the EPIDATA version 3.1 software after verification of each sheet, they had been analyzed using the EPIINFO version 7 and STATA 11 software. A *p* value less than 0.05 was considered significant.

Ethical aspects: data confidentiality was respected during the survey. After explaining to the patients the purpose of the work, they were free to participate or not to participate in the survey and that once accepted, they were entitled to withdraw afterwards. Anonymity was required on the survey sheets.

3. Results

A total of 498 PLHIV were included in the study, among them, 379 were female, *i.e.* a sex ratio of 0.3. The average age of PLHIV was 40 ± 9.90 years with extremes of 20 years and 72 years. The age group of 30 to 40 years represented 38.7% of the population. Regarding lifestyle, 23 (4.6%) smoked tobacco; 179 (33.9%) patients took alcoholic beverages; 1 (0.2%) used injection drugs; 158 (31.7%) practiced phytotherapy and 10 (2%) were sedentary. The serological status of the partner was unknown in 240 (48.2%) patients and 392 (78.7%) patients had shared their HIV serological status. During follow-up, 90 (18.1%) patients had at least one opportunistic infection; 373 (74.9%) had gained weight and 50 (10%) were malnourished. Compliance with ARV treatment was good in 378 (75.9%) patients. That CTM prophylaxis was good in 374 (75.1%) patients. TF was effective in 76 patients, *i.e.* a frequency of 15.3% (**Table 1**).

Table 1. General characteristics of the study population of PLHIV followed in the Internal Medicine department of RHU-B in 2019 (n = 498).

	n	%
Women	379	79.11
≤40 years old	287	57.7
Tobacco consumption	23	4.6
Alcohol consumption	179	33.9
Phytotherapy	158	31.7
Sedentary lifestyle	10	2
Positif serological status of the partner	118	23.7
Sharing HIV status	392	78.7
Number of tablets per day ≤ 2	196	39.4
Good adherence to antiretrovirals	378	75.9
Good adherence to cotrimoxazole	374	75.1
Presence of opportunistic infections	90	18.1
Weight gain	37	74.9
Undernutrition	50	10
Anemia	110	22.1
Elevated serum creatinine	34	6.5
TF	76	15.3

The factors associated with TF in bivariate analysis were: phytotherapy (21.5% vs 12.3%), more than 2 tablets per day (29.4% vs 9.4%), poor compliance with ARVs (41.7% vs 6.9%) and cotrimoxazole (40.3% vs 6.9%), the presence of opportunistic infections (36.7% vs 10.5%), the absence of weight gain (26.4% vs 11.5%), undernutrition (28% vs 13.8%) and anemia (19.5% vs 11.6%) (**Table 2**).

In multivariate analysis, poor compliance with ARVs (OR: 7.25), the presence of opportunistic infections (OR: 2.17), phytotherapy (OR: 1.9), lack of weight gain (OR: 1.6) and anemia (OR: 2.3) are associated with TF (**Table 3**).

Table 2. Factors associated with TF in bivariate analysis in PLHIV followed in the internal medicine department of RHU-B in 2019.

	Virological TF (%)	OR	CI _{95%}	P
Absence of phytotherapy	12.3	1		0.009
Presence of Phytotherapy	21.5	1.9	[1.2 - 3.2]	
Absence of anemia	11.6	1		0.014
Presence of Anemia	19.5	1.8	[1.1 - 3]	
Number of tablets per day ≤ 2	9.4	0.2	[0.1 - 0.5]	<0.001
Number of tablets per day > 2	29.4	1		
Good adherence to antiretrovirals	6.9	1		<0.001
Poor adherence to antiretrovirals	41.7	9.7	[5.6 - 16]	
Good adherence to cotrimoxazole	6.9	1		<0.001
Poor adherence to cotrimoxazole	40.3	9	[5.3 - 15]	
Absence of opportunistic infections	10.5	1		<0.001
Presence of opportunistic infections	36.7	4.9	[2.8 - 8.3]	
No weight gain	26.4	1.6		<0.001
Weight gain	11.5	1	[0.2 - 0.6]	
Undernutrition	28	2.4	[1.2 - 4.7]	0.010
No undernutrition	13.8	1		

Table 3. Factors associated with TF in multivariate analysis in PLHIV followed in the internal medicine department of RHU-B in 2019.

	Virological TF (%)	OR	CI _{95%}	P
Adherence to antiretrovirals				
Good	6.9	1		<0.001
Poor	41.7	7.25	[4 - 13.1]	
Anemia				
No	11.6	1		0.009
Yes	19.5	2.3	[1.2 - 4.2]	
Presence of opportunistic infections				
No	10.5	1		0.016
Yes	36.7	2.17	[1.1 - 4.1]	

Continued

Phytotherapy				
No	12.3	1		0.033
Yes	21.5	1.9	[1.1 - 3.4]	
Weight gain				
No	26.4	1		0.005
Yes	11.5	0.4	[0.2 - 8]	

4. Discussion

The present study was interested in TF in PLHIV followed up in the Internal Medicine department in Parakou. TF had been assessed by virological failure in accordance with current recommendations.

The study population consisted mainly of women. This female predominance could be explained by the fact that HIV screening is systematic in pregnant women. In the study by Buju *et al.* [7] in the Democratic Republic of Congo and that of Kebede *et al.* [8] in Ethiopia, respectively 70% and 53.38% of the subjects were female. The average age of the patients was 40 ± 9.90 years. It was a relatively young population. Our results were the same as those reported by Ba *et al.* [9] in Senegal where the average age was 44 ± 11 years.

The frequency of TF in this study was 15.3%. Our result was similar to Shad *et al.* [10] in the Democratic Republic of Congo with a TF frequency of 19%. In the study by Azamar-Alonso *et al.* [6] in Mexico a higher frequency of TF had been reported (41%) while Ly *et al.* [11] in Mauritania reported a lower frequency (9%). This frequency of TF was not negligible given the limited effective therapeutic possibilities for HIV; hence the need to take an interest in the associated factors.

In multivariate analysis, poor adherence to ARVs, presence of opportunistic infections, phytotherapy, lack of weight gain and anemia were associated with TF. Several studies have got similar results. This was the case for the studies by Amagnu *et al.* [12] in Ethiopia, Jones *et al.* [13] in Zambia, Sithole *et al.* [14] in Zimbabwe and Ortiz *et al.* [15] in Guatemala where poor adherence to ARVs was associated with treatment failure. Decreased immunity promotes infections in PLHIV. This explains the frequency of opportunistic infections in HIV-infected subjects on ARVs in TF. In the studies by Buju *et al.* [7] and Ba *et al.* [9], subjects classified at WHO stage 3 or 4 were more at risk of developing TF. The practice of herbal medicine could lead to drug interactions with ARVs. Also, patients could abandon antiretroviral treatment in order to get traditional medicine. Lack of weight gain during follow-up was significantly associated with TF in our study. Melsew *et al.* [16] in Ethiopia had made the same observation. In the study by Amagnu *et al.* [12], the presence of anemia in PLHIV was associated with TF.

We could not document the mutations of resistance associated with therapeu-

tic failures. This is a limitation in our study and can be explained by the limited accessibility to these tests in RHU-B. Thus, it would be relevant to conduct epidemiological surveillance of resistance by performing genotyping tests to justify the choice of effective molecules for the treatment of HIV infection.

5. Conclusion

TF to antiretrovirals was a reality despite the advantages of antiretroviral treatment. It was frequent in patients in the active file of the Internal Medicine department of RHU-B despite regular follow-up. The systematic investigation for failure must be made in all people living with HIV on antiretrovirals, especially those who present during their follow-up with anemia, opportunistic infections or lack of weight gain. Good compliance with antiretroviral treatment and avoidance of phytotherapy will prevent treatment failure.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix: Questionnaire

- 1) Age (years)
- 2) Sex
- 3) Nutritional status
 - Weight (kgs)
 - Weight gain Yes No
 - Size (m)
 - Mass index (kg/m²)
- 4) Way of life
 - Alcohol consumption Yes No
 - Tobacco consumption Yes No
 - Phytotherapy Yes No
 - Sedentary lifestyle Yes No
- 5) HIV and Antiretroviral therapy
 - Sharing HIV status Yes No
 - Serological status of the partner Positive Negative
 - Good Adherence to antiretrovirals Yes No
 - Good Adherence to cotrimoxazole Yes No
 - Number of tablets per day
 - Presence of opportunistic infections
- 6) Psychological status
 - Anxiety Yes No
 - Depression Yes No
- 7) Biological data
 - Anemia Yes No
 - Elevated serum creatinine Yes No
 - Viral load