



FACTORS RELATED TO NON-COMPLIANCE WITH ANTIRETROVIRAL TREATMENT IN THE CITY OF GOMA

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ABSTRACT

Introduction: For the effectiveness of antiretroviral therapy, it is necessary to avoid adherence in patients on treatment. The Democratic Republic of Congo has little information on non adherence antiretroviral treatment and its predictors. We conducted this study to examine levels of non-compliance and explore associated factors among PLHIV receiving antiretroviral therapy in Goma.

Methods: In an analytical study, 264 HIV positive patients receiving first-line antiretroviral therapy were interviewed by HIV services in the city of Goma, using a semi-structural questionnaire.

Results: The prevalence of adherence was observed in 111 patients out of 153 PLHIV on ART, i.e, 72.5% of cases. Non-observers were recorded in 27.5% of cases.

The most common reasons for not taking antiretrovirals on schedule were: forgetting (80%), busy schedule (19%), and severity of illness (11%).

In relation to the socio-economic characteristics of the different predictors:

In multivariate analysis by binary logistic regression, non-compliance is significantly associated with the notion of miraculous healing belief (p-value = 0.001), with stigma on drug withdrawal (p-value = 0.000) and with cost. displacement (p-value = 0.007).

With respect to the clinical characteristics of the different predictors. In multivariate analysis by binary logistic regression, non-compliance was significantly associated with side effects with an OR: 0.630; 95% CI 1.050 - 2.594 and CD4 count at the start of treatment with OR: 1.198; 95% CI 1.029 - 2.370.

Conclusion: In the light of these results, the following conclusions can be drawn: the prevalence of non-compliance to ART is still high in Goma. Belief in the notion of a miraculous cure, in the stigma at drug withdrawal, the cost of travel, the presence of side effects of ARVs and the CD4 count at the start of treatment have been identified as determinants of non-adherence to ART in Goma.

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INTRODUCTION

Adherence to antiretroviral therapy (ART) should be understood as compliance by the patient with the drug prescription, the degree of agreement between the doctor's recommendations and the patient's behavior [1, 4]. Most studies on antiretroviral therapy have shown that 40 to 60% of patients have an adherence level below 90% [5, 11]. However, the effectiveness of treatment requires a compliance rate greater than or equal to 95% [5, 7, 8]. There are no data on patient compliance in hospitals of the Gomacity since free antiretrovirals (ARVs).

With an estimated seroprevalence of 1.1% among the adult population [12], the Congolese government has made the fight against AIDS one of the priority axes of its development policy. The national response to date has consisted of a range of interventions ranging from prevention to free ART.

The city of Goma has 12 HIV care services. Screening, prevention and care activities are integrated into the various care services in the city. First-line multi-therapies (2 NRTI + 1INI) are available in all these services. All patients are called upon to attend appointments to renew their drug stocks. The renewal of ARVs is done or less once every three months at health care providers authorized to prescribe antiretrovirals

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(ARVs). Psychosocial support is provided mainly by nurses trained according to the recommendations of the national policy.

In this work, we propose to study the factors associated with non-adherence to antiretroviral therapy among PLHIV on ARVs in the city of Goma.

More specifically, for us, it is a question of: determining the characteristics of patients put on ARVs in the city of Goma; determine the proportion of patients not observing antiretroviral treatment in the city; identify risk factors associated with non-adherence to antiretroviral therapy in the city.

MATERIALS AND METHODS

Study population

This study was carried out in health facilities for the treatment of HIV infection by antiretrovirals in the Health Zones of Goma and that of Karisimbi in the city of Goma. We used a sample of 316 patients living with HIV on ARVs (TDF / 3TC / DTG) who were followed in the care services in the city of Goma.

Type and period of study

This is a cross-sectional study with an analytical aim. The sampling was exhaustive, because it was not possible to know in advance the number of patients on antiretroviral therapy in the ARV treatment facilities in Goma. We therefore opted for a comprehensive recruitment of all patients on treatment, completing our inclusion criteria.

To carry out this study we worked with patients aged at least 15 years on antiretroviral therapy who started treatment at least 3 months before the study period. These patients were able to give their informed consent before participating in this study. Patients less than 15 years old were excluded from the study.

To achieve our objectives, a multi-site analytical study was carried out in our environment over a period of 12 months.

Patients were invited and asked to participate in the study without any incentive. Eligible patients who were able to give informed consent were informed in advance of the study's purpose, objectives and methodology. Then they were interviewed by trained investigators in a private location. Each patient was interviewed for 15 to 20 minutes. The file number of each participant was recorded to avoid any repetition of the interview. To avoid information bias, information was obtained only from respondents, and not from health services.

The questionnaire used in this study has been adapted from previous studies, with slight modifications, to match the DRC standard. The questionnaire was translated into Swahili (main language spoken in Goma) and checked by a second translator. It consisted of questions relating to socio-demographic information related to adherence to antiretroviral therapy and questions related to patient baseline characteristics and socio-economic conditions. In addition, patients' medical records were used to collect information on CD4 counts and the types of antiretroviral drugs prescribed to them.

The explanatory variables were classified as follows: age (continuous variable), sex (male / female), level of education (illiterate, primary / secondary and university), profession

(bureaucrat / free profession) and marital status (single / married / widowed), alcohol consumption in the past month (yes / no), recall method used to take the tablets (yes / no). Clinical and laboratory characteristics included last available CD4 cell count, duration of antiretroviral therapy (continuous variable), adverse reactions (yes / no).

The primary outcome variable for this analysis was measured by asking patients to remember their prescribed doses taken during the seven days prior to the interview. In an attempt to minimize recall bias, patients were asked about their compliance during the previous day, the previous 3 days and the previous week. Self-reported adherence to all antiretroviral drugs was calculated as the ratio of doses taken during a given time period to the total number of ART doses prescribed or planned for the same time period.

The results were expressed in percentage. Patients who reported absorbing 95% to 100% of the prescribed combination therapy within the previous were considered to be adherent to antiretroviral therapy. Likewise, patients who reported taking less than 95% of the prescribed tablets were considered non-compliant.

First, the association was measured for each explanatory variable in a uni-varied model. Differences between subject compliance and non-compliance were tested using the Student's t test and chi-square test for continuous and categorical analyzes. Then each univariate model was realized by including all the variables in a model.

The strength of the association between explanatory variables and adherence was measured by using logistic regression and was reported as an odds ratio (OR) with a 95% confidence interval. The criterion for statistical significance was $p < 0.05$.

RESULTS

Gross Observance Prevalance

The prevalence of adherence was observed in 111 patients out of 153 PLHIV on ART, ie 72.5% of cases. Non-observers were recorded in 27.5% of cases.

Table 1 Sociodemographic characteristics in relation to ART adherence rates

Sociodemographic characteristics	Observing	%	Not observing	%	P
Gender					0,889
Male	78	72,2	30	27,8	
Female	33	73,3	12	26,7	
Age					0,006
18 à 24 (ans)	16	80	4	20	
25 à 34	35	89,7	4	10,3	
35 à 49	60	65,3	32	34,7	
50 et plus	0	0	2	100	
Religion					0
Catholic	51	86,4	8	13,6	
Protestant	27	100	0	0	
Muslim	21	100	0	0	
Evangelical church	4	13,3	26	86,7	
Adventist	4	33,3	8	66,7	
Jehovah's Witness	4	100	0	0	
Civil status					0,003
Single	20	76,9	6	23,1	
Married	52	83,9	10	13,1	
Divorced	6	100	0	0	
Widowed	33	55,9	26	44,1	
Occupation					0,662
Unemployed	32	80	8	20	

Farmer	11	100	0	0
Housewife	15	65,2	8	34,8
Retailer	18	40,9	26	52,1
Bureaucrat	35	100	0	0
Education level				0,057
Primary	28	50	28	50
Secondary	62	93,2	4	6,1
University	9	69,2	4	30,8
Illiterate	12	66,7	6	33,3

Analysis of the results reported in Table 1 shows that adherence rates greater than or equal to 95% were observed in the following socio-demographic groups: Protestants, Muslims, Jehovah's Witnesses, Divorced, Farmers and bureaucrats. Non-observance was more marked in the age group of 50 and over with 100%, for the categories of religious beliefs, it is therefore more marked among evangelical believers with 86.7%.

Reasons for Non-Compliance

Table 2 Reasons for non-compliance with the treatment dose

Reasons for non-compliance with dose	Frequency	Percentage
Forgetting	34	80
Days too busy	8	19
Too sick to take medication	5	11
Outside the house	2	4,70
Toxicity / side effect	2	4,7
To hide the status	2	4,7
Medication loss	1	2,3

According to Table 2, the most common reasons given for not taking antiretrovirals on schedule were forgetting (80%), busy schedule (19%) and severity of illness (11%).

Socioeconomic Characteristics and Observance Rates

Table 3 Socio-economic characteristics in relation to ART adherence rates

Parameters	Observing	%	Not observing	%	P
Travel cost					0,739
500 FC	33	89,2	4	10,8	
500 à 1000 FC	24	50	24	50	
Feet	54	79,4	14	20,6	
Alcohol use					0,012
Yes	60	65,2	32	34,8	
No	51	83,6	10	23,8	
Hope for miraculous healing					0
Yes	34	51,1	30	48,9	
No	77	86,5	12	13,5	
Stigma on drug withdrawal					0
Yes	12	26,1	34	83,9	
No	99	92,5	8	7,5	
Family stigma					0,262
Yes	20	64,5	11	35,5	
No	91	75,6	31	24,4	

According to the results of Table 3, adherence to ARV treatment was lower in patients who based their belief in a miraculous cure for HIV / AIDS and those who complained of stigma when withdrawing medication (p 0.05) . The 83.9% of patients agreed that stigma when withdrawing medication was a real limit for adherence to treatment. Alcoholism was also found to be more common in non-observant PLHIV (0.05).

Clinical Features and Compliance Rates

Table 4 Distribution of patient clinical profiles in relation to ART adherence rates

	compliance	%	Non-compliance	%	p-value
Duration of treatment					0
to 24 Months	14	28	36	72	
at 24 Months	97	94,2	6	5,8	

Side effects					
Yes	58	64,4	32	35,6	0,007
No	53	84,1	10	15,9	
Recall Method					
Yes	99	89,2	12	10,8	0
No	12	28,6	30	71,4	
CD4 start of treatment					
200 to 350	32	28,5	34	51,5	0
Over 350	79	92,9	6	7,1	
More than 350	0	0	2	100	
Compliance with CD4 control appointments					0
Yes	88	89,8	10	10,2	
No	23	41,8	32	58,2	

Clinically, non-compliance was more common in patients who took ART for 24 months or more, those who had side effects, those who recognized that they were not used to the ART method. reminder to take medication, and those who had a CD4 count between 200 and 350 years (0.05).

Multivariate Analysis of Study Variables

Faced with the different variables studied above, we found it useful to make them dichotomous in order to properly determine the risk factors for non-compliance with ARV treatment in our environment.

Multivarial Analysis of Sociodemographic and Economic Characteristics By Observance Rate

Table 5 Distribution of patients according to their socio-demographic and economic characteristics in relation to ART adherence rates

Variables	OR	CI to 95%	P-value
Patient sex	0,185	0,031 to 1,090	0,062
Alcohol use	0,462	0,090 to 2,365	0,354
Notion of miraculous healing	0,045	0,007 to 0,273	0,001
Stigma on drug withdrawal	0,031	0,007 to 0,143	0
Family stigma	0,361	0,094 to 1,395	0,14
Travel cost	10,813	1,938 to 60,319	0,007

Table 5 presents the raw odds ratios of non-compliance by different predictors. In multivariate analysis by binary logistic regression, non-compliance is significantly associated with the notion of miraculous recovery (p-value = 0.001), stigma on withdrawal of drugs (p-value = 0.000) and the cost of displacement (p-value = 0.007).

Patient gender, alcohol use, and family stigma did not show a significant association with ART adherence.

Multivarial Analysis of Clinical Characteristics by Observance Rate

Table 6 Distribution of clinical characteristics of patients in relation to ART adherence rates

Variables	OR	CI to 95%	P-value
Duration of treatment	1,32	0,954 to 2,124	0,995
Side effect	0,630	1,050 to 2,594	0,031
Recall method	44,906	0,986 to 88,354	0,996
Sharing of serological status	74,402	0,785 to 145,401	0,994
Compliance with CD4 control appointment	4,671	1,001 to 21,793	0,049
CD4 count at start of treatment	1,198	1,029 to 2,370	0,01

Table 6 presents the odds ratios of non-compliance with respect to the clinical characteristics of the different predictors. In multivariate analysis by binary logistic regression, non-

compliance was significantly associated with side effects with an OR: 0.630; 95% CI 1.050 - 2.594 and CD4 count at the start of treatment with OR: 1.198; 95% CI 1.029 - 2.370.

DISCUSSION

Crude prevalence of adherence and reasons for not taking medication

Due to the variation in the methods of measuring compliance, it is difficult to compare the results of different studies. However, the literature indicates that developing countries such as Uganda, Kenya, Nepal and India have had better compliance rates (82% to 89%) [13, 14-18] than the United States. (50%), France (29%) and Brazil (63.1%) [2]. In the context of these countries, the predictive role of the socioeconomic component on non-compliance is diminished by community assistance and assistance from associations. This is not the case in our study environment where the prevalence of adherence was observed in 111 patients out of 153 PLHIV on ART, or 72.5% of cases. Non-observers were recorded in 27.5% of cases.

Our study was carried out in the city of Goma, which is located in eastern DRC; Goma is a border town of Rwanda which opens up to the countries of eastern DRC. The very high unemployment rate pushes the majority of the adult population to make short trips for activities in the form of small cross-border trading. This situation promotes social instability in the patient population and sometimes meeting appointments becomes more difficult to observe.

Regarding the reasons for not taking medication, the main reasons given for non-compliance were forgetting and overloading with daily activities or occupations. This finding has also been made in other studies carried out in poor countries in Africa and Asia [13-18]. Indeed, the main characteristics of the typical patients in our series (man, adult, thatched) can favor the multiplicity of different daily activities, activity aimed at meeting their own needs and those of their families. In this situation, forgetting or neglecting to take medication may be the consequence of these multiple activities. Another aspect is that the services which deal with the management of the disease are less organized with the absence of a specialized team (psychologists, social workers for home visits without forgetting the computerized tools for traceability and patient appointments) [19].

However, the results of our study are unique because, according to our knowledge, this is the first study to assess factors associated with nonadherence to antiretroviral therapy in HIV patients in the context of the Gomacity.

Risk factor for non-compliance

This study made it possible to highlight specific determinants of non-compliance in a context of free healthcare and geographical proximity to the health center in a country in sub-Saharan Africa. A second peculiarity is the context of an unstable region in terms of security with a health system that is less inadequate for proper monitoring of chronic patients. The dichotomization of the variables studied allowed us to clearly determine the risk factors for non-compliance with ARV treatment in our environment.

On the socio-demographic and economic level in multivariate analysis by binary logistic regression, non-compliance is significantly associated with the notion of miraculous recovery (p-value = 0.001), with stigma upon withdrawal of drugs (p-value = 0.000) and the travel cost (p-value = 0.007). Patient gender, alcohol use, and family stigma did not show a significant association with ART adherence.

Belief in miraculous healing is a common situation in our community where atheism has no place in society. But poor counseling when the diagnosis is announced by an untrained or rushed provider has an impact on the patient's follow-up to long-term treatment. Some patients develop an obsession with a miraculous cure while forgetting the chronic nature of HIV infection [9, 10, 11].

Patient stigma is an important factor influencing nonadherence to ART [16-18]. In the literature, it has been categorized as stigma by family or / and by society [13-18]. But the peculiarity of our study is the self-stigmatization during the withdrawal of drugs that was identified as a risk factor, 81% of patients who recognized that this psychological constraint during the withdrawal of drugs constitutes a limit for adherence to treatment.

The cost of travel to reach the consultation site has also been recognized as a determining factor in Nigeria by Oku *et al* [22]. The Congolese population on ARVs in this series having low income and financial constraints, has difficulty paying for transport to reach the place of consultation and this6. Conflicts of interest and Contributions by authors

The authors declare no conflicts of interest and all contributed to the writing of this manuscript and read and approved the final version.

Study Limit

This study has limitations. First, the transversal nature of the study masks the dynamism of compliance over time. Second, biological methods such as viral load measurement or anti-protease assay would have guaranteed the validity of our questionnaire.

Conflicts of Interest and Contributions By Authors

The authors declare no conflicts of interest and all contributed to the writing of this manuscript and read and approved the final version.

CONCLUSION

The prevalence of adherence observed in this study seems to be encouraging. The finding suggests that nonadherence is significantly associated with the notion of belief in a miraculous cure from HIV infection, the stigma of withdrawing medication, and the cost of travel to the point of care. Clinically, particular importance should be attached to the presence of side effects as well as the CD4 count at the start of treatment. . In our context, particular attention must be paid to this category of patients in order to reduce the rate of non-compliance in the city of Goma.

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