

Evaluation of Adherence to Anti-Retroviral Treatment: Experience of SANRU, DRC

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Abstract: Access to antiretroviral treatment (ART) has substantially increased in the Democratic Republic of Congo (DRC) over the past 5 years. Santé Rural (SANRU), a non-governmental organization established by l'Eglise de Christ du Congo (Christ's Church of the Congo) in the 1980s to improve rural health in the DRC, is one of the principal recipients of Global fund in DRC with around 40000 people living with HIV/AIDS (PLWHIV) receiving ART in 129 health zones in the country. The continuous success of ART critically depends on sustained ART adherence. The objective of this study was to identify the determinants of adherence among PLWHIV in SANRU managed health zones in the Democratic Republic of Congo. Two thousand five hundred eighty-six PLWHIV's files were extracted. Eighty-two percent (82%) were adherent to ART, while 85.5% were alive after 12 months on anti-retroviral treatment, 5.2% were lost from follow-up and 2.2% were transferred. The average age was 37 years, and predominantly women formed 65.5% of the sample. The median distance between facilities and patient's habitat was 5 kms. Close to three-fifth of the PLWHIV were living in urban settings (64.4%). Among 2586 patient's files retrieved, 2495 (96, 5%) were followed up in facilities with at least an HIV-care trained physician and nurses, 1566 (60.6%) were followed up in facilities with at least one HIV care trained pharmacist; 1645 (63.6%) among the PLWHIV did not report ART stock run-outs. These findings highlight the relevance of healthcare providers' training on HIV to improve HIV patient outcomes.

Keywords: ART, PLWHIV, Adherence, Evaluation

1. Introduction

HIV infection is still spreading on a global scale [1]. As a consequence of this expansion, there has been a worldwide significant increase in the number of PLWHIV receiving ART [2, 3]. As anti-retroviral treatment becomes more readily available, the next major challenge for HIV Control programs and the public sector health care practitioners will be to deliver high quality care to the patients [4].

Achieving optimal therapeutic outcomes, such as reduced viral load, reduction of drug resistance, and improved survival, require strict adherence to ART regimens [4-8].

Adherence is defined as taking medications or interventions correctly according to prescription [5]. The importance of adherence to ART has increased as HIV has become a chronic illness and treatment of HIV requires life-long therapy once initiated. Although adherence is not the only determinant of treatment success, non-adherence is the most critical and one of the modifiable risk factors leading to a chain of negative clinical outcomes, and resulting in both personal and public-health implications [9]. In the United States of America, a study on adherence to ART found that the mean adherence to recommended ART regimens was 91.5% [10]. In another study conducted in California, USA,

authors reported that a greater percentage of pilot than non-pilot pharmacy patients were adherent to their ART medication regimens (69.4% vs. 47.3%, respectively, $P < 0.001$ [4].

Protopopescu and colleagues in Paris, France reported that non-adherence was independently associated with drug side effects, having a three times or more daily dosing regimen, experience of being at World Health Organization clinical stage 3/4, and being diagnosed as HIV-positive for <6 months[11]. In the study by Hirsch *et al* [4], non-adherence was more likely among patients who were younger, had children, were born in the European Union, had depressive symptoms, consumed alcohol daily and declared a lack of support from their main partner. The meta-analysis by Mills and colleagues in sub-Saharan Africa and North America pooled an estimated adherence by sub-Saharan Africa patients of 77%, whereas for North American patients, it was 55% [12].

There are different methods to assess medication adherence and the level of adherence is specific not only to places and patient groups but also to the method of adherence measurement used [13]. Challenges to ART adherence include factors related to patients and their families, socioeconomic factors, medication, and the healthcare systems[14]. African health-care systems are facing exploding demands for HIV care [15] that make high levels of adherence to ART central to HIV management [16] and the issue of adherence to therapy imperatives [17]. Studies conducted in sub-Saharan Africa have identified the rates of adherence and factors that challenge the ability of individuals to adhere to ART [16, 18].

A meta-analysis on self-reported adherence to antiretroviral therapy in sub-Saharan Africa revealed that adherence rates to ART ranged from a minimum of 30% to a maximum of 100% [19]. Non-adherence to ART is a significant hindrance to the success of any HIV/AIDS treatment program [20]. Results from a South African study suggests that structural barriers to medication-taking has the greatest impact on adherence [OR: 2.32, 95% (CI: 1.73 to 3.12), followed by structural barriers to clinic attendance (OR: 2.06, 95% CI: 1.58 to 2.69] and behavior skill deficits (OR: 1.34, 95% CI: 1.05 to 1.71) [21]. Individual-level barriers to dose adherence and clinic attendance have been found to include forgetfulness, fear of disclosure, the experience and fear of side effects, travel/migration, use of traditional medicine, alcohol use, feeling hopeless or depressed and feeling better on Treatment [22].

Very few studies have reported ART adherence and its determinants in the DRC. Ditekemena *et al* in their study, reported an overall adherence rates of 88% at 6 months, 85% at one year, 79% at two years and 74% at 3 years [23]. Kitetele *et al*, highlight the need of psychosocial support structures for children and caregivers which should be placed at facilities treating children with HIV and providing ART [24].

In the DRC, the HIV / AIDS program led by SANRU covers 129 Health Zones in five provinces (Bas Congo, Bandundu, Katanga, Kasai Occidental and Kasai Oriental).

This study sought to identify adherence and its determinants in SANRU managed PLWHIV in these provinces, to determine the effectiveness of its HIV/AIDS program.

2. Methods

2.1. Design and Setting

We conducted a cross sectional study in 41 health Zones supported by Global Fund in five provinces in the DR Congo namely Bandundu, Bas Congo, Kasai-Occidental, Kasai-Oriental and Katanga.

2.2. Sampling and Data Collection

Data were extracted from the PLWHIV's files from July 2012 to October 2014. One hundred and twenty-nine health zones were conveniently selected with those having at least 100 PLWHIV on ART and all integrated HIV care facilities with 25 or more PLWHIV on ART. Interviewers' training sessions were organized and to protect patient confidentiality, nurses were the only persons who extracted the information from the files for the interviewers. Any incomplete files were excluded from analyses.

2.3. Variables

The following variables were recorded from the PLWHIV's files in surveyed facilities:

- a Gender
- b Age
- c Address
- d Distance between HIV care facilities and patient's habitat
- e The ART starting date
- f The attending dates of routine appointments
- g Presence of HIV care trained provider (Physician or Nurse)
- h Presence of HIV care trained pharmacist
- i Adherence
- j Status: Lost to follow up, died or transferred.

2.4. Data Analysis

Data was analyzed using SPSS® software package 21.0 version. Simple descriptive statistics were performed and presented as frequencies and tables. Associations between variables were evaluated using the chi-square test where appropriate, with the statistical significance of $p < 0.05$. Survival analyses were performed using Kaplan Meier method to measure the mean time after event occurs (lost to follow up, died or transferred).

The reliability of the study was enhanced by using a clear and concise method, intense training of interviewers who were in charge to adequately explain the objectives of the study and to fill the questionnaire correctly. In addition, the reliability was enhanced by assuring that each questionnaire was cross-checked for consistency during data collection by SANRU data collection staff. The validity of the study was

enhanced by using the same questionnaire correctly to measure the variables. Several incomplete patient files were discarded.

2.5. Ethical Considerations

Ethics approval with clearance number CEUPC0026 was obtained from the ethics committee of the Protestant University of Congo, Kinshasa, DR Congo before the commencement of the study.

3. Results

Two thousand, five hundred and eighty-six (2586) files

were extracted. Among patients whose files were retrieved, 2123 (82%) were adherent and 463 (18%) were non-adherent to ART at the time of the study. Regarding the status of the PLWHIV at the time of the survey, 2212 (85, 5%) were still alive on ART, 181 (6.9%) were died, 135(5.2%) were lost to follow-up and 58(2.2%) were transferred from SANRU-controlled health facilities to other public facilities. The average age was 37 years (SD+/-1, 4years), the minimum age was 6 years and the maximum age was 79 years. The age group between 31 and 40 years was the most represented with 33.9% of the PLWHIV. Women formed the majority of patients with 65.5%.

Table 1. Adherence and patients' baseline characteristics.

Characteristic	Adherence		Total
	Adherent	Non adherent	
Province			
Bandundu	111 (4.29%)	3 (0.12%)	114 (4.41%)
Bas-Congo	730 (28.23%)	283 (10.94%)	1013 (39.17%)
Kasai-occidental	331 (12.80%)	8 (0.31%)	339 (13.11%)
Kasai-oriental	598 (23.12%)	112 (4.33%)	710 (27.46%)
Katanga	353 (13.65%)	57 (2.20%)	410 (15.85%)
	2123 (82.10%)	463 (17.90%)	2586 (100.00%)
Gender			
Male	725 (28.04%)	166 (6.42%)	891 (34.45%)
Female	1398 (54.06%)	297 (11.48%)	1695 (65.55%)
	2123 (82.10%)	463 (17.90%)	2586 (100.00%)
Age Group (Years)			
10 or less	44 (1.70%)	10 (0.39%)	54 (2.09%)
11 to 20	135 (5.22%)	19 (0.73%)	154 (5.96%)
21 to 30	403 (15.58%)	74 (2.86%)	477 (18.45%)
31 to 40	721 (27.88%)	157 (6.07%)	878 (33.95%)
41 to 50	548 (21.19%)	131 (5.07%)	679 (26.26%)
51 to 60	236 (9.13%)	63 (2.44%)	299 (11.56%)
More than 60	36 (1.39%)	9 (0.35%)	45 (1.74%)
	2123 (82.10%)	463 (17.90%)	2586 (100.00%)
Distance(From the patient's habit to the facility)			
5 Km or less	1305 (50.46%)	236 (9.13%)	1541 (59.59%)
5 Km	818 (31.63%)	227(8.78%)	1045 (40.41%)
	2123 (82.10%)	463 (17.90%)	2586 (100.00%)

The mean distance between HIV care health facilities and patient's habitat was 5 kms, the farthest distance was 225 kms and the closest distance was less than one kilometer. Two-fifth (40.4%) of the patients lived more than 5kms from HIV care health facilities. Close to two-thirds (64.4%) of PLWHIV lived in urban areas and 35.6% lived in rural areas.

Of the 2586 patients, 2495 (96.5%) were managed at health facilities with at least one HIV care trained physician; 2451 (94.8%) were managed at health facilities with at least one HIV care trained nurses; 1566 (60.6%) were managed in facilities with at least one HIV care trained drug manager, and 1645 (63.6%) did not report ART stock run-outs.

Table 2. Patients and characteristics of facilities.

	Yes	No	Total
Patients followed up in a facility which had HIV trained physicians	2495 (96.4%)	91 (3.5%)	2586 (100%)
Patients followed up in a facility which had HIV trained nurses	2451 (94.8%)	135 (5.2%)	2586 (100%)
Patients followed up in a facility which had HIV trained drug store agent	1020 (39.4%)	1566 (60.6%)	2586 (100%)
Patients followed up in a facility which have reported ART stock out	941 (36.4%)	1645 (63.6%)	2586 (100%)

Adherence was strongly associated with the presence of HIV care trained pharmacist ($p = 0.000$); HIV care trained nurses ($p = 0.001$) and HIV care trained physicians ($p = 0.02$).

Adherence was also associated with setting and distance between the facilities and the patient's habitat. The

percentage of adherence to treatment was 77.0% in the group of PLWHIV whose residences were located between 0 and 5 km from medical center versus 71.4% in the group of those whose residences were located at more than 5 kms of a medical center ($p=0.001$). Adherence was not associated with ART stock run-out; patient gender; and age.

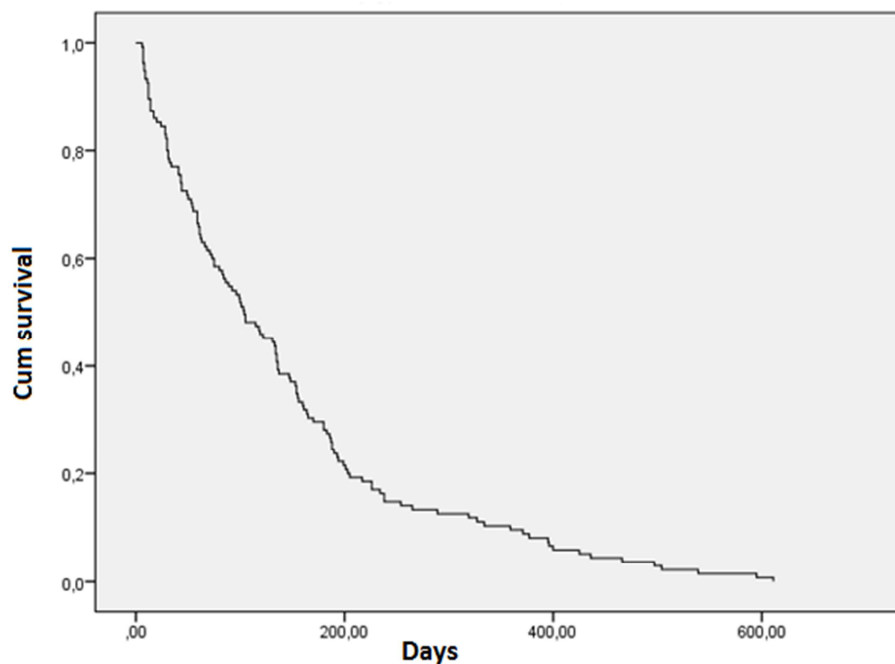


Figure 1. Survival function for PLWHIV lost to follow up.

Survival analyzes revealed that 50% of patients died or left the ART program before the completion of six months on ART (figures 1 and 2).

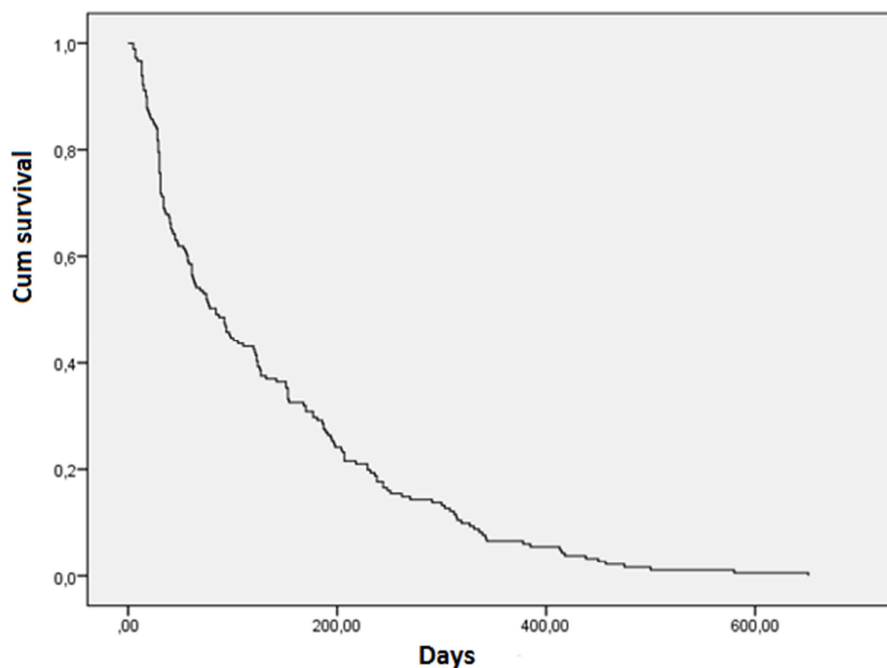


Figure 2. Survival function for PLWHIV who died during the monitoring.

4. Discussion

The ART adherence rate in our study (82%) is comparable to a Kenyan study conducted in Nairobi (82%) [17]. A slightly higher rate (86.7%) was documented by Shigdel *et al*, in their study of HIV-infected patients in Kathmandu District, Nepal[3]. But, lower in Cooke *et al* study, in the

United States of America (91.5%)[9]and higher in the study conducted in Zambia by Sasaki *et al* (59.9%) [18]. The differences in the findings of Sasaki and Cooke studies with our study could be attributed to differences in the assessment methods used for determining the adherence rates.

In our study, adherence was associated with the presence of an HIV care trained pharmacist; an HIV care trained nurse or

physician. Our findings emphasize those of Reda et al [14], who reported that structural factors not directly related to patient or medications can also influence adherence. Presence of healthcare providers experienced in ART provision, patient-nurse and other provider relationships, health care providers' beliefs, waiting time and opening hours, availability of counseling services, and social, economic, or psychological support can influence adherence positively or negatively. In the same way, some approaches used by trained health care providers can help to improve adherence, such as HIV/AIDS education and a supportive network [20].

The ratio of females in this study was two-fold to that of males, which is similar to the proportion of HIV/AIDS cases reported in the DRC [25]. However, gender did not influence adherence to ART in this study. These findings are similar to the proportion of HIV/AIDS reported in Kenya [17]. But they did not correlate with findings of Rougemont et al [15] who found that women presented lower risk of non-adherence both in the best case and in the worst case scenarios [15], nor with the findings of Shigdel et al [3] who reported that ART adherence in men and women were 84.3% and 91.1%, respectively.

Adherence was associated with distance between the health facilities and patients' habitats. Similar finding was reported by Wakibi et al [17] in a multiple facility-based cross-sectional study, where patients were grouped into adherent and non-adherent based on a composite score derived from a three questions adherence tool developed by Center for Adherence Support Evaluation (CASE).

Okafor and Ekwunife reported in a meta-analysis for self-reported adherence to ART in sub-Saharan Africa that the clinic, which is far from the patient's home could prevent some patients from attending scheduled clinic visits [19]. We recorded that 6.99%, 5.22% and 2.24% respectively had died, were lost to follow up or transferred to other facilities. Rougemont et al [15] in their study reported 9% of dead, 17% of lost, and 4% of transferred to other facilities, which were higher than in our study. Possible reasons for the differences in our results with those of Rougemont et al were that in Cameroon, at the time of the study, patients had to pay for care, including drugs, laboratory tests and clinical visits. In addition, before receiving ART, pre-counseling and post-counseling visits were mandatory, followed by three consecutive medical visits and a final socio-economic inquiry to assess ART readiness [15]. An Ethiopian study showed 14.5 % of lost to follow-up and 14.9 % of transferred out to other health facilities for treatment [26].

Our findings showed that 50% of patients died or left cohort before completing 6 months of ART. A study conducted in Cameroun found that patient dropout occurred at a median of 44 days (IQR: 28-80 days) and death occurred at a median of 55 days (IQR: 28- 81 days) after treatment initiation [14].

Ayele and al reported that 12.6 % patients died in the five years follow up period after ART initiation [26]. These findings have broader implications for other ART program in the DRC and future research. The findings highlight the

importance and relevance of healthcare providers' training on HIV in order to achieve success. Based on our findings, interventions focused on providing more training on HIV/AIDS management to pharmacists will be useful in increasing ART program success in the DRC.

5. Limitations

In our study, we only considered some factors related to the supply of ART services. Other important variables such as CD4 count and viral load could not be taken into account as these were not consistently recorded in the reviewed patients' files at the health facilities. The method used cannot offer temporal evidence between identified determinants and ART adherence.

This study used pharmacy-refill adherence method, which might be considered as an alternative to CD4 count monitoring for identification of patients at risk of virological failure, especially in resources-scarce countries. Pharmacy-refill history gives no description of daily adherence to treatment, because patients may not take all prescribed medications. It could also be considered as a time-consuming monitoring tool for the pharmacy staff, owing to the rapidly growing number of HIV/AIDS patients on the public health ART programs.

6. Conclusion

The success of any ART program depends on the adequate control of adherence determinants. Availability of HIV care trained health providers is one of the key determinant factors in improving ART adherence among PLWHIV, apart from the quality of counselling services offered. It is important to reduce the distances between health facilities and PLWHIVs' habitats through increasing the availability of ART services and to increase ART adherence especially within the rural context.

Conflicts of Interests

The authors declare that they have no competing interests.

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