

Quality of life of people living with HIV and their adherence to antiretroviral therapy in Bukavu City, Democratic Republic of the Congo

Célestin Kyambikwa Bisangamo

cele.kyambis@gmail.com

Institut Supérieur des Techniques Médicales (ISTM-Bukavu)

Ahmed El-Nimr Nessler

High Institute of Public Health, Alexandria University

Patrick Milabyo Kyamusugulwa

Institut Supérieur des Techniques Médicales (ISTM-Bukavu)

Mohamed Helmy Wahdan Iman

High Institute of Public Health, Alexandria University

Metwally Gad Zahira

High Institute of Public Health, Alexandria University

Research Article

Keywords: Quality of life, People living with HIV, Adherence, Antiretroviral therapy, Referral, Bukavu, the Democratic Republic of Congo (DRC)

Posted Date: February 12th, 2024

DOI: <https://doi.org/10.21203/rs.3.rs-3943678/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

The benefits of Highly Active Antiretroviral Therapy (HAART) for people living with HIV/AIDS (PLHIV) include immune system strengthening, viral load suppression, and improved health-related quality of life (HRQoL).

Objectives

To compare the HRQoL of PLHIV attending ART clinics versus PLHIV visiting traditional healers' (THs) offices, to assess the adherence of PLHIV to ART, to identify possible predictors of non-adherence of PLHIV to ART and QoL and to estimate the proportion of patients with HIV referred by THs to health centers in Bukavu.

Methods

Between February and June 2023, a comparative cross-sectional study was carried out involving 150 HIV-positive patients who were attending ART clinics and 150 PLHIV who were visiting the offices of THs in the three Bukavu urban health zones. The World Health Organization Quality of Life questionnaire (WHOQoL-BREF) and a self-reported questionnaire measuring antiretroviral medication adherence were used to collect data. Regression models were used to identify the predictors of no adherence to ART and the QoL of PLHIV.

Results

PLHIV attending ART clinics had higher mean scores in all QoL domains compared to those attending THs' offices. About 84% of participants were compliant with ART. Predictors associated with non-adherence to ART included: illiterate participants [OR = 23.3 (95% CI: 1.23–439.5), $p = 0.004$] and divorced or separated participants [OR = 10.3 (95% CI: 1.12–94.4), $p = 0.034$]. The proportion of patients with HIV/AIDS referred to ART clinics by THs was only 10.7%.

Conclusion and recommendation

PLHIV visiting ART clinics had a better QoL compared to PLHIV attending THs' offices. The rate of adherence to ART among PLHIV who attended ART clinics was high. It is recommended to refer PLHIV visiting THs to the ART clinics for better QoL.

Background

Human immunodeficiency virus (HIV) infection remains one of the most serious public health problems in the world, with high morbidity and mortality rates. Since the beginning of the epidemic, it has infected 85.6 million people and killed 40.4 million in 2022.[1] About 39 million individuals were living with HIV at

the end of 2022, and 630,000 perished from AIDS-related illnesses.[2] Sub-Saharan Africa remains the most severely affected, with nearly one in every twenty-five adults (3.2%) living with HIV and accounting for more than two-thirds of the people living with HIV (PLHIV) worldwide.[1] New HIV infections are particularly common in low and middle-income countries (LMICs) like the Democratic Republic of the Congo (DRC). In 2020, there were 510,000 PLHIV in DRC, including about 20,000 new cases.[3]

Life expectancy for PLHIV has increased[4] and HIV-related morbidity and death have significantly decreased as a result of combined antiretroviral therapy (cART) and its adherence.[5] HIV/AIDS infection has transformed from a fatal disease to a chronic disease that may be managed since the advent of safe and effective antiretroviral therapy (ART).[6] When PLHIV receive Highly Active Antiretroviral Therapy (HAART), their viral load is suppressed,[7] their immune system is strengthened,[8] and their health-related quality of life (HRQoL) is enhanced.[9]

When a health professional at one level of the health system lacks the resources to manage a clinical condition, they can refer a patient to a facility at a higher or better level to receive help in managing the client's case or to receive better resources. The importance of patient referrals is to guarantee that each patient receives the required specialized care, hence improving the quality of care.[10]

Health related quality of life is a multifaceted notion[11] and can be considered as a subjective evaluation that patients make of themselves based on their perception of the impact of the disease and/or its treatment on their well-being[12] in the physical, spiritual, social, psychological, and environmental domains. HRQoL is a crucial metric that helps medical professionals to understand patients' perceived satisfaction and perception of disease.[5, 6] There is a complex relationship between HIV/AIDS, ART, and HRQoL.[13] HRQoL of PLHIV on ART is essential for monitoring the impact of medication therapy on the progression of the disease.[13, 14]

To our knowledge, no study has been conducted to compare the HRQoL of PLHIV attending ART clinics and PLHIV visiting traditional healers' (THs) offices in Bukavu. The current study will provide essential baseline information that will help health authorities design evidence-based interventions that are suitable for PLHIV in Bukavu.

The current study aimed to compare the HRQoL of PLHIV who visited ART clinics versus those who visited THs' offices. Additionally, the study sought to evaluate the adherence of PLHIV to ART, identify potential predictors of PLHIV non-adherence to ART and to their QoL, and estimate the proportion of PLHIV who were referred to health centers in Bukavu by THs.

Methods

Study design and setting

A comparative cross-sectional study was conducted between February and June 2023 among HIV-positive patients attending ART clinics and PLHIV visiting THs' offices in the three health zones of

Bukavu.

Study participants and sampling procedure

The target population consisted of adult patients with HIV (≥ 18 years old) who had been diagnosed at ART clinics for at least a year and adult PLHIV (≥ 18 years old) who visit THs. In the Bukavu health zones, there are 30 ART clinics and 71 THs' offices recognized by the provincial coordination of traditional medicine and medicinal plants in South Kivu. The sample size was calculated using the StatCalc TM function in Epi Info® 7.4 software. Based on the assumption that patients with HIV should experience poor HRQOL 50% of the time, odds ratio of 2, two-sided confidence levels of 95%, power of 80%, ratio of unexposed/exposed of 1, prevalence ratio of 1.3, and percentage of outcome in exposed group of 66.7%, the Fleiss with continuity correction formula produced a sample size of 296 patients with HIV, which was rounded to 300 (150 patients with HIV per group).

To select patients with HIV from the ART Clinics, a three-stage sampling technique was used. Bukavu City has three health zones (Bagira-Kasha, Ibanda and Kadutu). All three health zones were included. Each health zone has 10 ART clinics. A list of all the ART Clinics was obtained from the provincial office of the National AIDS Control Programme (PNLS) and used as the sampling frame. The ART Clinics were selected from each health zone using a simple random sampling technique. A total of 15 ART clinics were included. Patients with HIV attending the clinics were consecutively recruited until completion of the required sample size.

All THs' offices (71) were visited for recruitment of PLHIV. Some patients visiting THs were known to have HIV and they visited THs in search for possible treatment. Others, on the other hand, come to the THs for treatment for reasons of poisoning or bewitchment. In this case, THs require them to take an HIV test in a hospital or health center before treatment. Only HIV-positive patients have been selected for this study. HIV-positive patients visiting the THs were consecutively recruited until the desired sample size was reached.

Data collection

A predesigned structured interviewer-assisted questionnaire was used to collect the following data from PLHIV: personal and demographic characteristics (age, gender, marital status, level of education, religious affiliation, ethnicity, occupation, area of residence, family size, income, and insurance status) and clinical characteristics (signs and symptoms), reasons to use traditional medicine and other health providers consulted, source of the referral of HIV-positive patients to clinical facilities.

The French version of the World Health Organization Quality of Life questionnaire (WHOQoL-BREF) was used to collect data about the QoL of PLHIV. The WHOQoL-BREF provides a valid and reliable alternative to the lengthier WHOQoL-100.[15] The tool has 26 items and four domains, namely:

- Physical health (7 items): activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, and work capacity.

- Psychological health (6 items): bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality / religion / personal beliefs, thinking, learning, memory, and concentration.
- Social relationships (3 items): personal relationships, social support, and sexual activity.
- Environmental health (8 items): financial resources, freedom, physical safety and security, health, and social care: accessibility and quality, home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation / leisure activities, physical environment (pollution / noise / traffic / climate), and transport.

Items are rated on a five-point Likert scale with 1 indicating low score and five indicating high score. In most questions, options 1 and 5 represent the lowest and highest values, respectively. However, in questions where a higher score did not mean a better QoL, responses were first reversed and then calculated. The score for each domain was calculated by adding up the total points for the questions in each domain, dividing the total value by the number of questions, and then multiplying the result by four. The score for each domain ranged from 4 to 20, with a score of 4 indicating the worst condition and a score of 20 representing the best condition in the domain. The total QoL was calculated based on the 26 items questionnaire. The scores were then transformed linearly to a 0–100-scale, with a higher score representing better QoL. Cronbach's alpha was used to check the reliability of the WHOQoL-Bref questionnaire, with a value greater than 0.7 indicating high reliability.

Finally, the validated French version of a self-reported questionnaire assessing adherence to ART was used.[16] It comprises nine main questions. First, patients were asked to name their antiretroviral medication and the daily dosage. A chart with a picture and the name of each available antiretroviral on the market was provided in order to help respondents recall the name of their antiretroviral medication. Subsequently, they reported the number of antiretroviral pills missing on the preceding and penultimate days. Then, three questions were used as aided-recall tools for situations that might have hampered the regular adherence to medication during the preceding seven days. Two questions were used to assess non-adherence during the preceding seven days. Respondents were asked to indicate how many times they missed taking one or more of their antiretroviral pills during the preceding seven days and then to translate this information into the total number of antiretroviral pills missed during this period of time. The last three questions referred to the preceding 30 days as a time frame.

The original version of the questionnaire was in French and was used as the language of the participants is French. The clarity of the questionnaire was tested beforehand on a group of 20 patients from the target population. PLHIV were considered non-adherent if they reported forgetting to take their antiretroviral treatment pills at least once in the week prior to the survey. Conversely, patients who took all their antiretroviral treatment pills during the same period were considered adherent.

Data management and analysis

The completeness of the data was checked during the data collection process. Data were entered in Kobocollect, cleaned, and coded in Microsoft Excel. The Epi Info version 3.5.1 and the Statistical Package for the Social Sciences (SPSS) version 16 were used to analyze the data.

The mean and standard deviation (SD) or median and interquartile range (IQR) were used to summarize quantitative variables, depending upon the distribution of the data. Categorical variables were summarized using the frequency and percent of subjects in each category.

The t-test and the ANOVA test were used to compare means. Bivariate comparisons of categorical variables were assessed using Pearson's chi-square (χ^2). Whenever χ^2 was not valid, Fisher's exact test was used for 2*2 tables. Multivariate logistic regression model was used to identify the significant predictors of non-adherence to ART as the dependent variable. Independent variables were socio-demographic characteristics such as age, gender, level of education, religion, tribe, place of residence and having received training in the take care of HIV infection. Multivariable linear regression was used to identify the predictors of QoL as the dependent variable. Socio-demographic factors such as age, gender, level of education, religion, tribe, place of residence, occupation, number of family members, monthly income in US dollars, and health insurance status were the independent variables. The correlation coefficient was used to verify the existence of a link between the QoL domains. The significance level was set at a p-value of less than 0.05.

Ethical considerations

The study was conducted in accordance with International Guidelines for Research Ethics. The approval of the Ethics Committee of the High Institute of Public Health, Alexandria University, Egypt was obtained. All study participants provided informed written consent following the explanation of the purpose and benefits of research. Anonymity and confidentiality were maintained and guaranteed.

To rationalize the study execution, the necessary administrative and preparatory communications with the health structures' authorities were completed. The competent authority of South Kivu Provincial Health Division and the Provincial Directorate of the National Health Ethics Committee authorized to conduct the study.

Results

The mean age of participants attending THs' offices was 41.3 ± 11.4 years and that of participants attending ART clinics was 42.9 ± 13.1 years. Female participants were predominant in both groups (64.7% vs 35.3% among PLHIV visiting THs' offices and 72.7% vs 27.3% among PLHIV attending ART clinics). Married participants represented the majority in both groups (52.0% among PLHIV visiting THs' offices and 45.5% among PLHIV attending ART clinics). The highest percentage of patients visiting the THs' offices had completed secondary education (46.7%), followed by those with university education (30.7%), while most patients attending ART clinics had secondary or primary education (49.3% and 24.0%, respectively). Most patients in both groups were Catholic Christians (45.3% and 46.0%, respectively), followed by Protestant Christians (42.7% and 39.3%, respectively), and from the Shi tribe (67.3% and 69.3%, respectively), followed by the Lega tribe (16.0% and 14.7%, respectively). Among both groups, the highest proportion of participants were unemployed or have their private businesses (46.7% and 31.3% among HIV-positive patients visiting THs' offices and 50.6% and 30.7% among PLHIV attending ART

clinics). Most of those visiting THs' offices had a household size of over six individuals (45.3%) and a monthly income of less than \$100 (62.7%). On the other hand, those attending ART clinics had a household size of three to six individuals and a monthly income of less than \$100. Participants whose healthcare expenditure came from their mutual health insurance predominated in both groups (55.4% and 45.4%, respectively).

Comparing the socio-demographic characteristics of PLHIV attending ART clinics with those visiting THs' offices, it was noticed that PLHIV attending THs' offices were more likely to be separated and widowed, with a low level of education, a household size \leq six and a low monthly income, whose source of healthcare expenditure is the family.

Results of the HRQoL comparison between patients with HIV/AIDS visiting THs' offices and those attending ART clinics are presented in table 1. Patients attending ART clinics had a better quality of life compared to those attending THs' offices in all QoL domains; physical (11.8 ± 2.5 versus 7.99 ± 2.3), psychological (10.9 ± 2.8 versus 7.96 ± 2.4), social (14.4 ± 3.1 versus 7.43 ± 2.0) and environmental aspects (10.4 ± 2.2 versus 7.43 ± 2.0). The same is true for the overall QoL (11.0 ± 2.2 versus 8.24 ± 1.8). The differences between HIV positive patients attending THs' offices and those attending ART clinics in overall QoL and in its different domains were statistically significant. ($p < 0.05$).

Findings of multiple linear regression analysis of predictors of QoL of patients with HIV/AIDS are summarized in table 2. Place of residence was the only significant predictor to the overall QoL of patients who visited the THs' offices ($p < 0.05$). The model correctly classified 15% of the change in the QoL. For patients attending ART clinics, adherence to antiretroviral therapy was the only significant predictor of QoL ($p < 0.05$). Of the changes in QoL, 12.3% were correctly categorized by the model.

Data on the referral rate of patients with HIV/AIDS to ART clinics by THs is presented in Fig. 1. Only 10.7% of patients attending the ART clinics were referred by THs. Data related to adherence to ART therapy among PLHIV attending the ART clinics is presented in Fig. 2. In total, 83.9% of participants were compliant and 16.1% were non-compliant.

Table 3 summarizes the results of the bivariate analysis of the personal and demographic characteristics of PLHIV attending ART clinics according to their adherence to antiretroviral treatment. The following socio-demographic characteristics of participants were significantly associated with non-adherence to ART: illiterate participants [OR = 23.3 (95% CI: 1.23–439.5), $p = 0.004$] and divorced or living separated participants [OR = 10.3 (95% CI: 1.12–94.4), $p = 0.034$].

Table 4 presents the results of the multivariate analysis of independent predictors of non-adherence using the logistic regression model. Only the level of education (being illiterate) remained significantly associated with non-adherence to ART [adjusted OR = 2.07 (95% CI: 1.13–3.78), $p = 0.018$].

Higher QoL mean scores in all domains could be noticed among PLHIV adherent to ART compared to those who were not adherent to treatment (table 5). The overall QoL also showed similar result ($11.2 \pm$

2.13 versus 9.99 ± 2.53). A significant relationship was observed between treatment adherence and the overall QoL score, the physical domain and environmental domain scores of HRQoL ($p = 0.05$).

Discussion

The current study is the first in Bukavu to compare the HRQoL of PLHIV who visit ART clinics versus PLHIV who visit THs' offices. The number of HIV cases has increased in 2022,[3] so it is relevant to understand what influences QoL to be able to tailor better health and social care services and improve the QoL of PLHIV. Because current HIV/AIDS treatment strategies allow patients to live longer, QoL has emerged as a key indicator of health outcomes, and improving the QoL is a key objective.[7]

The present study showed that PLHIV attending ART clinics had a higher overall QoL than PLHIV visiting THs' offices. The same was true for all domains of QoL, with PLHIV attending ART clinics having a better QoL compared with PLHIV visiting THs. This high QoL of PLHIV attending ART clinics compared with PLHIV visiting THs' offices could be explained by the fact that the majority (83.9%) of PLHIV attending clinics were well adherent to ART. Numerous studies have demonstrated a strong correlation between ART adherence and PLHIV QoL. Patients with low/moderate ART adherence were 60% less likely than patients with high adherence to have a high overall QoL score, according to a study done in Ethiopia (2020).[7] Similar findings were also reported by other studies conducted in Tunisia[17] and Ethiopia,[18] which suggest that adherence to antiretroviral treatment is associated with a higher QoL for PLHIV. Following a regimen lowers viral load and enhances patients' clinical status, both of which have an impact on QoL. [19–21]

In the present study, multiple linear regression analysis revealed that only the place of residence of PLHIV visiting THs was a significant predictor of their HRQoL. These results were different from those obtained in Brazilian and Italian studies.[9, 22] Higher education can help people deal with HIV more effectively, increase patient awareness of illness, and ultimately improve HRQoL.[23, 24] Age causes a decline in HRQoL, while these findings are different from those from Brazil and the United States.[9, 25]

The issue of therapeutic non-adherence is far more serious, especially for individuals who are HIV/AIDS positive. In addition to having an impact on the non-adherent person, the repercussions of poor patient adherence can also have a broad societal impact. Adherence is necessary for viral suppression, decreased infection, minimized opportunistic infections, and decreased resistance to antiretroviral medications.[26–28] The results of the present study showed a therapeutic non-adherence rate of 16.1% among PLHIV attending ART clinics. This low rate of non-adherence could be explained by the therapeutic education and awareness that PLHIV received in ART clinics about the advantages of adherence and the disadvantages of non-adherence. The rate of non-adherence found in this study was lower than the one found in studies carried out in Gabon, Ethiopia and Cameroon,[29–31] and higher than the one reported by in Madagascar (2023).[32] The current findings also differed from those observed in certain towns in the DRC.[33, 34] This variability in non-adherence rates could be explained by differences in the populations studied on the one hand, and by the method used to assess compliance, on the other.

Regarding the relationship between adherence to ART by PLHIV and their QoL, the present study showed that good adherence to ART increased the HRQoL score. This may be explained by the fact that adherence to treatment is the most important factor in determining the success of ART and long-term viral suppression.[35] In other words, adherence prevents the virus from multiplying, which reduces the risk of mutation and resistance to HIV, thus strengthening the immune system. The previous literature review and studies conducted in South Africa,[36] Brazil,[37] and Ethiopia[7, 38, 39] revealed that ART adherence improves the HRQoL. In addition, a study from Colombia found that non-adherence to combined ART was associated with lower QoL.[40]

In bivariate analysis, the current results showed that being separated and having a low level of education were determinants of non-adherence and therefore of poor therapeutic outcomes. Only low level of education remained significantly associated with non-adherence to ART in multivariate analysis using the logistic regression model. Having a low level of education as a predictor of non-adherence was not consistent with the results obtained by other authors in most of the studies that explored the issue.[30, 31, 34, 41] In itself, level of education does not encourage people to take their treatment as planned. However, when it follows a shared decision-making process, in which patient and doctor agree together on the best course of treatment, the level of education helps patients to adhere to their treatment.[42]

Conclusion and recommendations

The QoL of PLHIV visiting THs is lower than that of PLHIV attending ART clinics. The latter showed high scores in all QoL domains. Adherence to ART by PLHIV attending ART clinics was high. Adherence to ART improves the HRQoL of PLHIV. It is recommended that PLHIV visiting THs to get to ART clinics for better care so that their QoL would improve.

List of abbreviations

PLHIV: People Living with HIV

ART: Antiretroviral Therapy

HRQoL: Health-Related Quality of Life

HIV/AIDS: Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome

Declarations

Competing interests

There are no conflicting interests that the authors claim to have.

Funding

The authors did not receive any funding for this study.

Availability of data and materials

There is unrestricted access to all information. All relevant data is included in the paper and additional files.

Authors' contributions

KBC designed the study, helped with gathering and analyzing data, and drafted and edited the manuscript. From the creation of the study protocol to its completion, MKP and NAEN were involved at every stage. They revised the manuscript. IMHW contributed to the creation of the instrument for gathering data, the analysis and interpretation of the findings, and the editing of the completed manuscript. ZMG had contributed to the creation of the data collection instruments and study protocol. Every author (apart from ZMG, may she rest in peace) reviewed and approved the final version.

Acknowledgments

We thank PLHIV for their cooperation in the data collection phase of this study. We would like to express our gratitude to the data clerk and medical professionals for their invaluable assistance with data collection.

References

1. World Health Organization. HIV: Global situation and trends. Fact sheet. Geneva: UNAIDS <https://www.who.int/data/gho/data/themes/hiv-aids>. Accessed 15 July 2023.
2. World Health Organization. HIV and AIDS statistics – Fact sheet. Geneva: UNAIDS <https://www.who.int/news-room/fact-sheets/detail/hiv-aids>. Accessed 13 July 2023.
3. UNAIDS. Country factsheets: Democratic Republic of the Congo. Fact sheet. Geneva <https://www.unaids.org/en/regionscountries/countries/democraticrepublicofthecongo>. Accessed 13 April 2022.
4. Trickey A, Sabin CA, Burkholder G, Crane H, Monforte ADA, Egger M, et al. Life expectancy after 2015 of adults with HIV on long-term antiretroviral therapy in Europe and North America: a collaborative analysis of cohort studies. *Lancet HIV*. 2023;10(5): e295–e307. [https://doi.org/10.1016/S2352-3018\(23\)00028-0](https://doi.org/10.1016/S2352-3018(23)00028-0)
5. Nyongesa MK, Mwangi P, Wanjala SW, Mutua AM, Koot HM, Cuijpers P, et al. Correlates of health-related quality of life among adults receiving combination antiretroviral therapy in coastal Kenya. *Health Qual. Life Outcomes*. 2020;18(1): 1–14. <https://doi.org/10.1186/s12955-020-01421-0>
6. Ahmed A, Saqlain M, Bashir N, Dujaili J, Hashmi F, Mazhar F, et al. Health-related quality of life and its predictors among adults living with HIV/AIDS and receiving antiretroviral therapy in Pakistan. *Qual Life Res*. 2021;30:1653–64. <https://doi.org/10.1007/s11136-021-02771-y>

7. Desta A, Biru TT, Kefale AT. Health related quality of life of people receiving highly active antiretroviral therapy in Southwest Ethiopia. *PLoS One*. 2020;15(8): e0237013. <https://doi.org/10.1371/journal.pone.0237013>
8. Ahmed M, Mital D, Abubaker NE, Panourgia M, Owles H, Papadaki I, et al. Bone Health in People Living with HIV/AIDS: An Update of Where We Are and Potential Future Strategies. *Microorganisms*. 2023;11(3): 789. <https://doi.org/10.3390/microorganisms 11030789>
9. Castro R, De Boni RB, Luz PM, Velasque L, Lopes LV, Medina-Lara A, et al. Health-related quality of life assessment among people living with HIV in Rio de Janeiro, Brazil: a cross-sectional study. *Qual Life Res*. 2019;28: 1035–45. <https://doi.org/10.1007/s11136-018-2044-8>
10. Seyed-Nezhad M, Ahmadi B, Akbari-Sari A. Factors affecting the successful implementation of the referral system: A scoping review. *J Family Med Prim Care*. 2021;10: 4364–75. [doi:10.4103/jfmpc.jfmpc_514_21](https://doi.org/10.4103/jfmpc.jfmpc_514_21)
11. Cooper V, Clatworthy J, Harding R, Whetham J. Measuring quality of life among people living with HIV: a systematic review of reviews. *Health Qual. Life Outcomes*. 2017; 15: 1–20. <https://doi.org/10.1186/s12955-017-0778-6>
12. Group TW. The World Health Organization quality of life assessment (WHOQOL): development and general psychometric properties. *Soc. Sci. Med*. 1998; 46 (12):1569–85. [https://doi.org/10.1016/S0277-9536\(98\)00009-4](https://doi.org/10.1016/S0277-9536(98)00009-4)
13. Emuren L, Welles S, Macalino G, Evans AA, Polansky M, Ganesan A, et al. Predictors of health-related quality of life among military HIV-infected individuals. *Qual Life Res*. 2020;29: 1855–69. <https://doi.org/10.1007/s11136-020-02441-5>
14. Kall M, Marcellin F, Harding R, Lazarus JV, Carrieri P. Patient-reported outcomes to enhance person-centred HIV care. *Lancet HIV*. 2020;7(1): e59–e68. [https://doi.org/10.1016/S2352-3018\(19\)30345-5](https://doi.org/10.1016/S2352-3018(19)30345-5)
15. World Health Organization. WHOQOL: Measuring quality of life. <https://www.who.int/tools/whoQoL>. Accessed 29 July 2023
16. Godin G, Gagné C, Naccache H. Validation of a self-reported questionnaire assessing adherence to antiretroviral medication. *AIDS Patient Care STDS*. 2004; 17(7): 325–32. <https://doi.org/10.1089/108729103322231268>
17. Berrezouga L, Kooli I, Marrakchi W, Harzallah G, Chakroun M. Quality of life of people living with HIV on antiretroviral therapy: A cross-sectional study in Monastir, Tunisia. *HIV/AIDS Res. Palliat. Care*. 2023;15: 671–82. <https://doi.org/10.2147/HIV.S430376>
18. Mohammed SA, Yitafr MG, Workneh BD, Hailu AD. Health-related quality of life and associated factors among people living with human immunodeficiency virus on highly active antiretroviral therapy in North East Ethiopia: Cross-sectional study. *PLoS One*. 2021;16(3): e0247777. <https://doi.org/10.1371/journal.pone.0247777>
19. Molla AA, Gelagay AA, Mekonnen HS, Teshome DF. Adherence to antiretroviral therapy and associated factors among HIV positive adults attending care and treatment in University of Gondar

- Referral Hospital, Northwest Ethiopia. *BMC Infect Dis.* 2018;18(1): 1–8.
<https://doi.org/10.1186/s12879-018-3176-8>
20. Abadiga M, Hasen T, Mosisa G, Abdisa E. Adherence to antiretroviral therapy and associated factors among Human immunodeficiency virus positive patients accessing treatment at Nekemte referral hospital, west Ethiopia, 2019. *PLoS One.* 2020;15(5): e0232703.
<https://doi.org/10.1371/journal.pone.0232703>
 21. Zhang S, Rust G, Cardarelli K, Felizzola J, Fransua M, Stringer Jr HG. Adherence to highly active antiretroviral therapy impact on clinical and economic outcomes for Medicaid enrollees with HIV and hepatitis C coinfection. *AIDS Care.* 2016;27(7): 829–35.
<https://doi.org/10.1080/09540121.2015.1021745>
 22. Venturini A, Cenderello G, Di Biagio A, Giannini B, Ameri M, Giacomini M, et al. Quality of life in an Italian cohort of people living with HIV in the era of combined antiretroviral therapy (Evidence from IANUA study-investigation on antiretroviral therapy). *AIDS Care.* 2017;29(11): 1373–7.
<https://doi.org/10.1080/09540121.2017.1286286>
 23. Nobre N, Pereira M, Roine RP, Sutinen J, Sintonen H. HIV-related self-stigma and health-related quality of life of people living with HIV in Finland. *J Assoc Nurses AIDS Care.* 2018;29(2): 254–65.
<https://doi.org/10.1016/j.jana.2017.08.006>
 24. Rzeszutek M, Gruszczyńska E, Firląg-Burkacka E. Coping profiles and subjective well-being among people living with HIV: less intensive coping corresponds with better well-being. *Qual Life Res.* 2017;26: 2805–14. <https://doi.org/10.1007/s11136-017-1612-7>
 25. Emuren L, Welles S, Evans AA, Polansky M, Okulicz JF, Macalino G, et al. Health-related quality of life among military HIV patients on antiretroviral therapy. *PLoS One.* 2017;12(6): e0178953.
<https://doi.org/10.1371/journal.pone.0178953>
 26. Sangeda RZ, Mosha F, Aboud S, Kamuhabwa A, Chalamilla G, Vercauteren J, et al. Predictors of non-adherence to antiretroviral therapy at an urban HIV care and treatment center in Tanzania. *Drug Healthc Patient Saf.* 2018;10: 79–88. <https://doi.org/10.2147/DHPS.S143178>
 27. Soares RDCA, Brito AMD, Lima K, Lapa TM. Adherence to antiretroviral therapy among people living with HIV/AIDS in northeastern Brazil: a cross-sectional study. *Sao Paulo Med. J.* 2020;137: 479–85.
<https://doi.org/10.1590/1516-3180.2019.0212170919>
 28. Ontario HIV Treatment Network. Impact of nonadherence to antiretroviral therapy (ART) on population-level health outcomes. Rapid response service. https://www.ohtn.on.ca/wp-content/uploads/2021/07/RR158_nonadherence.pdf. Accessed 26 November 2023.
 29. Collinet O. Facteurs associés à une mauvaise observance thérapeutique chez les patients vivant avec le VIH à l'hôpital Albert Schweitzer au Gabon en 2019. *Sciences du Vivant [q-bio].* 2019; ffdumas-02401977. <https://dumas.ccsd.cnrs.fr/dumas-02401977>
 30. Nigusso FT, Mavhandu-Mudzusi AH. Magnitude of non-adherence to antiretroviral therapy and associated factors among adult people living with HIV/AIDS in Benishangul-Gumuz Regional State, Ethiopia. *PeerJ.* 2020;8: e8558. doi:10.7717/peerj.8558

31. Lantche MW, Fokam J, Cheudjui AJN, Tchatchueng JBM, Noumsi TSJ, Ateba FN, et al. Factors associated with non-adherence to antiretroviral therapy among HIV-infected adolescents aged 15-19 years: A snapshot from the Mother and Child Center in Yaounde, Cameroon. *Pan Afr Med J.* 2021;39(154): 1–13. <https://www.panafrican-med-journal.com//content/article/39/154/full>
32. Andriamamonjisoa J, Andriananja V, Andrianarivony R, Rakotomijoro E, Raberahona M, Rakotoarivelo R, et al. Facteurs associés à la non-observance thérapeutique des personnes vivant avec le VIH sous antirétroviraux. *Med Mal Infect.* 2023;2(2): Suppl 148–9. <https://doi.org/10.1016/j.mmifmc.2023.03.343>
33. Izizag, BB, Situakibanza H, Kiazayawoko F, Nkodila A, Mafuta E, Lukanu P, et al. Déterminants de la non-observance au traitement antirétroviral chez l’adulte à Kinshasa. *Pan Afr Med J.* 2020;37(157): 1–15. <https://www.panafrican-med-journal.com//content/article/37/157/full>
34. Mandro CN, Tibamwenda YB, Mosomo TK, Wolyec ST, Kibendelwa ZT, Wembonyama SO. Déterminants de la non observance du traitement antirétroviral chez les personnes vivant avec le VIH dans les villes de Bunia et Goma: Une étude transversale analytique. *J Med Public Health Policy.* 2023;3(1):34–42.
35. Legesse TA, Reta MA. Adherence to antiretroviral therapy and associated factors among people living with HIV/AIDS in Hara town and its surroundings, North-Eastern Ethiopia: A cross-sectional study. *Ethiop J Health Sci.* 2019;29(3): 299–308. doi:10.4314/ejhs.v29i3.2
36. Rajesh VV, Johanna CM, Brian G, Gous AGS. Relationship between adherence and health-related quality of life among HIV-patients in South Africa: findings and implications. *J. AIDS HIV Res.* 2018;10(8): 121–32. <https://doi.org/10.5897/JAHR2018.0478>
37. Cunha GHD, Ramalho AKL, Fontenele MSM, Dantas MB, Fachine FV, Abreu WCD. Quality of life and adherence to antiretroviral therapy in people living with HIV in the Ceará, Brazil. *AIDS Care.* 2023; 1–14. <https://doi.org/10.1080/09540121.2023.2275035>
38. Surur AS, Teni FS, Wale W, Ayalew Y, Tesfaye B. Health related quality of life of HIV/AIDS patients on highly active anti-retroviral therapy at a university referral hospital in Ethiopia. *BMC Health Serv Res.* 2017;17(737): 1–8. <https://doi.org/10.1186/s12913-017-2714-1>
39. Girma D, Dejene H, Geleta LA, Tesema M, Legesse E, Nigussie T, et al. Health related quality of life of HIV-positive women on ART follow-up in north Shewa zone public hospitals, central Ethiopia: Evidence from a cross-sectional study. *Heliyon.* 2023;9(2) e13318. <https://doi.org/10.1016/j.heliyon.2023.e13318>
40. Narváez M, Lins-Kusterer L, Valdelamar-Jiménez J, Brites C. Quality of life and antiretroviral therapy adherence: A cross-sectional study in Colombia. *AIDS Res. Hum. Retroviruses.* 2022;38(8): 660–9. <https://doi.org/10.1089/aid.2021.0233>
41. Usman SA, Shehu A, Ajumobi O, Gidado S, Dalhatu I, Balogun M, et al. Predictors of non-adherence to antiretroviral therapy among HIV patients in secondary health care facilities in Kano State-Nigeria: A case-control study. *Pan Afr Med J.* 2019;32 (3):1–4. doi: 10.11604/pamj.suppl.2019.32.1.13746

Tables

Table (1): Distribution of patients with HIV/AIDS visiting THs' offices and those attending ART clinics according to their HRQoL (Bukavu, 2023)

Domains of HRQoL	PLHIV		T-test
	visiting THs' offices (n=150)	attending ART clinics (n=150)	<i>p-value</i>
Physical			
Mean ± SD	8.00 ± 2.28	11.8 ± 2.49	< 0.0001*
Psychological			
Mean ± SD	7.96 ± 2.36	10.9 ± 2.84	< 0.0001*
Social relations			
Mean ± SD	12.8 ± 3.17	14.4 ± 3.11	< 0.0001*
Environment			
Mean ± SD	7.43 ± 2.01	10.4 ± 2.55	< 0.0001*
Overall HRQoL			
Mean ± SD	8.24 ± 1.80	11.0 ± 2.24	< 0.0001*

SD, standard deviation; HRQoL, health-related quality of life; T-test, independent-samples T test; * Significant ($p < 0.05$)

Table (2): Results of the multiple linear regression analysis of the predictors of HRQoL of patients with HIV/AIDS visiting the THs' offices and those attending the ART clinics (Bukavu, 2023)

Independent predictors	B	Std Error	Beta	T-Test	p-value
Patients with HIV/AIDS visiting THs' offices					
Age	-0.110	0.446	-0.023	-0.247	0.805
Gender	0.077	0.358	0.019	0.214	0.831
Marital status	0.277	0.166	0.163	1.665	0.098
Level of education	-0.133	0.194	-0.065	-0.687	0.493
Religion	0.192	0.158	0.098	1.217	0.226
Tribe	0.014	0.150	0.008	0.093	0.926
Place of residence	-0.499	0.172	-0.236	-2.903	0.004*
Occupation	-0.185	0.160	-0.098	-1.153	0.251
Number of family members	-0.204	0.197	-0.086	-1.038	0.301
Monthly income in US dollars	-0.273	0.311	-0.077	-0.877	0.382
Source of health expenditure	0.236	0.177	0.113	1.329	0.186
Correlation coefficient	$r^2 = 0.150$				
Patients with HIV/AIDS attending ART clinics					
Age	-2.068	3.198	-0.056	-0.647	0.519
Gender	0.998	2.036	0.043	0.490	0.625
Marital status	-0.886	1.249	-0.062	-0.709	0.479
Level of education	-1.430	1.167	-0.117	-1.226	0.222
Religion	0.241	1.000	0.020	0.241	0.810
Tribe	-0.861	0.932	-0.080	-0.924	0.357
Place of residence	2.022	1.099	0.154	1.839	0.068
Occupation	-1.510	1.081	-0.124	-1.397	0.165
Number of family members	1.192	1.334	0.085	0.968	0.335
Monthly income in US dollars	-0.341	1.625	-0.019	-0.210	0.834
Source of health expenditure	-1.581	1.145	-0.121	-1.381	0.170
Adherence to treatment	6.049	2.522	-0.199	2.399	0.018*
Correlation coefficient	$r^2 = 0.123$				

* Significant ($p < 0.05$); Std Error, standard error; T-Test, independent-samples T test

Table (3): Distribution of patients with HIV/AIDS attending ART clinics according to their personal and socio-demographic characteristics and their adherence to ART (Bukavu, 2023)

Characteristics	Not adherent		Adherent		OR (95% CI)	p value
	No.	%	No.	%		
Age in years						
18 –	1	8.3	11	91.7	2.48 (0.09-68.1)	1.000
40 –	23	18.0	105	82.0	4.23 (0.24-75.3)	0.356
62+	0	0.0	9	100	1	
Gender						
Female	18	16.7	90	83.3	1.17 (0.43-3.18)	0.763
Male	6	14.6	35	85.4	1	
Marital status						
Single	1	4.0	24	96.0	1	
Married	9	13.8	56	86.2	3.86 (0.46-32.2)	0.273
Separated	6	30.0	14	70.0	10.3 (1.12-94.4)	0.034*
Widowed	8	20.5	31	79.5	6.19 (0.72-53.0)	0.078
Level of education						
Illiterate	8	38.1	13	61.9	23.3 (1.23-439)	0.004*
Primary	6	16.7	30	83.3	7.89 (0.42-148)	0.163
Secondary	10	13.5	64	86.5	6.02 (0.34-107)	0.201
University	0	0.0	18	100	1	
Place of residence						
Ibanda	11	17.5	52	82.5	2.22 (0.66-7.48)	0.263
Kadutu	9	22.5	31	77.5	3.05 (0.86-10.8)	0.129
Bagira	4	8.7	42	91.3	1	
Occupation						
Unemployed	13	17.3	62	82.7	4.82 (0.60-39.0)	0.177
Paid employment	1	4.2	23	95.8	1	
Private business	10	21.7	36	78.3	6.39 (0.77-53.3)	0.083
Agropastoral activities	0	0.0	4	100	1.74 (0.06-49.9)	1.000
Income in US dollars						

< 100	19	17.4	90	82.6	1.94 (0.10-37.5)	1.000
100–	5	13.9	31	86.1	1.57 (0.07-33.5)	1.000
300 +	0	0.0	4	100	1	

OR, odds ratio; CI, confidence interval; * Significant ($p < 0.05$)

Table (4): Results of the logistic regression analysis of the independent predictors of non-adherence of patients with HIV/AIDS attending ART clinics (Bukavu, 2023)

Independent predictors	Adjusted OR	95% CI	Coefficient	S-E	Z-Statistic	p-value
Age	2.48	0.61-9.92	0.907	0.708	1.280	0.200
Gender	0.64	0.20-2.08	-0.443	0.601	-0.738	0.461
Marital status	0.70	0.41-1.19	-0.359	0.271	-1.324	0.186
Level of education	2.07	1.13-3.78	0.728	0.307	2.372	0.018*
Place of residence	1.21	0.68-2.15	0.191	0.294	0.648	0.517
Occupation	0.96	0.58-1.60	-0.039	0.260	-0.150	0.881
Income in US dollars	1.21	0.41-3.58	0.189	0.555	0.341	0.733

OR, odds ratio; CI, confidence interval; S-E, standard error; * Significant ($p < 0.05$)

Table (5): Relation between the QoL of patients attending ART clinics and their adherence to treatment (Bukavu, 2023)

Domains of HRQoL	PLHIV		T-test
	Not adherent (n=24)	Adherent (n=125)	<i>p-value</i>
Physical			
Mean ± SD	10.54 ± 2.65	12.00 ± 2.40	0.0091*
Psychological			
Mean ± SD	9.89 ± 3.02	11.10 ± 2.77	0.0551
Social relations			
Mean ± SD	13.89 ± 3.19	14.52 ± 3.09	0.3569
Environment			
Mean ± SD	9.31 ± 3.02	10.61 ± 2.41	0.0223*
Overall HRQoL			
Mean ± SD	9.99 ± 2.53	11.2 ± 2.13	0.0117*

SD, standard deviation; HRQoL, health-related quality of life; T-test, independent-samples T test; * Significant ($p < 0.05$)

Figures

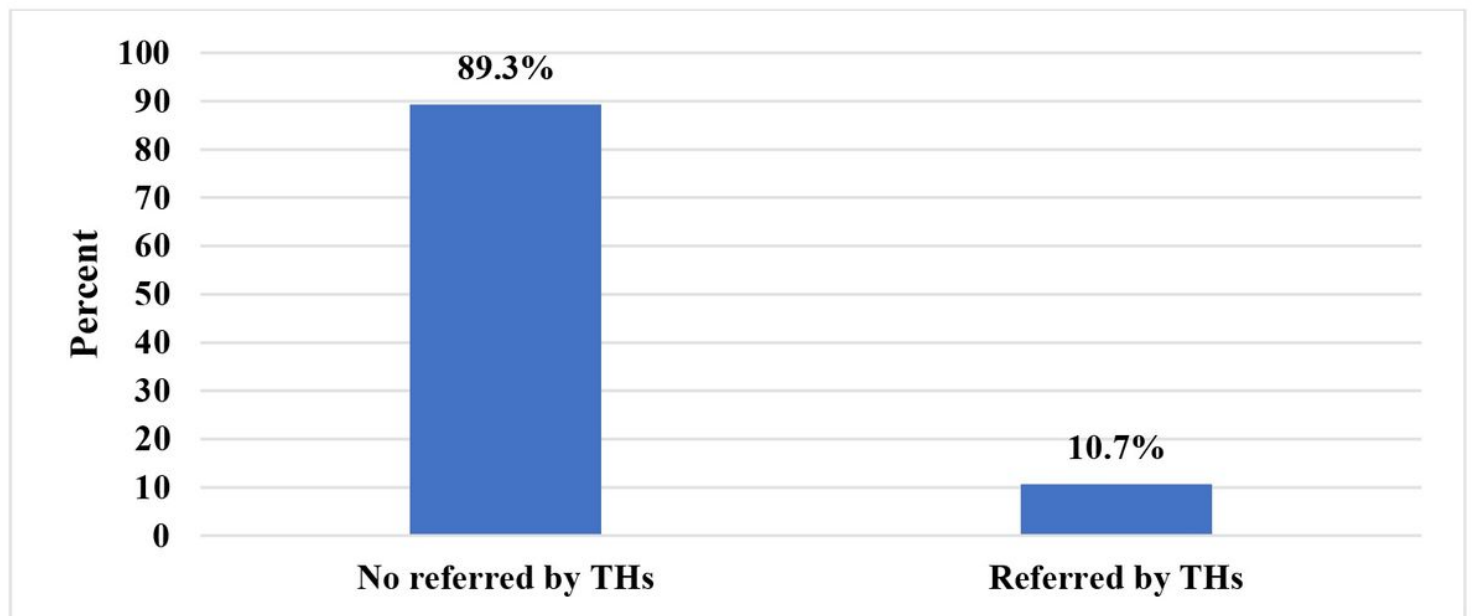


Figure 1

Distribution of PLHIV attending the ART clinics referred by THs (Bukavu, 2023)

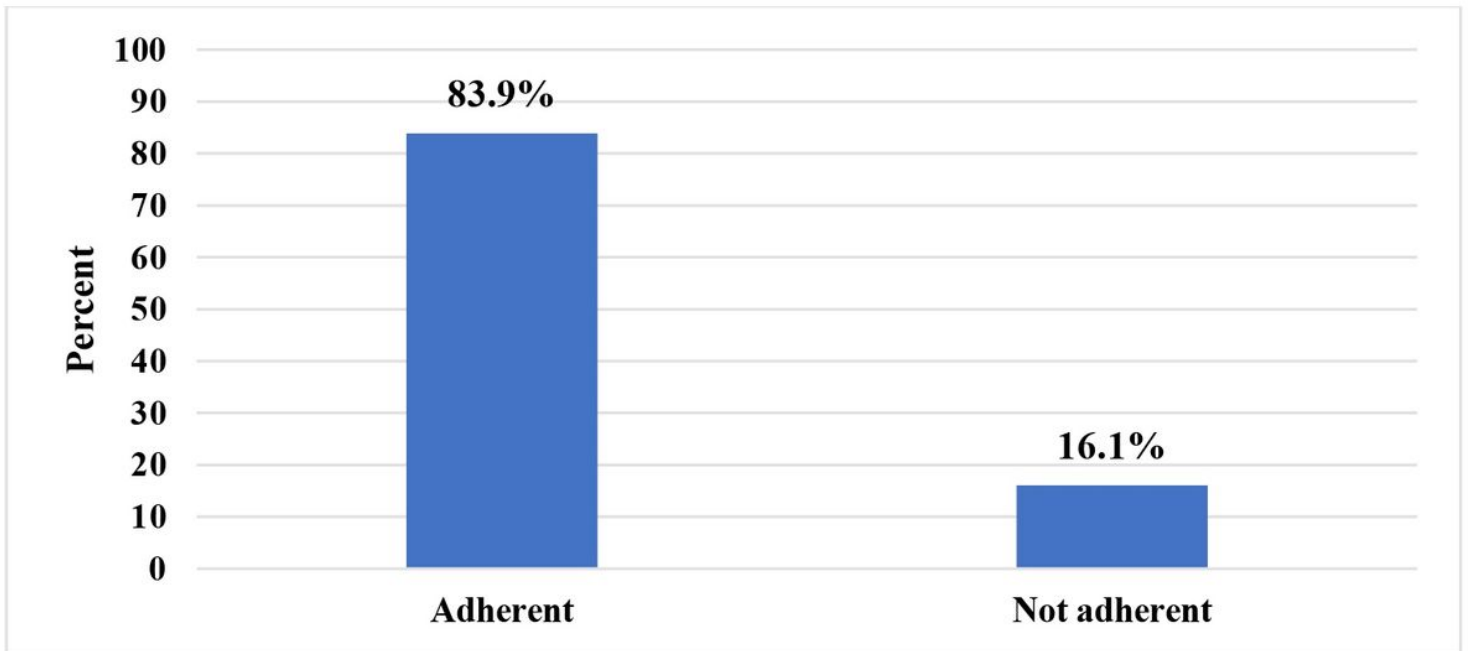


Figure 2

Distribution of PLHIV attending ART clinics according to their adherence to antiretroviral therapy (Bukavu, 2023)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementaryTablesAIDS.docx](#)