RBFHSS
Revista Brasileira de Farmácia Hospitalar e Serviços de Saúde

Original Paper

Open Access

Can the absence of drug dispensing units in municipalities influence the abandonment of treatment by people living with HIV/AIDS?

Francisco Álisson PAULA-FRANÇA[1], Rafael Santos SANTANA[2]

[1]Universidade de Brasília – doutorando - Programa de Pós-graduação em Ciências Farmacêuticas, Área de concentração: Desenvolvimento e qualidade de produtos e serviços farmacêuticos. Brasília/Distrito Federal, Brasil

Corresponding author: Paula-Franca FA, alissonpetunifor@gmail.com

Submitted: 19-01-2023 Resubmitted: 17-07-2023 Accepted: 17-07-2023

Double blind peer review

Abstract

Objective: to verify the existence of an association between abandonment to antiretroviral therapy (ART) by PLWHA and the lack of dispensing service in municipalities located in southern Brazil. **Methods:** an exploratory and analytical study was carried out based on records of People Living with HIV/AIDS (PLWHA) abandoning antiretroviral therapy (ART) in the South region of Brazil. We included the record of individuals who had not taken their medications for at least one hundred days. Data were collected through the Drugs Management System (SICLOM), Clinical Monitoring System of People Living with HIV/AIDS (SIMC) and Laboratory Test Control System (SISCEL), from october to november 2022, referring to records of users dated between 1986 and 2022. **Results:** the records of 21,861 users were checked. The mean abandonment rate was 814±831.7 days, ranging from 101 to 4,276 days. Most PLWHA on ART lived in Rio Grande do Sul (n=10,951; 50.1%), one of the states with the highest incidence of AIDS. Regarding the other socio-demographic characteristics, it was revealed that most were male (n=12,300; 56.4%), living in the countryside (n=15,905; 72.8%), with a mean age of 42.1±13.0, white (n=13,053; 59.7%) and with 4 to 7 years of schooling (n=6,192; 28.3%). The average time of ART use was 7.9±2.1 years, and 49.0% (n=10,718) of PLWHA before abandoning treatment had an undetectable viral load (<50 copies/mm^3). In parallel to this, it was observed that the research participants who lived in cities that did not have Drug Dispensing Units (DDU) (p<0.02) had a 14.9% (CI 14.5- 15.3) higher chance of abandoning their therapy when compared to those who lived in cities that had antiretroviral dispensing service. **Conclusion:** these findings pointed out that the abandonment of ART by PLWHA may be associated with the spatial distribution of DDUs. Therefore, decentralizing access to antiretroviral drugs is a strategy that can positively impact the quality of life and increase the survival time of patients in southern Brazil.

Keywords: access to health services, medication support, HIV, high-activity antiretroviral therapy and acquired immunodeficiency syndrome.

A ausência de unidades dispensadoras de medicamentos em municípios pode influenciar no abandono ao tratamento por pessoas vivendo com HIV/AIDS?

Resumo

Objetivo: verificar a existência de associação entre o abandono à terapia antirretroviral (TARV) por PVHA e a não disponibilização de serviço de dispensação em municípios situados na região Sul do Brasil. **Métodos:** estudo exploratório e analítico, realizado a partir de registros de Pessoas Vivendo com HIV/AIDS (PVHA) em abandono de TARV residentes na região Sul do Brasil. Incluiu-se o registro de indivíduos que estavam há, pelo menos, cem dias sem retirar medicamentos. Os dados foram coletados por meio do Sistema de Controle Logístico de Medicamentos (SICLOM), Sistema de Monitoramento Clínico das Pessoas Vivendo com HIV/AIDS (SIMC) e Sistema de Controle de Exames Laboratoriais (SISCEL), no período de outubro a novembro de 2022, referentes aos registros de usuários datados entre 1986 a 2022. **Resultados:** foram checados os registros de 21.861 usuários. A média de abandono foi 814±831,7 dias, com variação entre 101 a 4.276 dias. A maioria das PVHA em TARV residia no Rio Grande do Sul (n=10.951; 50,1%), uma das Unidades da Federação que apresenta maior incidência de AIDS. Com relação às demais características sociodemográficas, revelou-se que a maioria era do sexo masculino (n=12.300; 56,4%), residente no interior (n=15.905; 72,8%), com faixa etária média de idade de 42,1±13,0, raça/cor branca (n=13.053; 59,7%) e com escolaridade de 4 a 7 anos de estudo (n=6.192; 28,3%). O tempo médio de uso da TARV foi de 7,9±2,1 anos, e 49,0% (n=10.718) das PVHA antes do abandono do tratamento estavam com a carga viral indetectável (<50 cópias/mm^3). Em paralelo a isso, foi observado que os participantes da pesquisa que moravam em municípios que não possuíam Unidades Dispensadoras de Medicamentos (UDM) (p<0,02) apresentavam 14,9% (IC 14,5 – 15,3) maior chance de abandonar sua terapia quando comparados aos que residiam em cidades que possuíam serviço de dispensação de antirretrovirais. **Conclusão:** esses achados apontaram que o abandono à TARV por PVHA pode ter uma associação com a distribuição espacial das UDM. Para tanto, descentralizar o acesso aos antirretrovirais é uma estratégia que poderá repercutir positivamente na qualidade de vida e aumentar o tempo de sobrevida dos pacientes da região Sul do Brasil.

Palavras-chave: acesso aos serviços de saúde, adesão a medicamentos, HIV, terapia antirretroviral de alta atividade e síndrome da imunodeficiência.

Introduction

In the face of the Human Immunodeficiency Virus (HIV), the causative agent of the Acquired Immunodeficiency Syndrome (AIDS), Brazil assumed a commitment with the World Health Organization (WHO) to reach the 95-95-95 target by 2030, in which 95% of the people with HIV are diagnosed, 95% of them are on Antiretroviral Therapy (ART) and, 95% of these latter have undetectable viral loads[1]. This situation requires continuous care, incorporating timely diagnosis, bonding, monitoring and periodic examinations of the user, adherence to the treatment and viral load suppression. To achieve these purposes, care and management methodologies must be adopted for shared care with the patients, and this commitment should be extended to society as a whole[2].

As for the factors associated with adherence to the treatment by People Living with HIV/AIDS (PLWHIV), it is possible to observe in the literature that socioeconomic status, stigma, waiting time at the health service, availability of medications, neuropsychological aspects and religiousness, care quality, drug regimen and side effects are conditions that frequently interfere with full adherence to ART[3-5].

Under these aspects, one of the factors that deserves to be highlighted is related to the users' accessibility to their treatment. Thus, access barriers such as PLWHIV commuting to another city to fetch their medications can lead to loss of therapeutic monitoring, as the users are usually responsible for financially paying for their transportation and, in addition, may have their income compromised, particularly for those individuals who work by production or autonomously[6].

According to the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*, IBGE), there were 5,568 municipalities in Brazil as of November 2022. The Northeast region has the largest number of cities, followed by the Southeast, with 1,794 and 1,668, respectively[7]. In the case of the number of Drug Dispensing Units (DDUs) intended for dispensing ART, medications for Opportunistic Infections (OIs) and prevention supplies for HIV, Viral Hepatitis (HV) and other Sexually Transmitted Infections (STIs), there were 1,315 services until November 2022. The South region is one of the ones with the lowest number of DDUs, with 224 units in 179 territories out of a total of 1,191 municipalities, which represents a DDU/municipalities ratio of 1:0.2. However, among the three states of the southern region, PLWHIV undergoing treatment are observed in all territories[8-9].

In addition to that, data from the HIV clinical monitoring, a document published in 2021 by the Department of Chronic Conditions and Sexually Transmitted Infections (*Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis*, DCCI) belonging to the Health Surveillance Department (*Secretaria de Vigilância em Saúde*, SVS) of the Ministry of Health (*Ministério da Saúde*, MS), points out that there were 852,000 PLWHIV up to mid-2021, of which only 700,000 (76%) were on treatment. In the South region, the percentage of individuals diagnosed and on ART was 79%[1]. Thus, considering that the distribution of DDUs in Brazilian cities can be considered a bottleneck in treatment access and retention among users, the current study aimed at verifying the existence of an association between ART abandonment by PLWHIV and non-availability of dispensing services in municipalities located in the Brazilian South region.

Methods

This is a descriptive, exploratory and analytical study, bearing in mind that it was intended to verify the existence of an association between ART abandonment by PLWHIV and the spatial distribution of the DDUs. Thus, the records of users on ART with at least 100 days without receiving medications were included in the descriptive analysis, as part of the methodology used in the paper by Kerbauy *et al*[10]. However, for the univariate analysis, users who were on ART at the DDUs within less than 100 data collection days were considered. The users excluded were those suspected to be dead or who were transferred to DDUs that did not use the Medication Logistic Control System (SICLOM), operational module, as well as PLWHIV living in cities that did not belong to the list of municipalities in the Brazilian South region and individuals who were recorded as deaths in the dispensing system[8].

The data were collected at the Health Surveillance Secretariat (SVS) of the Ministry of Health (MS), through SICLOM, the Clinical Monitoring System of People Living with HIV/AIDS (, SIMC) and the CD4+/CD8+ and HIV Viral Load Laboratory Test Control System (SISCEL); and tabulated in *Microsoft Excel®*, version 2017, from October to November 2022, referring to users diagnosed in the period from 1986 to 2022. The variables selected are described in Chart 1.

Figure 1. Variables selected for data analysis. 2022.

Sociodemographic data	
State	Patient's state of residence: Paraná, Santa Catarina or Rio Grande do Sul
Gender	Male or female
Days in dispensing arrears	Number calculated in days
Municipality of residence	Territory in which the patient lives
City of the drug dispensing unit	Territory where the patient last fetched their antiretrovirals
Date of birth	Date of birth in day, month and year corresponding to the user on antiretroviral therapy
Race/Skin color	White, black, Asian, brown, indigenous, not reported or unknown
Schooling	From 1 to 3 years; from 4 to 7 years; from 8 to 12 years; 12 years or more; not reported or unknown
Street situation	Dummy type variable (Yes/No)
Registration date	Patient registration day in day, month and year
Clinical data	
Co-infected patient	If co-infection with tuberculosis, hepatitis B and/or C
Viral load test	Age group at last viral load test: if <50; 50-1,000 or >1,000 copies/mm³
Last viral load release time	Time, in days, since the last exam was released
Therapeutic scheme	Combination of antiretrovirals dispensed to the user at the last visit to the pharmacy.
Origin of medical monitoring	If public or private

Source: Prepared by the author (2022).

The statistical analysis was performed using the *Statistical Package for the Social Science*® software and described inferentially, using mean, relative and absolute frequencies and standard deviation. In addition to that, a univariate analysis was performed with Pearson's chi-square test or Fisher's exact test to verify the association between ART abandonment and the territorial distribution of DDUs. For this purpose, a *2x2* table was used, where, in the first column, individuals who had abandoned ART (>100 days without fetching their ART supplies) were added; and, in the second column, individuals who were using ART on a regular basis (fetched their ART supplies in the last 100 days), because of those who lived in municipalities where the DDUs were implemented or not. Statistically significant results were those with p-values below 0.05 and 95% confidence intervals (95% CIs).

The Brazilian South was chosen for this study because it is the second region in the country with the smallest number of municipalities and also with the second highest AIDS prevalence, with rates that reached 22%/100,000 inhabitants in 2020[9].

Written informed consent from the individuals, consent from the service coordinators and ethics approval were not required, as this was a retrospective analysis of fully anonymous surveillance data collected during routine monitoring of PLWHIV.

Results

SICLOM returned data from 146,358 PLWHIV undergoing treatment in southern Brazil; however, only 21,861 individuals were included in the descriptive analysis. The mean number of days that users had abandoned ART was 814±831.7, varying from 101 to 4,276. Regarding spatial distribution of the PLWHIV, most of them were from Rio Grande do Sul (n=10,951; 50.1%), followed by the state of Paraná (n=6,166; 28.2%). As for the other sociodemographic characteristics of the individuals, it was observed that the majority were male (n=12,300; 56.4%), lived in the inland (n=15,905; 72.8%), were aged between 30 and 39 years old (n=6,047; 4.1%) with a mean of 42.1±13.0 (varying from 0 to 93), belonged to the white race/skin color (n=13,053; 59.7%) and had from 4 to 7 years of study (n=6,192; 28.3%). Homeless PLWHIV represented 0.9% (n=197) of the study population (Table 1).

In relation to treatment time, records of use starting 36 years ago were found, immediately at the beginning of the HIV/AIDS epidemic in the 80s in Brazil. The mean time since therapy initiation was 7.9±2.1 years. With regard to the origin of medical monitoring, most PLWHIV were treated in the Unified Health System (*Sistema Único de Saúde*, SUS) (n=11,462; 52.4%).

With regard to the clinical data of the individuals, it was observed that the regime most involved in ART abandonment was Tenofovir (TDF) 300 mg + Lamivudine (3TC) 300 mg + Efavirenz (EFZ) 600 mg with 25.4% (n=5,542), followed by TDF 300 mg + 3TC 300 mg and Dolutegravir (DTG) 50 mg with 11.9% (n=2,592), and TDF 300 mg + 3TC 300 mg and Raltegravir (RAL) 400 mg with 6.3% (n=1.387). In all, 74 combinations of antiretrovirals were observed. 49.0% (n=10,718) of the PLWHIV had undetectable viral loads (<50 copies/mm^3) before treatment abandonment. Additionally, 13.8% (n=3,009) of the individuals were co-infected with tuberculosis, 2.8% (n=612) with HBV, 0.3% (n=57) with HCV and six with HIV-HBV-HCV (Table 2).

In addition to that, the main parameter analyzed concerns the locus where the PLWHIV under study fetch their treatment supplies before abandoning it, regarding the DDU arrangement in their territory. Thus, it was revealed that 22.4% (n=4,900) of the participants studied lived in municipalities that did not have any ARV dispensing service. For these individuals, the mean of abandonment provision was 820.5±831.7, higher than the mean for those who lived in municipalities that had DDUs in the health network, which was 811.8±831.5. It was also observed that the individuals who lived in municipalities that did not have DDUs (p<0.002), based on the adjusted Odds Ratio, had 15.5% (CI: 15.1 – 15.9) more chances of abandoning their treatments when compared to those living in cities where DDUs were implemented (Chart 2).

Table 1. Sociodemographic characteristics of the people living with HIV/AIDS abandoning antiretroviral therapy in the Brazilian South region. 2022.

Gender	**n (%)**
Male	12,300 (56.3)
Female	9,561 (43.7)
Total	**21,861 (100.0)**
State of residence	**n (%)**
Paraná	6,166 (28.2)
Rio Grande do Sul	10,951 (50.1)
Santa Catarina	4,744 (21.7)
Total	**21,861 (100.0)**
Place of residence	**n (%)**
Capital city	5,956 (27.2)
Inland	15,905 (72.8)
Total	**21,861 (100.0)**
Age group	**n (%)**
0-9	37 (0.2)
10-19	218 (1.0)
20-29	3,751 (17.2)
30-39	6,067 (27.8)
40-49	5,816 (26.6)
50-59	3,624 (16.6)
60-69	1,673 (7.7)
70-79	534 (2.4)
80+	141 (0.6)
Total	**21,861 (100.0)**
Race/Skin color	**n (%)**
Asian	106 (0.5)
White	13,053 (59.7)
Unknown	216 (1.0)
Indigenous	44 (0.2)
Not reported	2,581 (11.8)
Brown	3,150 (14.4)
Black	2,711 (12.4)
Total	**21,861 (100.0)**
Schooling	**n (%)**
From 1 to 3 years	1,591 (7.3)
From 4 to 7 years	6,192 (28.3)
From 8 to 11 years	5,413 (24.8)
12+ years	2,308 (10.6)
Unknown	581 (2.7)
Not reported	5,776 (26.4)
Total	**21,861 (100.0)**
Street situation	**n (%)**
No	21,664 (99.1)
Yes	197 (0.9)
Total	**21,861 (100.0)**

Source: Prepared by the author (2022).

Table 2. Clinical data of the users abandoning antiretroviral therapy in the Brazilian South region. 2022.

Antiretroviral regime	**n (%)**
TDF 300 mg + 3TC 300 mg + EFZ 600 mg	5,542 (25.4)
TDF 300 mg + 3TC 300 mg + DTG 50 mg	2,592 (11.9)
TDF 300 mg + 3TC 300 mg + RAL 400 mg	1,387 (6.3)
AZT 300 mg + 3TC 150 mg + ATV 300 mg + RTV 100 mg	259 (1.2)
Others	12,081 (55.3)
Total	**21,861 (100.0)**
Last viral load	**n (%)**
<50	10,718 (49.0)
From 51 to 1,000	4,876 (22.3)
>1.000	6,267 (28.7)
Total	**21,861 (100.0)**
TB-HIV co-infection	**n (%)**
Yes	3,009 (13.8)
No	18,852 (86.2)
Total	**21,861 (100.0)**
HBV-HIV co-infection	**n (%)**
Yes	612 (2.8)
No	21,249 (97.2)
Total	**21,861 (100.0)**
HCV-HIV co-infection	**n (%)**
Yes	57 (0.3)
No	21,804 (99.7)
Total	**21,861 (100.0)**

*Acronyms: Tenofovir (TDF); Lamivudine (3TC); Efavirenz (EFZ); Dolutegravir (DTG); Raltegravir (RAL); Zidovudine (AZT); Atazanavir (ATV); Ritonavir (RTV); Tuberculosis (TB); Human Immunodeficiency Virus (HIV); Viral Hepatitis B (HBV); Viral Hepatitis C (HCV). Source: Prepared by the author (2022).

Figure 2. Influence of the presence of a drug dispensing unit on adherence to the antiretroviral therapy, according to whether or not it is available in the municipality of residence of the person living with HIV/AIDS.

ART dispensing	**>100 days without fetching ART supplies**	**<100 days without fetching ART supplies**	**Total**
Resident in a Municipality with no DDU	4,900	26,776	31,676
Resident in a Municipality with a DDU	16,961	97,721	114,682
Total	**21,861**	**124,500**	**146,358**

Pearson's Chi-square or Fisher's Exact tests. p<0.02; Adjusted OR: 15.5% (CI: 15.1 – 16.9). Acronyms: Human Immunodeficiency Virus (HIV); Acquired Immunodeficiency Syndrome (AIDS), Antiretroviral Therapy (ART), Drug Dispensing Unit (DDU).Source: Prepared by the author (2022).

Discussion

Since 2013, the MS has recommended prompt and uninterrupted ART initiation by PLWHIV as one of the combined prevention strategies, as individuals with undetectable viral loads for HIV (<50 copies/mm^3) are non-transmissible, in addition to minimizing complications caused by the infection, such as opportunistic infections associated with AIDS, and contributing to achieving the 95-95-95 targets. Combined prevention is understood as a set of strategies that use different approach modalities to respond to HIV and other STIs. These strategies can be structural, behavioral and biomedical, and can be applied in ways that reach multiple audiences at the individual, social, community and relationship levels[11].

Thus, it was observed that almost 15% of the PLWHIV on ART in the South region did not adhere to the treatment, especially in Rio Grande do Sul, a Brazilian state with significant numbers of HIV/AIDS cases, with abandonment rates that exceeded 50% of the records analyzed. Despite the reduction in mortality with AIDS as the underlying cause over the years due to prompt diagnosis, with the possibility of immediate ART initiation regardless of the viral load for HIV and the levels of CD4-T lymphocytes, in 2020 Rio Grande do Sul had a mortality rate of 7.2/100,000 inhabitants, the highest in Brazil, and 3.1 times higher than that of Acre, the state with the lowest rate, with 2.3/100,000 inhabitants[9].

In addition to that, it was noticed that the individuals who most abandoned their treatments are predominantly young adults, male, living in the inland of the state and with low schooling levels (from 4 to 7 years of study). It should be noted that the highest number of HIV/AIDS notifications in males follows the prevalence of the distribution of cases at the global and national levels, with 64% and 65.3% of the notifications in men, respectively. In the country, the detection rate for this group has tended to increase, reaching 25.8/100,000 inhabitants[12].

In addition, men are historically less likely to take care of their health. In general, men's lifestyle and health behaviors would be strongly influenced by cultural issues, which would put them at a greater risk when compared to women[13]. The individuals' young age is also highlighted, corroborating other studies that found similar results[14-15].

With regard to the participants' low schooling levels, according to Souza *et al.*[13], higher schooling favors understanding of the pathology and drug therapy, reflecting in greater adherence to the treatment, which was also observed in the research by Myiada *et al.*[16]. On the other hand, low schooling levels have shown a change in the profile of the infected patients and a relationship not only with adherence to the treatment, but also with the virus infection itself[13].

Another important element is the users' time since ART initiation, with individuals who started their treatment immediately after the notification of the first HIV/AIDS cases in Brazil. A Brazilian cohort study estimated a mean survival of 5 months for cases diagnosed in the 1980s, 18 months for those diagnosed in 1995 and 58 months for those diagnosed in 1996, whereas a study carried out in 2021 in the state of Alagoas revealed a median survival of 98 months[17-18]. The increase in PLWHIV survival over the years can be related to the HIV diagnosis expansion, to rapid ART initiation, and to the high effectiveness of the therapeutic regimens[19].

In relation to the schemes used by the patients before abandonment, it was identified that the most involved one, according to the current recommendations set forth by the Ministry of Health, was the first-line treatment for adults living with HIV/AIDS co-infected by tuberculosis without severity criteria; TDF 300 mg + 3TC 300 mg + EFZ 600 mg, with severity criteria for tuberculosis, such as users with CD4<200 cells/mm^3; TDF 300 mg + 3TC 300 mg and RAL 400 mg, children (from 6 years old onwards) and adults living with HIV/AIDS; characterized by the TDF + 3TC and DTG scheme[11]. It should also be noted that the TDF 300 mg + 3TC 300 mg + EFZ 600 mg regime is safe and effective in PLWHAIV co-infected with HBV, with the ability to suppress the viral load of the agents involved in both infections[20]. In addition to that, the diversity of schemes that were used by the users also draws the attention.

With regard to the high number of PLWHIV co-infected with tuberculosis, it is also worth emphasizing that tuberculosis is the

most common opportunistic infection in PLWHIV, with a high risk of disease progression. Thus, untreated HIV infection results in a progressive reduction in the CD4-T cell count, which increases the risk of active tuberculosis progression. In turn, tuberculosis can exacerbate the HIV infection, as an increase in HIV viral load in the lungs, blood and cerebrospinal fluid has been observed in PLWHIV co-infected with tuberculosis, considerably increasing the risk of death if the person's clinical condition is not timely reversed[21].

Additionally, another aspect that drew the attention and which is worrying at the same time is the fact that most users abandoning ART, at the time, had undetectable viral loads. This allows inferring that the users' good clinical status can give them the feeling of controlling the infection, to the point of neglecting its treatment, which is common in diseases with a chronic profile with remission of symptoms[22]. This result corroborates the findings of Candido *et al.*, who identified the sociodemographic profile and the ART adherence level of women assisted at a reference unit in the inland of Pará, North of Brazil[23].

In parallel, it was evidenced that individuals who live in territories where ART is not available may have their full adherence to the treatment impaired. Considering this context, according to Folayan *et al.*, the need to commute to other cities to fetch their treatment supplies and, consequently, the transportation costs are one of the causes that lead to abandoning the therapy[24]. However, for Onwujekwe *et al*., among the main limiting factors for achieving universal ART coverage is the centralization of dispensing units in secondary- and tertiary-level services, mainly located in large centers. Efficient decentralization of DDUs is recommended as a key strategy for improving access to the treatment[25]. Therefore, despite the stigma and discrimination commonly reported by PLWHIV with regard to their serological status, perhaps having dispensing points closer to the users will reduce the barriers to accessing the treatment. In view of this, the MS provides ART dispensing points in services that serve a minimum of 50 users[26].

These results point to the importance of the participation of Primary Health Care (PHC) services in controlling the morbidity and mortality associated with the infection, especially considering the chronic profile that the infection started to present from 2013, when ART was recommended for all PLWHIV regardless of viral loads and/or CD4 counts. In Nigeria, to achieve geographic accessibility to HIV/AIDS care services, care was decentralized to PHC services[27]. In Brazil, from 2013 onwards, the Ministry of Health also started to implement guidelines and recommendations to encourage monitoring of low-risk PLWHIV in PHC. Some municipalities with large PHC investments and structuring, such as Curitiba and Rio de Janeiro, effectively started to decentralize the care provided to PLWHIV to basic care services. This has enabled PHC to provide services that were previously only seen at the secondary and tertiary levels[17,28].

Some limitations of this study should be noted. The data used are based on information system records and, therefore, there is a possibility of case underreporting and of inaccurate quality. The incompleteness and absence of other personal information prevented other variables from being included in the analysis. Despite this, data was surveyed from a representative sample of abandoning users, with evident significant results. This information can serve as a basis for comparison with other studies and for planning strategies linked to health policies. For future studies, is suggested to investigate the influence of the distance traveled by users abandoning ART.

Conclusion

The findings showed that there may be an association between ART abandonment among PLWHIV living in municipalities where DDUs are not implemented, when compared to those from municipalities where ARV dispensing services are readily available. In this regard, and in order to extend the survival time of PLWHIV in southern Brazil, it is suggested to decentralize access to the treatment to other points of care, such as Primary Health Care, which may exert an impact on PLWHIV's quality of life, as well as contributing to achieving the 95-95-95 targets in Brazil, especially retention in treatment, and attaining and maintaining suppressed viral loads. It is also worth noting the importance of pharmacists and other actors involved in health care in the active search for these users and in their reconnection to health services.

Funding sources

There was no funding aid for conducting this research.

Collaborators

FAPF participated in the following steps: choice of topic and research design; data survey and interpretation and writing of the article. RSS collaborated with statistics, interpretation of the results, writing of the article and relevant critical review of the intellectual content.

Declaration of conflicts of interest

The authors declare that there are no conflicts of interests in relation to this article.

References

1. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis. Relatório de monitoramento clínico do HIV 2021. Brasília: Ministério da Saúde. 2022. 153 p. [internet]. Accessed jan 03, 2023. https://bvsms.saude.gov.br/bvs/publicacoes/relatorio_monitoramento_clinico_hiv_2021.pdf.
2. Miranda MMF, Oliveira DR, Quirino GS, *et al*. Adesão à terapia antirretroviral por adultos vivendo com HIV/AIDS: um estudo transversal. Rev Bras Enferm. 2022; 75(2): 1-9. doi:10.1590/0034-7167-2021-0019.
3. Reif LK, Abrams EJ, Arpadi S, *et al*. Interventions to Improve Antiretroviral Therapy Adherence Among Adolescents and Youth in Low- and Middle-Income Countries: A Systematic Review 2015-2019. AIDS Behav. 2020; 24(10): 2797-2810. doi: 10.1007/s10461-020-02822-4.
4. Carvalho PP, Barrroso SM, Coelho HC, *et al*. Fatores associados à adesão à terapia antirretroviral em adultos: revisão integrativa de literatura. Cienc. saúde colet. 2019; 24(7): 2543-2555. doi: 10.1590/1413-8123201 8247.22312017.
5. Kalichman SC, Kalichman MO, Cherry C. Forget about forgetting: structural barriers and severe non-adherence to antiretroviral therapy. AIDS Care. 2016; 29(4): 418-422. doi: 10.1080/09540121.2016.1220478.

6. Bueno MAM, Simões TC, Luz TCB. Diferenças na disponibilidade de medicamentos prescritos na Atenção Primária: evidências do Projeto Prover. Ciênc. saúde coletiva. 2022; 27(03): 1191-1203. doi: 10.1590/1413-81232022273.38782020.

7. Brasil. Instituto Brasileiro de Geografia e Estatística. Cidades. 2023. [internet]. Accessed dec 22, 2022. https://cidades.ibge.gov.br/.

8. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis. Consulta uma UDM. 2022a. [internet]. Accessed nov 20, 2022. http://azt.aids.gov.br/.

9. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis. Boletim epidemiológico HIV/AIDS 2021.Brasília: MS. 2021.72 p. [internet]. Accessed dec 02, 2022. https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/epidemiologicos/especiais/2021/boletim-epidemiologico-especial-hiv-aids-2021.pdf/view.

10. Kerbauy G, Amaral VM, Nascimento JVS, *et al*. Pessoas vivendo com HIV em abandono do tratamento: resgate e promoção da saúde. Braz J Infect Dis. 2022; 26(2). doi: 10.1016/j.bjid.2022.102463.

11. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/AIDS e das Hepatites Virais. Protocolo Clínico e Diretrizes Terapêuticas para Manejo da Infecção pelo HIV em Adultos. Brasília: Ministério da Saúde, 2018. 412 p.

12. Joint United Nations Programme on HIV/AIDS. Blind spot: reaching out to men and boys. 2017. [internet]. Accessed dec, 2022. http://www.unaids.org/sites/default/files/media_asset/ blind_ spot_en.pdf.

13. Souza HC, Mota MR, Alves AR. Análise da adesão ao tratamento com antirretrovirais em pacientes com HIV/AIDS. Ver. Bras. Enferm. 2019; 72(5): 1295-1303. doi: 10.1590/0034-7167-2018-0115.

14. Benzaken AS, Oliveira MCP, Pereira GFM, *et al*. Presenting national HIV/ AIDS and sexually transmitted disease research in Brazil. Medicine. 2018; 97(1):S1-S2.14. doi: 10.1097/MD.0000000000010109.

15. Fontes MB, Crivelaro RC, Scartezini AM, *et al*. Determinant factors of knowledge, attitudes and practices regarding STD/AIDS and viral hepatitis among youths aged 18 to 29 years in Brazil. Ciênc. Saúde Coletiva. 2017; 22(4):1343-52. doi: 10.1590/1413-81232017224.12852015.

16. Miyada S, Garbin AJI, Colturato R, *et al*. Treatment adherence in patients living with HIV/AIDS assisted at a specialized facility in Brazil. Rev Soc Bras Med Trop. 2017; 50(5): 607-12. doi: 10.1590/0037-8682-0266-2017.

17. Melo GC, Carvalho ACA, Moreira AS, *et al*. Survival time and distance to access specialized treatment among people living with HIV/AIDS in the state of Alagoas, Brazil. Rev. bras. Epidemiol. 2021; 24 (suppl 1). doi:10.1590/1980549720210019.

18. Marins JR, Jamal LF, Chen SY, *et al*. Dramatic improvement in survival among adult Brazilian AIDS patients. AIDS. 2003; 17(11): 1675-82. doi: 10.1097/00002030-200307250-00012.

19. Zuber JFS, Muller EV, Borges PKO. Sobrevida de pessoas vivendo com HIV/AIDS na região dos Campos Gerais, Paraná 2008-2018. Research, Society and Development. 2021; 10(1). doi: 10.33448/rsd-v10i1.11444.

20. Amariles P, Galindo J, Mueses-Marin HF, *et al* . Efectividad y seguridad del esquema genérico lamivudina/tenofovir y efavirenz en pacientes con VIH/SIDA naïve: estudio fase IV no aleatorizado, Cali-Colombia 2012-2014. Rev. chil. Infectol. 2019; 36(1): 32-4.

21. Hamada Y, Getahun H, Tadesse BT, *et al*. HIV-associated tuberculosis. Int J STD AIDS. 2021; 32(9): 780-790. doi: 10.1177/0956462421992257.

22. Medeiros, LB. Fatores influentes no abandono do acompanhamento clínico ambulatorial por pessoas vivendo com HIV/Aids. Dissertação (Mestrado) – Programa de Pós-graduação em Modelos de Decisão e Saúde - Universidade Federal da Paraíba. 2016. 126 f.

23. Candido PGG, Amador BM, Silva FF, *et al*. Adherence to antiretroviral therapy among women living with HIV/AIDS in the interior of the Brazilian state of Pará: cross-sectional study. Sao Paulo Med J. 2021; 139(2): 99-106. doi: 10.1590/1516-3180.2020.0370.R1.18112020.

24. Folayan MO, Aliyu S, Oginni A, *et al*. Effectiveness of three delivery models for promoting access to pre-exposure prophylaxis in HIV-1 serodiscordant couples in Nigeria. PLoS One. 2022, 17(5): e0268011. doi: 10.1371/journal.pone.0268011.

25. Onwujekwe O, Chikezie I, Mbachu C, *et al*. Investigating client perception and attitude to decentralization of HIV/AIDS treatment services to primary health centres in three Nigerian states. Health Expect. 2016, (5): 1111-20. doi: 10.1111/hex.12403.

26. Brasil. Ministério da Saúde. Portaria Conjunta nº 1, de 16 de janeiro de 2013. Dispõe sobre a altera na tabela de Serviço Especializado no Sistema de Cadastro Nacional de Estabelecimentos de Saúde (SCNES), o Serviço 106 de Atenção a DST/HIV/AIDS, e institui o regulamento de serviços de atenção às DST/HIV/AIDS, que define suas modalidades, classificação, organização das estruturas e o funcionamento. Diário Oficial da União. 17 de janeiro de 2013. Accessed jan 04, 2023. https://www.saude.sc.gov.br/index.php/informacoes-gerais-documentos/assistencia-farmaceutica/componente-estrategico/informes/10587-portaria-conjunta-n-01-2013-sas-svs-ms/file.

27. Oleribe OO, Oladipo OA, Ezieme IP, *et al*. From decentralization to commonization of HIV healthcare resources: keys to reduction in health disparity and equitable distribution of health services in Nigeria. Pan Afr Med J. 2016; 24. doi: 10.11604/pamj.2016.24.266.6286.

28. Colaço AD, Meirelles BHS, Heidemann ITSB, *et al*. O cuidado à pessoa que vive com HIV/AIDS na atenção primária à saúde. Texto Contexto Enferm. 2019, 28: 1-14. doi: 10.1590/1980-265X-TCE-2017-0339.