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Adherence to antiretroviral therapy during the COVID-19 pandemic in a referral service

Adesão à terapia antirretroviral durante a pandemia de COVID-19 em um serviço de referência

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ABSTRACT
Objective: Evaluate the impact of the pandemic on adherence to antiretroviral therapy in people living with HIV. Method: An observational study was conducted, using data from the Medication Logistics Control System and physical records of 117 patients from a pharmacy linked to a tertiary hospital. Two periods were examined, one pre-pandemic and one during the COVID-19 pandemic. Adherence to antiretroviral therapy was assessed by comparing medication withdrawal with the expected time frame. Results: The majority of patients were adherent before (60.7%) and during (62.4%) the pandemic. Most patients maintained undetectable viral load and LT-CD4+ count above 350 cells/mm³ in both periods. Conclusion: the COVID-19 pandemic did not negatively impact adherence to antiretroviral therapy, and there was no difference in viral and immunological parameters before and during the COVID-19 pandemic.

Keywords: HIV. Antiretroviral Therapy, Highly Active. Medication Adherence. COVID-19.

RESUMO
Objetivo: Avaliar o impacto da pandemia de COVID-19 na adesão à terapia antirretroviral em pessoas vivendo com HIV. Método: Um estudo observacional foi conduzido, utilizando dados do Sistema de Controle Logístico de Medicamentos e prontuários físicos de 117 pacientes de uma farmácia vinculada a um hospital terciário. Dois períodos foram examinados, sendo um pré-pandemia e um durante a pandemia de COVID-19. A adesão ao tratamento foi avaliada comparando a data de retirada dos antirretrovirais e a data esperada para esta retirada. Resultados: A maioria dos pacientes foi aderente antes (60,7%) e durante (62,4%) a pandemia e a maioria manteve a carga viral indetectável e contagem de LT-CD4+ acima de 350 células/mm³ nos dois períodos. Conclusão: a pandemia de COVID-19 não impactou negativamente a adesão à terapia antirretroviral neste serviço, e não houve diferença nos parâmetros virais e imunológicos antes e durante a pandemia de COVID-19.

Palavras-chave: HIV. Terapia Antirretroviral de Alta Atividade. Adesão à Medicação. COVID-19.

INTRODUCTION

The human immunodeficiency virus (HIV) is a retrovirus that has had a significant impact on global health since its discovery[1,2]. This pathogen is responsible for causing immunological changes that may lead to the development of Acquired Immunodeficiency Syndrome (AIDS), a condition characterized by an LT-CD4+ count below 200 cells/mm^3 and the emergence of opportunistic infections[3].

Although there was a decrease in the global disease burden between 2010 and 2021, it still ranks 24th among leading causes of disability worldwide. Furthermore, it remains among the top ten causes of disability in countries with a low Human Development Index (HDI), which demonstrates its continued relevance in the context of global health, despite the progress made in the last decade[4]. It is estimated that 39 million people live with HIV worldwide, and as of 2010, only 7.7 million had access to treatment, while currently, 29.8 million receive antiretroviral therapy (ART). Moreover, among patients receiving ART, 93% achieved viral suppression, which highlights the importance of this therapy. In Brazil, from 2007 to June 2023, a total of 489,594 cases of HIV infection were reported in the Notifiable Diseases Information System (Sistema de Informação de Agravos de Notificação – SINAN) in Brazil, with the Southeast region being the most affected, with 203,227 (41.5%) cases, followed by the Northeast region, with 104,251 (21.3%)[5].

In the context of people living with HIV (PLHIV), health promotion and disease prevention take on a more critical role and comprise key pillars in health management. They involve integrated strategies that articulate health system policies and technologies to face contemporary epidemiological and sociopolitical challenges[6]. Among these technologies is access to antiretroviral therapy, which allows viral load (VL) suppression, a situation in which the viral load is less than 50 copies/mL. Viral suppression eliminates the risk of sexual transmission of the virus, in accordance with the principle "undetectable is equivalent to untransmissible" and allows people living with HIV to have a better quality of life. Worldwide, around 21 million AIDS-related deaths were avoided between 1996 and 2022 thanks to ART[1].

Despite the increase in the number of cases of HIV infection, the AIDS detection rate has been decreasing in Brazil since 2013. The detection rate in 2013 was 21.8 cases per 100,000 inhabitants and, in 2020, 14.4 cases per 100,000 inhabitants, the lowest value observed since the 1990s. This reduction may be partly due to the effects of underreporting of cases caused by the COVID-19 pandemic[5], which destabilized the health services necessary for the treatment and prevention of HIV[7]. This had a likely impact on adherence to ART, as the relationship with health professionals, as well as the insertion of these users in the health system are predictors of adherence and were harmed by the pandemic[7].

Studies to assess factors that resulted in adherence to ART during the COVID-19 pandemic were carried out in a number of countries[8], demonstrating the relevance of the topic. In this context, it is important to consider the normal flow of care for PLHIV, which consists of: diagnosis, reception, medical consultation, dispensing of ART, and, after treatment, undetectable viral load. Nevertheless, if there are gaps in any of these stages, as was In the case of the COVID-19 pandemic, there may be treatment failure and loss of follow-up[9].

Therefore, the purpose of this study was to assess the impact of the COVID-19 pandemic on adherence to ART in PLHIV in a reference service, as well as carrying out a survey of the clinical and sociodemographic characteristics of the study population, in order to verify whether there is a relationship between these characteristics and adherence to ART. The purpose was also to compare viral load and LT-CD4+ count before and during the COVID-19 pandemic.

METHODOLOGY

This is an observational study, with retrospectively-collected data from physical records and from the Medication Logistics Control System (*Sistema de Controle Logístico de Medicamentos* – SICLOM).

The initial study population is composed of 215 individuals who receive antiretroviral medication at the pharmacy of a tertiary referral hospital located in the interior of the State of São Paulo, Brazil. The study included individuals over 18 years of age, previously diagnosed with HIV and receiving ART at the pharmacy of this tertiary hospital. Patients who did not have at least one LT-CD4 and viral load count prior to the period assessed were excluded from the study, as were those who had not been receiving ART for at least two years or who had not discontinued the medication for more than two years.

The period defined for collection was divided into two parts, being a pre-pandemic period, from April 1, 2019 to March 31, 2020, and a period during the COVID-19 pandemic, from April 1, 2020 to 31 March 2021.

Patient adherence to ART during the COVID-19 pandemic was assessed by comparing the date of antiretroviral discontinuation and the expected date for such discontinuation. Based on that, patients who discontinued antiretroviral therapy on the expected date or up to seven days after this date, and who had no interruptions in treatment until the day of data collection, were classified as "adherent to therapy." Conversely, patients who did not discontinue their medications on the expected date or within seven days and those who abandoned drug therapy for a period of time were classified as "non-adherent to treatment."

Patient information was collected using an adapted data collection instrument[10]. This data collection instrument is divided into two stages, the first of which contains items on sociodemographic characteristics (age, sex, marital status, education, and occupation), while the second contains information on clinical aspects (source of infection, time of HIV diagnosis, case of AIDS, viral load, LT-CD4+, and previous history of opportunistic infection).

Qualitative variables were described by relative (%) and absolute (N) frequency distribution. In order to test the differences in the distribution of proportions between the categories of a variable, the Chi-square test was performed. The association between qualitative variables was analyzed using Fisher's exact test with post-hoc comparisons and the Bonferroni correction. In order to test differences in proportion distribution between moments before and during the pandemic, the McNemar test was performed for dichotomous variables and the McNemar-Bower symmetry test for variables with more than two categories (non-binary ordinals). The significance level adopted was 5% (p-value$\leq$0.050) and the data were analyzed using the SPSS software program (version 24.0).

This study complies with the ethical principles in research, in accordance with CNS Resolution 466/2012, having been submitted and approved by the Ethics and Research Committee (*Comitê de Ética e Pesquisa* – CEP) of the Marília Medical School (*Faculdade de Medicina de Marília* – FAMEMA), with Opinion number 5,138,166, on December 1, 2021.

RESULTS

The final study sample consisted of 117 individuals, as 83 patients were removed based on the exclusion criteria, plus another 15, which resulted from deaths that occurred before the COVID-19 pandemic period.

The data analyzed provide an in-depth perspective on socioeconomic and clinical characteristics and adherence to antiretroviral therapy (ART) before and during the COVID-19 pandemic, from a set of predominantly male participants (64.1%), aged 40 to 59 years old (59%), white (65%), single (34.2%), with incomplete primary education (30.8%), and with an occupation (57.3%). Nevertheless, the analysis of associations between sociodemographic variables and adherence to ART reveals a more complex picture. Fisher's exact tests indicate that there was no significant association between age group, sex, color, marital status, education and occupation regarding adherence to ART before the pandemic (all with p-value$>$0.05). A similar pattern remained during the COVID-19 pandemic period, where, again, none of the sociodemographic variables analyzed showed a significant association with treatment adherence (all with p-value$>$0.05).

Table 1. Association between sociodemographic data and adherence to Antiretroviral Therapy before and during the COVID-19 pandemic.

Variables	N (%)	Adherence		p-value	Adherence		p-value
Age		Yes (%)	No (%)		Yes (%)	No (%)	
18-39	21 (17.9)	14 (19.7)	7 (15.2)	0.867	14 (19.2)	7 (15.9)	0.931
40-59	69 (59)	41 (57.7)	28 (60.9)		42 (57.5)	27 (61.4)	
> 59	27 (23.1)	16 (22.5)	11 (23.9)		17 (23.3)	10 (22.7)	
Sex							
Male	75 (64.1)	49 (69)	26 (56.5)	0.236	48 (65.8)	27 (61.7)	0.693
Female	42 (35.9)	22 (31)	20 (43.5)		25 (34.2)	17 (38.6)	
Color							
White	76 (69.7)	47 (70.1)	29 (69)	0.808	51 (75)	25 (61)	0.170
Brown	25 (22.9)	16 (23.9)	9 (21.4)		14 (20.6)	11 (26.8)	
Black	8 (7.3)	4 (6)	4 (9.5)		3 (4.4)	5 (12.2)	
M. Status							
Single	40 (37.4)	28 (44.4)	12 (27.3)	0.183	28 (42.4)	12 (29.3)	0.393
Stable Union	5 (4.7)	1(1.6)	4 (9.1)		3 (4.5)	2 (4.9)	
Married	31 (29)	16 (25.4)	15 (34.1)		15 (22.7)	16 (39)	
Divorced	14 (13.1)	9 (14.3)	5 (11.4)		10 (15.2)	4 (9.8)	
Widow(er)	17 (15.9)	9 (14.3)	8 (18.2)		10 (15.2)	7 (17.1)	
Education							
No education	1 (1.2)	0 (0)	1 (3)	0.758	1 (1.9)	0 (0)	0.976
IEE	15 (17.6)	8 (15.4)	7 (21.2)		9 (17.3)	6 (18.2)	
CEE	36 (42.4)	22 (42.3)	14 (42.4)		21 (40.4)	15 (45.5)	
ISE	4 (4.7)	2 (3.8)	2 (6.1)		2 (3.8)	2 (6.1)	
CSE	22 (25.9)	15 (28.8)	7 (21.2)		14 (26.9)	8 (24.2)	
CHE	7 (8.2)	5 (9.6)	2 (6.1)		5 (9.6)	2 (6.1)	
Occupation							
Yes	67 (66.3)	43 (67.2)	24 (64.9)	0.830	43 (65.2)	24 (68.6)	0.826
No	34 (33.7)	21(32.8)	13 (35.1)		23 (34.8)	11 (31.4)	

Source: Author's own work

Notes: p-value calculated by Fisher's exact test for association

IEE: Incomplete Elementary Education; CEE: Complete Elementary Education; ISE: Incomplete Secondary Education; CSE: Complete Secondary Education; CHE: Complete Higher Education

Regarding clinical aspects, sexual transmission was identified as the main source of HIV infection (25.6%). It was observed that a significant proportion of individuals have been diagnosed with HIV for more than 10 years (32.5%), with a high prevalence of a history of AIDS (73.5%) and opportunistic infection (56.4%). The majority of participants have been receiving ART for more than 10 years (46.2%) and follow regimens with one or two treatment plans (32.5% each). These data highlight the stability in the treatment of most individuals, also reflected in the low viral loads (<50 copies/ml) and high counts of LT-CD4+ (>350 cells/mm³), both before (89.7% and 77.8%, respectively) and during the pandemic (67.5% and 52.1%, respectively). Regarding the test, a similar pattern was maintained in the analysis of sociodemographic characteristics, in which none of the variables presented demonstrated a significant association with treatment adherence (all with p-value>0.05).

Table 2. Association between clinical data and adherence to Antiretroviral Therapy before the COVID-19 pandemic.

Variables	Categories	Adhesion before the pandemic		Total	p-value (a)
		Yes (%)	No (%)		
Source of infection	Sexual	14 (87.5)	16 (84.2)	30 (85.7)	0.201
	Injectable drugs	0 (0)	1 (5.3)	1 (2.9)	
	Transfusion	2 (12.5)	0 (0)	2 (5.7)	
	Others	0 (0)	2 (10.5)	2 (5.7)	
Time since diagnosis	2-5 years	8 (11.3)	4 (8.7)	12 (10.3)	0.643
	6-10 years	25 (35.2)	13 (28.3)	38 (32.5)	
	> 10 years	38 (53.5)	29 (63)	67 (57.3)	
AIDS	Yes	50 (70.4)	36 (78.3)	86 (73.5)	0.397
	No	21 (29.6)	10 (21.7)	31 (26.5)	
ART	2-5 years	9 (12.7)	7 (16.3)	16 (14.0)	0.898
	6-10 years	28 (39.4)	16 (37.2)	44 (38.6)	
	> 10 years	34 (47.9)	20 (46.5)	54 (47.4)	
Number of plans	1	27 (38.0)	11 (25.6)	38 (33.3)	0.583
	2	22 (31.0)	16 (37.2)	38 (33.3)	
	3	8 (11.3)	5 (11.6)	13 (11.4)	
	> 3	14 (19.7)	11 (25.6)	25 (21.9)	
Viral load before the pandemic	< 50	68 (95.8)	37 (80.4)	105 (89.7)	0.018
	50-100K	3 (4.2)	7 (15.2)	10 (8.5)	
	> 100K	0 (0)	2 (4.3)	2 (1.7)	
LT-CD4+ before the pandemic	< 200	3 (4.2)	4 (8.7)	7 (6.0)	0.416
	200-350	10 (14.1)	9 (19.6)	19 (16.2)	
	> 350	58 (81.7)	33 (71.7)	91 (77.8)	
ART interruption before the pandemic	Yes	12 (20.7)	14 (35.0)	26 (26.5)	0.162
	No	46 (79.3)	26 (65.0)	72 (73.5)	
Opportunistic infection	Yes	38 (56.7)	28 (63.6)	66 (59.5)	0.555
	No	29 (43.3)	16 (36.4)	45 (40.5)	

Source: Author's own work
Note: a. Fisher's exact test for association

Table 3. Association between clinical data and adherence to Antiretroviral Therapy during the COVID-19 pandemic.

Variables	Categories	Adherence during the pandemic		Total (%)	p-value (a)
		Yes (%)	No (%)		
Source of infection	Sexual	16 (88.9)	14 (82.4)	30 (85.7)	0.168
	Injectable drugs	0 (0.0)	1 (5.9)	1 (2.9)	
	Transfusion	2 (11.1)	0 (0.0)	2 (5.7)	
	Others	0 (0.0)	2 (11.8)	2 (5.7)	
Time since diagnosis	2-5 years	9 (12.3)	3 (6.8)	12 (10.3)	0.497
	6-10 years	25 (34.2)	13 (29.5)	38 (32.5)	
	> 10 years	39 (53.4)	28 (63.6)	67 (57.3)	
AIDS	Yes	48 (65.8)	38 (86.4)	86 (73.5)	0.017
	No	25 (34.2)	6 (13.6)	31 (26.5)	
ART	2-5 years	9 (12.5)	7 (16.7)	16 (14.0)	0.833
	6-10 years	28 (38.9)	16 (38.1)	44 (38.6)	
	> 10 years	35 (48.6)	19 (45.2)	54 (47.4)	
Number of plans	1	25 (34.7)	13 (31.0)	38 (33.3)	0.858
	2	22 (30.6)	16 (38.1)	38 (33.3)	
	3	8 (11.1)	5 (11.9)	13 (11.4)	
	> 3	17 (23.6)	8 (19.0)	25 (21.9)	
Viral load during the pandemic	< 50	57 (89.1)	22 (81.5)	79 (86.8)	0.042
	50-100K	7 (10.9)	2 (7.4)	9 (9.9)	
	> 100K	0 (0.0)	3 (11.1)	3 (3.3)	

LT-CD4+ during the pandemic	< 200	1 (1.9)	1 (4.0)	2 (2.6)	0.061
	200-350	7 (13.2)	8 (32.0)	15 (19.2)	
	> 350	45 (84.9)	16 (64.0)	61 (78.2)	
ART interruption during the pandemic	Yes	2 (4.3)	9 (30.0)	11 (14.3)	0.003
	No	45 (95.7)	21 (70.0)	66 (85.7)	
Opportunistic infection	Yes	40 (58.0)	26 (61.9)	66 (59.5)	0.696
	No	29 (42.0)	16 (38.1)	45 (40.5)	

Source: Author's own work
Note: a. Fisher's exact test for association

Conversely, during the COVID-19 pandemic period, viral load, history of AIDS and history of treatment interruption were significantly associated with adherence to ART. Regarding viral load, both adherent and non-adherent patients presented mainly undetectable viral load, i.e., less than 50 copies/mL. ART interruption during the pandemic was more common among patients considered non-adherent to treatment.

Table 4. Adherence to Antiretroviral Therapy before and during the COVID-19 pandemic.

Adherence to ART	Categories	N	%	p-value
Before the pandemic	Yes	71	60.7	0.021
	No	46	39.3	
Pandemic	Yes	73	62.4	0.007
	No	44	37.6	

Source: Author's own work
Note: Chi-square test for proportion

Regarding adherence to ART (Table 4), most participants were considered adherent to treatment before (60.7%) and during the COVID-19 pandemic (62.4%). In contrast, when analyzing clinical data related to adherence to ART before the COVID-19 pandemic, it was possible to observe a significant singularity, i.e., viral load. Fisher's exact test showed that viral load had a statistically significant association with treatment adherence (p-value=0.018). This can be interpreted as individuals with a higher viral load may be more aware or motivated to strictly adhere to antiretroviral treatment to avoid adverse health progressions. Nevertheless, other clinical variables did not demonstrate significant associations.

Conversely, analysis of clinical data during the pandemic revealed multiple variables with significant associations regarding adherence to ART. History of AIDS (p=0.017), viral load (p=0.042) and history of treatment interruption before the pandemic (p=0.003) emerged as significantly associated factors. These results indicate that, in the context of the pandemic, a number of multifaceted interactions influenced adherence to treatment.

The analysis of the discordance of paired data in qualitative variables was carried out using the McNemar Bowker symmetry test.

Table 5. Discordance of paired data on the Viral Load (VL) count variable before and during the COVID-19 pandemic.

			VL before the pandemic			Total	**p-valor**
			<50	50 – 100K	>100K		
Pandemic VL	<50	N	75	4	0	79	**0,348**
		%	82,4%	4,4%	0,0%	86,8%	
	50 – 100K	N	5	4	0	9	
		%	5,5%	4,4%	0,0%	9,9%	
	>100K	N	2	0	1	3	
		%	2,2%	0,0%	1,1%	3,3%	
Total		*N*	*82*	*8*	*1*	*91*	
		%	*90,1%*	*8,8%*	*1,1%*	*100,0%*	

Source: Author's own work
Note: p-value calculated using the McNemar-Bowker symmetry test.
Percentage calculated for the total.

Table 6. Discordance of paired data on the LT-CD4+ count before and during the COVID-19 pandemic.

			LT-CD4+ before the pandemic			Total	**p-valor**
			<200	200-350	>350		
Pandemic LT-CD4+	<200	N	1	1	0	2	**0,565**
		%	1,3%	1,3%	0,0%	2,6%	
	200-350	N	3	9	3	15	
		%	3,8%	11,5%	3,8%	19,2%	
	>350	N	0	4	57	61	
		%	0,0%	5,1%	73,1%	78,2%	
Total		*N*	*4*	*14*	*60*	*78*	
		%	*5,1%*	*17,9%*	*76,9%*	*100,0%*	

Source: Author's own work
Note: p-value calculated using the McNemar-Bowker symmetry test.
Percentage calculated for the total.

Table 7. Discordance of paired data on adherence to Antiretroviral Therapy before and during the COVID-19 pandemic.

			Treatment unterruotion (before the pandemic)		Total	**p-valor**
			Yes	No		
Treatment interruption (pandemic)	Yes	N	8	1	9	**0,010***
		%	10,8%	1,4%	12,2%	
	No	N	9	56	65	
		%	12,2%	75,7%	87,8%	
Total		*N*	*17*	*57*	*74*	
		%	*23,0%*	*77,0%*	*100,0%*	

Source: Author's own work
Notes: p-value calculated using the McNemar-Bowker symmetry test.
* Indicates significant difference in the distribution of proportions between moments using the McNemar test for p-value≤0.050.
Percentage calculated for the total.'

The LT-CD4+ count was analyzed using the following categories: <200, 200-350, and >350 (Table 5). Stability was also a major factor, with 73.1% of individuals maintaining a count above 350 in both periods. Similar to the behavior of viral load, there was variability, with seven individuals increasing and four decreasing their LT-CD4+ counts during the pandemic (Table 6).

Regarding the history of ART interruption (Table 7), 75.7% of individuals did not interrupt treatment in any of the periods analyzed. Nevertheless, 12.2% of participants with no history of discontinuation before the pandemic discontinued treatment during the pandemic. Additionally, 1.4% of individuals who had interrupted ART before the pandemic did not do so during the pandemic period. The p-value of 0.010 revealed a statistically significant difference, indicating a relevant impact of the pandemic on the continuity of antiretroviral treatment.

In addition to the above, a significant exchange was observed between adherence states: 10 individuals who were adherent to treatment before the pandemic became non-adherent, while 12 who were non-adherent became adherent during the pandemic. The p-value of 0.154 did not indicate a significant difference in the proportion of adherence between the periods, which suggests that, despite a number of individual movements, adherence to treatment as a whole was not significantly affected by the pandemic.

DISCUSSION

The profile found is in line with what is observed in most studies that analyze the sociodemographic characteristics of people living with HIV (PLHIV). In 2020, a ratio between male and female cases of 2.8[5] was found. Such results corroborate other Brazilian studies conducted in different regions of the country, which found similar data in relation to the predominance of males, people over the age of 40[11-15] and a predominance of people with low education.[1,10-12] Regarding self-declared color, as of 2013, the majority of cases involved people with white skin color; however, in the following years, there was a significant increase among Black[16,17] and, mainly, among Brown individuals[11,18].

In this study, no statistically significant association was found between sociodemographic variables and adherence to ART before and during the COVID-19 pandemic. Nevertheless, other studies indicate that female sex is a factor related to lower adherence to treatment[11,18-20], while older age is related to higher adherence rates.[15,20-22] White skin color, higher educational levels[10,11,15,18,19] and having an occupation[11,18] are generally factors associated with greater adherence to ART. Understanding sociodemographic characteristics is crucial to understanding the profile of patients with HIV and, thus, being able to direct health policies and prevention and treatment strategies.

Based on this study, it was observed that there was no association between sociodemographic variables and adherence to ART both in the period before the COVID-19 pandemic and during the pandemic. This relationship, however, is found in a number of studies, which observed that female sex is a factor related to lower adherence to treatment[11,18-20] and increasing age behaves as a factor related to higher adherence rates[15,20-22]. White skin color is generally a factor related to adherence to ART[19,20], as well as higher educational levels[10,11,15,18,19] and having an occupation[11,18].

Regarding clinical variables, before the COVID-19 pandemic, the patients' viral loas was less than 50 copies/mL, while the LT-CD4+ count was greater than 350 cells/mm³. Similar data were found in other studies conducted during this period[10,12,15,18,23]. Moreover, in this study, 60.7% of participants were adherent to ART in the pre-pandemic period; however, it appears that the rate of non-adherence to ART in Brazil can vary from 18% to 74.3%[24] due to different methodologies used to assess adherence to antiretroviral therapy.

During the period of the COVID-19 pandemic, 62.4% of individuals were adherent to ART, and the viral load of most patients remained lower than 50 copies/mL, while the LT-CD4+ count remained higher than 350 cells/mm³. Studies carried out in this same period found similar data[11,20], with the majority of patients maintaining adequate levels of

immunocompetence and suppressing viral load during the COVID-19 pandemic. International studies also found data showing that there was no change in adherence after the start of the pandemic or at any time during the pandemic, as well as that adherence was slightly higher in the post-confinement months[25].

Regarding clinical variables, a few studies show that low viral load levels and higher LT-CD4+ counts are associated with higher treatment adherence rates[19,26], although this relationship was not verified in our study. Other studies have also identified that the time period since HIV diagnosis is a factor related to adherence, so that the longer this time period, the greater the adherence to treatment[3,11,13,15].

It is important to stress that, as demonstrated in the selected studies, factors that influence adherence may vary according to the population, and there is not a single factor that is related to lack of adherence across studies[27]. One aspect that may have influenced this result in this study is the adherence criterion used, which considered the discontinuation of medications on the expected date, which may not reflect the effective use of medications by patients, as discontinuation of medications may not necessarily mean that the patient has used the medication.

Health promotion among PLHIV must be addressed in a comprehensive manner, considering their health needs, access to services, and respect for human rights, which was partially achieved with the availability of ART in the Brazilian Unified Health System (*Sistema Único de Saúde* – SUS), enabling significant improvements in the quality of life and life expectancy. This process, however, faces continuous challenges[28], as demonstrated in this study. Therefore, it is necessary to strengthen integration and coordination between specialized services, ensuring that PLHIV are able to receive continuous, quality care[28], particularly in times of crisis, such as the COVID-19 pandemic.

Based on the discussion above, it is expected that these data may have implications for the practice of decision making in healthcare, as, although less adherence to antiretroviral therapy was not observed during the COVID-19 pandemic, the rate of adherence to treatment was only 62.4%, i.e., lower than the UNAIDS targets for 2025, which predict that 95% of people living with HIV are aware of their diagnosis, 95% of diagnosed individuals receive ART, and 95% have achieved viral suppression (95-95-95)[1,2]. Therefore, it is necessary to develop strategies to increase and maintain adherence to treatment in order to prevent the progression of the disease and promote an improvement in the quality of life of these individuals, particularly in crisis situations.

CONCLUSION

In view of the above, it is concluded that the COVID-19 pandemic did not impact adherence to ART in PLHIV, and subsequently, there was no difference in the distribution of viral load and LT-CD4+ count of participants before and during the COVID-19 pandemic.

Regarding factors related to adherence to ART, viral load was a clinical characteristic related to adherence to treatment before the COVID-19 pandemic, while during the pandemic, other factors in addition to viral load were related to adherence, such as history of AIDS and history of treatment interruption. That is, in this study, none of the sociodemographic characteristics assessed comprised factors related to ART adherence, and viral load was the only clinical characteristic related to treatment adherence in both periods.

Among the limitations of the study, there was difficulty in analyzing medical records, given the lack of a standardization relating thereto, which resulted in the loss of clinical and sociodemographic information. Furthermore, there was difficulty in accessing SICLOM, as it was necessary for the person in charge of the system to be present to gain access to the system.

Finally, we suggest carrying out new studies to verify adherence to ART in other services and in different regions of Brazil so that we can have an image of the country's panorama regarding the impact of the COVID-19 pandemic on adherence to ART.

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