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ORIGINAL ARTICLE

Lifestyle and adherence to antiretrovirals in people with HIV in the COVID-19 pandemic

Estilo de vida e adesão aos antirretrovirais em pessoas com HIV na pandemia de COVID-19

Estilo de vida y adherencia a los antirretrovirales en personas con VIH en la pandemia de COVID-19

Gilmara Holanda da Cunha[I]
ORCID: 0000-0002-5425-1599

Maria Amanda Correia Lima[I]
ORCID: 0000-0001-6244-3964

Larissa Rodrigues Siqueira[I]
ORCID: 0000-0001-6948-9834

Marina Soares Monteiro Fontenele[I]
ORCID: 0000-0002-8781-5645

Ane Kelly Lima Ramalho[I]
ORCID: 0000-0003-4250-7697

Paulo César de Almeida[II]
ORCID: 0000-0002-2867-802X

[I]*Universidade Federal do Ceará. Fortaleza, Ceará, Brazil.*
[II]*Universidade Estadual do Ceará. Fortaleza, Ceará, Brazil.*

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Corresponding author:
Gilmara Holanda da Cunha
E-mail: gilmaraholandaufc@yahoo.com.br

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ABSTRACT

Objectives: to assess the lifestyle and adherence to antiretrovirals in people living with HIV (PLHIV) in the COVID-19 pandemic. **Methods:** a cross-sectional study, through telephone interview to 150 patients, using a sociodemographic, epidemiological and clinical form, and questionnaires to assess lifestyle profile and adherence to antiretrovirals. Statistics analysis used Fisher's exact test, odds ratio and 95% confidence interval. **Results:** most patients had a satisfactory lifestyle (121; 80.7%) and adequate adherence to antiretrovirals (133; 88.7%). All were in social isolation, without follow-up appointments, with access to the health service only to receive antiretrovirals, and 16 (10.7%) had COVID-19 infection. Evangelicals (p=0.002), Spiritists (p=0.045), patients using atazanavir (p=0.0001) and ritonavir (p=0.002) had a more unsatisfactory lifestyle. Adherence to antiretrovirals was more inadequate in female patients (p=0.009), with two (p=0.004) and three or more children (p=0.006), retired (p=0.029), with serodiscordant partner (p=0.046) and diagnosis time of 5 to 10 years (p=0.027). **Conclusions:** the most PLHIV had a satisfactory lifestyle and adequate adherence to antiretrovirals, but some groups needed intervention to improve medication adherence and lifestyle.
Descriptors: HIV; COVID-19; Life Style; Antiretroviral Therapy, Highly Active; Nursing.

RESUMO

Objetivos: avaliar o estilo de vida e a adesão aos antirretrovirais em pessoas vivendo com HIV (PVHIV) na pandemia de COVID-19. **Métodos:** estudo transversal, por meio de entrevista telefônica a 150 pacientes, utilizando-se o formulário sociodemográfico, epidemiológico e clínico; e os questionários para avaliação do perfil de estilo de vida e adesão aos antirretrovirais. A análise estatística utilizou o teste exato de Fisher, *odds ratio* e intervalo de confiança de 95%. **Resultados:** a maioria dos pacientes evidenciou estilo de vida satisfatório (121; 80,7%) e adesão adequada aos antirretrovirais (133; 88,7%). Todos estavam em isolamento social, sem consultas de acompanhamento, com acesso ao serviço de saúde apenas para receber os antirretrovirais; e 16 (10,7%) tiveram infecção por COVID-19. Evangélicos (p=0,002), espíritas (p=0,045), pacientes em uso de atazanavir (p=0,0001) e ritonavir (p=0,002) apresentaram um estilo de vida mais insatisfatório. A adesão aos antirretrovirais foi mais inadequada em pacientes do sexo feminino (p=0,009), com dois (p=0,004) e três ou mais filhos (p=0,006), aposentados (p=0,029), com parceiro sorodiscordante (p=0,046) e tempo de diagnóstico de 5 a 10 anos (p=0,027). **Conclusões:** a maioria das PVHIVs demonstrou estilo de vida satisfatório e adesão adequada aos antirretrovirais, mas alguns grupos necessitavam de intervenção para melhorar a adesão à medicação e estilo de vida.
Descritores: HIV; COVID-19; Estilo de Vida; Terapia Antirretroviral de Alta Atividade; Enfermagem.

RESUMEN

Objetivos: evaluar el estilo de vida y la adherencia a los medicamentos antirretrovirales en personas que viven con el VIH (PVVIH) en la pandemia de COVID-19. **Métodos:** estudio transversal, mediante entrevista telefónica a 150 pacientes, utilizando la ficha sociodemográfica, epidemiológica y clínica; y cuestionarios para evaluar el perfil de estilo de vida y la adherencia a los medicamentos antirretrovirales. El análisis estadístico utilizó la prueba exacta de Fisher, *odds ratio* y el intervalo de confianza del 95%. **Resultados:** la mayoría de los pacientes mostró un estilo de vida satisfactorio (121; 80,7%) y adecuada adherencia a los fármacos antirretrovirales (133; 88,7%). Todos estaban en aislamiento social, sin citas de seguimiento, con acceso al servicio de salud solo para recibir antirretrovirales; y 16 (10,7%) tuvieron infección por COVID-19. Los evangélicos (p=0,002), los espiritistas (p=0,045), los pacientes que usaban atazanavir (p=0,0001) y ritonavir (p=0,002) presentaron un estilo de vida más insatisfactorio. La adherencia a los medicamentos antirretrovirales fue más inadecuada en pacientes del sexo femenino (p=0,009), con dos (p=0,004) y tres o más hijos (p=0,006), jubilados (p=0,029), con pareja serodiscordante (p=0,046) y tiempo de diagnóstico de 5 a 10 años (p=0,027). **Conclusiones:** la mayoría de las PVVIH demostraron un estilo de vida satisfactorio y una adherencia adecuada a los medicamentos antirretrovirales, pero algunos grupos requirieron intervención para mejorar la adherencia a la medicación y el estilo de vida.
Descriptores: VIH; COVID-19; Estilo de Vida; Terapia Antirretroviral Altamente Activa; Enfermería.

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INTRODUCTION

The infection caused by new coronavirus (COVID-19) reached a pandemic level months after the first report, with a negative impact on the health system and resulting economic losses that represent a global threat[1]. On August 18, 2020, Brazil was the second leading country in number of cases (3,340,197) [2], with greater concentration in the Northeast (949.091) and Southeast (1.042.124) regions[3]. In Ceará, up to August 6, 2020, 176,403 cases were confirmed and along with 7,799 deaths[4]. The COVID-19 pandemic caused a restructuring of public and private health services. Elective consultations, examinations and non-emergency procedures have given way to the care of patients with COVID-19, changing the routine of those undergoing regular health care, such as people living with HIV (PLHIV)[5]. COVID-19 represents another health burden for these individuals, who face multiple morbidities, putting this population at risk for COVID-19 and increasing the likelihood of adverse outcomes[6].

A European study involving 19 countries, showed that HIV clinics were operating normally in only six countries (31.6%), and in 11 countries (57.9%) health professionals were dividing care between PLHIV and patients with COVID-19, with changes in the usual flow of care, which can interfere with antiretroviral therapy (ART) and expose PLHIV to COVID-19. In addition, 10 countries (52.6%) already had PLHIV in quarantine[7]. All these changes, in addition to the social isolation that is a measure to contain the pandemic, can negatively affect the physical, emotional and social well-being of PLHIV, interfering in the provision of health care and access to ART, which can change the lifestyle and adherence to antiretrovirals[6,8].

Lifestyle is one of the factors for maintaining people's quality of life and health, these three items being associated with psychological well-being and prevention of some chronic non-communicable diseases[9-10]. Lifestyle is the set of habitual actions that reflect attitudes, values and opportunities in people's lives, and according to the Pentacle of Well-Being[10], referentially used in this study to assess the lifestyle of PLHIV, includes the five following factors: nutrition, physical activity, preventive behavior, relationships and stress control.

For PLHIV, CD4+ T lymphocyte count and viral load are important markers for assessing the progression of infection, and for these parameters to stay as expected, there must be adequate adherence to ART[11]. The adherence to antiretrovirals must be greater than 95%, for viral suppression and immune recovery[12-13]. But studies have found that ART can be changed during the COVID-19 pandemic, considering the changes that can occur, such as stress, social isolation, work overload for some and unemployment for others, in addition to the lack of access to health services and non-receipt of antiretrovirals [5-6,8].

Given the above, considering changes and the negative impact of COVID-19 on the health system and on economy in the state of Ceará, which is located in the Northeast region, one of the most affected in Brazil, this study was carried to assess the lifestyle and adherence to ART in PLHIV in the COVID-19 pandemic. The results could guide health promotion practices for these individuals according to the resources they have to live.

OBJECTIVES

To assess the lifestyle and adherence to ART in PLHIV in the COVID-19 pandemic.

METHODS

Ethical aspects

Project approved by the Ethics Committee of the Federal University of Ceará, in accordance with the standards for research involving human beings. All participants signed the consent form.

Study design and participants

This was a cross-sectional study, following the norms of STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines. The study participants were patients cared for by the "Project for Health Promotion Practices in the Context of HIV/AIDS", an assistance extension project from the Nursing Department of the Federal University of Ceará, in which nurses, teachers and undergraduate and graduate students in nursing carry out health education activities for PLHIV. However, due to the social isolation caused by the COVID-19 pandemic, activities started to be carried out by means of telephone calls and internet, with nursing consultations via Google Meet, as outpatient care was suspended in the lockdown.

The study population consisted of PLHIV registered and monitored in the referred project, which up to May 2020 included 245 individuals. The sample was sized to estimate the prevalence of PLHIV with changes in lifestyle and adherence to ART during the COVID-19 pandemic, with 95% confidence that the estimation error did not exceed 5%. Considering that such prevalence is unknown in the population, being stipulated at 50% (presumed prevalence), as it provides a larger sample size, and that there were 245 PLHIV in the extension project, the expression was applied:

$$n = \frac{Z^2 \,.\, p \,.\, (1-p) \,.\, N}{\varepsilon^2 \,.\, (N-1) + Z^2 \,.\, p \,.\, (1-p)}$$

In this formula, z^2 is equal to the value of the statistic z (1.96) for the degree of confidence adopted (95%) and p, N and ε correspond to the presumed prevalence (0.50), population (245) and tolerable error (0.05), respectively. Thus, a sample of 150 PLHIV was calculated. For the sampling process, a non-probabilistic convenience strategy was adopted, selecting participants consecutively, as they answered phone calls. Inclusion criteria: PLHIV over 18 years of age, with a landline or mobile phone in the extension project register, who have an email or smartphone to receive the informed consent form. Exclusion criteria: not answering phone calls on the day of contact.

Data collection

Data were collected from June to September 2020, in Fortaleza, Ceará, Brazil. First, a telephone call was made informing the participants about the study. The interested parties were sent by email or smartphone the informed consent form signed by the

researcher, and arranged day and time to make the phone call and answer the study forms. Two exclusive smartphones were used for the study. The nurses involved were trained to apply forms through telephone interviews, following standard operating procedures (application of the consent form, telephone call and of the three study instruments). Interviewers had printed forms, asked patients and recorded responses in real time on the forms themselves. Data were collected through telephone interviews with an average duration of 30 minutes, using three instruments:

The Sociodemographic, Clinical and Epidemiological Form for PLHIV, validated in previous studies[14-16], with the variables: age, sex, skin color, education, marital status, exposure category, sexual orientation, living with partner, partner's anti-HIV serology, number of children, religion, occupational status, number of people in the household, monthly family income, time of diagnosis and of ART, antiretrovirals, CD4+ T lymphocytes count, viral load, access to health service, social isolation and if there was COVID-19 with confirmation of testing.

The Individual Lifestyle Profile Questionnaire developed[10] and validated in Brazil[9], conceptually based on the Well-Being Pentacle, with five factors: 1. Nutrition; 2. Physical activity; 3. Preventive behavior; 4. Relationships; and 5. Control of stress. Each factor has three questions, totaling 15. For each question, there are four possible answers on a likert scale: (0) it is absolutely not part of your lifestyle, (1) sometimes it corresponds to your behavior, (2) almost always true in your behavior, (3) the statement is always true in day-to-day life, as it is part of your lifestyle. The values "0" and "1" are linked to a negative lifestyle profile, and "2" and "3" to a positive profile[10].

The Questionnaire to Assess Adherence to Antiretroviral Treatment-HIV[17] or *Cuestionario para la Evaluación de la Adhesión al Tratamiento Antiretroviral* (CEAT-VIH)[17-18], being used in this study in translated version, adapted and validated for Brazilian Portuguese[17]. It has 20 questions that assess the degree of adherence to ART. The score is obtained by the sum of all items (minimum value: 17; maximum value: 89). The higher the score, the better adherence to ART[17].

Data analysis

The mean, standard deviation (SD), minimum and maximum values of the quantitative variables were calculated. The existence of an association between the lifestyle, adherence to antiretroviral and the sociodemographic, epidemiological and clinical variables was verified by Fisher's exact test. The strength of the associations was calculated by the odds ratio and its respective 95% confidence interval. Was considered statistically significant a value of $p < 0.05$. The data were processed in IBM® SPSS® Statistics version 20.0, license number 10101131007.

RESULTS

Most patients had a satisfactory lifestyle (121; 80.7%; mean ± SD: 33.6 ± 6.65; minimum: 13.0; maximum: 45.0) and adequate adherence to ART (133; 88.7%; mean ± SD: 78.3 ± 4.6; minimum: 55.0; maximum: 86.0). Of the sample of 150 participants, most had the following characteristics: male (96; 64.0%), over 40 years old (85; 56.7%), self-reported brown skin color (95; 63.3%), with 10 to 12 years of study (72; 48.0%), single (81; 54.0%), without children (73; 48.7%), Catholic (86; 57.3%), with a job (84; 56.0%), living with up to two people in the home (73; 48.7%), and family income of one to two minimum wages (48; 32.0%; value of the minimum wages in 2020: $ 201.34). Table 1.

In the associations made between lifestyle and sociodemographic variables, the chances of Evangelicals (p=0.002) and Spiritists (p=0.045) having an unsatisfactory lifestyle were, respectively, 4.3 and 3.8 times higher when compared to Catholics. There was a tendency for an association between monthly family income below one minimum wage and unsatisfactory lifestyle (p=0.053), and the chance of inadequate adherence being 3.2 times greater in those with income less than or equal to one minimum wage, when compared to those who had an income greater than three minimum wages. PLHIV who had a greater chance of having an unsatisfactory lifestyle were: in the age group of 19 to 29 years old, which was 2.2 times higher than in those over 40 years old; blacks and browns, respectively, with 3.7 and 2.1 times greater chance than those with white skin; and those with one to nine years of study, who were 2.4 times more likely compared to those with 13 or more years of study. Table 1.

The majority reported sexual exposure category (140; 93.3%), being heterosexual (86; 57.3%), living with a partner (93; 62.0%), and 41 (27.3%) were serodiscordant. The time of diagnosis (59; 39.3%) and ART (60; 40.0%) from 5 to 10 years stood out. Most of the sample had a CD4+ T lymphocyte count greater than 350 cells/mm^3 (136; 90.7%) and undetectable viral load (139; 92.6%). The most used antiretrovirals were lamivudine (140; 93.3%), tenofovir (118; 78.7%), dolutegravir (79; 52.7%), efavirenz (39; 26.0%), ritonavir (27; 18.0%) and atazanavir (24; 16.0%). Sixteen people (10.7%) who tested positive for COVID-19 did not need hospitalization, where they were treated with symptomatic drugs at home. All reported being in social isolation, without follow-up appointments, with access to the health service only to receive antiretrovirals, because clinics were redirected to COVID-19 care. Table 2.

In the associations of lifestyle with epidemiological and clinical variables, it was found that PLHIV using the antiretroviral drugs atazanavir (p=0.0001) and ritonavir (p=0.002) had a more unsatisfactory lifestyle. The exposure category of injecting drug users was 3.0 times more likely to have an unsatisfactory lifestyle than those in the sexual exposure category. Heterosexuals and homosexuals had a, respectively, 3.7 and 2.9 times greater chance of having an unsatisfactory lifestyle when compared to bisexuals. Table 2.

In the associations between adherence to ART and sociodemographic variables, there was more inadequate adherence to ART in females (p=0.009) compared to males, people with two (p=0.004) and three or more (p=0.006) children compared to those without children, retirees (p=0.029) in relation to those employed, and those who lived with one to two people in the household compared to those who lived with more than five (p=0.019). The chance of inadequate adherence to ART was greater as follows: 4.3 times among those of yellow skin color compared to whites, 2.6 times in those with one to nine years of study than in those with more than 13 years, and 3.4 times among divorced individuals than married people. Evangelicals had a 2.3 times greater chance of inadequate adherence to ART than Catholics, and those with a monthly family income below one minimum wage had a 3.6 times greater chance than those with an income above three minimum wages. Table 3.

Table 1 - Association between the lifestyle of people with HIV and sociodemographic variables, Fortaleza, Ceará, Brazil, 2020 (N=150)

Sociodemographic variables	Individual lifestyle				Odds ratio	95% confidence interval	*p* value*
	Unsatisfactory (n=29)		Satisfactory (n=121)				
	n	%	n	%			
Age group							
19 – 29	6	20.6	16	13.2	2.2	0.7 - 7.0	0.143
30 – 39	11	38.0	32	26.5	2.0	0.8 - 5.2	0.112
> 40	12	41.4	73	60.3	1.0		
Sex							
Female	12	41.4	42	34.7	1.3	0.5 - 3.0	0.503
Male	17	58.6	79	65.3	1.0		
Skin color							
Black	6	20.7	14	11.5	3.7	0.8 - 17.1	0.084
Brown	19	65.5	76	62.9	2.1	0.5 - 7.9	0.235
Yellow	1	3.5	5	4.1	1.7	0.1 - 20.2	0.662
White	3	10.3	26	21.5	1.0		
Years of study							
1 – 9	12	41.4	39	32.2	2.4	0.6 - 9.7	0.188
10 – 12	14	48.3	58	48.0	1.9	0.5 - 7.3	0.330
≥ 13	3	10.3	24	19.8	1.0		
Marital status							
Not married	16	55.2	65	53.8	1.1	0.4 - 2.8	0.832
Divorced	5	17.3	20	16.5	1.1	0.3 - 4.0	0.854
Married	8	27.5	36	29.7	1.0		
Number of children							
1	7	24.2	22	18.1	1.6	0.5 - 4.6	0.370
2	7	24.2	19	15.7	1.8	0.6 - 5.4	0.246
≥ 3	3	10.3	19	15.7	0.8	0.2 - 3.1	0.753
None	12	41.3	61	50.5	1.0		
Religion							
Evangelical	14	48.2	37	30.6	4.3	1.7 -11.5	**0.002**
Spiritist	5	17.2	8	6.6	3.8	1.1 -15.0	**0.045**
Catholic	10	3.4	76	62.8	1.0		
Occupational situation							
Employed	16	55.2	68	56.2	1.3	0.4 - 4.4	0.620
Unemployed	9	31.1	30	24.7	1.7	0.4 - 6.3	0.410
Retired	4	13.7	23	19.1	1.0		
People in the home							
≥ 5	2	6.8	12	10.0	0.9	0.1 - 4.7	0.940
3 – 4	16	55.2	47	38.8	1.9	0.8 - 4.5	0.134
1 – 2	11	38.0	62	51.2	1.0		
Monthly family income**							
≤ 1	13	44.9	31	25.6	3.2	0.9 - 11.0	0.053
1 – 2	9	31.0	39	32.3	1.7	0.5 - 6.3	0.368
2 – 3	3	10.3	20	16.5	1.1	0.2 - 5.7	0.855
> 3	4	13.8	31	25.6	1.0		

Fisher's exact test;In minimum wages, value in 2020: $ 201.34.*

Table 2 - Association between lifestyle of people with HIV and epidemiological and clinical variables, Fortaleza, Ceará, Brazil, 2020 (N=150)

Epidemiological and clinical variables	Individual lifestyle				Odds ratio	95% confidence interval	*p* value*
	Unsatisfactory (n=29)		Satisfactory (n=121)				
	n	%	n	%			
Exposure category							
Injecting drug user	4	13.7	6	5.0	3.0	0.8 - 11.6	0.088
Sexual	25	86.3	115	95.0	1.0		
Sexual orientation							
Heterosexual	19	65.5	67	55.3	3.7	0.5 - 30.0	0.197
Homosexual	9	31.0	41	33.9	2.9	0.3 - 24.7	0.327
Bisexual	1	3.5	13	10.8	1.0		
Lives with partner							
No	20	69.0	73	60.3	1.5	0.6 - 3.5	0.391
Yes	9	31.0	48	39.7	1.0		
Time of diagnosis							
< 5	9	31.0	34	28.0	1.1	0.4 - 3.2	0.795
5 ≥ 10	11	38.0	48	39.8	0.9	0.3 - 2.6	0.989
≥ 11	9	31.0	39	32.2	1.0		

To be continued

Table 2 (concluded)

Epidemiological and clinical variables	Individual lifestyle				Odds ratio	95% confidence interval	*p* value*
	Unsatisfactory (n=29)		Satisfactory (n=121)				
	n	%	n	%			
ART** time (in years)							
< 5	10	34.4	36	29.8	1.2	0.4 - 3.5	0.675
5 ≥ 10	8	27.6	36	29.8	1.0	0.3 - 2.8	0.984
≥ 11	11	38.0	49	40.4	1.0		
CD4+ T lymphocytes							
< 350 cells/mm³	2	6.9	12	10.0	0.6	0.1 - 3.1	0.617
> 350 cells/mm³	27	93.1	109	90.0	1.0		
Viral load							
Undetectable	27	93.1	112	92.6	1.0	0.2 - 5.3	0.920
Detectable	2	6.9	9	7.4	1.0		
Atazanavir							
Yes	11	38.0	13	10.7	5.0	1.9 - 13.0	**0.0001**
No	18	62.0	108	89.3	1.0		
Ritonavir							
Yes	11	38.0	16	13.2	4.0	1.6 - 10.0	**0.002**
No	18	62.0	105	86.8	1.0		
Had COVID-19							
No	25	86.2	109	90.0	0.6	0.2 - 2.3	0.545
Yes	4	13.8	12	10.0	1.0		

*Fisher's exact test; **ART: Antiretroviral therapy.*

Table 3 - Association between adherence to antiretroviral therapy and sociodemographic variables, Fortaleza, Ceará, Brazil, 2020 (N=150)

Sociodemographic variables	Adherence to antiretroviral therapy				Odds ratio	95% confidence interval	*p* value*
	Inadequate (n=17)		Adequate (n=133)				
	n	%	n	%			
Age group							
19 – 29	1	5.8	21	15.7	0.2	0.0 - 2.3	0.223
30 – 39	4	23.6	39	29.3	0.6	0.1 - 2.0	0.438
> 40	12	70.6	73	55.0	1.0		
Sex							
Female	11	64.8	43	32.3	3.8	1.3 - 11.0	**0.009**
Male	6	35.2	90	67.7	1.0		
Skin color							
Black	1	5.8	19	14.2	0.4	0.0 - 4.8	0.506
Brown	11	64.8	84	63.2	1.1	0.2 - 4.3	0.855
Yellow	2	11.7	4	3.0	4.3	0.5 - 34.5	0.149
White	3	17.7	26	19.6	1.0		
Years of study							
1 – 9	9	52.9	42	31.5	2.6	0.5 - 13.4	0.219
10 – 12	6	35.3	66	49.7	1.1	0.2 - 6.0	0.881
≥ 13	2	11.8	25	18.8	1.0		
Marital status							
Not married	9	52.9	72	54.1	1.7	0.4 - 6.7	0.438
Divorced	5	29.4	20	15.0	3.4	0.7 - 15.7	0.103
Married	3	17.7	41	30.9	1.0		
Number of children							
1	3	17.7	26	19.5	2.6	0.5 - 14.1	0.230
2	6	35.3	20	15.0	7.0	1.6 - 30.5	**0.004**
≥ 3	5	29.3	17	12.8	6.8	1.4 - 31.5	**0.006**
None	3	17.7	70	52.7	1.0		
Religion							
Evangelical	6	35.2	45	33.9	2.3	0.7 - 6.8	0.126
Spiritist	2	11.8	11	8.2	0.7	0.0 - 6.8	0.820
Catholic	9	53.0	77	57.9	1.0		
Occupational situation							
Unemployed	5	29.4	34	25.6	1.9	0.5 - 6.6	0.317
Retired	6	35.3	21	15.7	3.7	1.0 - 12.7	**0.029**
Employed	6	35.3	78	58.7	1.0		
People in the home							
1 – 2	13	76.4	60	45.1	4.3	1.1 - 15.9	**0.019**
3 – 4	3	17.7	60	45.1	2.8	0.3 - 23.4	0.323
≥ 5	1	5.9	13	9.8	1.0		
Monthly family income**							
< 1	8	47.0	36	27.0	3.6	0.7 - 18.6	0.100
1 – 2	5	29.4	43	32.3	1.9	0.3 - 10.6	0.449
2 – 3	2	11.8	21	15.8	1.5	0.2 - 12.0	0.664
> 3	2	11.8	33	24.9	1.0		

*Fisher's exact test; **In minimum wages, value in 2020: $ 201.34.*

Table 4 - Association between adherence to antiretroviral therapy and epidemiological and clinical variables, Fortaleza, Ceará, Brazil, 2020 (N=150)

Epidemiological and clinical variables	Adherence to antiretroviral therapy				Odds ratio	95% confidence interval	p value*
	Inadequate (n=17)		Adequate (n=133)				
	n	%	n	%			
Category of exposure							
Injecting drug user	3	17.7	7	5.2	3.8	0.8 - 16.7	0.055
Sexual	14	82.3	126	94.8	1.0		
Sexual orientation							
Heterosexual	14	82.4	72	54.1	0.8	0.7 - 0.9	0.105
Homosexual	3	17.6	47	35.3	0.9	0.8 - 1.0	0.352
Bisexual	0	0.0	14	10.6	1.0		
Partner's serology							
Negative	6	100.0	35	58.3	0.8	0.7 - 0.9	**0.046**
Positive	0	0.0	25	41.7	1.0		
Time of diagnosis							
< 5	5	29.4	38	28.6	0.5	0.1 - 1.8	0.350
5 – 10	3	17.6	56	42.1	0.2	0.0 - 0.9	**0.027**
≥ 11	9	53.0	39	29.3	1.0		
ART** time (in years)							
< 5	5	29.4	41	30.9	0.5	0.1 - 1.8	0.327
5 – 10	4	23.6	56	42.1	0.3	0.0 - 1.1	0.071
≥ 11	8	47.0	36	27.0	1.0		
CD4+ T lymphocytes count							
< 350 cells/mm³	1	5.9	13	9.8	0.5	0.0 - 4.7	0.605
> 350 cells/mm³	16	94.1	120	90.2	1.0		
Viral load							
Undetectable	16	94.1	123	92.5	1.3	0.1 - 10.8	0.808
Detectable	1	5.9	10	7.5	1.0		
Use of efavirenz							
Yes	0	0.0	39	29.3	1.1	1.0 - 1.2	**0.010**
No	17	100.0	94	70.7	1.0		
Had COVID-19							
No	16	94.1	118	88.7	2.0	0.2 - 16.4	0.499
Yes	1	5.9	15	11.3	1.0		

**Fisher's exact test; **ART: Antiretroviral therapy.*

In the associations between adherence to ART and epidemiological and clinical variables, it was found that people who had a partner with negative HIV serology, had more inadequate adherence to ART (p=0.046), with a statistically significant association, where 100% of individuals with a seroconcordant partner had adequate adherence versus 85.4% who had a serodiscordant partner. PLHIV with 5 to 10 years of positive HIV serology diagnosis time (p=0.027) had more inadequate adherence to ART than those with 11 years or more since diagnosis. Efavirenz users had more adequate adherence to ART (p=0.010), as there was a statistically significant association, where 100% of the individuals who used this medication were more adherent. For the category of exposure of injecting drug users, there was a tendency of an association (p=0.055) with inadequate adherence to ART, with a 3.8 times greater chance than those in the sexual exposure category. Table 4.

DISCUSSION

Most participants had a satisfactory lifestyle. Research conducted in Brazil prior to the COVID-19 pandemic showed a similar result regarding lifestyle in PLHIV[13]. It is noteworthy that in the study, lifestyle included nutrition, physical activity, preventive behavior, relationships and stress control[10]. Most participants showed adequate adherence to ART. In contrast, in the United States, a clinical team that managed telephone conversations with PLHIV in the COVID-19 pandemic, reported that many patients were stressed, anxious and with insomnia, factors that can negatively influence adherence to ART and long-term health[6].

Male participants and the age group of 30 to 50 years stood out, agreeing with other studies that showed that HIV affects more men than women[19-20]. Browns and blacks had a greater chance of having unsatisfactory lifestyles. In this regard, studies have observed that among men who have sex with men, there is a higher incidence of HIV in blacks than in whites[21]. Participants' education was relatively high, unlike other surveys in which PLHIV had a low educational level[22-23]. But those with less education were more likely to have unsatisfactory lifestyle and inadequate adherence to ART. Studies have shown that low educational level can hinder medication adherence and access to information related to therapeutic follow-up[24-25].

Singles and those without children stood out, in line with a study that showed that being single is a predictive factor for HIV infection[26]. Female PLHIV, those with two or more children, those retired and individuals living with one to two people in the household had more inadequate adherence to antiretrovirals. A systematic review pointed out that financial restrictions, social support and employment status are factors that influence adherence to ART[27]. In addition, PLHIV who are married may have better health care due to the social support of the partner and children, when they help with the daily routine and reminding to take medications[23]. However, when there are children or family members who depend on the persons with HIV, they will have to divide their available time to care for themselves and others.

As for religion, most PLHIV claimed to be Catholic, and Evangelicals and Spiritists had a more unsatisfactory lifestyle. Evangelicals also had a greater chance of inadequate adherence to ART. However, studies have shown that religion is associated with positive health behaviors[28], better adherence to ART, quality of life and social support[28-30]. In a study conducted in Africa, some participants reported that certain religions encouraged the abandonment of ART, believing in healing through prayer[31]. In this way, religion can promote or hinder adherence to ART.

Most patients had jobs and monthly family income of one to two minimum wages. Similar to this study, research has identified the prevalence of HIV in those who live in low- and middle-income families[32]. Despite the COVID-19 pandemic, many PLHIV kept their jobs, carrying out activities at home, had informal jobs or were self-employed. Lower-income PLHIV had greater chances for unsatisfactory lifestyle and inadequate adherence to ART. Corroborating these findings, a study showed that financial difficulties negatively interfere with adequate nutrition, ART and therapeutic follow-up[31], and the higher the socioeconomic level, the better the self-evaluation of health[32-33].

Participants in the exposure category of injecting drug users had a greater chance of having an unsatisfactory lifestyle and inadequate adherence to ART. Studies have shown that PLHIV with drug use history are less concerned with health care[34]. A prospective cohort study also showed that injecting drug use reduced the chance of achieving viral suppression in 12 months, probably because of inadequate adherence to ART[35]. Most participants were heterosexual and homosexual, and among those who had a steady partner, a portion was serodiscordant. Research has shown that among PLHIV with a fixed partnership, seroconcordant companions are more common than serodiscordant[36], and when the partner's serology is unknown the HIV transmission may be greater compared to the situation in which the partner's seropositivity is known[37].

In this study, PLHIV with a serodiscordant partner and time of diagnosis of 5 to 10 years had more inadequate adherence to ART. Studies show that ART reduces the risk of HIV transmission among serodiscordant couples[38-39], and interventions in this group are needed to improve adherence to ART, as well as condom use, to reduce the spread of HIV[37]. Research also found that PLHIV with a diagnosis time greater than 10 years had better adherence to antiretrovirals[25]. Heterosexuals and homosexuals had a greater chance of having an unsatisfactory lifestyle compared to bisexuals. Another study pointed out that the health of heterosexual men with HIV can be more compromised, because these individuals tend not to seek health care, which is related to the social stigma of the disease[34].

As for the CD4+ T lymphocyte count, most participants had values above 350 cells/mm^3 and undetectable viral load. Monitoring viral load and CD4+ T lymphocyte count provides useful information that can be used to improve life expectancy for people with HIV, although patients take longer time to achieve a normal CD4+ T lymphocyte count and less time to reach undetectable viral load, where viral load is a better predictor of HIV/AIDS progression than CD4+ T lymphocyte count[11].

In particular, lamivudine, tenofovir and dolutegravir were the most used antiretrovirals, as they are widely prescribed for PLHIV. In a cohort study, 57% of patients were on a regimen with zidovudine/lamivudine/nevirapine, and the other 43% used tenofovir/lamivudine/efavirenz[40]. A meta-analysis has shown that starting ART with dolutegravir has important clinical implications for achieving viral suppression, mainly in those with high viral load, when compared to the initial ART regimen without this drug. Also, there are fewer side effects, drug interactions and less occurrence of drug resistance[41].

PLHIV who used atazanavir and ritonavir had a more unsatisfactory lifestyle. A cohort study showed that treatment with protease inhibitors, such as atazanavir and ritonavir, were strongly related to the reduction of lean mass and loss of bone mineral density and may interfere with body self-image and lifestyle[42]. Efavirenz users had better adherence to ART. It can be inferred that the type of ART regimen is a significant factor associated with adherence[19]. A meta-analysis showed that PLHIV who took a single pill a day were more adherent[43], such as efavirenz, which is part of the 3 in 1 combination, tenofovir/lamivudine/efavirenz. Therefore, a simplified therapeutic regimen is associated with better adherence.

Some PLHIV reported positive testing for COVID-19 and home treatment. In the United States, a study showed that PLHIV who had COVID-19 did not show severe symptoms, where they were followed by the infectious disease clinic by telephone contact[6]. It is noteworthy that the treatment of HIV/COVID-19 co-infection must also address possible viral interactions, as well as the psychosocial burden that exacerbates co-infection, which can increase the likelihood of mortality[6].

All reported being in social isolation, without follow-up appointments, with access to the health service only to receive antiretrovirals, because clinics were redirected to COVID-19 care. Therefore, it is important to formulate alternatives for continued health care for this population. Research in Africa reported that almost all PLHIV have accepted mobile technology for health monitoring, such as receiving HIV-related phone calls and text messages. This acceptability did not depend on sex, age or literacy level, although most of the sample was illiterate[44]. However, it must be considered that economic and geographical differences can interfere with these patients' adequate access to technologies.

Study limitations

Because of social isolation, the study's limitations were that data collection took place over the phone, and that diagnostic tests for COVID-19 were not performed across the sample, so the number of HIV/COVID-19 co-infections may have been underestimated.

Contributions to the area of nursing, health and public policy

The patients referred to the feeling of support and care, because they had the attention of nurses who answered questions about HIV and COVID-19. The study showed the challenges that arose with the advancement of COVID-19, and pointed out health care deficits, which can be addressed by nurses and other members of the multidisciplinary health care team, considering

the resources these patients have to live. Can be used telephone interventions, including audio and video calls, as well internet and social networks, to continued care for patients in the period of seclusion and changes in the health system due to the COVID-19 pandemic. Further studies are suggested, capable of evaluating remote care strategies for PLHIV, and the monitoring of these patients in the long term as well.

CONCLUSIONS

The most PLHIV had a satisfactory lifestyle and adequate adherence to ART, but some groups needed intervention to improve medication adherence and lifestyle. The study pointed out the need for continued health care, even in extreme situations, such as the COVID-19 pandemic.

REFERENCES

1. Ahn DG, Shin HJ, Kim MH, Lee S, Kim HS, Myoung J, et al. Current status of epidemiology, diagnosis, therapeutics, and vaccines for novel Coronavirus disease 2019 (COVID-19). J Microbiol Biotechnol. 2020;30(3):313-24. https://doi.org/10.4014/jmb.2003.03011
2. World Health Organization. WHO Coronavirus Disease (COVID-19): Dashboard[Internet]. 2020 [cited 2020 Apr 10]. Available from: https://covid19.who.int/
3. Ministério da Saúde (BR). Boletim Epidemiológico Especial. Doença pelo Coronavírus COVID-19. Semana Epidemiológica 32 (02 a 08/08). [Internet]. 2020 [cited 2020 Oct 20]. Available from: https://www.saude.gov.br/images/pdf/2020/August/12/Boletim-epidemiologico-COVID-26.pdf
4. Governo do Estado do Ceará. Boletim Epidemiológico. Doença pelo novo coronavírus (COVID-19), N° 37, 06/08/2020[Internet]. 2020[cited 2020 Oct 20]. Available from: https://www.saude.ce.gov.br/wp-content/uploads/sites/9/2020/02/BOLETIM_COVID19_06_08_2020.pdf
5. Dourado I, Magno L, Soares F, Massa P, Nunn A, Dalal S, et al. Adapting to the COVID-19 pandemic: continuing HIV prevention services for adolescents through telemonitoring, Brazil. AIDS Behav. 2020;24(7):1994-9. https://doi.org/10.1007/s10461-020-02927-w
6. Shiau S, Krause KD, Valera P, Swaminathan S, Halkitis PN. The burden of COVID-19 in people living with HIV: a syndemic perspective. AIDS Behav. 2020;24(8):2244-9. https://doi.org/10.1007/s10461-020-02871-9
7. Kowalska JD, Skrzat-Klapaczyńska A, Bursa D, Balayan T, Begovac J, Chkhartishvili N, et al. HIV care in times of the COVID-19 crisis: where are we now in Central and Eastern Europe? Int J Infect Dis. 2020;96:311-4. https://doi.org/10.1016/j.ijid.2020.05.013
8. Sun S, Hou J, Chen Y, Lu Y, Brown L, Operario D. Challenges to HIV care and psychological health during the COVID-19 pandemic among people living with HIV in China. AIDS Behav. 2020;24(10):2764-5. https://doi.org/10.1007/s10461-020-02903-4
9. Both J, Borgatto AF, Nascimento JV, Sonoo CN, Lemos CAF, Nahas MV. Validation of the "Individual Lifestyle Profile". Rev Bras Ativ Fís Saúde [Internet]. 2008 [cited 2020 Apr 10];13(1):5-14. Available from: https://rbafs.org.br/RBAFS/article/view/778/787
10. Nahas MV, Barros MVG, Francalacci VL. O pentáculo do bem-estar: base conceitual para avaliação do estilo de vida de indivíduos e grupos. Rev Bras Ativ Fís Saúde[Internet]. 2000 [cited 2020 May 05];5(2):48-59. Available from: https://rbafs.org.br/RBAFS/article/view/1002/1156
11. Shoko C, Chikobvu D. A superiority of viral load over CD4 cell count when predicting mortality in HIV patients on therapy. BMC Infect Dis. 2019;19(1):169. https://doi.org/10.1186/s12879-019-3781-1
12. Wang Y, Jin Y, Chen C, Zheng W, Wang S, Ungvari GS, et al. Meta-analysis of adherence to highly active antiretroviral therapy in patients with HIV infection in China. AIDS Care. 2019;31(8):913-22. https://doi.org/10.1080/09540121.2018.1554238
13. Eidam CL, Lopes AS, Guimarães MDC, Oliveira OV. Lifestyle of HIV seropositives patients and your association with CD4 positive t-lymphocytes counts. Rev Bras Cineantropometria Desempenho Hum. 2006 [cited 2020 Apr 10];8(3):51-7. Available from: https://periodicos.ufsc.br/index.php/rbcdh/article/view/3910/3316
14. Cunha GH, Galvão MTG. Nursing diagnoses in patients with human immunodeficiency virus/acquired immunodeficiency syndrome in outpatient care. Acta Paul Enferm. 2010;23(4):526-32. https://doi.org/10.1590/S0103-21002010000400013
15. Cunha GH, Galvão MTG. Sociodemographic context of patients with HIV/aids attended in nursing consultation. Rev Enferm UFPE. 2011a;5(3):713-21. https://doi.org/10.5205/reuol.1262-12560-1-LE.0503201120
16. Cunha GH, Galvão MTG. Contraceptive and prevention methods of transmission/reinfection of the virus among patients with HIV/aids. Rev Rene[Internet]. 2011 [cited 2020 Aug 10];12(4):699-708. Available from: http://periodicos.ufc.br/rene/article/view/4320/3320
17. Remor E, Milner-Moskovics J, Preussler G. Brazilian adaptation of the Assessment of Adherence to Antiretroviral Therapy Questionnaire". Rev Saúde Pública. 2007;41(5):685-94. https://doi.org/10.1590/S0034-89102006005000043
18. Remor E. Valoración de la adhesión al tratamiento antirretroviral en pacientes VIH+. Psicothema [Internet]. 2002 [cited 2020 Apr 20];14(2):262-7. Available from: http://www.psicothema.es/pdf/718.pdf
19. Leiva-Moral JM, Loayza-Enriquez BK, Palmieri PA, Guevara-Vasquez GM, Elias-Bravo UE, Edwards JE, et al. Adherence to antiretroviral therapy and the associated factors among people living with HIV/AIDS in Northern Peru: a cross-sectional study. AIDS Res Ther. 2019;16(22):1-12. https://doi.org/10.1186/s12981-019-0238-y
20. Abrahams Z, Maartens G, Levitt N, Dave J. Anthropometric definitions for antiretroviral-associated lipodystrophy derived from a longitudinal South African cohort with serial dual-energy X-ray absorptiometry measurements. Int J STD AIDS. 2018;29(12):1194-03. https://doi.org/10.1177/0956462418778649

21. McCree DH, Williams AM, Chesson HW, Beer L, Jeffries WL, Lemons A, et al. Changes in disparities in estimated HIV incidence rates among black, hispanic/latino, and white men who have sex with men (MSM) in the United States, 2010-2015. J Acquir Immune Defic Syndr. 2019;81(1):57-62. https://doi.org/10.1097/QAI.0000000000001977

22. Mabaso M, Makola L, Naidoo I, Mlangeni LL, Jooste S, Simbayi L. HIV prevalence in South Africa through gender and racial lenses: results from the 2012 population-based national household survey. Int J Equity Health. 2019;18(1):167. https://doi.org/10.1186/s12939-019-1055-6

23. Lenzi L, Tonin FS, de Souza VR, Pontarolo R. Social support and HIV: Relationship between clinical and sociodemographic characteristics and treatment adherence. Psic Teor Pesq. 2018;34:e34422. https://doi.org/10.1590/0102.3772e34422

24. Silva JAG, Dourado I, Brito AM, Silva CAL. Factors associated with non-adherence to antiretroviral therapy in adults with AIDS in the first six months of treatment in Salvador, Bahia State, Brazil. Cad Saúde Pública. 2015;31(6):1-11. https://doi.org/10.1590/0102-311X00106914

25. Foresto JS, Melo ES, Costa CRB, Antonini M, Gir E, Reis RK. Adherence to antiretroviral therapy by people living with HIV/AIDS in a municipality of São Paulo. Rev Gaúcha Enferm. 2017;38(1):e63158. https://doi.org/10.1590/1983-1447.2017.01.63158

26. Wand H, Reddy T, Naidoo S, Moonsamy S, Siva S, Morar NS, et al. A simple risk prediction algorithm for HIV transmission: results from HIV prevention trials in Kwazulu Natal, South Africa (2002-2012). AIDS Behav. 2018;22(1):325-36. https://doi.org/10.1007/s10461-017-1785-7

27. Paramesha AE, Chacko LK. Predictors of adherence to antiretroviral therapy among PLHIV. Indian J Public Health[Internet]. 2019 [cited 2020 Dec 10];63(4):367-76. Available from: http://www.ijph.in/text.asp?2019/63/4/367/273360

28. Poteat T, Lassiter JM. Positive religious coping predicts self-reported HIV medication adherence at baseline and twelve-month follow-up among Black Americans living with HIV in the Southeastern United States. AIDS Care. 2019;31(8):958-64. https://doi.org/10.1080/09540121.2019.1587363

29. Suzuki-Crumly JK, Ackerman ML, Vance DE, Antia L, Blanshan SA, Smith BA, et al. The role of religiosity in mediating biopsychosocial outcomes in homosexuals and heterosexuals with HIV: a structural equation modeling comparison study. J Spirit Mental Health. 2010;12(3):209-23. https://doi.org/10.1080/19349637.2010.498700

30. Nightingale VR, Sher TG, Thilges S, Niel K, Rolfsen N, Hansen NB. Non-conventional practices and immune functioning among individuals receiving conventional care for HIV. J Health Psychol. 2011;16(8):1241-50. https://doi.org/10.1177/1359105311405350

31. Moomba K, Van Wyk B. Social and economic barriers to adherence among patients at Livingstone General Hospital in Zambia. Afr J Prim Health Care Fam Med. 2019;11(1):e1-e6. https://doi.org/10.4102/phcfm.v11i1.1740

32. Mabaso M, Zungu NP, Rehle T, Moyo S, Jooste S, Zuma K. Determinants of excellent/good self-rated health among HIV positive individuals in South Africa: evidence from a 2012 nationally representative household survey. BMC Public Health. 2018;18(1):198. https://doi.org/10.1186/s12889-018-5102-9

33. Le Coeur S, Desesquelles A, Morand E, Kanabkaew C, Lelièvre E. Self-rated health among HIV-infected people receiving treatments in Thailand. Asian Soc Sci. 2017;13(1):20-30. https://doi.org/10.5539/ass.v13n1p20

34. Burchell AN, Gardner S, Light L, Ellis BM, Antoniou T, Bacon J, et al. Implementation and operational research: Engagement in HIV care among persons enrolled in a clinical HIV cohort in Ontario, Canada, 2001-2011. J Acquir Immune Defic Syndr. 2015;70(1):e10-e19. https://doi.org/10.1097/QAI.0000000000000690

35. Costa JO, Ceccato MGB, Silveira MR, Bonolo PF, Reis EA, Acurcio, FA. Effectiveness of antiretroviral therapy in the single-tablet regimen era. Rev Saúde Pública. 2018;52(87). https://doi.org/10.11606/S1518-8787.2018052000399

36. Oliveira LB, Matos MCB, Jesus GJ, Reis RK, Gir E, Araújo TME. Sexual partnerships of people living with the Human Immunodeficiency Virus. Rev Rene. 2017;18(6):825-31. https://doi.org/10.15253/2175-6783.2017000600017

37. Ma G, Chen H, Chen J, Jiang Z, Ma T. HIV transmission between spouses living in Lu'an city, Anhui province, China: a longitudinal study. Epidemiol Infec. 2019;147:e205. https://doi.org/10.1017/S095026881900089X

38. Yang RR, Gui X, Xiong Y, Gao SC, Yan YJ. Five-year follow-up observation of HIV prevalence in serodiscordant couples. Int J Infect Dis. 2014;33:179-84. https://doi.org/10.1016/j.ijid.2015.02.007

39. Anglemyer A, Rutherford GW, Horvath T, Baggaley RC, Egger M, Siegfried N. Antiretroviral therapy for prevention of HIV transmission in HIV-discordant couples. Cochrane Database Syst Rev. 2013;4(4):1-65. https://doi.org/10.1002/14651858.CD009153.pub3

40. Babu H, Ambikan AT, Gabriel EE, Akusjärvi SS, Palaniappan AN, Sundaraj V, et al. Systemic inflammation and the increased risk of inflamm-aging and age-associated diseases in people living with HIV on long term suppressive antiretroviral therapy. Front Immunol. 2019;10:1-11. https://doi.org/10.3389/fimmu.2019.01965

41. Cruciani M, Parisi SG. Dolutegravir based antiretroviral therapy compared to other combined antiretroviral regimens for the treatment of HIV-infected naive patients: A systematic review and meta-analysis. PloS One. 2019;14(9):e0222229. https://doi.org/10.1371/journal.pone.0222229

42. Chitu-Tisu CE, Barbu EC, Lazar M, Bojincă M, Tudor AM, Hristea A, et al. Body composition in HIV-infected patients receiving highly active antiretroviral therapy. Acta Clin Belg. 2017;72(1):55-62. https://doi.org/10.1080/17843286.2016.1240426

43. Clay PG, Nag S, Graham CM, Narayanan S. Meta-analysis of studies comparing single and multi-tablet fixed dose combination HIV treatment regimens. Medicine. 2015;94(42):e1677. https://doi.org/10.1097/MD.0000000000001677

44. Lepère P, Touré Y, Bitty-Anderson AM, Boni SP, Anago G, Tchounga B, et al. Exploring the patterns of use and acceptability of mobile phones among people living with HIV to improve care and treatment: cross-sectional study in three francophone West African countries. JMIR Mhealth UHealth. 2019;7(11):e13741. https://doi.org/10.2196/13741