Quality of care and adherence to antiretroviral drugs in specialized HIV services in Pernambuco/Brazil, 2017-2018

Qualidade da assistência e adesão aos antirretrovirais em serviços especializados em HIV em Pernambuco/Brasil, 2017-2018

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ABSTRACT The aim of this study was to evaluate health care quality and medication adherence in people living with human immunodeficiency virus in specialized care services. This is a cross-sectional, evaluative study, with a quantitative approach, carried out in ten services in Pernambuco. Two instruments were validated and analyzed by statistical tests were used and 306 adults and their service managers participated. The quality standard was equivalent for most indicators. Only in the countryside, the indicators referring to the availability of antiretroviral drugs and care in the absence of medication were associated with low adherence (p-value=0.033 and p-value=0.011), the latter being a predictor for low adherence. Services with insufficient quality standards showed a 19% higher occurrence of low medication adherence. 81% of users had low adherence to antiretroviral drugs. There is a deficiency in adherence to antiretroviral drugs, and those assisted in services in the countryside have more complicating factors related to the quality of health care for satisfactory adherence.

KEYWORDS Quality of health care. Medication adherence. Anti-retroviral agents.

RESUMO *O objetivo deste estudo foi avaliar a qualidade da assistência à saúde e a adesão à medicação em pessoas vivendo com vírus da imunodeficiência humana em serviços de assistência especializada. Trata-se de um estudo transversal, avaliativo, com abordagem quantitativa, realizado em dez serviços em Pernambuco. Utilizaram-se dois instrumentos validados e analisados por testes estatísticos, dos quais participaram 306 adultos e os respectivos gerentes dos serviços. O padrão de qualidade foi equivalente para a maioria dos indicadores. Apenas no interior, os indicadores referentes à disponibilidade de antirretrovirais e atendimento na falta do medicamento foram associados à baixa adesão (p-valor=0,033 e p-valor=0,011), sendo o último preditor para baixa adesão. Serviços com padrão de qualidade insuficiente apresentaram uma ocorrência 19% maior de baixa adesão à medicação. 81% dos usuários apresentaram baixa adesão aos antirretrovirais. Há deficiência na adesão aos antirretrovirais, e aqueles assistidos nos serviços do interior apresentam mais fatores complicadores relacionados à qualidade da assistência à saúde para uma adesão satisfatória.*

PALAVRAS-CHAVE *Qualidade da assistência à saúde. Adesão à medicação. Antirretrovirais.*

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Introduction

The early start of Antiretroviral Therapy (ART) provides a fundamental condition for the prevention and control of the epidemic due to the potential for intervention in the transmission chain because of the reduction of viral load levels in the blood of people living with HIV (Human Immunodeficiency Virus). This perspective points to a delay in the rise of the epidemic and a reduction in mortality from Aids-related diseases over the years, attributing to HIV infection the characteristics of a chronic disease, with possibilities of management, being essential a satisfactory adherence to antiretrovirals, which represents a regular and daily frequency in taking doses of drug therapy[1,2].

About 23.3 million people living with HIV use ART worldwide, with approximately 1.3 million of these people in Latin America. Between 2010 and 2018, there was a rapid and progressive decrease in Aids-related deaths in the world, corresponding to 14%[3].

The promotion of adherence to HIV treatment through attendance to consultations, examinations and daily intake of antiretrovirals are characterized as essential factors, in which the preservation of care should start from the quality of care provided, with interventions focused on the health environment, in the availability of resources, organization of the work process, quality clinical and pharmaceutical care and the behavior of health professionals, in order to ensure continuity of care[4].

Medication adherence is not a static condition and is influenced by several factors, being that the organization of the service and the quality of health care provided have important aspects in this scenario and that they interfere with care due to the possibilities of increasing tje life expectancy of people living with HIV assisted in services that guarantee full access to ART[5].

The growing internalization of the epidemic in the country and the singularities of the different regions have submerged the concern about the organization of services to promote adherence to ART, since geographical barriers, ie, the distance to large urban centers, can become complicating factor for monitoring the health condition of people living with HIV in the countryside. In addition, the increase in infection in municipalities with lower per capita income includes financial and social problems, in addition to deficiencies in the availability of human and material resources for HIV care, which, in turn, weakens the comprehensiveness of care[6,7].

In this context, an analysis of the quality of health care for people living with HIV and adherence to medication of these people assisted in services distributed in different locations becomes necessary, so that the reality can be better understood and, also, that efforts can be directed to the most vulnerable regions[8]. Thus, given the above, the objective was to assess the quality of health care and medication adherence in people living with HIV in Specialized Assistance Services (SAS).

Material and methods

This is a quantitative, evaluative and cross-sectional study, developed in ten SAS, distributed in the state of Pernambuco, Northeast region of Brazil, with two services located in the state capital and eight in the countryside. The choice of locations was made through a partnership with the School of Public Health of Pernambuco, which had a mutual interest in the study because of the Residency Program in Public Health with Emphasis on Network Management, which had residents installed in the Regions of Health correspondents in the interior of the state and who, after prior training, collaborated in collecting data under the monitoring of researchers. The state of Pernambuco has 37 SASs.

To assess adherence, people living with HIV over 18 years of age, using ART for at least 6 months, participated in the study. People with difficulty in verbal communication,

pregnant women and individuals whose medical records were not identified were excluded. A stratified sampling plan was used to ensure proportionality in each health service evaluated, based on a finite population calculation, resulting in 306 people. To assess the quality of health care in reference services that serve people living with HIV, the 10 managers of the respective services participated. Both groups consisted of non-probabilistic convenience sampling.

Data were collected in two steps. The first stage corresponded to the collection of data related to adherence to ART and took place between June 2017 and May 2018, through interviews conducted at the SAS facilities of each Health Region, in a room predetermined by the service coordination, for the specific purpose of data collection, in order to protect the privacy of the interviewees.

Participants were approached in the waiting room for consultation and collection of material for CD4 count and viral load. Those who met the eligibility criteria were informed about the research, the study objectives and invited to participate. Participation was confirmed by signing the Informed Consent Form.

At this stage, two instruments were used for data collection, which were collected through face-to-face interviews: a semi-structured interview form to describe the sociodemographic, economic, behavioral and clinical profile of people who perform ART; and, to classify adherence to medication, ART, the version validated for the Portuguese language of the 'Questionnaire for the Evaluation of Adherence to Antiretroviral Treatment' (CEAT-VIH) was used. This is a self-reporting instrument, consisting of 20 questions, which considers good adherence to ART to be a percentage equal to or greater than 859,10.

The minimum CEAT-HIV score is 17, and the maximum 89, allowing you to classify adherence into 3 levels. To favor bivariate analyses, facilitating the association and, consequently, the identification or not of statistical significance, as well as for the fact that the literature points to the importance of maintaining high adherence for therapeutic success[3], the adherence classification was adapted for good adherence (score $\geq$ 79 points), which equates to an adherence $\geq$ 85%, and low adherence (score $\leq$ 78 points), which represents less than 84% adherence to the ART9,10.

The second stage corresponded to the collection of data related to the quality of service indicators and took place from May to August 2018. An electronic form was built, using the Google forms tool, based on the adaptation of 6 (six) questions of the Qualiaids questionnaire, which aims to assess the quality of health care provided by public services in Brazil that assist people living with HIV on an outpatient basis: organization of the care process, technical management of work and availability of resources related to medication adherence, with their respective domains and evaluation indicator criteria[11] (*box 1*).

Box 1. Questions, dimensions, domains and criteria of health care quality indicators related to the promotion of adherence to Antiretroviral Therapy considered for the study

Question	Dimension	Domain	Criteria of Indicator
A30	Organization of the care process	Specific medication adherence activities	Interval between medical appointments, at the beginning or at the change of ARV
A31	Organization of the care process	Specific medication adherence activities	Monitoring of patients' antiretroviral use
A33	Organization of the care process	Specific medication adherence activities	Behaviors for patients with difficulty in using the medication
A34	Organization of the care process	Specific medication adherence activities	Forms of care for patients who were left without medication
G32	Technical management of work	Records, evaluation, monitoring and planning	Monitoring of ARV adherence rates
R51	availability of resources	Medicines, supplies, exams and references	Antiretroviral drugs

Source: Self elaboration. Adapted from Qualiaids Questionnaire[11].
Note: Qualiaids questionnaire.

The form was sent by email to the managers responsible for the respective services to be answered by the managers themselves and/or by the local health team. The questions (quality indicators) received the values 0, 1 or 2, where the score represents, respectively: value zero (0): insufficient quality standard; one (1): acceptable quality standard; and two (2): expected quality standard[11].

Data were analyzed using descriptive and inferential statistics from the SPSS 18.0 software. Analyzes were performed using the following tests: Chi-square. In cases where the Chi-square test assumptions were not satisfied, Fisher's exact test was applied. The Wald test was used to compare the risks between the levels of the assessed factors. Variables that showed statistical significance of up to 20% in the bivariate analysis were included in the adjustment of the Poisson model with robust variance for multivariate analysis, in order to determine which factors influence low adherence to ART. All conclusions were drawn, considering a significance level of 5%.

Aiming to facilitate the multivariate analysis, with regard to the service's assistance quality indicators, the number of assisted participants was considered, respectively, in each SAS, according to the assistance quality standards found for each indicator.

The dependent variable was the level of medication adherence (low adherence and good adherence to ART). As independent variables, those with service quality data were considered: interval between medical appointments, at the beginning or at the exchange of ART; monitoring of patients' antiretroviral use; behaviors for patients with difficulty in using the medication; forms of care for patients who were left without medication; monitoring of ART membership rates; and availability of antiretroviral drugs.

For the development of the study, prior approval was obtained from the Research Ethics Committee of the Hospital Complex of the University of Pernambuco (UPE), through Opinion No. 2122011, of June 15th, 2017, meeting the ethical requirements of Resolution No. 466/2012, of the National Health Council.

Results and discussion

The sample was characterized by the prevalence of males (57.2%), self-declared brown (44.1%), with complete/incomplete elementary school (44.1%), married or living with a partner (46.4%), aged 40 to 59 years (60.8%) and average monthly family income of up to 1 (one) minimum wage[12] (41.5%). Higher percentage (32.4%) of people using ART in the period from 1 to 5 years, 54.9% used the ART scheme with two pills/day, 69.9% had undetectable viral load in the the last record of their medical record, and only 21.9% registered low adherence to ART.

As for the classification of the level of adherence to ART of people living with HIV (*table 1*), there was a high rate of low adherence (81.0%) throughout the state. It is noteworthy that the level of low medication adherence is higher in the countryside (91.5%) than in the capital (77.9%), and this finding is significant (p-value < 0.05).

Table 1. Level of adherence to medication of people living with HIV undergoing antiretroviral treatment, according to location, in Specialized Assistance Services. Pernambuco, Brazil, 2019 (n=306)

			Capital		Countryside		
Adherence Level*	**n**	**%**	**n**	**%**	**N**	**%**	**p-value**
Low adherence	248	81.0	183	77.9	65	91.5	0.010*
Good adherence	58	19.0	52	22.1	6	8.5	

Source: Self elaborated.

*p-value by Chi-square test for homogeneity.

The low adherence to ART verified corroborates Brazilian studies13-16, carried out in different regions of Brazil, and other studies[17-19] carried out in Chile, Equatorial Guinea and Romania, in which the CEAT-VIH was the instrument used to analyze the level of adherence to ART.

Low adherence is a concern, since adherence to antiretroviral drugs is the main focus for individual therapeutic success, due to the possibility of reducing the chances of infection, thus minimizing the incidence of HIV. High rates of low adherence mean that people living with HIV have difficulties with ART and are not adhering to treatment safely and regularly[20].

Difficulties in the use of ART can be aggravated during the course of treatment due to the lack of family and social support, the discomfort of the time in therapy, the false belief of cure related to spirituality, and also the lack of awareness of the disease and the severity that can be generated around the failure of viral suppression and opportunistic diseases[21].

It is important that the health team organizes itself in order to provide assistance that involves the person living with HIV to discuss the main problems faced in order to improve adherence to treatment, creating spaces and encouraging the exchange of experiences and experiences[22].

As for the quality of services (*table 2*), the indicators evaluated as having an insufficient standard were 'monitoring of patients' antiretroviral use' (95.1%), 'monitoring of ART adherence rates' (94.8%) and ' availability of antiretroviral drugs' (75.2%). The indicator with the highest percentage of acceptable standard was 'conducts for patients with difficulty in using medication' (94.8%). The

expected quality standard was found in the highest percentage in the indicators 'interval between medical appointments, at the start or change of ART' and 'forms of care for patients who were without medication', with 78.1% and 64.1%, respectively, these findings being significant in all indicators (p-value < 0.05).

Still, with regard to the quality standard of the indicator 'forms of care for patients who were without medication', the capital had 75.3% of services with an expected standard, while the countryside showed 64.8% with an insufficient standard.

Table 2. Indicators of service quality from the perspective of promoting adherence to antiretroviral medication, according to location, in Specialized Care Services. Pernambuco, Brazil, 2019 (n=306)

			Capital		Countryside		
Quality indicators	**n**	**%**	**n**	**%**	**N**	**%**	**p-value**
A30. Interval between medical appointments. at the beginning or at the change of antiretroviral							
Acceptable standard	67	21.9	58	24.7	9	12.7	0.032*
Expected standard	239	78.1	177	75.3	62	87.3	
A31. Monitoring of patients' antiretroviral use							
Insufficient standard	291	95.1	235	100.0	56	78.9	<0.001**
Expected standard	15	4.9	-	-	15	21.1	
A33. Behaviors for patients with difficulty in using the medication							
Insufficient standard	16	5.2	-	-	16	22.5	<0.001**
Acceptable standard	290	94.8	235	100.0	55	77.5	
A34. Forms of care for patients who were left without medication							
Insufficient standard	46	15.0	-	-	46	64.8	<0.001*
Acceptable standard	64	20.9	58	24.7	6	8.4	
Expected standard	196	64.1	177	75.3	19	26.8	
G32. Monitoring of Antiretroviral Therapy adherence rates							
Insufficient standard	290	94.8	235	100.0	55	77.5	<0.001**
Acceptable standard	16	5.2	-	-	16	22.5	
R51. Availability of Antiretroviral Drugs							
Insufficient standard	230	75.2	177	75.3	53	74.6	<0.001*
Acceptable standard	18	5.9	-	-	18	25.4	
Expected standard	58	19.0	58	24.7	-	-	

Source: Self elaborated.

*p-value using Chi-square test for homogeneity. **p-value using Fisher's exact test.

Adherence to antiretroviral medication in people living with HIV involves multiple aspects that should be explored in services that provide assistance to these people. By measuring the degree of adherence to ART and the quality of health care, it is possible to reorganize and plan care practices, thus identifying the best strategies for strengthening adherence in the field of care management[8,13].

The beginning of therapy, as well as the change of antiretroviral drugs, is a delicate moment, which involves, in addition to the acceptance of the diagnosis, the adaptation of the person living with HIV to the new changes

that the treatment entails. It is known that antiretroviral drugs can have side effects that, if not followed up, contribute to treatment irregularity or even abandonment[23].

In these omens, if the intervals between appointments are long, there may be a weakness in the monitoring of these people, favoring greater vulnerability to non-adherence and subsequent abandonment of therapy[22]. Given this importance, the SAS presented a satisfactory work process, since the quality standard was expected for the corresponding indicator.

In the analysis of the level of adherence to antiretroviral medication according to the quality of service indicators (*table 3*), in the state, in general, only the quality indicator 'ways of care for patients who ran out of medication' was significant in modifying the level adherence (p-value = 0.005), with a greater predominance of low adherence to ART in the group of people whose service presented an insufficient quality standard for this indicator (97.8%).

In the capital, there were no significant quality indicators to change the level of adherence to ART of people living with HIV evaluated. However, for the interior of the state, the quality indicators that were significant for adherence to ART were 'forms of care for patients without medication' (p-value = 0.011) and 'availability of antiretroviral drugs' (p-value = 0.033).

People cared by services with an acceptable quality standard in the indicator 'ways of care after running out of medication' and an insufficient quality standard in the indicator 'availability of antiretroviral medication' were those with the highest percentage of low adherence to ART (100.0 % and 96.2%, respectively).

Table 3. Level of adherence to Antiretroviral Therapy of people living with HIV, according to quality indicators, according to location, in Specialized Care Services. Pernambuco. Brazil. 2019 (n=306)

	Adherence level					
	General		Capital		Countryside	
Quality indicator	Low	Good	Low	Good	Low	Good
A30. Interval between medical appointments, at the beginning or at the change of antiretroviral						
Acceptable standard	53(79.1%)	14(20.9%)	46(79.3%)	12(20.7%)	7(77.8%)	2(22.2%)
Expected standard	195(81.6%)	44(1.4%)	137(77.4%)	40(22.6%)	58(93.5%)	4(6.5%)
p-value	0.646*	0.761*	0.164**	0,761*		0,164**
A31. Monitoring of patients' antiretroviral use						
Insufficient standard	235(80.8%)	56(19.2%)	183(77.9%)	52(22.1%)	52(92.9%)	4(7.1%)
Expected standard	13(86.7%)	2(13.3%)	-	-	13(86.7%)	2(13.3%)
p-value	0.745**	-	0.600**	-		0,600**
A33. Conducts for patients with difficulty in using medication						
Insufficient standard	14(87.5%)	2(12.5%)	-	-	14(87.5%)	2(12.5%)
Acceptable standard	234(80.7%)	56(19.3%)	183(77.9%)	52(22.1%)	51(92.7%)	4(7.3%)
p-value	0.745**		0.611**			0,611**
A34. Forms of care for patients who were left without medication						
Insufficient Standard	45(97.8%)	1(2.2%)	-	-	45(97.8%)	1(2.2%)
Acceptable standard	52(81.3%)	12(18.7%)	46(79.3%)	12(20.7%)	6(100.0%)	0(0.0%)
Expected standard	151(77.0%)	45(23.0%)	137(77.4%)	40(22.6%)	14(73.7%)	5(26.3%)
p-value	0.005*	0.761*	0.011**	0,761*		0,011**

Table 3. (cont.)

	Adherence level					
	General		Capital		Countryside	
Quality indicator	Low	Good	Low	Good	Low	Good
G32. Monitoring of Antiretroviral Therapy adherence rates						
Insufficient standard	235(81.0%)	55(19.0%)	183(77.9%)	52(22.1%)	52(94.5%)	3(5.5%)
Acceptable standard	13(81.3%)	3(18.7%)	-	-	13(81.3%)	3(18.7%)
p-value		1,000*		-		0,123**
R51. Availability of Antiretroviral Drugs						
Insufficient Standard	188(81.7%)	42(18.3%)	137(77.4%)	40(22.6%)	51(96.2%)	2(3.8%)
Acceptable standard	14(77.8%)	4(22.2%)	-	-	14(77.8%)	4(22.2%)
Expected standard	46(79.3%)	12(20.7%)	46(79.3%)	12(20.7%)	-	-
p-value		0,856*		0,761*		0,033**

Source: Self elaborated.

*p-value using the Chi-square test for independence. *p-value using Fisher's exact test.

Of all the factors that showed statistical significance of up to 20% in the multivariate analysis, only the 'way of care for patients who were without medication' is a determining factor for low adherence to antiretrovirals (*table 4*).

In services with an insufficient quality standard, the occurrence of low adherence to ART was 19% higher when compared to services with an expected quality standard (PR=1.19; p-value < 0.001). For the group of people living with HIV in which the service presented an acceptable standard of quality, it was found that the occurrence of low adherence (PR=1.05) was not significant (p-value = 0.476).

Table 4. Adjustment of the Poisson model for low adherence to Antiretroviral Therapy by people living with HIV in Specialized Care Services. Pernambuco, Brazil, 2019 (n=306)

Quality Indicator	PR	CI(95%)	p-value*
A34. Forms of care for patients who were left without medication			
Insufficient standard	1.19	1.09 – 1.30	<0.001
Acceptable standard	1.05	0.92 – 1.20	0.476
expected standard	1.00	-	-

Source: Self Elaborated.

*p-value using the Wald test. PR = Prevalence Ratio. CI = Confidence Interval.

Although the indicator 'forms of care for patients without medication' is considered a positive scenario in the assessment of services in the state in general and in the capital, as shown in *table 2*, it contrasted with the scenario of services in the countryside, being highlighted, in *table 3* too, as an important factor for low adherence to ART. This finding denotes a weakness in the work process of these SAS, since the form of care for the patients who ran off their antiretrovirals weakens the treatment, affects the quality of

care, patient safety and, in the long term, increases treatment costs and the chances of virological failure[24].

In addition, the 'availability of antiretroviral drugs' is another important finding for adherence, since the SAS of both locations were insufficiently structured, and the unavailability was a predictor for adherence to ART in countryside services. There is a need for organization and availability of resources for services, as the literature[25] proves that the lack of medication was significantly reported by people living with HIV as a barrier to medication adherence.

The fragility of the dispensing of antiretroviral drugs discourages the continuity of treatment in services with poor quality indicators, since they present a higher risk for non-adherence to ART when compared to those with better quality indicators[4,26].

A finding in the Brazilian literature[27] found that only half of the services meet the expected quality standard for the availability of antiretroviral drugs. This finding puts at risk the concept of care for people living with HIV, which aims to provide satisfactory adherence, in order to ensure an increase in people with viral suppression and reduce the transmission of the disease[28].

The drug supply deficit is a complex and multifactorial situation, influenced by elements related to political factors, financing and pharmaceutical management[29]. Sufficient supply and good quality of resources is essential for better care to be offered. The management and financing of health services are as responsible for the quality of care as the professionals who provide assistance[30].

From this perspective, although the services in both locations have presented an acceptable standard of quality of health care for the indicator 'conducts for patients with difficulty in using medication', it was inferred that this represents the care provided to those people who are having difficulties in adapting to the use of antiretroviral drugs is still not occurring satisfactorily.

With regard to the indicators 'monitoring of patients' antiretroviral use' and 'monitoring of rates of adherence to ART', services in both locations showed an insufficient standard of quality, which is a worrying finding, as the service must develop strategies and have the means to monitor the use of ART by each individual. Studies have observed that, in most Brazilian HIV referral services, adherence of people living with HIV to ART was verified in individual consultations by questioning the correct use of medications[28].

State services, regardless of location, have precarious monitoring adherence to ART, which reinforces the fragility of care provided by these services in terms of monitoring the use of ART by patients and monitoring adherence to medications.

In general, despite the weaknesses found in the services, it appears that those located in the interior of the state are more vulnerable, from the perspective of adherence, to a fragmented care. This finding denotes a greater commitment to actions to promote adherence to ART, which are considered essential in the treatment of HIV.

As can be seen, adherence to ART is a complex process, influenced by several factors that must be explored in the services that provide care to these people. Thus, understanding the difficulties in adherence to ART is an essential process and requires shared and co-responsible decisions between the user and the service, the health team and the social support network, in order to meet the sociocultural and subjective singularities of the assisted population[13].

In this scenario, the SAS must be articulated in favor of actions to promote and monitor the retention of patients in follow-up in order to improve the adherence and permanence of users in the services. It is expected that managers are sensitized to assess and monitor indicators related to the quality of health care and adherence

to antiretroviral medication, in order to plan strategies to reach the 90-90-90 goal, especially with regard to satisfactory access to treatment and, with that, to virological suppression[28].

Final considerations

The SASs in the state of Pernambuco, where this study was carried out, still do not have the expected quality standard to maintain comprehensive care for people living with HIV. The availability of resources and the way the work process is organized were important for adhering to ART.

The unavailability of antiretroviral drugs was a factor associated with low adherence in the state. It is, therefore, an administrative issue that involves financial and logistical aspects. It is understood that efforts are made to minimize obstacles to the regular and continuous supply of antiretroviral drugs, according to demand.

People assisted by SASs in the countryside have complicating factors for adherence to ART. The forms of care for the person who was left without medication, due to a deficit in the service, was a predictor of low adherence. This is a deficiency in the care process and, with the unavailability of antiretrovirals, it can compromise all the work that the health team performs on the importance of adherence to treatment, favoring virological failures, as well as negligence in the continuity of the daily use of these drugs.

Adding to this, the low adherence found requires the implementation of continuing education actions for health professionals working in the SASs, given that in this situation it is important to provide a humanized and welcoming service that enables listening and considering the singularities of each individual, aiming at minimize disincentives to the continuity of treatment and even strengthen the bond between the user and the service.

As a limitation of the study, with regard to the analysis of care quality indicators in the SASs, the possibility of conflicts of interest is highlighted, since the forms were filled in by the managers of the respective services. Other limitations include the secondary source of data: incomplete medical records, with regard to viral load and low adherence record, which resulted in an informative collection made from old records. It is believed that these data were omitted.

It is expected to contribute to a better understanding of the behavior of adherence to ART and the quality of reference services in the state of Pernambuco, but mainly in the capital and interior locations, since, in the context of HIV, these have different characteristics and that need specific planning and interventions, consistent with each reality. Thus, the findings of this research can help to structure and strengthen public health policies aimed at HIV in Pernambuco.

Collaborators

Moraes DCA (0000-0003-4979-6145)* and Cabral JR (0000-0003-3827-996X)* contributed to data collection, analysis and discussion of the data. Oliveira RC (0000-0002-6559-5872)* and Souza VA (0000-0001-7232-7561)* contributed equally to the preparation of the manuscript. ■

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