Temporal analysis of the incidence of HIV/AIDS in older people from 2007 to 2020

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Abstract

Objective: To analyze the temporal trend of the incidence rate of new HIV/AIDS cases in the old-aged, from 2007 to 2020, in the state of Bahia, in the Northeast Region and in Brazil. *Methods:* Ecological time series study, using secondary data from 2007 to 2020 in an elderly population. Calculations of the HIV/AIDS incidence rate and frequency distribution of sociodemographic characteristics and exposure categories were performed. Simple linear regression models were estimated for trend analysis and calculated by the annual percentage change (APC). *Results:* In Brazil, during the study period, there was stability in the trend of the HIV/AIDS incidence rate for the general population and for both sexes. In the Northeast there was an increase for the general (APC=6.4%), for males (APC=6.9%) and females (APC=6.5%). In Bahia, there was an increase for the general (APC=7.4%) and male sex (APC=7.4%), and stability for females. Higher proportions of new cases in the elderly were observed in males, whites (Brazil), blacks (Northeast and Bahia), low education and heterosexual exposure category. *Conclusion:* Attention should be paid to the increase in cases in individuals in the third age seeking to demystify taboos about the sexuality of the elderly in order to promote the adoption of health promotion measures, aiming at reducing the transmission of the virus.

Keywords: Health Profile; HIV; Health of the Elderly; Epidemiologic Studies.

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INTRODUCTION

In 1980, the first cases of AIDS, caused by the human acquired immunodeficiency virus (HIV), which destroys the human body's natural defense mechanisms, were officially documented by the US Centers for Disease Control and Prevention (CDC)[1]. In that period, homosexuals, injecting drug users, sex workers and hemophiliacs were included in the risk group for contamination by the virus[1-2]. Since then, AIDS has been considered a pandemic, with around 37.9 million infected worldwide[3].

The African and Asian continents have the highest numbers of virus infection, with about 30.6 million people infected. Latin America is just behind with 1.9 million people living with the virus, ranking third in the world[3]. In Brazil, between 1980 and June 2021, 1,045,355 AIDS cases were identified, in 2021, 32,701 new HIV cases and 29,917 AIDS cases were diagnosed, with a detection rate of 14.1 per 100,000 inhabitants[4].

With the advance of the HIV/AIDS epidemic, the profile of those infected has changed. Currently, heterosexual individuals are the most affected by the disease, the idea of a risk group has been replaced by risk or vulnerable behavior[5]. Thus, it allows the expansion of the focus of attention to society as a whole and not just to isolated groups, avoiding the stigmatization of social groups[5].

Regarding vulnerability to HIV/AIDS, individual and collective aspects are important in exposure to the virus[6,7]. In this way, low access to health services, unfavorable economic conditions and lack of sexual and reproductive rights contribute to greater exposure to the virus[6,7]. There is a change in the regional distribution of the disease, previously restricted to the Southeast region, now spread in other regions of the country, such as the North and Northeast regions[8,9]. Probably related to the context of social vulnerability that these regions present and also the reduction of underreporting of the disease[5].

Another change observed in the progression of the epidemic is the increasing infection in people aged 60 years and over[2,7,10]. At the beginning of the infection, in the 1980s, the older population was not affected and only four cases appeared in the first five years of the epidemic[2]. In 1995, 395 cases were reported in the country, rising to 1,119 cases reported in 2005 in this population[11].

With the increase in life expectancy and the achievement of retirement, aging has been re-signified. Older people have increasingly sought an active social life, with physical activity practices, greater social circle, body changes and also in sexual behavior[12]. Thus, there is the introduction of drugs that help sexual life, such as drugs for erectile dysfunction and hormone therapy, which provides a more active sex life[2,7,10,12]. Despite this, there are still many taboos regarding the sexuality of older people, on the part of family members and health professionals[9,13,14].

The taboo on the sexuality of older people is a problem that can lead to a decrease in the early detection of HIV infection, since this group is often not considered among those who have an active sexual life[14,15]. Another factor that contributes to a possible infection is the non-use of condoms by these individuals, because they do not feel vulnerable to the disease, due to taboos and, mainly, due to the lack of orientation of this population when they were young.

With the possible increase in the number of HIV/AIDS infections in people aged 60 and over, it becomes important to estimate whether this increase has been real over the years and how it is distributed in this population group. Given the above, this article aims to analyze the temporal trend of the incidence rate of new cases of HIV/AIDS in older people, from 2007 to 2020, in the state of Bahia, in the Northeast Region and in Brazil.

METHODS

This is an ecological time series study of new reported cases of HIV/AIDS in people aged 60 years and over, between 2007 and 2020, living in the state of Bahia, Northeast Region and Brazil.

Secondary data obtained from the following databases were used: National System of Notification of Diseases (SINAN) made available by the Department of Informatics of the Unified Health System (DATASUS)[11] and data from the 2010

demographic census[16] and intercensus estimates for the other years, made available by IBGE, through TABNET – DATASUS[17].

The absolute and relative frequencies of reported AIDS cases in older people were calculated according to sociodemographic and exposure characteristics for the state of Bahia, the Northeast Region and Brazil. The variables studied were: age group (60-69; 70-79 and 80 years or older); sex; year of diagnosis (from 2007 to 2020); years of education (none, 1 to 3 years, 4 to 7 years, 8 to 11 years and 12 years or more); race/color (white, black, brown, yellow and indigenous) and exposure category (heterosexual, homosexual, bisexual, IDU injecting drug use, hemophiliac and vertical transmission).

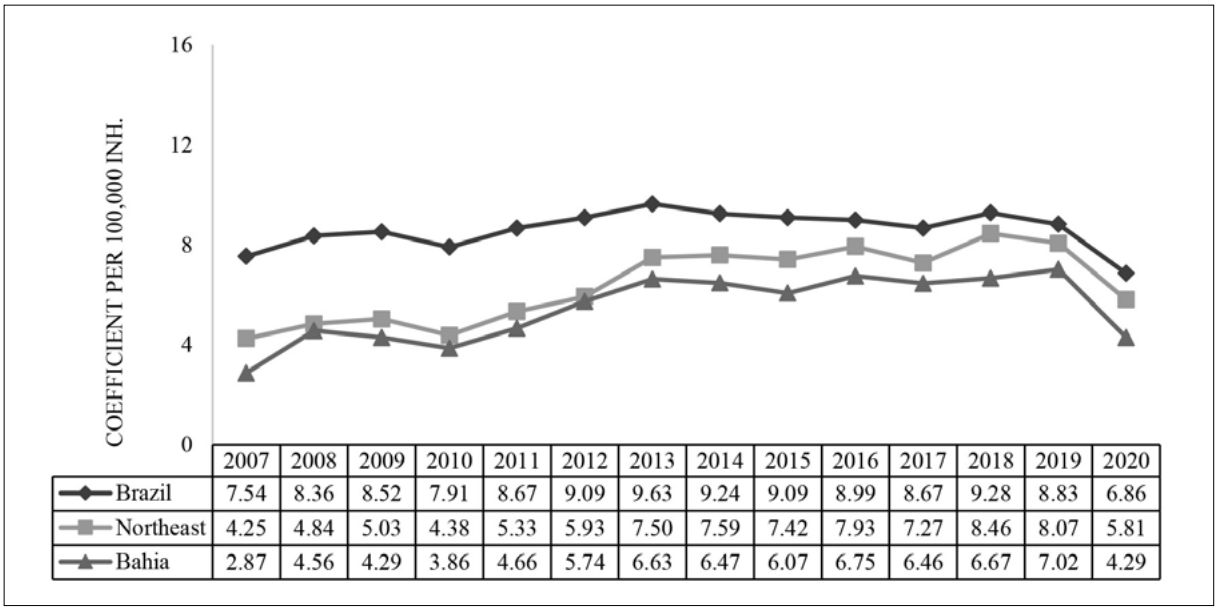
The HIV/AIDS incidence rate was calculated stratified by year, sex and geographic area, and considered the new reported cases of HIV/AIDS in older people in the numerator and the older population multiplied by 100,000 in the denominator. To assess the time trend of the rates, the annual percentage change (APC) of the incidence rates was calculated through the ratio of the regression coefficient in relation to the rate at the beginning of the period.

To estimate the regression coefficients and their 95% confidence intervals, simple linear regression was used, considering the incidence rate as the dependent variable and the years of the historical series as the independent variable. The trend whose regression coefficient was not different from zero, p-value>0.05, was considered stationary. The assumptions of normality, linearity and homoscedasticity of the residuals were verified, respectively, by the Shapiro-Wilk test, scatter plot and Breusch-Pagan test. A 5% significance level was adopted.

RESULTS

From 2007 to 2020, 27,856 new cases of HIV/AIDS in older people were reported in Brazil, 5,207 in the Northeast region and 1,225 in the state of Bahia.

In Brazil, the incidence of HIV/AIDS in older people increased from 7.54/100,000 inhabitants in 2007 to 6.86 in 2020. In the Northeast region, the incidence rate was 4.25 in 2007, rising to 8.73 in 2020, and in the state of Bahia, the incidence increased from 2.87/100,000 in 2007 to 4.29 in 2020. In these three regions, a drop in rates was observed in 2020 (Figure 1).



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Brazil	7.54	8.36	8.52	7.91	8.67	9.09	9.63	9.24	9.09	8.99	8.67	9.28	8.83	6.86
Northeast	4.25	4.84	5.03	4.38	5.33	5.93	7.50	7.59	7.42	7.93	7.27	8.46	8.07	5.81
Bahia	2.87	4.56	4.29	3.86	4.66	5.74	6.63	6.47	6.07	6.75	6.46	6.67	7.02	4.29

Figure 1. Incidence coefficient (100,000 inhabitants) of HIV/AIDS in older people in the state of Bahia, Northeast Region and in Brazil, 2007-2020.

In older males in Brazil, in 2007, the incidence of HIV/AIDS was 10.3 per 100,000 inhabitants, and in 2020, it decreased to 9.6. In the Northeast region, the incidence rate in 2007 was 6.7 and 8.7 in 2020. In Bahia, in 2007, the incidence rate was 4.3 and increased to 6.6 in 2020 (Figure 2).

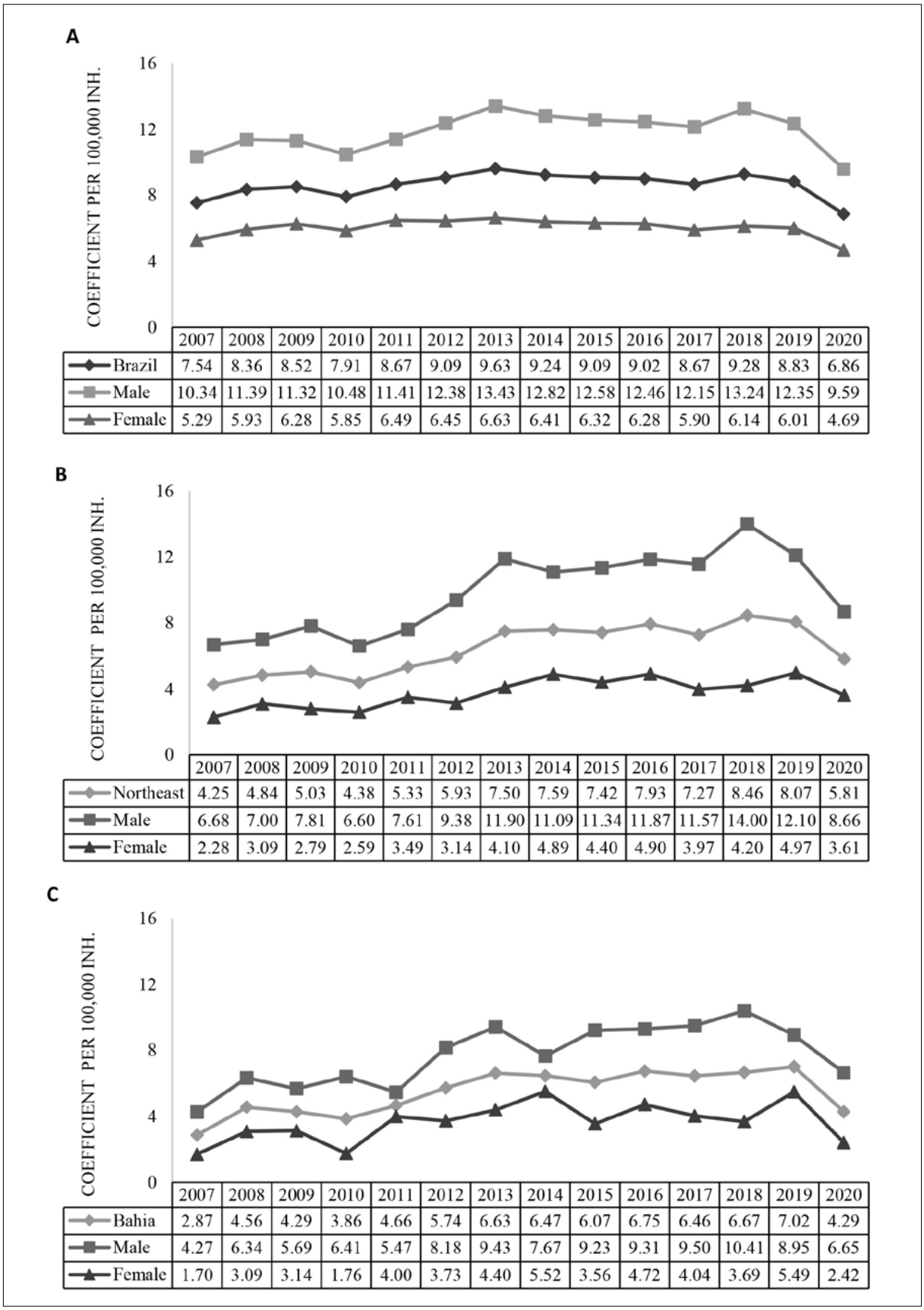
In older females, in 2007, in Brazil, the incidence per 100,000 inhabitants was 5.3 and 4.7 in 2020. In 2007, the rate was 2.3 in the Northeast region and 1.7 in Bahia, in 2020 it was 3.6 in the Northeast and 2.4 in Bahia (Figure 2).

The average HIV/AIDS incidence rate was 9.5/100,000 in Brazil, 6.7/100,000 in the Northeast region and 6.0/100,000 in the state of Bahia, with an average rate about 2 times higher in men than in women. In Brazil, the incidence rate trend was stable for the total population and for sex. There was an increasing trend in the incidence rate for the Northeast region (APC=6.4%) and the state of Bahia (APC=7.4%), and a similar behavior was observed for males. In females, an increase in incidence was observed only in the Northeast region (APC=6.9%), being stable in Bahia (Table 1).

In the three regions analyzed, a reduction in the incidence rate of HIV/AIDS was observed with increasing age (Figure 3).

Among the new reported cases of HIV/AIDS in Brazil, the highest percentage of white individuals (30.5%) was observed, followed by browns and blacks. In the Northeast region and in the state of Bahia, a higher percentage of the black population (blacks and browns) was observed. As for the education of the new cases, a higher frequency was observed in the category of 4 to 7 years of study in all regions, in this variable, more than half of the population in each region was classified as ignored, exceeding 60% in the state of Bahia (Table 2).

Regarding the category of exposure in older people with HIV/AIDS, the predominance of contamination in heterosexual relationships was observed in the three regions analyzed, accounting for 42.8% of cases in Brazil, followed by homosexual (3.5%) and bisexual (2.2%) other categories such as Injectable Drug Use (IDU) and vertical transmission showed to be frequent. The number of ignored people in this category was 59.9% in the state of Bahia (Table 2).



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Brazil	7.54	8.36	8.52	7.91	8.67	9.09	9.63	9.24	9.09	9.02	8.67	9.28	8.83	6.86
Male	10.34	11.39	11.32	10.48	11.41	12.38	13.43	12.82	12.58	12.46	12.15	13.24	12.35	9.59
Female	5.29	5.93	6.28	5.85	6.49	6.45	6.63	6.41	6.32	6.28	5.90	6.14	6.01	4.69

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Northeast	4.25	4.84	5.03	4.38	5.33	5.93	7.50	7.59	7.42	7.93	7.27	8.46	8.07	5.81
Male	6.68	7.00	7.81	6.60	7.61	9.38	11.90	11.09	11.34	11.87	11.57	14.00	12.10	8.66
Female	2.28	3.09	2.79	2.59	3.49	3.14	4.10	4.89	4.40	4.90	3.97	4.20	4.97	3.61

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bahia	2.87	4.56	4.29	3.86	4.66	5.74	6.63	6.47	6.07	6.75	6.46	6.67	7.02	4.29
Male	4.27	6.34	5.69	6.41	5.47	8.18	9.43	7.67	9.23	9.31	9.50	10.41	8.95	6.65
Female	1.70	3.09	3.14	1.76	4.00	3.73	4.40	5.52	3.56	4.72	4.04	3.69	5.49	2.42

Figure 2. Incidence coefficient (100,000 inhabitants) of HIV/AIDS in older people from 2007-2020: a) sex for Brazil; b) sex for the Northeast Region; c) sex for the state of Bahia.

Table 1. Average coefficient per 100,000 inhabitants and trend of HIV/AIDS incidence rates in older people according to sex for Brazil, Northeast Region and Bahia in the period 2007-2020.

Geographical unit / sex	average coefficient	APC (%) [a]	95%CI [b]	p-value	Interpretation
Brazil	9.52	0.28	-1.20; 1.77	0.684	Stable
Male	13.09	0.74	-0.84; 2.33	0.328	Stable
Female	6.67	-0.39	-1.85; 1.06	0.567	Stable
Northeast	6.72	6.43	3.11; 9.76	0.001	Increasing
Male	10.10	6.54	2.93; 10.15	0.002	Increasing
Female	3.98	6.93	3.04; 10.82	0.002	Increasing
Bahia	5.98	7.38	2.22; 12.55	0.009	Increasing
Male	8.32	7.42	2.76; 12.08	0.005	Increasing
Female	4.04	7.83	-1.42; 17.08	0.090	Stable

a Annual percentage change.

b Confidence interval.

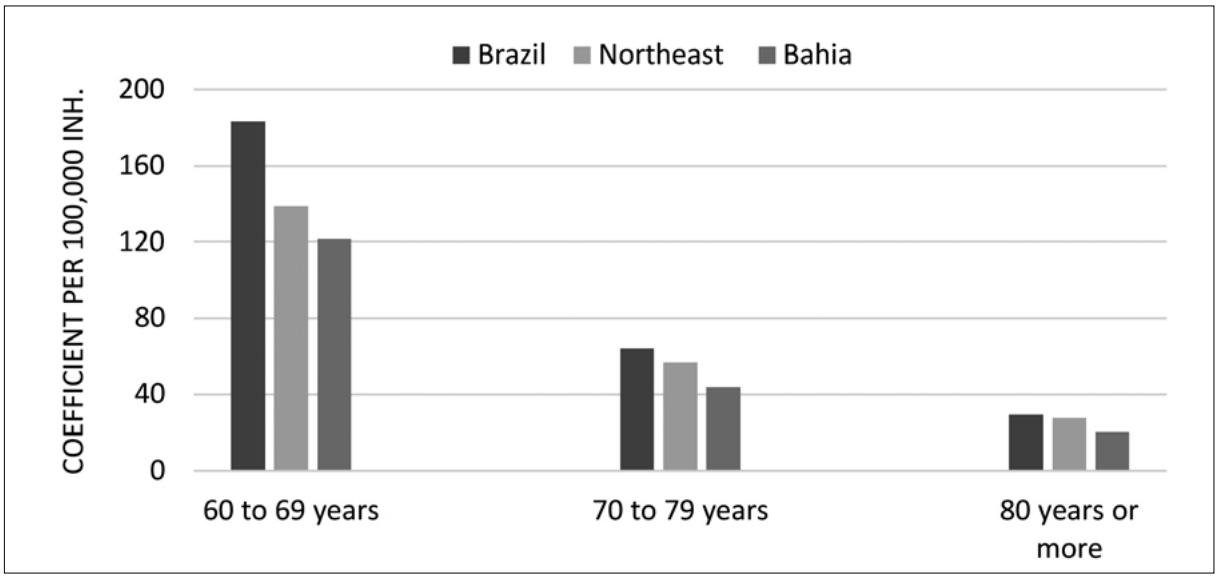


Figure 3. Incidence coefficient (100,000 inhabitants) of HIV/AIDS in older people by age group in Brazil, the Northeast region and Bahia, in the period 2007-2020.

Table 2. Distribution of new HIV/AIDS cases in individuals aged 60 years and over, according to sociodemographic characteristics, years of education and exposure category in Brazil, the Northeast Region and Bahia in the 2007-2020 period.

Variables	Brazil		Northeast		Bahia	
	n	%	n	%	n	%
Sex						
Female	11,015	38.9	1,733	32.7	466	37.0
Male	17,315	61.1	3,559	67.3	794	63.0
Ignored	1	0.0	0	0.0	0	0.0
Age						
60 to 69 years	22,455	79.3	4,129	78.0	1,012	80.3
70 to 79 years	4,977	17.6	952	18.0	203	16.1
80 years +	899	3.2	211	4.0	45	3.6
Total	28,331		5,292		1,260	
Skin colour						
White	8,632	30.5	512	9.7	122	9.7
Black	1,427	6.1	333	6.3	119	9.4
Yellow	112	0.4	15	0.3	1	0.1
Brown	8,898	20.8	2,096	39.6	298	23.7
Indigenous	61	0.2	7	0.1	4	0.3
Ignored	11,901	42.0	2,329	44.0	716	56.8
Education						
None	1,305	4.6	466	8.8	56	4.4
1 to 3 years	2,645	9.3	511	9.7	92	7.3
4 to 7 years	4,064	14.3	574	10.8	117	9.3
8 to 11 years	3,532	12.5	519	9.8	97	7.7
12 or more	1,076	3.8	155	2.9	30	2.4
Ignored	15,709	55.4	3,077	58.1	868	68.9
Exposure Category						
Homosexual	991	3.5	203	3.8	39	3.1
Bisexual	628	2.2	117	2.2	24	1.9
Heterosexual	12,124	42.8	2,074	39.2	424	33.7
IDU	142	0.5	20	0.4	9	0.7
hemophiliac	3	0.0	3	0.0	3	0.2
Transfusion	12	0.0	0	0.0	0	0.0
Acc. Biological material	1	0.0	0	0.0	0	0.0
Vertical Transmission	65	0.2	16	0.3	6	0.5
Ignored	14,365	50.7	2,859	54.0	755	59.9

IDU*= Injectable drug use, **Acc. Biological Mat = Accident with biological material.

DISCUSSION

In the present study, it was possible to observe the temporal trend of the HIV/AIDS incidence rate in the older population over a period of 14 years (2007 to 2020) according to gender and geographic area. In Brazil, this trend was stable for the total population of older people and for both sexes, in Bahia for the female sex, while in the Northeast and Bahia there was a growing trend for the total population and for the male sex. The reported cases of HIV/AIDS in the three regions analyzed were higher in males, in the 60-69 age group, in the 4-7 year-old category and among heterosexuals. As for the distribution of cases by race/color, white was more frequent in Brazil and blacks in the Northeast region and in the state of Bahia.

The HIV/AIDS epidemic in Brazil is currently expanding to groups that were not considered "at risk", starting to be found throughout society, regardless of gender, sexual orientation and age. A study that evaluated the temporal trend of the incidence of HIV/AIDS in people aged 50 years or older found stability in Brazil and in the Southeast, South and Midwest regions, and an increase in the North and Northeast regions[8]. The increase in the number of diagnosed cases of HIV/AIDS in older people has been described in the literature, Castro et al 2020 in the period from 2007 to 2016, found in Minas Gerais an increase in the incidence rate of HIV/AIDS in all age groups[18]. In the states of Piauí[19] and Ceará[5], an increase in the number of cases among older people was also observed.

The increase in cases of HIV/AIDS in older people has been observed since 1990[9]. This increase is attributed to socioeconomic aspects such as: unfavorable economic conditions, low perception of the risk of acquiring the infection, unprotected sexual practice and the lack of information about the disease[6,8,12,20,21]. The lack of health campaigns that address older people sexuality and the taboo on sexuality in this population may contribute to health professionals not providing guidance on protective practices[21].

It is therefore important to reflect on the transmissibility of the virus and the increase in the number of cases in this specific population. Taking into account the latency period of the virus, since many individuals spend years asymptomatic and when they present the symptoms of the disease, such symptoms are confused and/or related to other age-related comorbidities[2,15]. The HIV diagnostic test can be requested/performed at different levels of health care, but it is only performed after excluding other diseases[2,14,15].

In 2020, lower rates of new HIV/AIDS cases were observed in relation to the previous years investigated, in the three regions analyzed. This fact may have occurred due to the COVID-19 pandemic that started in 2020, which possibly led to underreporting of new cases of HIV/AIDS and other diseases. A lower demand for health services aimed at sexually transmitted diseases due to social distancing measures[22] and the mobilization of health professionals from different areas to face the pandemic[4], shortening the opening hours and sometimes running out of professionals to serve the public are some of the situations that can explain such falls[22]. In addition, there was a significant reduction in HIV/AIDS prevention actions due to the overload of health services in the face of COVID-19 cases[23]. This reduction in new cases may be related to the lack of screening and, consequently, the scarcity of diagnoses of individuals[22].

In the present study, the highest number of HIV/AIDS cases was in males. The result was similar to that observed in other studies carried out in different regions of Brazil[2,20,21, 24,25]. HIV infection has been more frequent among men, with the main route of transmission being sexual, and mostly in heterosexual relationships[2,20,21]. Consistent data in the literature show less concern about health by the male population and, consequently, less search for health services[24]. The lack of adherence to health services can be related to the stereotype of the male figure, where masculinity is linked to strength and the idea of less possibility of illness[24,26,27].

Sexual practices are often unprotected, due to lack of information, and taboos that permeate the use of condoms, which can be associated with marital infidelity to discomfort in the sexual act[21,27,28,29]. Despite health campaigns aimed at the

distribution of condoms and safer sex, couples in monogamous relationships do not use them, due to the stabilization of the relationship and the trust placed in the partner[6,21].

An increasing number of reported cases in women was also observed in this research in the Northeast region. Some authors refer to the feminization of the epidemic[8,21]. The insertion of women in the epidemic may be linked to the heterosexual transmission route, the main means of infection. Pereira et al 2008 points out that there are other factors linked to female vulnerability, especially in the domestic sphere, such as in cases of violence and financial dependence[30]. In addition, the lack of access to education and health, associated with some cultural and religious patterns, can discourage condom use.[7,8,29,30].

The age group with the highest number of diagnosed cases was 60 to 69 years old, considered young seniors. Part of this population may have been infected in the younger age group, from 50 to 59 years old[12]. For Affeldt et al 2015, young seniors can benefit from pharmacological treatments, which may modify the severity and lethality of the disease, increasing survival even when infected with HIV. Despite the growing increase in cases, educational and HIV/AIDS prevention campaigns for this public have not been promoted in the country[13,25].

Regarding the characteristic of the infected older population, for the race/color variable, differences were observed in the analyzed regions. In Brazil, the largest number of infected were white, followed by browns and blacks, while in the Northeast region and in the state of Bahia, the majority were blacks and browns. This difference can be explained due to population differences. In a study carried out in Tubarão SC[31], the vast majority of older people with HIV/AIDS were white, the authors related to the high number of descendants of Europeans. On the other hand, in the Northeast region[9], in the state of Rio Grande do Norte[32] and in Ceará[5], most of the diagnosed cases were of brown and black individuals.

Regional characteristics can influence the difference observed in the proportions in relation to race/color, taking into account the historical and social context of the regions studied. The black population, predominant for example in the state of Bahia, is mostly residents of peripheral areas, living with various social inequalities, with lack of access to health, education and security[33]. These historical characteristics of social vulnerability experienced by this population contribute to the higher incidences not only of HIV/AIDS but also of several other diseases. Low access to health services results in vulnerability to HIV/AIDS, making it difficult to acquire condoms and prevention guidance materials, as well as adequate treatment and diagnosis of this and other sexually transmitted infections[27,28,30].

The distribution of cases in terms of education followed the pattern found in other studies[2,5], with the highest number of cases occurring in the strata with less education. In this study, it was noticed that the highest percentage of infected individuals comprised the subcategory of no education up to 7 years of education. Lower levels of education are related to the difficulty in accessing and understanding information about the mode of transmission and prevention of the disease[21]. The trend seen by the epidemic to reach social classes with low education has been referred to as impoverishment[12,25].

For the category of exposure, the main route of infection of the virus was the sexual route, by heterosexual transmission, this shows an important characteristic of the dynamics of the epidemic, being observed in all regions. This mode of transmission as the main one confers the heterosexualization of the epidemic, given that it is in accordance with the Brazilian panorama[31]. The transmission route through injecting drug use presented lower percentages in the Northeast region and in Brazil, a result observed in other studies[2,12]. Older people have maintained an active sex life associated with unprotected sex, which indicates the need for HIV prevention actions for this group[2].

This research was used as a secondary data source due to its ease of acquiring them and for being within the reach of the population and managers. However, they are subject to underreporting, which may be related to the lack of organization of epidemiological surveillance systems, non-reporting, delay in case investigation and diagnosis performed after death, in addition to the low quality of the information collected that feeds the system[34]. As described in

other studies[2,14,17], a high percentage of ignored information was observed in several variables, such as education, skin color and exposure category. The magnitude and trend of HIV/AIDS among older people stands out as a limiting factor for adequately tracing the population profile. Thus, it is necessary to carry out permanent education on the notification of diseases in relation to filling out the notifications, typing and recording the information.

CONCLUSION

The profile of HIV/AIDS infection in the three regions studied is still mostly characterized by men, predominantly brown and/or white, with sexual intercourse being the main form of transmission and contamination and predominant in heterosexual relationships. There is also an increase in cases, year by year, in women from the Northeast region, thus characterizing a trend of the epidemic.

The importance of this type of study is highlighted for a better characterization of the older population and HIV/AIDS infection, assuming the magnitude of the epidemic and, thus, acting early in the prevention of infection. Although the older population is growing in the country, the sexuality of older people still remains a taboo, as well as the diagnosis of HIV/AIDS, reflecting the scarcity of published works on this topic for this target audience.

Therefore, attention should be paid to the increase in cases in older people, seeking to demystify taboos about sexuality, in order to promote sex education in this population and the adoption of health promotion measures aimed at reducing the transmission of the virus. Educational campaigns aimed at this public, as a way of encouraging the adoption of condoms in sexual practices and raising awareness about the importance of performing diagnostic tests on a regular basis, can contribute to a reduction in cases. The use of comprehensive and easily accessible means of communication such as television, internet and visual campaigns contribute to the effectiveness of the strategies.

Public campaigns to promote the continuing education of health professionals regarding the request for rapid testing and health promotion, including sexual health, for the older population, are of great importance. One should also think about new studies that analyze the use of antiretroviral drugs in relation to existing comorbidities in this population.

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