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# Analysis of the epidemiological profile of the number of aids cases in Brazil in the last 10 years

Análisis del perfil epidemiológico del número de casos de sida em Brasil em los últimos 10 años

Análise do perfil epidemiológico do número de casos de aids no Brasil nos últimos 10 anos

## ABSTRACT

Objective: to analyze the epidemiological profile of individuals affected by AIDS in Brazil in the period from 2009 to 2019. Methods: epidemiological study, with sampling of all AIDS cases diagnosed in Brazil present in the Notifiable Diseases Information System, from January 2009 to June 2019. Results: A total of 283,234 seropositive cases were reported. Data were grouped in the six-year period (2009–2014) and the five-year period (2015–2019). The predominant profile was: male (65.1% and 71.1%), white (47.1%) and brown (46.5%), aged between 30 and 39 years (32.6% and 30.3%), education up to elementary school (53.1% and 44.7%), sexual exposure in heterosexuals (60.39%). Conclusion: The profile in the last 10 years has been marked by young, white, male adults, contaminated by heterosexual relationships. The drop in the number of diagnoses highlights the effectiveness of the population's prevention and adherence policies and strategies.

**DESCRIPTORS:** HIV; Public Health; Epidemiology; Health Profile.

## RESUMEN

Objetivo: analizar el perfil epidemiológico de las personas afectadas por el SIDA en Brasil en el período de 2009 a 2019. Métodos: estudio epidemiológico, con muestreo de todos los casos de SIDA diagnosticados en Brasil presentes en el Sistema de Información de Enfermedades Notificables, de enero de 2009 a junio de 2019. Resultados: Se notificaron un total de 283.234 casos seropositivos. Los datos se agruparon en el sexenio (2009–2014) y el quinquenal (2015–2019). El perfil predominante fue: masculino (65,1% y 71,1%), blanco (47,1%) y moreno (46,5%), con edades comprendidas entre 30 y 39 años (32,6% y 30,3%), educación hasta la primaria (53,1% y 44,7%), exposición sexual en heterosexuales (60,39%). Conclusión: El perfil en los últimos 10 años ha estado marcado por jóvenes, blancos, varones adultos, contaminados por las relaciones heterosexuales. La caída en el número de diagnósticos destaca la efectividad de las políticas y estrategias de prevención y adherencia de la población.

**DESCRIPTORES:** VIH; Salud Pública; Epidemiología; Perfil de Salud.

## RESUMO

Objetivo: analisar o perfil epidemiológico dos indivíduos acometidos pela AIDS no Brasil no período de 2009 a 2019. Método: estudo epidemiológico, com amostragem de todos os casos de AIDS diagnosticados no Brasil presentes no Sistema de Informação de Agravos de Notificação, de janeiro de 2009 a junho de 2019. Resultados: notificaram-se um total de 283.234 casos soropositivos. Os dados foram agrupados nos períodos sexênio (2009–2014) e quinquênio (2015–2019). O perfil predominante foi: sexo masculino (65,1% e 71,1%), cor de pele branca (47,1%) e parda (46,5%), idades entre 30 e 39 anos (32,6% e 30,3%), escolaridade até o ensino fundamental (53,1% e 44,7%), exposição por via sexual em heterossexuais (60,39%). Conclusão: o perfil nos últimos 10 anos foi marcado por adultos jovens, brancos, do sexo masculino, contaminados por relações heterossexuais. A queda no número de diagnósticos destaca a eficácia das políticas e estratégias de prevenção e adesão da população.

**DESCRITORES:** HIV; Saúde Pública; Epidemiologia; Perfil de Saúde.

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**INTRODUCTION**

**T**he Acquired Immunodeficiency Syndrome (AIDS) represents an epidemic of worldwide importance, bringing with it consequences related to human suffering, demographic, cultural and economic impacts, spreading through several countries.<sup>1</sup> It is transmitted through the Human Immunodeficiency Virus (HIV), which mainly attacks CD4 + T lymphocytes, the body's defense cells. Contagion is done mainly through unprotected sex, sharing contaminated syringes or during pregnancy and breastfeeding.<sup>2</sup>

Brazil had its first case registered in 1982, in the city of São Paulo, which is one of the most affected metropolitan regions. From 1990, with the evolution of the outbreak, it was observed that there was a transition in the epidemiological profile, resulting in new cases in women, children, the elderly and those with less financial conditions. Data released by the Ministry of Health indicated that from 1980 to June 2019, 966.058 AIDS cases were identified in Brazil. Thus, the HIV/AIDS epidemic therefore represents a global, energetic and unstable phenomenon. In addition to becoming a relevant public health problem that heterogeneously affects different segments of the population, it continues to expand dynamically.<sup>3,4</sup>

**Timely HIV testing and the initiation of antiretroviral therapy (ART) are determining factors in the survival of HIV-infected individuals, associated with a better prognosis and lower rates of disease progression.**

According to data collected in the Notifiable Diseases Information System (SINAN), the AIDS detection rate has been falling in Brazil in recent years. In 2012, the rate was 21,7 cases per 100.000 inhabitants; in 2014, it was 20,6; in 2016, it increased to 18,9; finally, in 2018, it reached 17,8 cases per 100,000 inhabitants. In a ten-year period, the detection rate decreased by 17,6%<sup>5</sup> (Ministry of Health, 2012).

Timely HIV testing and the initiation of antiretroviral therapy (ART) are determining factors in the survival of HIV-infected individuals, associated with a better prognosis and lower rates of disease progression. Early diagnosis, therefore, must be made through the proper implementation of guidelines and analysis of indicator conditions in individuals who seek health services. It is noteworthy that, the later the diagnosis of HIV, the greater the chances of developing the infection, which results in significant problems for the public health system.<sup>6</sup>

With a view to controlling the epidemic in the world, the goal "90-90-90" was created by the United Nations Program where it stipulates that 90% of people living with HIV/AIDS (PLWHA) are aware of their diagnosis, 90% already under treatment and 90% have an undetectable viral load. In Brazil, according to data from 2015, 60% of PLWHA are undergoing treatment and approximately

54% are on viral suppression. Such results demonstrate that, despite the free access to medicines in the country, efforts are still needed to reach the goal. The main barriers to treatment adherence are the use of alcohol and other drugs, factors related to depression, unemployment and the number of pills recommended for therapy.<sup>7</sup>

In view of the need to know the evolution of the HIV/AIDS epidemic in Brazil and considering the importance of providing data that guide the formulation of public policies related to the orientation of the population and health professionals inserted in it, the present

study was carried out, which aimed to analyze the epidemiological profile of individuals affected by AIDS in Brazil in the period from 2009 to 2019.

## METHODS

This is a descriptive study carried out based on data collected from the Information System for Notifiable Diseases (SINAN), available at the SUS Informatics Department (DATASUS). The study population consisted of AIDS cases diagnosed in Brazil between 2009 and June 2019. Brazil is located in South America, with a territorial

area of 8.510.820,623 square kilometers, with a further 5.570 municipalities, totaling a population composed of 210.147.125 people.<sup>8,9</sup>

Data collection was carried out in April 2020. The study variables were the year of diagnosis (divided into two periods, a sexennium and a five-year period), sex (male and female), skin color (white, black, mixed race, yellow and indigenous), age group (<14 years, 15 to 19, 20 to 29, 30 to 39, 40 to 49, 50 to 59 and ≥ 60), education (illiterate, elementary, middle and higher education), exposure category (homosexual, bisexual, heterosexual, injecting drug use, hemophilia, transfusion, accident with biological material, vertical and ignored transmission) and notification region (north, northeast, south, southeast and midwest). The collected data were tabulated, analyzed and arranged in tables with the aid of Excel software Microsoft Office 2010 and Tabwin version 4.1.5. As a method of analysis, descriptive statistical analysis was used using the percentage technique.

As this is a research carried out based on secondary data, freely accessible in electronic media, contained in public domain databases, this study did not need to be analyzed by the Research Ethics Committee (CEP), in accordance with the Resolution 466/12 of the National Health Council.<sup>10</sup>

## RESULTS

Epidemiological data were collected using the Notifiable Diseases Information System - SINAN, in accordance with existing notifications on AIDS in Brazil. The general context emphasizes the growth in the number of notifications from the year of diagnosis, in which the numbers were evidenced and classified into variables, such as sex, skin color, age and education. The information was grouped in Table 1 and divided into two periods, a six-year period and a five-year period.

Table 1 - Sociodemographic characteristics of people living with AIDS in Brazil, between 2009 and 2019. Picos, PI, Brazil, 2021.

PERIOD VARIABLES	2009-2014 N(%)		2015-2019 N(%)	
	F	%	F	%
<b>Sex</b>				
Male	119.183	65,1%	71.105	71,1%
Female	64.003	34,9%	28.939	28,9%
Total	183.186	100%	100.044	100%
<b>Skin color</b>				
White	79.573	47,1%	39.139	41,5%
Black	18.113	10,7%	10.506	11,2%
Brown	69.918	41,4%	43.764	46,5%
Yellow	820	0,5%	472	0,5%
Indigenous	546	0,3%	337	0,4%
Total	168.970	100%	94.218	100%
<b>Age (in Years)</b>				
0-14	2714	1,5%	1023	1%
15-19	3938	2,1%	2411	2,4%
20-29	43.388	23,7%	24.941	24,9%
30-39	59.729	32,6%	30.343	30,3%
40-49	44.099	24%	22.351	22,3%
50-59	21.353	11,6%	13.088	13,1%
60 or more	7.966	4,3%	5.889	5,9%
Total	183.187	100%	100.046	100%
<b>Education</b>				
Illiterate	3964	2,9%	2037	2,7%
Elementary School	72.530	53,1%	33.552	44,7%
High School	41.097	30,1%	26.065	34,7%

Superior School	18.948	13,8%	13.394	17,8%
Total	136.539	100%	75.048	100%

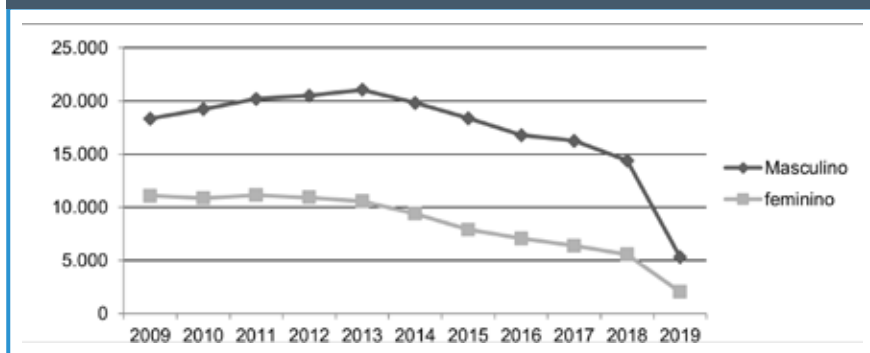
Source: SINAN-AIDS, 2009 - 30/06/2019<sup>11</sup>.

**Table 2 - Absolute and relative distribution of AIDS cases reported according to age group and exposure category, Brazil, 2009-2019. Picos, PI, Brazil, 2021.**

AGE GROUP		0 TO 14	15-19	20-29	30-39	40-49	50-59	60 OR MORE
Homosexual	N	28	1.842	22.429	18.175	8.845	3.002	751
	%	0,74%	29,01%	32,82%	20,17%	13,31%	8,71%	5,42%
Bisexual	N	9	423	4.477	4.714	3.260	1.499	498
	%	0,24%	6,66%	6,55%	5,23%	4,90%	4,35%	3,59%
Heterosexual	N	174	2.800	30.140	49.356	40.131	22.541	9.524
	%	4,65%	44,10%	44,11%	54,79%	60,39%	65,44%	68,74%
IDU	N	4	153	1.858	3.238	2.346	733	115
	%	0,10%	2,40%	2,71%	3,59%	3,53%	2,12%	0,83%
Hemophilic	N	1	0	9	25	18	8	2
	%	0,02%	0,00%	0,01%	0,02%	0,02%	0,02%	0,014%
Transfusion	N	0	4	6	10	19	16	8
	%	0,00%	0,06%	0,008%	0,01%	0,02%	0,04%	0,05%
Accident with Biological Material	N	0	0	3	3	8	2	1
	%	0,00%	0,00%	0,004%	0,003%	0,01%	0,005%	0,007%
Vertical Transmission	N	3263	379	536	368	206	98	53
	%	87,31%	5,96%	0,78%	0,4%	0,31%	0,28%	0,38%
Ignored	N	258	748	8.871	14.183	11.617	6.542	2.903
	%	6,90%	11,78%	12,98%	15,74%	17,48%	18,99%	20,95%
Total	N	3737	6349	68329	90072	66450	34441	13855
	%	100%	100%	100%	100%	100%	100%	100%

Source: SINAN-AIDS, 2009 - 30/06/2019<sup>11</sup>.

**Graph 1 - Distribution according to sex and year of diagnosis of AIDS cases**  
Source: SINAN-AIDS, 2009 - 30/06/2019<sup>11</sup>.



Source: SINAN-AIDS, 2009 - 30/06/2019<sup>11</sup>.

It was observed that the number of cases in the studied period reached 283.234

cases diagnosed and reported, regarding gender, the predominance of male diag-

nosis is noted in both periods. Regarding skin color, in the first period, those with white skin predominated and in the second, brown skin. Regarding age, in both periods, those between 30 and 39 years old predominated. Regarding the level of educational instruction, we found that those with elementary education predominated in both periods.

AIDS notifications in children (under 14 years old) were higher in the first period, however since 2009, years after year, there has been a reduction in cases in this age group, out of the total number of cases, this represents only 1,3% (3.737). As for the elderly (60 years old or older), the number of cases predominated in the first period, with an increase in the year 2013 and decreasing consecutively over the other years, of the total number of cases, this represents only 4,9% (13.855).

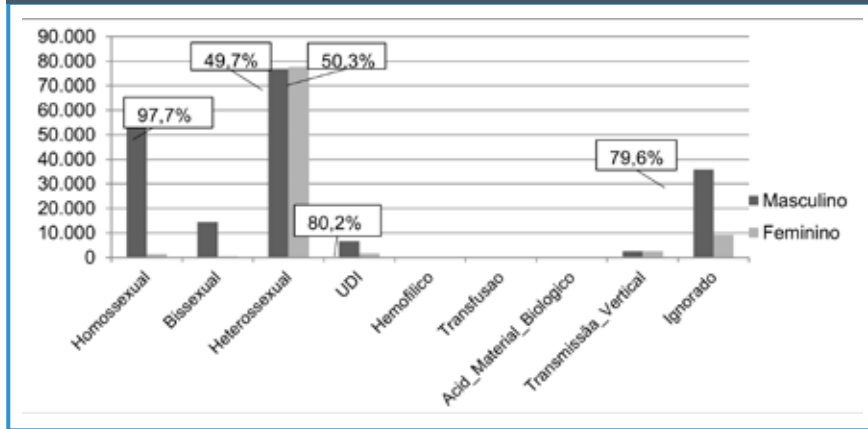
The absolute and relative distribution of AIDS cases reported according to age group and exposure category was performed, and from that, it is possible to identify which categories had a higher percentage of diagnoses (Table 2).

It was noticed that vertical transmission predominated in people aged zero to 14 years. In the age group of 15 to 19 years, 20 to 29 years and 30 to 39 years, sexual transmission in heterosexual relationships prevailed, followed by homosexuals. In the 40 to 49 age group, 50 to 59 year old and 60 year old or more was marked by the presence of heterosexuals and ignored. Graph 1 shows the behavior of the occurrence of cases according to sex and year of diagnosis over the past decade.

Over the years there has been a decline in the number of diagnosed cases, a fact that is related to the increased dissemination of information on prevention and pre-exposure prophylaxis. Note that the largest number of cases for males was in 2013 and for females in 2011, both decreasing from those years respectively. When associating the category of exposure and sex (graph 2), there were significant differences between genders.

The male sex overlapped the female in the categories homosexual, bisexual,

Graph 2 - Distribution according to sex and exposure category. Picos, PI, Brazil, 2021.



Source: SINAN-AIDS. 2009 - 30/06/2019<sup>11</sup>.

IDU and in the ignored cases. The female, in turn, surpassed the percentages in the heterosexual category. Excluding data from the “ignored” category, sexual transmission was responsible for approximately 79,3% (223.755) of the total cases, followed by blood transmission, responsible for 3,0% (8.497) of the cases and for vertical transmission with 1,7% (4.815).

## DISCUSSION

The study in question shows a gradual reduction in the number of cases in the last ten years. A similar study carried out in Tanzania, which analyzed 40 years of the epidemic, found a gradual reduction in prevalence and mortality.<sup>12</sup> In Korea, a cross-sectional study obtained a gradual increase in incidence over the years.<sup>13</sup>

In the present study, it was found that the majority of diagnoses of HIV and AIDS were in the male population, which is in line with studies carried out in other countries, such as Korea, India and Poland.<sup>13,14,15</sup> Based on this, studies carried out with the female population in the years 2003/2004, found low demand for serological testing (12,7%) free demand; the search only happened after presenting the symptoms of AIDS (24,6%), often the diagnosis came from the sick spouse (24,7%) or else in the performance of prenatal care (19,5%).<sup>16</sup>

With regard to education, we have a

**Among the categories of exposure, sexual transmission in heterosexuals and homosexuals predominated. A study carried out in a hospital in India evaluated the epidemiological pattern over a period of 13 years and obtained prevalence of the heterosexual category (95,5%).**

national tendency for people with elementary education, which is similar to the epidemiological study carried out in India, where 77,1% of adult patients were educated only at the primary level.<sup>14</sup>

Regarding the age group, we have the prevalence of people between 30 and 39 years old. An epidemiological study carried out in Poland found a predominance of HIV/AIDS diagnoses among people aged 20 to 39 years (69,5%).<sup>15</sup> In contrast, a study conducted in Korea found a predominance of people aged  $\geq$  50 years.<sup>13</sup>

There were changes in the skin color profile, ceasing to be predominated by the white color and starting to have an elevation to the brown ones. However, this variable is often inconsistent with reality, as there are still difficulties in classifications, duality in filling in or even a single classification of browns and blacks. Making an analysis in relation to the categories of exposure by age group, among children there is a predominance of vertical transmission, which may be associated with mothers with high viral load, the failure to perform antiretroviral prophylaxis during pregnancy and vaginal delivery.<sup>17</sup>

Among the categories of exposure, sexual transmission in heterosexuals and homosexuals predominated. A study carried out in a hospital in India evaluated the epidemiological pattern over a period of 13 years and obtained prevalence of the heterosexual category (95,5%).<sup>14</sup> However, in Poland (69,5%) refer to the route by homosexual relationship.<sup>15</sup>

It is possible to understand that the profile of the HIV/AIDS epidemic has been undergoing adaptations and modifications over the years, being subject to variation according to the characteristics of a region and very strongly linked to the social, economic and cultural determinants of the populations,<sup>17</sup> studies have found a greater likelihood of late diagnosis in people who use illicit drugs, in males and in heterosexuals.<sup>18</sup>

In addition, some limitations are taken into account, such as difficulties in

the notification process, problems in the organization of services, among others, which lead to underreporting or inadequate notification,<sup>19</sup> thus highlighting a still existing obstacle to the quantification of information.

## CONCLUSION

The epidemiological profile of AIDS cases in Brazil in the last 10 years obtained a scenario marked by the prevalence

of young adults, male, aged between 30 and 39 years old, of white skin color, with elementary school and who contracted the virus through heterosexual relationships.

The results showed a drop in the number of diagnoses compared to the years prior to the study, which confirms the effectiveness of disease prevention policies and strategies, as well as people's adherence. It is worth mentioning the need and importance of sustaining these tools,

as a way to further decrease the statistical data regarding the diagnosis of new cases.

The importance of epidemiological studies is also noted, since they provide a numerical comparison and monitoring of cases, enabling the assessment of the current profile, the analysis of the growth or decrease in the number of cases, causes and/or reasons of contamination. Thus facilitating the characterization of those affected for the development of approach strategies. ■

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