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Pinto, Flavia Kelli Alvarenga; Wollmann, Silvana Teresa Neitzke; Hubner, Michele; Amaral, Tatiana Rodrigues do; Souza, Flavia Moreno Alves de; Watanabe, Helena Akemi Wada

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Aging with AIDS: epidemiological profile of AIDS in older adults in Brazil

Envelhecer com AIDS: perfil epidemiológico da AIDS em idosos no Brasil

Flavia Kelli Alvarenga Pinto^{a,b}  , Silvana Teresa Neitzke Wollmann^c , Michele Hubner^c ,
Tatiana Rodrigues do Amaral^d , Flavia Moreno Alves de Souza^a , Helena Akemi Wada Watanabe^e 

^a Departamento de HIV/AIDS, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis, Ministério da Saúde – Brasília (DF), Brazil.

^b Programa de Pós-graduação em Epidemiologia Experimental Aplicada às Zoonoses, Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo – São Paulo (SP), Brazil.

^c Programa de Pós-graduação em Saúde e Ruralidade, Universidade Federal de Santa Maria – Santa Maria (RS), Brazil.

^d Programa de Pós-graduação em Saúde Coletiva, Universidade Federal do Espírito Santo – Vitória (ES), Brazil.

^e Faculdade de Saúde Pública, Universidade de São Paulo – São Paulo (SP), Brazil.

Correspondence data:

Flávia Kelli Alvarenga Pinto – SQS 403, Bloco C, apto 301 – CEP 70237030 – Brasília (DF), Brazil.
E-mail: flaviakap@usp.br;
flavia.alvarenga@ids.gov.br

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Abstract

Objective: To assess the historical trend of AIDS detection in Brazil and compare the epidemiological characteristics of this condition in older persons versus the adult population.

Methods: Cross-sectional descriptive study of AIDS cases reported in Brazil from 2010 to 2019, utilizing the publicly available database provided by the Unified Health System through the Ministry of Health Department of Informatics (DATASUS). The proportion of AIDS cases for older persons and adults was calculated based on epidemiological characteristics, and Pearson's chi-squared test was applied at a 5% significance level to identify differences. Thematic maps displaying AIDS detection rates were created. **Results:** Overall, 61.43% of those diagnosed with AIDS were male. The AIDS rate among older adults increased by almost 10%, rising from 8.1 cases per 100,000 in 2010 to 8.7 cases in 2019. Among women, the rate remained relatively stable, while there was an increase among men, rising from 11.0 to 12.6 cases per 100,000 men over the period. The Northeast and North regions showed the most significant increases in detection rates from 2010 to 2019: 81.39 and 44.18%, respectively. Female sex, white race, and lower educational attainment were identified as higher risk factors for infection in older adults compared to the adult population. **Conclusion:** These data demonstrate an increase in cases of AIDS among older adults in Brazil from 2010 to 2019, particularly among men and in the North and Northeast regions. There is a need to enhance sexual health programs for the older population, as well as to train healthcare professionals to address these demands. This includes promoting educational prevention campaigns that take into account the contexts and challenges faced by older adults.

Keywords: aged; AIDS; sexually transmitted diseases; aging; health profile.

Resumo

Objetivo: Este estudo avaliou a tendência histórica da detecção de SIDA e comparou as características epidemiológicas deste agravo em idosos e na população adulta. **Metodologia:** Trata-se de um estudo descritivo transversal dos casos notificados de SIDA no Brasil, no período de 2010 a 2019. Utilizou-se o banco de dados público disponibilizado pelo Sistema Único de Saúde, por meio do departamento de informática do Ministério da Saúde (DATASUS). Calculou-se a proporção dos casos de SIDA segundo as características epidemiológicas para idosos e adultos, bem como foi aplicado o teste qui-quadrado de Pearson ao nível de 5% de significância. Elaborou-se mapa temático com as taxas de detecções de SIDA. **Resultados:** Eram do sexo masculino 61,43%. No Brasil, a taxa de SIDA nos idosos aumentou quase 10%, passando de 8,1 em 2010 por 100 mil idosos para 8,7 casos em 2019. Entre as mulheres a taxa permaneceu relativamente estável e houve aumento entre os homens, passando de 11,0 para 12,6 casos por 100 mil homens no período. As Regiões Nordeste e Norte apresentaram os aumentos mais significativos nas taxas de detecção de 2010 a 2019, com aumento de 81,39 e 44,18%, respectivamente. O sexo feminino, raça cor branca e baixa escolaridade foram fatores de maior risco à infecção em comparação à população adulta. **Conclusão:** Esses dados demonstram que houve aumento nos casos de SIDA em idosos no Brasil no período de 2010 a 2019, mais em homens e na população do norte e nordeste. É necessário aprimorar programas de saúde sexual na população idosa, bem como capacitar os profissionais de saúde para estas demandas, promovendo campanhas educativas de prevenção que considerem todos os contextos e desafios enfrentados pelos idosos.

Palavras-chave: idoso; SIDA; infecções sexualmente transmissíveis; envelhecimento; perfil epidemiológico.

INTRODUCTION

The aging process presents challenges and opportunities for society, particularly in the areas of healthcare, retirement, employment, and education. It is imperative to develop public policies and initiatives that promote healthy and active aging, acknowledge the contributions of older people, and safeguard their rights and quality of life.¹

Despite these advancements, discussions, studies, and policies centered around the theme of population aging underscore the need for expanded identification of associated factors, beyond economic and health-related changes, to address the complexity of this phenomenon. These changes must be accompanied by social achievements that encompass the diverse aspects of aging, including sexuality, which remains relevant in this stage of life. However, in addition to recognizing the intricacies of sexuality in the aging process, it is crucial to go beyond analyses and interventions focused solely on the individual.²

In this context, as the sexual performance of people over 60 continues to benefit from scientific and technological advancements and improvements in quality of life, concerns about sexually transmitted infections (STIs) in this age group increase, as enhanced sexual performance might lead to riskier sexual behaviors.³

The sexually active population over 60 can be exposed to the human immunodeficiency virus (HIV) due to unprotected sexual activity, just as any other age group.⁴ Factors such as difficulty in using condoms, alcohol and drug use, and beliefs regarding erectile dysfunction, among others, can increase the likelihood of unprotected sex.⁵ It is important to highlight that effectively reducing high-risk sexual behavior among this population necessitates the development of age-appropriate interventions for preventing STIs, including HIV/AIDS, while also considering gender and sexual orientation.^{5,6}

In this context, cases of HIV/AIDS among the Brazilian geriatric population have been increasing, negatively impacting the lives of infected patients and their families. This has become a public health issue, as these patients require more healthcare services from both the public and private sectors, including treatment, medications, and hospitalization.⁷ Furthermore, the adverse effects of antiretroviral therapy (ART) are more pronounced in older patients, as the aging process and age-related conditions, including chronic non-communicable diseases such as hypertension and diabetes, cause additive negative health outcomes in this group when combined with the effects of HIV.⁸

Considering the above, the aim of this study is to assess the 10-year historical trend of AIDS detection rates in older patients by sex, federative unit/region of residence, and the

epidemiological characteristics of new AIDS cases in older adults in Brazil from 2010 to 2019, comparing them with AIDS cases detected in younger adults (ages 20 to 59).

METHODS

This study is a descriptive cross-sectional analysis of new AIDS cases diagnosed in individuals aged 60 and older residing in Brazil. These cases were reported to the National Notifiable Diseases Information System (SINAN), Mortality Information System (SIM), and Laboratory Testing Information System (SISCEL), and confirmed in the Medication Logistics Control System (SICLOM), from 2010 to 2019.

Secondary data were used, sourced from the SINAN and SISCEL databases (up to June 30, 2022) and from SIM (from 2000 to 2021). SICLOM, provided by the Unified Health System Department of Informatics (DATASUS), was used to validate SISCEL data.⁹ Data linkage was performed on consolidated data until June 30, 2022, by the former Department of Chronic Conditions and Sexually Transmitted Infections (DCCI) of the Health and Environmental Surveillance Secretariat (SVSA) of the Brazilian Ministry of Health. This was done by comparing the patient's name, mother's name, and date of birth variables. Phonetic codes corresponding to the patient's first and last names and sex were used as blocking keys in a three-step process automated by RecLink III software.¹⁰ Preliminary population estimate data from SVSA for 2000 to 2020, provided by DATASUS, were used to calculate AIDS detection rates in older persons.

Two age categories were defined. "Older individuals" were defined as those aged 60 or older, according to the World Health Organization (WHO) and the National Policy on Elder Health; "adults" were defined as those aged 20 to 59 (as WHO categorizes individuals between 10 and 19 years of age as adolescents).¹¹

The proportion of new AIDS cases was also calculated, by age group, according to the following variables: sex (male; female), region of residence (North; Northeast; Southeast; South; Center-West), race/ethnicity (White; Black/mixed; indigenous; Asian), education (illiterate; some primary; completed primary; some secondary; completed secondary; some higher; completed higher), and exposure category (homosexual; bisexual; heterosexual; intravenous drug user; others). To calculate the proportion, the subset of cases based on these epidemiological variables was considered in the numerator, and the total new cases by age group was used as the denominator. For race/ethnicity, the definition provided by the Racial Equality Statute¹² was employed. Education categories from the National Notifiable Diseases

Information System (SINAN) were adapted to the Brazilian Institute of Geography and Statistics (IBGE) educational attainment parameters.¹³

To assess the historical trend of AIDS in the elder population, AIDS detection rates were calculated per 100,000 older adults, with the numerator being the number of new AIDS cases in older adults by sex, region, and federative unit (state or Federal District) of residence per year. The denominator consisted of the estimated geriatric population, using the same analytical variable and year, as provided by the Brazilian Ministry of Health.

To illustrate the comparison of AIDS detection rates by federative unit and region of residence between the years 2010 and 2019, a thematic map was developed using QGIS 2.18.2 software.

Statistical analyses were conducted in R version 4.2.3 for Windows. Pearson's chi-squared test was employed to assess differences between epidemiological variables of the disease in older compared to younger adults. A significance level of 5% was adopted. To evaluate the degree of association, the Phi test was conducted for variables with two response categories, and Cramer's V was employed for variables with more than two response categories. In both tests, values are interpreted within a range of 0 to 1, where a value of 1 indicates maximum association between variables and 0 indicates no association.¹⁴

This study did not require ethical approval from the National Health Council Research Ethics Committee, as all data used were secondary and publicly available. It adhered to the guidelines of Resolution No. 510/2016. Thus, all ethical principles set forth in Resolution No. 466/2012 were followed.^{15,16}

RESULTS

From 2010 to 2019, a total of 21 947 cases of AIDS were reported in individuals aged 60 and older. Among these, one case lacked information on sex. Out of the reported cases, 13 481 (61.4%) were male, and 8465 (38.6%) were female. The detection rate of cases among women remained relatively stable throughout the entire period. In contrast, a slight increase in the detection rate was observed among men, rising from 11.0 cases in 2010 to 12.6 cases per 100 000 men by the end of the period (Figure 1).

Alongside the map in Figure 2, a graph illustrates AIDS detection rates among the geriatric population in Brazil as a whole and its regions. Overall, this rate increased from 8.1 cases per 100 000 older adults in 2010 to 8.7 cases in 2019 (an almost 10% rise). Although the South region accounted

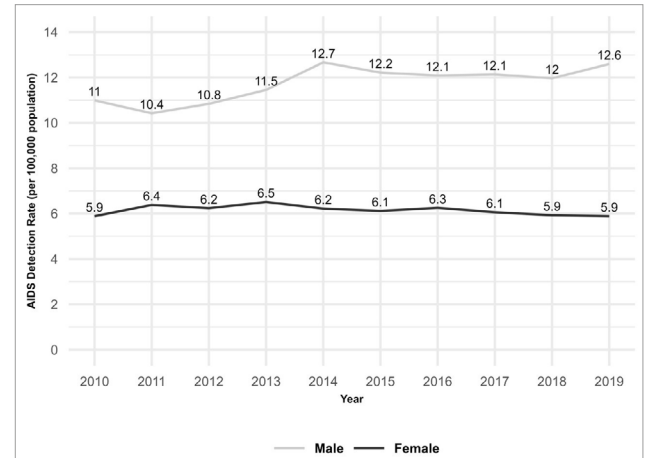


FIGURE 1. Reported AIDS detection rate in individuals aged 60 and older, by year of diagnosis.

for the highest rates during both periods, it is noteworthy that the Northeast and North regions exhibited the most significant increases in detection rates from 2010 to 2019, with a rise of 81.39 and 44.18%, respectively.

Furthermore, as shown in Figure 2, only nine federative units, mostly located in the Southeast and South regions of the country, demonstrated a decrease in AIDS detection rates among individuals aged 60 and older between 2010 and 2019. On the other hand, 17 federative units experienced an increase, with the ten greatest increases occurring in states in the North and Northeast regions, namely: Amapá (324.14%); Alagoas (204.00%); Maranhão (161.54%); Rio Grande do Norte (134.88%); Paraíba (119.23%); Sergipe (106.25%); Pará (91.14%); Bahia (84.62%); and Ceará (75.68%). The state of Acre was excluded from this analysis due to an absence of recorded AIDS cases in older adults in the year 2010.

The characteristics of AIDS cases in the populations aged 60 and older versus 20 to 59 are presented in Table 1. The proportion of new AIDS cases in women was higher among those aged 60 and older (38.57%) compared to those aged 20 to 59 (32.83%) ($p < 0.000$). Notably, the South region exhibited a difference in the proportion of detected AIDS cases, with those aged 60 and older (24.88%) having a higher fraction of cases compared to those aged 20 to 59 (20.28%) ($p < 0.000$). White race/skin color was the most frequent ethnicity among AIDS cases in the latter population, accounting for 51.16% of cases. This proportion differed significantly from the geriatric population, where the highest proportion was among Black or mixed-race individuals (55.17%) ($p < 0.001$). Furthermore, 62.96% of adults diagnosed with AIDS had low education levels, ie, were illiterate or had not completed primary education. In contrast, the same level of education

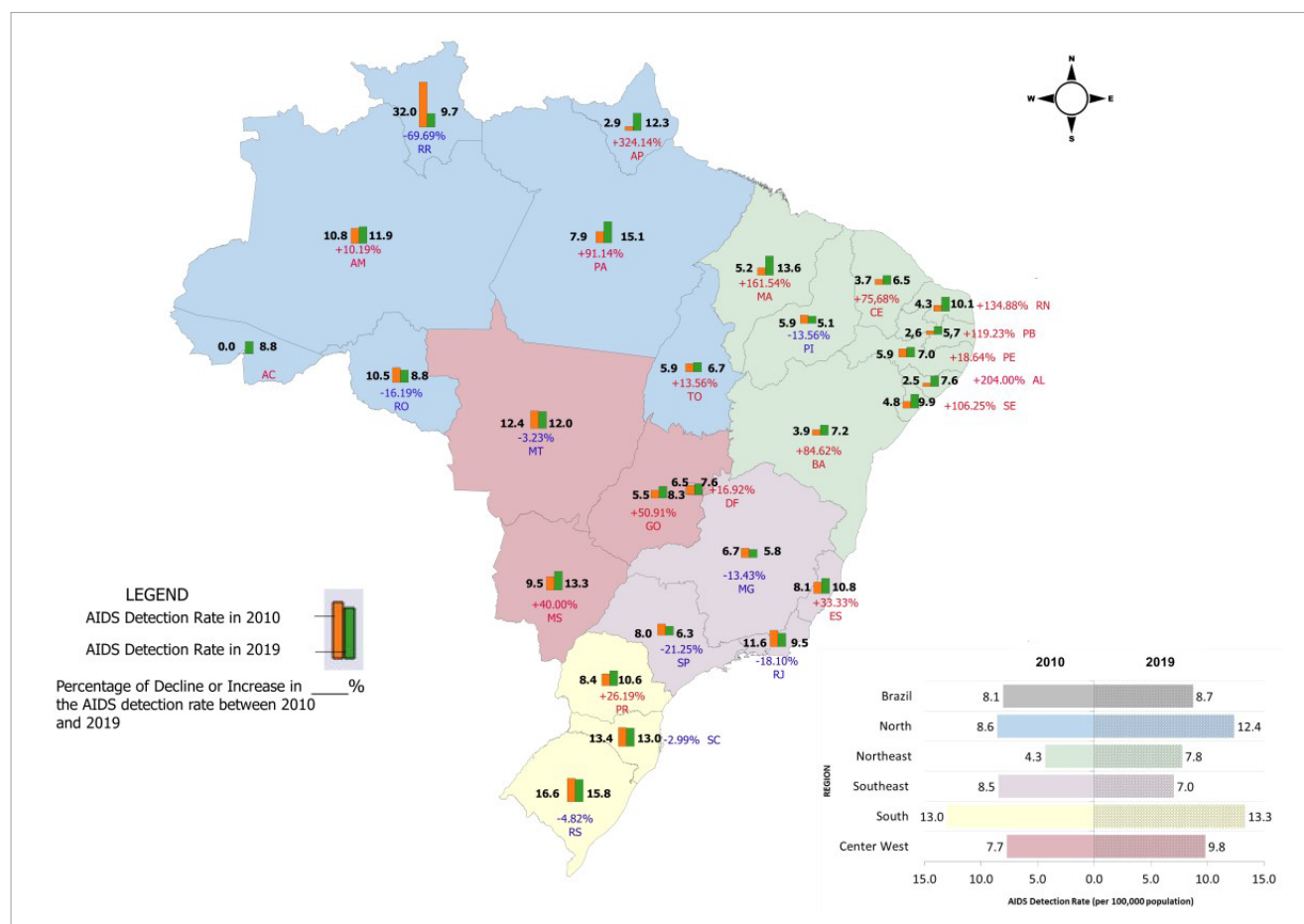


FIGURE 2. AIDS detection rate among individuals aged 60 and older (per 100 000 population) and percent decline or increase, by state or district of residence and year of diagnosis.

TABLE 1. Absolute and relative frequency of new AIDS cases, according to epidemiological characteristics, among Brazilians aged 60 and older vs 20 to 59.

Characteristics	Population						p-value
	Age 60 and older			Age 20 to 59			
	n	%	Information not available	n	%	Information not available	
Sex							
Male	13 481	61.43	1 (0.01%)	251 021	67.17	39 (0.01%)	< 0.0001
Female	8465	38.57		122 681	32.83		
Region of residence							
North	1660	7.56	0 (0%)	38 226	10.23	0 (0%)	< 0.0001
Northeast	4226	19.26		81 037	21.68		
Southeast	9102	41.47		151 986	40.67		
South Region	5460	24.88		75 798	20.28		
Center-West	1499	6.83		26 694	7.14		

Continue....

TABLE 1. Continuation.

Characteristics	Population						p-value
	Age 60 and older			Age 20 to 59			
	n	%	Information not available	n	%	Information not available	
Race/Ethnicity							
White	6625	51.16		103 518	44.00		< 0.0001
Black/Mixed	6205	47.91	8996	129 778	55.17	138 500	
Indigenous	44	0.34	(40.98%)	752	0.32	(37.06%)	
Asian	77	0.59		1193	0.51		
Education							
Illiterate	1049	10.57		4657	2.44		< 0.0001
Some primary	5200	52.39		67 838	35.56		
Completed primary	1170	11.79		22 863	11.99		
Some secondary	453	4.56	12 021	16 074	8.43	183 003	
Completed secondary	1199	12.08	(54.77%)	47 606	24.96	(48.96%)	
Some higher	142	1.43		11 459	6.01		
Higher degree	713	7.18		20 239	10.61		
Exposure category							
Homosexual	766	6.97		53 475	25.22		< 0.0001
Bisexual	486	4.42		13 593	6.41		
Heterosexual	9574	87.06	10 950	136 292	64.29	161 732	
Intravenous drug user	108	0.98	(49.89%)	7299	3.44	(43.27%)	
Others	63	0.57		1350	0.64		

was diagnosed in only 38.00% of cases in the geriatric population ($p < 0.0000$). Regarding the exposure category, the heterosexual category predominated among both the 20-to-59 and 60-and-older populations, with a higher proportion among the latter (87.06%, $p < 0.000$).

DISCUSSION

In this study, designed to assess the 10-year historical trend of AIDS detection rates in Brazilians aged 60 and older, we found that the increase in AIDS detection rates among this segment of the population, particularly in the North and Northeast regions, may be partly attributed to the improvement of the HIV/AIDS surveillance system. Although nationwide mandatory reporting of AIDS cases began in 1986, confirmed cases of HIV infection only became notifiable in 2014.¹⁷

However, Batista et al.¹⁸ pointed out that the increase in the case rate of AIDS (the most advanced stage of HIV infection) in the North region among young individuals is also related to difficulties in access to diagnosis and inadequate epidemiologic control in this region of the country.

Nevertheless, this geographic factor may hinder disease control for the entire population residing in the region, including older adults. The same authors also highlighted the low education level of the geriatric population in the Northeast region as a potential factor which limits understanding of the disease and its prevention. Additionally, the authors note that some healthcare professionals face challenges in detecting and preventing HIV/AIDS in individuals aged 60 and older, alongside other social, economic, and cultural factors that contribute to the rising number of cases. Finally, the increase in AIDS rates in the North and Northeast regions could also be linked to urbanization trends, coupled with social inequalities, vulnerabilities, and financial conditions.

Despite the substantial increase in AIDS rates among the geriatric population in the North and Northeast regions, the proportion of cases in this population compared to that aged 20 to 59 is higher in the South region. This makes the South region an equally crucial area for fighting the HIV/AIDS epidemic within these demographics. Notably, in the last decade, the South region has stood out for having annual AIDS detection rates higher than the national average.¹⁰

These findings demonstrate that aging people in the aforementioned regions may be in a state of heightened vulnerability. It is important to highlight that several hypotheses could explain this trend, including the higher growth rate of the older population, delayed diagnosis, region-specific risk factors, and the lack of prevention and treatment programs tailored for this age group.⁴

White individuals accounted for more AIDS cases in the 60-and-older population than in the 20-to-59 population. This result can be partially explained by the fact that White individuals have a longer life expectancy than Black or mixed-race individuals in Brazil, and that older individuals of Black or mixed-race heritage often face more challenging conditions in terms of accessing and utilizing healthcare services.¹⁹

Increasing life expectancy, coupled with the availability of medications that enhance sexual performance, especially for men, has led older individuals to feel more secure in establishing romantic relationships. This is because sexuality is not solely about sexual activity, but also encompasses the physical, emotional, intellectual, spiritual, and social aspects of an individual.^{5,20}

However, it seems that healthcare services have not kept pace with this new reality. Alencar & Ciosak⁴ note that, from the point of view of healthcare professionals, HIV serology tests are not routinely ordered during the assessment of the health status of people over age 60 in primary care settings. Diagnosis often occurs incidentally at secondary or tertiary healthcare services after investigating other illnesses, many of which may constitute opportunistic infections. This mainly arises from the fact that healthcare providers are not adequately prepared to assess the vulnerability of the geriatric population regarding HIV/AIDS and often neglect discussions about sexuality.

The Brazilian Ministry of Health periodically publishes documents and manuals that guide the roles of managers and healthcare professionals in managing this issue. Strategies for testing all sexually active individuals, regardless of symptoms or complaints, aim to improve the quality of HIV diagnosis and ensure that detection occurs as early, safely, and promptly as possible.²¹

Illiteracy and low educational attainment have also proved to be significant factors in the incidence of AIDS among older adults. Individuals above 45 years of age with low education levels are more susceptible to HIV exposure due to limited understanding of transmission and prevention, leading to unsafe practices such as genital cleansing after sexual intercourse as a prophylactic measure.²² Lack of education hinders the understanding of information conveyed

by healthcare professionals and awareness campaigns about the disease. Therefore, education emerges as a vital preventive measure in STI/HIV prevention initiatives.⁸

Furthermore, individuals with lower education levels are less likely to adhere to HIV/AIDS treatment. Adherence to ART is crucial for treatment success.²³ The availability of ART over the years has potentially improved the prognosis of HIV/AIDS patients, substantially reducing disease progression and mortality rates while making HIV infection a manageable chronic condition. Individuals with lower education levels require specialized assistance when being dispensed medications due to difficulties in identifying and correctly using prescribed drugs. Given this and considering that Brazil is a continental-sized country with great heterogeneity in offer of healthcare services, enhancing ART adherence among older individuals with low education levels becomes a major challenge.²⁴

AIDS detection rates among older women have remained stable over the years, yet it is evident that the proportion of females with AIDS is higher in this group compared to what is observed in the younger adult population. These findings are in line with the 2022 HIV/AIDS Epidemiological Bulletin, which indicates that male participation in the AIDS epidemic decreases with increasing age brackets.¹⁰ Additionally, there is a predominance of heterosexual cases of AIDS, with a higher proportion among aging persons compared to the adult population.

During the early stages of the AIDS epidemic, older individuals primarily contracted the virus through blood transfusions. However, with the advent of donor blood testing, this mode of transmission has systematically decreased, and, over the years, sexual transmission has become the primary mode of HIV transmission in older individuals.^{5,25} The increase in HIV contamination among this population, especially among women, may be partly attributed to resistance to condom use. This resistance might stem from fears of losing erection, lack of knowledge on proper usage, or the belief that protection is only necessary in extramarital relationships.²²

Although adults aged 60 and older are the fastest-growing population group worldwide, the results of the present study suggest that STI control measures have not yet significantly impacted the occurrence of new AIDS cases in this population. It is crucial to note that numerous myths and social attitudes are associated with aging, particularly those linked to sexuality. These myths and attitudes can hinder the expression of sexuality by older adults. Challenging these stereotypes and promoting a broader and more inclusive understanding of sexuality in old age is essential.²⁶

Sexuality has historically been stigmatized and associated primarily with reproductive purposes. Older individuals, often viewed as asexual due to the perception of their inability to reproduce, are frequently confined to the role of grandparents. This perpetuates the notion that aging involves the denial of feelings, desires, expectations, and sexual needs.²

Another issue contributing to many prejudices regarding sexuality in the aging process is the perception that the people aged 60 and older are bidding farewell to work, life, leisure, and sex. This limited perspective can lead to a misconceived understanding of sexuality in aging.³

In Brazil, the issue of aging and AIDS also reflects cultural aspects of exclusion, primarily centered on societal prejudice related to sexuality at older ages. Preventing STIs including HIV/AIDS among the older population is highly intricate and poses a challenge to current public health policies. Older individuals often postpone HIV testing due to perceiving themselves as a low-risk group.⁴

It is vital to note that most older adults did not start their sexual experiences as condom users, hindering usage later in life and rendering them more susceptible to acquiring STIs. There is a perception of invulnerability to HIV/AIDS among the geriatric population, stemming from misconceptions and lack of awareness. Dispelling these myths and biases is imperative.²⁷

Within this context, understanding sexuality in the later stages of life is crucial, considering that sexual behavior is influenced by cultural, religious, and educational factors. These values significantly impact sexual development, shaping how older people experience and cope with their sexuality over their lifetime.²⁸

The well-being of older adults results from the balance between various dimensions of their functional and social capacity. The more active they are, the greater their satisfaction and quality of life. In the past, it was inconceivable for someone over 60 to be sexually active. However, with increased life expectancy and medical advancements, it is increasingly believed that sexuality is not tied to chronological age.²⁷

This study has limitations, including underreporting and the quality of the collected data. Publicly available secondary data may be affected by gaps, omissions, identification errors, and inaccuracies in reporting, potentially leading to underestimation or overestimation of the provided information. A considerable number of datasets had missing information, especially regarding race, education, and exposure category. Regional differences in data performance and quality may still exist. The decision was made to use information from 2010 to 2019, excluding data from

the last three years, due to the disruption caused by the coronavirus pandemic.

CONCLUSION

This study revealed a rising trend in AIDS cases among older individuals in Brazil over 10 years. Older men were the most affected, and we identified regional differences, with the Northeast and North showing more significant increases in AIDS detection rates. When comparing the epidemiological characteristics of AIDS cases among individuals aged 60 and older and those aged 20 to 59, we found that female sex, White race, and low educational attainment were risk factors for infection in older individuals compared to the younger adult population.

In conclusion, addressing the rising trend of AIDS cases among older individuals necessitates a multifaceted approach. Our findings emphasize the importance of expanding preventive measures and awareness efforts, particularly considering the heightened risk faced by older women. A comprehensive healthcare strategy for this demographic should integrate an understanding of affective relationships and sexual practices into both the investigation and diagnosis of HIV/AIDS infection, as well as in the formulation of prevention strategies. Success in controlling and preventing HIV/AIDS among older individuals, especially those with limited education, relies on clear, open, and unbiased approaches, ensuring a safe and confidential environment for effective interventions.

Conflict of interest

The authors declare no conflicts of interest.

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Authors' contribution

FKAP: conceptualization, data curation, formal analysis, methodology, software, validation, resources, writing – original draft, writing – review & editing. STNW: data curation, resources, writing – original draft, writing – review & editing. MH: resources, visualization, writing – original draft, writing – review & editing. TRA: data curation, formal analysis, writing – original draft; writing – review & editing. FMAS: formal analysis, resources, writing – original draft, writing – review & editing. HAWW: conceptualization, methodology, project administration, supervision, writing – review & editing.

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