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## Original Article

# Epidemiological aspects of acquired immunodeficiency syndrome in older Brazilians: a comparative approach

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### A B S T R A C T

**Objectives:** To compare epidemiological aspects of young (15 to 49 years old) and older (more than 50 years old) AIDS patients.

**Methods:** We analyzed 511,633 AIDS cases notified to the Brazilian Ministry of Health in the period of 1980-2008 looking at sex, age ranges, educational level and exposure category. Patients were divided into three age groups: under 15, from 15 to 49 and over 50 years old. Using a comparative approach, we analyzed data with regard to category of exposure, education (expressed in years of schooling), and sex ratio among younger (15-49) and older adults (over 50 years old). Time series data were log-transformed and normalized, and the temporal trend was evaluated.

**Results:** AIDS incidence is increasing among people over 50 years old in Brazil, with those older than 50 being responsible for 9.64 % of AIDS cases. There was no significant difference between educational level and gender ( $p = 0.468$ ), but there was a significant difference in exposure category with a lower proportion of injecting drug users amongst the older group.

**Conclusion:** Based on this analysis over the last 10 years, the percentage of AIDS cases has increased almost three times among people over 50 years old when compared with the 15-49 year-old group. Our findings suggest that public campaigns have to be specially targeted to the older segment of the population, aiming at heterosexual transmission.

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## Introduction

More than 500,000 cases of AIDS have been notified in Brazil since 1982.<sup>1</sup> Although in the early years the epidemic was mainly disseminated among young gay men, there has been a progressive shift in the epidemic pattern, with cases among women<sup>2</sup> and children,<sup>3</sup> representing an important segment

of the AIDS patients in recent years. Despite a reduction in the total number of new cases in other age groups,<sup>4</sup> the older population has experienced an increase in notifications.<sup>5</sup> In the USA, the number of cases in this group quintupled from 1990 to 2001.<sup>6</sup> Given the findings in the USA and that AIDS may be an important cause of death and a potentially stigmatizing disease among the elderly,<sup>7</sup> we have analyzed the epidemic

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pattern in this segment of the Brazilian population, in order to assess the risk factors and behaviors contributing to the transmission of HIV.

**Material and methods**

Data were obtained from the Brazilian Ministry of Health (<http://www.datasus.gov.br>). Notification of AIDS in Brazil is made through a unified database (SINAN) used by all health care units of Ministry of Health of Brazil. All HIV-positive cases that score over ten points using the Rio de Janeiro/Caracas criteria and have at least one item of the Centers for Disease Control and Prevention adapted criteria or are suspicious of having AIDS as an associated cause of death are included in the system.<sup>8</sup>

The 511,633 AIDS cases notified in the period from 1980-2008 were divided into three age groups: under 15, from 15 to 49 and over 50 years old. Missing data, i.e., data from patients with incomplete notification and thus tagged as "ignored" in the database were excluded. Using a comparative approach, we analyzed data with regard to category of exposure, education (expressed in years of schooling), and sex ratio between younger (15-49) and older (over 50 years old) adults. Data were log-transformed and normalized by the smallest value of each series in order to obtain a common beginning point and evaluate temporal progression of AIDS in these three strata of the population.

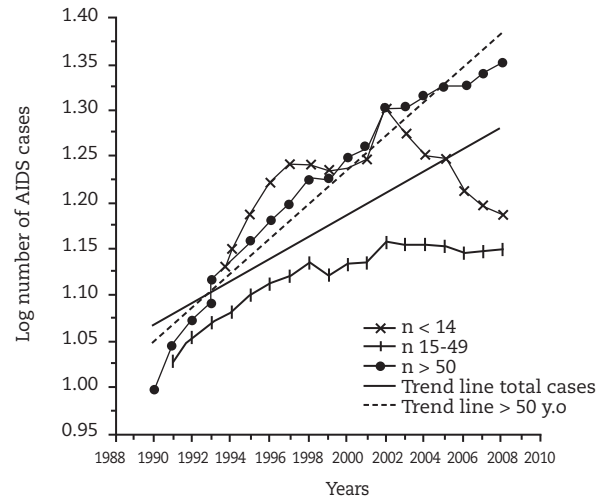
**Results**

Table 1 summarizes the notifications of AIDS in Brazil from 1980 to 2008. People over 50 years old accounted for 9.64 % of AIDS notifications and an annual (mean) incidence rate of 7.8 cases per 100,000 inhabitants in Brazil until 2008.

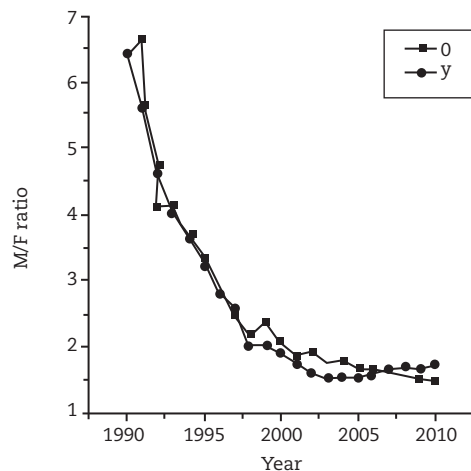
Educational levels were: less than 4 years of schooling (little or no schooling), 4 to 11 years (primary and secondary education) and greater than 12 years of schooling (university level). The majority of AIDS cases fall within the 4-11 years group but no significant statistical differences were observed for the variable between younger and older adults ( $p = 0.439$ ). In the same way, gender proportions were not significantly different in the older segment of population when compared to the younger adults. The proportion of injecting drugs users (IDUs), on the other hand, was considerably different between the 15-49 years old group (14.16%) and those over 50 years old (2.49%). Heterosexual transmission was predominant in both groups, although more representative among the older patients (48.79% vs. 42.37% in younger adults,  $p < 0.001$ ). The proportions of men and women with AIDS was not significantly different between the two groups ( $p = 0.468$ ) and a predominance of men was observed (average 65% males to 35% females), and this finding was reinforced by time series analysis.

Fig. 1 depicts the steady increase since 2001 of AIDS notifications among people > 50 years old. This was not the case for younger adults (15-49) and children/teens (< 15) groups, where notifications have leveled off and are

decreasing, respectively. Fig. 1 shows the trend lines obtained for the age-stratified log-transformed and normalized case numbers series, where a total increase trend can be observed, together with the fact that > 50 trend line is about 1.5 times steeper than the total trend line (angular coefficients 0.018 and 0.012 respectively), indicating that older adults need special attention. The temporal behavior of the sex proportions is shown in Fig. 2 and reinforces the results obtained in the analysis of the data shown in Table 1.



**Fig. 1 – Trend analysis of normalized and log-transformed series of AIDS cases. The comparison between the two trend lines shows that the older cases (dash) are on the increase. Angular coefficients of 0.010, 0.070 and 0.018 were found for < 15, 15-49 and > 50 years old groups, respectively.**



**Fig. 2 – Evolution of sex ratio (M:F) in young (Y) and older (O) adults. These data corroborate  $\chi^2$  test's results that showed no statistical differences between the groups regarding to sex ratio.**

**Table 1 - Comparative numbers of AIDS epidemic in young (15-49) and older (> 50) adults**

Variable	15-49 years old		Over 50 years old		p-value
	n	%	n	%	
Total cases	460424	86.6	51213	9.64	-
Mean (annual) cases	5481.2	-	609.6	-	-
Mean (annual) incidence <sup>1</sup>	22.01	-	7.08	-	-
Exposure categories					
Homo/bisexual	89642	19.46	7764	15.16	< 0.01
Heterosexual	195107	42.37	24988	48.79	
IDU	65230	14.16	1276	2.49	
Sex					
Male	304582	66.15	33715	65.83	0.468
Female	155827	33.84	17498	34.16	
Educational level (years of schooling)					-
Less than 3	92472	29.51	11535	36.79	0.439
4 to 11	199528	60.48	16026	54.11	
More than 12	31327	9.99	3789	12.08	

<sup>1</sup>Incidence rate per 100,000 inhabitants; IDU, injecting drug user.

## Discussion

Although the majority of AIDS cases occur among younger adults, the epidemic in this group has now almost stabilized. However, it continues to increase in the older segment of the Brazilian population in recent years. There are a number of possible reasons which are briefly discussed here. We found that total case numbers and annual (mean) incidence were considerably lower among older people in comparison with younger adults. This fact may play an important role in the misdiagnosing of AIDS in older people, since the low prevalence may lead physicians to attribute the symptoms to age-related factors.<sup>9</sup> Highly active antiviral therapy (HAART) may also be an important factor to explain the prevalence of AIDS amongst people over 50 years old. These therapies have been highly successful and have considerably increased life expectancy,<sup>10</sup> leading to successful ageing of AIDS patients. A more worrying factor is that new infections (incidence rate) in this age group are increasing. New social behaviors like the use of drugs for erectile dysfunction,<sup>11</sup> together with increase of divorces and popularization of internet dating<sup>6</sup> may be responsible for the rise of AIDS among older people.

Our data analysis showed that HIV transmission among older Brazilians is mainly heterosexual and that, unlike other countries, IDUs do not contribute to a significant proportion of cases. While in the USA IDUs account for 16%<sup>12</sup> of cases in people over 50, in Brazil the proportion is 2.49% (Table 1). It would seem that the older generation is more at risk from sexual exposure, and that older Brazilian people have little

knowledge about the forms of transmission of HIV.<sup>13</sup> Other studies have shown that this age group is unlikely to use condoms.<sup>14</sup> Some authors have attributed this behavioral pattern to lower levels of education, but we did not observe statistical difference regarding educational level among younger and older adults. The immunological status of older people as long as being affected by underlying conditions such as renal dysfunction and chronic lung disease<sup>15</sup> is an special issue in diagnosing AIDS and have been pointed out as a major cause of sub-notification of AIDS in older adults.<sup>16,17</sup>

## Conclusion

AIDS cases are increasing about 1.5 times more rapidly among people over 50 years of age in Brazil. However, little attention has been paid to the disease in this age group, resulting in a potential cause of morbidity and mortality in old age. In 2008, the Brazilian Ministry of Health launched a television campaign targeted at older people to raise awareness about HIV/AIDS (<http://www.aids.gov.br/tags/tags-do-portal/sexo-nao-tem-idade-protecao-tambem-nao>). This campaign is definitely a step in the right direction, since the data (Fig. 1) suggest that the relative increase in cases in this age group is a consistent trend. This portion of the population receives less attention in relation to the damage caused by AIDS, and is probably being overlooked by the physicians. More public health and education campaigns need to specifically target older Brazilians, and physician's special awareness of AIDS in older patients is an urgent issue.

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## Conflict of interest

All authors declare to have no conflict of interest.

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