HIV/AIDS case definition criteria and association between sociodemographic and clinical aspects of the disease reported in the State of Minas Gerais from 2007 to 2016


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Abstract

Introduction: Over 30 years after the acquired immunodeficiency syndrome epidemic, several strategies have been implemented to verify the trend of the infection, the profile of the affected individuals, and the impact of prevention and control measures, with notification of asymptomatic carriers being the most recent measure. This study aimed to verify the geographic distribution of human immunodeficiency virus/acquired immunodeficiency syndrome and analyze the association between case definition criteria, sociodemographic data, and clinical aspects of the disease in the State of Minas Gerais between 2007 and 2016. Methods: In this ecological and analytical study, 35,349 cases of human immunodeficiency virus/acquired immunodeficiency syndrome reported in the State of Minas Gerais between 2007 and 2016 were analyzed. The data were analyzed using multiple correspondence factor analysis, time series analysis, descriptive statistics, and spatial distribution of the cases by macro-region. Results: The majority of the patients were brown-skinned individuals, alive, diagnosed with human immunodeficiency virus/acquired immunodeficiency syndrome on the basis of the criteria adapted from the Centers for Disease Control and Prevention, and living in municipalities with more than 50,000 (80.5%) inhabitants. Between 2007 and 2016, there was an increase in the number of criteria used for diagnosing human immunodeficiency virus. By contrast, a consequent decrease was observed in the number of criteria used for defining cases, which were adapted from the Centers for Disease Control and Prevention, Rio de Janeiro/Caracas, and for identifying AIDS-related deaths. Young people aged between 13 and 29 years, individuals whose education level is compatible with the observed age, and homosexual men were associated with the HIV+ criterion. Conclusions: After the mandatory notification of human immunodeficiency virus-positive cases in 2014, there was a decrease in other criteria for defining human immunodeficiency virus/acquired immunodeficiency syndrome cases and changes in the profile of people living with human immunodeficiency virus/acquired immunodeficiency syndrome.

Keywords: HIV. Acquired immunodeficiency syndrome. Time series studies. Factor analysis. Health profile.

INTRODUCTION

Over 30 years after the acquired immunodeficiency syndrome (AIDS) epidemic, AIDS remains one of the challenges to global public health, with consequences to the society and families. Every day more than 7,000 people are infected, and every 20 seconds, an AIDS-related death occurs, being the fifth most common cause of death among adults[1,2].

Although everybody is subject to contamination, sexual contact remains the main route of AIDS transmission. The rate of AIDS detection in Brazil has stabilized in the last 10 years, with an average of 20.5 cases/100,000 inhabitants. The mortality rate in 2014 was 5.7 deaths/100,000 inhabitants[3].

Clinical monitoring of people living with human immunodeficiency virus/acquired immunodeficiency syndrome (PLHA), defined by the Pan American Health Organization, was carried out in three stages/goals. These goals became known as 90-90-90, in which countries by 2020 should reach 90% of the diagnosed PLHA, 90% of PLHA under antiretroviral therapy (ART), and 90% of PLHA under ART with viral suppression[3,4,6].
Some strategies have been implemented to verify the trend of HIV infection and the impact of prevention and control activities such as compulsory notification of pregnant women and children exposed to vertical transmission, notification of asymptomatic carriers, optimization of risk, and vulnerability research 6.

Since 2014, the Ministry of Health has included mandatory notification of HIV-positive cases by health services, with the aim of increasing the number of people aware of the serological condition and offering free access to the treatment for inhibition of viral replication 8. This requirement can have important implications on the epidemiological profile of the disease in the country and health authorities’ response to HIV/AIDS. The sub-registration may compromise the continuity of the provision of antiretroviral drugs and priority actions to vulnerable populations 9.

Increasing access to diagnostic testing as well as eliminating HIV-related discrimination are among the current challenges for monitoring and controlling the HIV/AIDS epidemic 6.

To verify whether there was a change in the pattern of the case definition criteria after the mandatory notification of HIV-positive cases, this study aimed to analyze the association between HIV/AIDS case definition criteria and clinical aspects of the disease, as well as to verify the geographical distribution of occurrence of cases in the state of Southeast Brazil between 2007 and 2016 by macro-region of health.

**METHODS**

This was an ecological study with an analytical approach. The Information System for notifiable diseases (SINAN) database, provided by the Minas Gerais State Health Department (SHD/MG) for the period between 2007 and 2016, containing the data of patients with HIV/AIDS older than 13 years was used.

Minas Gerais is the second most populous state in Brazil. The SHD/MG divided the state into 13 macro-regions and 77 micro-regions to facilitate in the expansion of public policies 6. Of the 853 municipalities in the State of Minas Gerais, the median population is 8,203 (interquartile range of 4,848:17,782) and the average number of inhabitants is 23,766 [standard deviation (SD): 96,887], with 36.3% of the municipalities comprising of 5,000 inhabitants, and 28.7% comprising of 5,000-10,000 inhabitants.

The variables used in the study were age, age group, race, education, gender, zone, case definition criteria, the period before and after the compulsory notification of HIV-positive cases, population range, sexual transmission, case evolution, exposure category, and macro- and micro-regions of health.

The descriptive statistics and multiple correspondence factor analysis (MCFA) were used to analyze the data, which allows verification of the association between the supplementary variables and active variables of the case definition. The active variables that made up the factorial plane were all mentioned, except for zone and health region. The relations between geometric proximity and the points in the factorial plane help identify the associations between the active and supplementary variables. The active variables were used to calculate the position of each individual in the factorial plane. By contrast, the supplementary variables were not used in the calculation but were used to determine the association of active variables in the factorial plane on the basis of similarity 11,12.

The MCFA demands complete data 11, and it is necessary to disregard cases with blank records. Variables whose categories have very unbalanced frequencies, that is, a category with a very high frequency (over 80%) and other categories with a very low frequency, were excluded, as the contribution of categories used in the construction of axes in the MCFA is inversely proportional to their frequency 11,13.

For the analysis of the temporal trend, the proportion of records according to HIV/AIDS case definition criteria per year (2007-2016) was used. In the analysis, the linear regression models standardized by the procedure proposed by Prais-Winsten were used to quantify the annual percent change (APC) of the Centers for Disease Control and Prevention (CDC)-adapted criteria, the number of HIV-positive cases in RJ/Caracas, and the number of HIV-related deaths, with 95% confidence intervals. A positive APC indicated an increasing time series; a negative APC indicated a decreasing times series; and when no significant difference was identified, a steady trend was considered 14.

The notifications were spatially distributed according to the cartographic base of the territory of Minas Gerais (available in http://datasus.saude.gov.br/cadastros-nacionais/294-dowload-mapas-tabwin), with the macro-regions of health as the unit of analysis. The total number of notifications from 2007 to 2016 was evaluated by macro-regions, and the linkage was given the cartographic base according to the macro-regional code of the Department of Informatics within the Unified Health System. The distribution considered the division of the values in the same frequency (quintile); the darkest gradation corresponded to the quintile of a higher value of notifications within a specific period. The Tabwin/DATASUS free software for mapping was used for mapping the frequency distribution.

**Ethical considerations**

This study was approved by the UFTM Research Ethics Committee (approval number: 2.099.176).

**RESULTS**

There was a higher proportion of notifications in the Central area (44.1%), Southeast (11.4%), and Northern triangle (10.8%) of the state (data not shown in table). With regard to the State Administrative Regions of Health, there was a greater proportion of cases in the regions of Belo Horizonte, Uberlândia, Uberaba, Juiz de Fora, Varginha, Divinópolis, Coronel Fabriciano, and Pouso Alegre (Figure 1). There were more reported HIV/AIDS cases in municipalities with more than 50,000 inhabitants (80.7%) and in municipalities with 20,000-50,000 inhabitants (9.9%).

Between 2007 and 2016, there were 35,349 HIV/AIDS cases reported in the State of Minas Gerais. The average age was 37.3 years (SD: 11.9 years), the median age was 35.6 years, and the
interquartile range was 28.1:45.0. There was a higher proportion of cases in the 40-to-59-year age group (33%) and 30-to-39-year age group (31.6%). About 13,921 (39.4%) patients were white, while 11,094 (31.4%) were brown skinned. Approximately 31.8% of patients had elementary education, and 18.4% had high school education; however, a large proportion of data about educational background ignored (37.4%). Majority of the study participants were living in urban areas (92.8%) and were men (67.8%) (Table 1).

In 2007-2016, the annual rate of change in the proportion of cases based on the reporting criteria for HIV infection increased (42.9%). For the other criteria, the annual rate of change decreased, with – 10.7% for the proportion of AIDS cases defined by the criteria adapted from CDC, – 6.9% for the proportion of cases reported based on the Rio de Janeiro/Caracas criteria, and – 13.9% for the proportion of cases that were reported based on the AIDS-related death criterion (Figure 2).

It was observed through the MCFA that most of the people living with HIV/AIDS, observed within the circle of Figure 3, were brown-skinned individuals, alive, diagnosed with AIDS based on the criteria adapted from CDC, and living in municipalities with more than 50,000 inhabitants. The quadrants of this figure were as follows:

**Quadrant 1:** Most cases of HIV infection were reported in white individuals aged 13-19 years and 20-29 years, and HIV infection was predominant in medium-framed and large-framed individuals. At the time of the notification, patients were probably alive owing to the time of the diagnosis and because they did not develop the immunodeficiency syndrome. It was also associated with being a male homosexual (Figure 3).

**Quadrant 2:** The variables with ignored information such as exposure category, race, educational level, evolution, mode of transmission, and exposure categorized as *others* that presented small percentages (presence of hemophilia, drug use, accidents with biological material, blood transfusion, and perinatal infection), municipalities with over 50,000 inhabitants, and being male were associated (Figure 3).

**Quadrant 3:** As regards the factors associated with period I (2007-2013) before the introduction of HIV notification, it was observed that the CDC and Rio de Janeiro/Caracas criteria were used to diagnose individuals aged 40-59 years and those aged over 60 years. Regarding the evolution of the case at the time of notification, patients' death was because of other causes unrelated to HIV infection. Still in this quadrant, a significant association was found in the criteria for defining an AIDS-related death case (Figure 3).
Quadrant 4: Women living in municipalities with up to 5,000 inhabitants were included, followed by those living in municipalities with 10,000-20,000 inhabitants, heterosexuals, and those who had elementary school education. In the lower part of the quadrant, more associated with the average profile of the individuals, it was observed that the transmission of infection was caused by men who have sex with men (MSM) and by women who have sex with women, that is, homosexuals; HIV infection was also prevalent among brown-skinned individuals, those aged 30-39 years, and those living in municipalities with 20,000-50,000 inhabitants. This quadrant was not associated with any HIV/AIDS case definition criteria (Figure 3).

**DISCUSSION**

As of 2014, the obligation to notify HIV-positive cases was implemented in Brazil through Ordinance No. 1,271, dated June 6, 2014\(^8\); this strategy was implemented to modify the profile of infected persons over time, especially in terms of age, sex, sexual orientation, and disease progression, as cases are expected to be detected early and the antiretroviral therapy regimen to be initiated allowing viral loads and reducing deaths and new infections.

After the mandatory notification of HIV-positive cases, there was an increase in the temporal trend of this case criterion to the detriment of the others and the association of this criterion with the diagnosis of HIV in white individuals, in individuals aged up to 29 years, male homosexuals, and those with education level compatible with the observed age. A study conducted in Recife and Curitiba in 2013 had already verified a high incidence of HIV in MSM and stressed the importance and urgency of strategies to control the spread of the epidemic in this population subgroup\(^15\). Findings of a recent study conducted in Switzerland indicated a recent resurgence of HIV infection among MSM, indicating possible changes in the epidemiological profile of the epidemic\(^16\) which may or may not be linked to the obligation to notify HIV-positive cases in Brazil.

In Brazil, the prevalence of HIV/AIDS cases among MSM ranged from 5.2% to 23.7% in the 10 cities surveyed\(^17\), and the risk was much higher in MSM than in heterosexuals\(^18\), a significant and important issue that must be prioritized and rethought in health action planning.

According to the Epidemiological AIDS and STD Bulletin\(^8\), the Brazilian epidemic is currently focused on MSM, transvestites, people who use drugs, and sex workers and reaffirm the growth of AIDS among people aged 15-24 years, a fact observed in the present study. It also revealed that this age group is more likely to be tested serologically, which is a good indication of the success of the campaigns that promote early awareness on the serological state, held by the federal government, especially the *Be Aware* campaign with mobile units for the serological testing of HIV, syphilis, and hepatitis B and C that are conducted at various events such as carnival and LGBT pride parade (lesbian, gay, bisexual, transsexual, and transgender), among others.

However, young male homosexuals still engage in same-sex sexual relationships, drawing the attention of the health authorities toward the implementation of prevention strategies specific to this target population\(^9\). A study carried out in the City of Salvador with MSM found that 63% had never undergone the HIV test; among the individual vulnerability factors, ages between 18 and 29 years, sexual life before the age of 15, prevalence of STI in the last 12 months, number of sexual partners in the last 6 months, and unprotected receptive anal sex with a casual partner were people of color and had up to 8 years of study\(^19\).

Another study carried out among MSM older than 18 years old in Fortaleza found that the majority were young (40.3%), unmarried (85.1%), had between 5 and 11 years of schooling (57.3%), and had a low income (37.6%), with 58.1% having been tested for HIV at some time in their lives, 34.1% have been tested to ensure that they were not infected, and 34% tested owing to the national campaign *Be Aware*\(^20\), which reinforces the need for this campaign.

**TABLE 1:** Distribution of the 35,349 cases of HIV/AIDS according to the sociodemographic profile, Minas Gerais, from 2007 to 2016.

<table>
<thead>
<tr>
<th>Profile</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>brown skinned</td>
<td>11,094</td>
<td>31.4</td>
</tr>
<tr>
<td>white/caucasian</td>
<td>13,921</td>
<td>39.4</td>
</tr>
<tr>
<td>black</td>
<td>4,655</td>
<td>13.2</td>
</tr>
<tr>
<td>ignored</td>
<td>5,473</td>
<td>15.5</td>
</tr>
<tr>
<td>asian</td>
<td>151</td>
<td>0.4</td>
</tr>
<tr>
<td>indigenous</td>
<td>55</td>
<td>0.1</td>
</tr>
<tr>
<td>Schooling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>illiterate</td>
<td>496</td>
<td>1.4</td>
</tr>
<tr>
<td>elementary</td>
<td>11,244</td>
<td>31.8</td>
</tr>
<tr>
<td>high School</td>
<td>6,504</td>
<td>18.4</td>
</tr>
<tr>
<td>higher</td>
<td>3,874</td>
<td>11.0</td>
</tr>
<tr>
<td>ignored</td>
<td>13,231</td>
<td>37.4</td>
</tr>
<tr>
<td>Zone</td>
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<td></td>
</tr>
<tr>
<td>urban</td>
<td>32,800</td>
<td>92.8</td>
</tr>
<tr>
<td>ignored</td>
<td>1,478</td>
<td>4.2</td>
</tr>
<tr>
<td>peri-urban</td>
<td>74</td>
<td>0.2</td>
</tr>
<tr>
<td>rural</td>
<td>997</td>
<td>2.8</td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
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<tr>
<td>female</td>
<td>11,362</td>
<td>32.1</td>
</tr>
<tr>
<td>male</td>
<td>23,982</td>
<td>67.8</td>
</tr>
<tr>
<td>ignored</td>
<td>5</td>
<td>0.1</td>
</tr>
<tr>
<td>Age range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>from 13 to 19</td>
<td>1,102</td>
<td>3.1</td>
</tr>
<tr>
<td>from 20 to 29</td>
<td>9,841</td>
<td>27.9</td>
</tr>
<tr>
<td>from 30 to 39</td>
<td>11,179</td>
<td>31.6</td>
</tr>
<tr>
<td>from 40 to 59</td>
<td>11,676</td>
<td>33.0</td>
</tr>
<tr>
<td>over 60</td>
<td>1,551</td>
<td>4.4</td>
</tr>
</tbody>
</table>

The reason for not taking the HIV test is to show trust the partner (21%) and the fear of discrimination if the test is positive (20.3%). Among MSM, the majority (97.6%) reported at least one advantage for the serological testing, and the remaining reported knowledge on serology testing (91.3%), immediate onset of treatment (83.5%), use of protection to avoid opportunistic diseases (56.7%), having sex without fear (55.6%), and increasing the quality of survival with HIV (54.1%)\(^{20}\). These vulnerabilities and fears served as barriers to the spontaneous performance of the exam, as also described by Terto Junior\(^{21}\).

Cardoso et al.\(^{22}\) in a review of the literature showed that alcohol-related sexual behavior is a risk factor for sexually transmitted infections, especially among men, adolescents, immigrants, and sex workers, for having sex without a condom when consuming alcohol. Alcohol, which has been increasingly used among adolescents and young adults, may contribute to the vulnerability to HIV infection observed in this study among those aged 13-29 years.

According to Asinelli-Luz and Junior\(^{23}\), the sexual behavior among adolescents is complex and permeated by behavioral, affective, and cognitive paradigms. Being influenced by gender characteristics, in which the female is linked to emotional involvement and the male is linked to pleasure and performance at the expense of condom use, also associated with family issues, self-esteem, early sexual initiation, and pressures of coexistence groups.

The decentralization of HIV testing in the basic healthcare network was an advanced measure and should be widely disseminated to the population in order to receive community support for this service\(^{24,25}\), as many people do not seek help from Testing and Counseling Centers because it is stigmatized as a place of treatment for AIDS. Testing through the Be Aware

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**FIGURE 2**: Temporal tendency according to the HIV/AIDS case definition criteria, Minas Gerais, 2007 to 2016. **HIV/AIDS**: human immunodeficiency virus/acquired immunodeficiency syndrome; **APC**: annual percent change; **CI**: confidence interval (95%); **CDC**: Centers for Disease Control and Prevention; **RJ**: Rio de Janeiro.
**FIGURE 3**: Factor analysis of multiple correspondence, association between HIV/AIDS case definition criteria and sociodemographic and exposure aspects. 

**EV**: death by aids, alive, death by other causes and ignored

**ST**: sexual intercourse with men, sexual intercourse with women, sexual intercourse with men and women, it was not a sexual transmission and ignored

**Ex**: heterosexual, homosexual, bisexual, others, and ignored

**Cr**: Adapted CDC, HIV+, Rio de Janeiro/Caracas, Death related to HIV/AIDS. School – Schooling: illiterate, elementary, high, superior and ignored

**HAB**: number of inhabitants per municipality: up to 5,000; 5,000-10,000; 10,000-20,000; 20,000-50,000; and over 50,000

**Gender**: male and female

**Race**: brown skinned, white, black, and ignored

**Age group**: from 13 to 19 years old, from 20 to 29 years old, from 30 to 39 years old, from 40 to 59 years old, and greater than 60 years old

A campaign deserves to be optimized and expanded to cover other events and population segments such as the elderly, heterosexual women, and adolescents.

For the State of Minas Gerais, in the small municipalities, a profile of heterosexual women with a low educational level living with HIV/AIDS was observed. The study characterized these phenomena as feminization and internalization of the illness.

Women primarily acquire the infection by having unprotected heterosexual relationships (86.8%)\(^2\). In the municipality of São Paulo, a study conducted in HIV-positive women reported a higher prevalence of a low level of schooling and unsatisfactory
socioeconomic conditions. In Rio Grande do Norte, most women in recent years acquire infection by having heterosexual relationships, and other studies have shown that women in a stable union have difficulties imposing the use of condoms during sexual contact, as this may lead to negative gender relations and mistrust in the partner.

A survey carried out in the municipality of São Leopoldo, RS, involving women aged between 23 and 55 years with HIV/AIDS found that the majority were in a childbearing age, were in a stable union, had incomplete elementary school level, were employed as household workers, and belonged to the low social class. They were misinformed about the transmission and evolution of the disease.

Between 2007 and 2013, before the mandatory notification of HIV-positive cases, the Rio de Janeiro/Caracas and Adapted CDC criteria were found to be associated with the diagnosis in individuals aged 40 to 59 years and over 60 years old, a fact explained by the case definition criteria available in the period, a late diagnosis after the symptoms manifested by AIDS, and the consequent notification of older individuals, which was also partially explained by the greater sexual freedom of the elderly after the creation of drugs that stimulate the male sexual erection, together with the lack of information about the disease as described in a study by Lazzarotto et al. on the elderly’s knowledge about HIV/AIDS carried out in Vale dos Sinos, Rio Grande do Sul, which favors the group age that are more vulnerable to infection, as verified by Melo et al. in a study carried out in Pernambuco.

Between 2007 and 2013, as regards the evolution of the disease, it was observed that individuals aged over 60 years died from other causes not related to AIDS, but also associated with this period were the notifications made after the death and consequently AIDS-related deaths. The death from non-infection/illness-related causes is probably attributed to the antiretroviral therapy offered free of charge to PLHA since 1996, which increased the patient survival by reducing opportunistic infections and hospitalizations, optimizing the survival and quality of life. AIDS-related deaths may be related to the late identification of the serological condition and the disease, the non-adherence to the antiretroviral therapy by some people and the identification/notification of the disease at the time of death.

PLHA in the State of Minas Gerais was brown-skinned, diagnosed based on the CDC criteria, and living in medium-sized municipalities, which are the majority in the state (80.7%). A study conducted in Rio Grande do Norte also found a higher prevalence of AIDS in brown-skinned individuals. Historically, people of color and those with a low educated have less access to health services and education, which directly relates to information on how diseases are transmitted and the means of prevention, making them more vulnerable.

Although the period before the mandatory reporting of HIV-positive cases was higher in years (7 years), the number of cases (n=17,519) was similar to that in the period after the notification (n=17,830), which presented another PLHA profile, composed of adolescents and young people and male homosexuals, indicating changes in the epidemiological profile of PLHA after the addition of the new case definition criteria.

In the State of Minas Gerais, a higher prevalence of cases in the Central, Triângulo Mineiro, and Southeastern regions of the state was observed. Barbosa et al. analyzed spatially the spread of AIDS in Minas Gerais and verified a spatial concentration of similar AIDS incidence in the Triângulo Mineiro and Alto Paranaíba, Central, Metropolitan Belo Horizonte, and West Minas regions.

In the present study, the municipalities with the highest cumulative number of cases were Belo Horizonte, Uberlândia, Juiz de Fora, and Uberaba. In another study, very similar results were found; the municipalities with the highest accumulation of cases up to June 2010 were Belo Horizonte, Juiz de Fora, Uberlândia, Contagem, and Uberaba. These cities have Regional Health Offices and therefore are more structured and resolving regarding the care, which can lead to a greater demand for health services and consequent notification of the illness.

After more than three decades of the AIDS epidemic, much success has been observed with the Brazilian experience, but some points still need to be improved, especially when it comes to prevention to reduce the number of cases of social stigma that the infection/illness still entails. According to Ayres, educational practices should be developed less in terms of population groups and behavior models and more in search of emancipatory attitudes that reduce the spaces that generate vulnerabilities.

This study had some limitations. This study was performed using a secondary database whose variables were restricted to the notification form but was considered an official database and recognized by researchers and health authorities. It should be observed that SINAN data before 2007 were not available for tabulation, which restricted the historical period analyzed.

In conclusion, when analyzing the period before and after the compulsory notification of HIV-positive cases, a considerable increase in the notification of HIV-positive cases and a decrease in the other criteria for case definition were observed, indicating a good adherence to this strategy of case detection by the health services. It was verified that the profile of PLWHA is already changing after the notification of HIV-positive cases because the individuals affected previously were those aged over 40 years and the elderly; those with a low educational level; those who were notified on the basis of the CDC, Rio de Janeiro/Caracas, and AIDS-related death criteria; and/or those whose disease evolution was related or unrelated to AIDS. Between 2014 and 2016, there was a change in the profile of adolescents and young people, most of whom were male, with schooling compatible with their ages.

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Conflict of interest

The authors declare that there is no conflict of interest.
REFERENCES


