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Short Communication

Is early HIV infection diagnosis at a reference center a reality in the state of Ceara?

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Abstract

Introduction: Early diagnosis of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) can decrease transmission and significantly affect morbidity and mortality; however, Brazil still confronts the reality of late HIV diagnosis. **Methods:** Medical records of 284 HIV-positive patients were reviewed in this cross-sectional study. **Results:** Of all patients, 28% were diagnosed in the context of health assessments, whereas 27% were symptomatic at diagnosis. Early HIV infection (Group 1) was diagnosed in 60.2% of participants. They were younger than those with late diagnosis (Group 2) ($p = 0.002$). **Conclusions:** These findings highlight the need for strategies to increase HIV testing in asymptomatic individuals and older patients.

Keywords: Acquired immunodeficiency syndrome. HIV. Early diagnosis. STI.

Acquired immunodeficiency syndrome (AIDS) is a major public health issue. From the beginning of the AIDS epidemic until June 2015, 798,366 cases were diagnosed in Brazil, of which 17,933 were diagnosed in the State of Ceara. In the last five years, about 40,600 new cases have been diagnosed annually in Brazil[1].

The Ministry of Health estimated that by the end of 2014, there were 781,000 people living with HIV/AIDS (PLWHA) in Brazil, of whom only 83% had been diagnosed, 66% were regularly undergoing follow-up at health centers, 52% had started antiretroviral therapy (ART), and 46% had undetectable viral loads (VL) after six months of treatment[1]. These numbers have not yet reached the targets established by the Joint United Nations Programme on HIV/AIDS in the 2014 Paris Declaration, where several countries committed to actions to achieve the 90-90-90 targets by 2020; that is, 90% of PLWHA will know their HIV status, 90% of people with diagnosed HIV infection will receive sustained ART, and 90% receiving ART will have viral suppression[2].

In this regard, it is important to consider at what stage the patient is diagnosed, because patients in the acute phase, in which many individuals do not associate the symptoms with the disease despite a high viremia, are responsible for most instances of transmission[3]. There are still cases of patients who, even after diagnosis, do not take their treatment properly. Thus, effective strategies need to be created to improve diagnosis and initiation of treatment immediately because early diagnosis reduces HIV transmission since early follow-up and initiation of ART enable viral suppression[4].

Many individuals are still diagnosed late in Brazil, especially men and elderly individuals. Although the national laboratory diagnosis rate of late-stage HIV infection CD4 T-helper lymphocytes (CD_4TL) <200 cells/dL decreased from 31% in 2009 to 25% in 2015, there are regional differences, with the highest rates occurring mainly in the North and Northeast regions. Between 2010 and 2014, the mean initial CD_4TL counts of patients diagnosed in the State of Ceará and its capital, Fortaleza, were 287 and 286 cells/dL, respectively[1].

Therefore, it is important that specialized health care centers determine their rates of early detection and take actions to identify seropositive asymptomatic individuals in order to commence ART early and achieve viral suppression[3]. Consequently, these facilities could significantly contribute to reduced HIV transmission and improved quality of life of infected individuals.

Thus, this study evaluated the early detection rates of HIV infection in Fortaleza on the basis of epidemiological, social,

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and clinical data possibly related to diagnosis, provided by a specialized HIV/AIDS care center in the city.

Medical records of 284 HIV-positive patients followed up at the Specialized Care Service of the Integrated Medical Care Center, University of Fortaleza (SAE NAMI/UNIFOR) from 2010 to 2014 were reviewed in this observational, cross-sectional study.

Patients aged >18 years and actively undergoing outpatient follow-up were included in the study. Patients were selected at random according to the availability of medical records. Epidemiological, clinical, and laboratory data were collected from patient medical records. Patients were classified into two groups on the basis of early (CD_4TL count ≥ 350 cells/dL) or late (CD_4TL count < 350 cells/dL) diagnosis.

Most patients were male (237; 83.4%) with a mean age of 33.7 (± 10.5) years. Although SAE NAMI/UNIFOR is a reference center for the treatment of patients in Fortaleza, 27 patients (9.5%) were from neighboring cities. The educational background of the 146 participants (51.4%) was good (at least a high school diploma). The median time between diagnosis and commencement of follow-up was two months (range: 0-60 months). The median CD_4TL count at the commencement of follow-up was 399 cells/dL (range: 11-1,714), corresponding to 189 and 567 cells/dL in the late and early diagnosis groups, respectively.

Although 171 (60.2%) patients were diagnosed with early HIV infection, 76 (27%) patients had requested testing because of symptoms related to HIV infection. Their median CD_4TL count was 265 cells/dL (range: 15-1,305). A history of sexually transmitted infections (STIs) was present in 138 (48.6%) patients. However, previous STIs were the reason for anti-HIV serology tests in only 18 patients (6%). Other frequent reasons for testing included a serum-positive partner by 39 (14%) patients and blood donation by 15 (5%) patients. In addition, 80 (28%) patients were diagnosed with HIV infection when tested upon their own request **(Figure 1)**.

In the analysis of epidemiological variables, only age showed a significant difference between groups (early vs. late diagnosis) with the early diagnosis group being younger than the late diagnosis group ($p = 0.002$). The analysis of prevalence according to risk factors showed no significant differences **(Table 1)**.

Most subjects (60.2%) undergoing follow-up at the health care service were diagnosed early, with CD_4TL counts ≥ 350 cells/dL and a median cell count of 399 cells/dL. These data are concordant with previously reported domestic data, indicating an increase in early diagnosis in recent years. In 2009, 51% of patients diagnosed in Brazil had CD_4TL counts > 350 cells/dL. This percentage increased to 58% in 2015, probably because of mass screening aimed at testing asymptomatic patients.

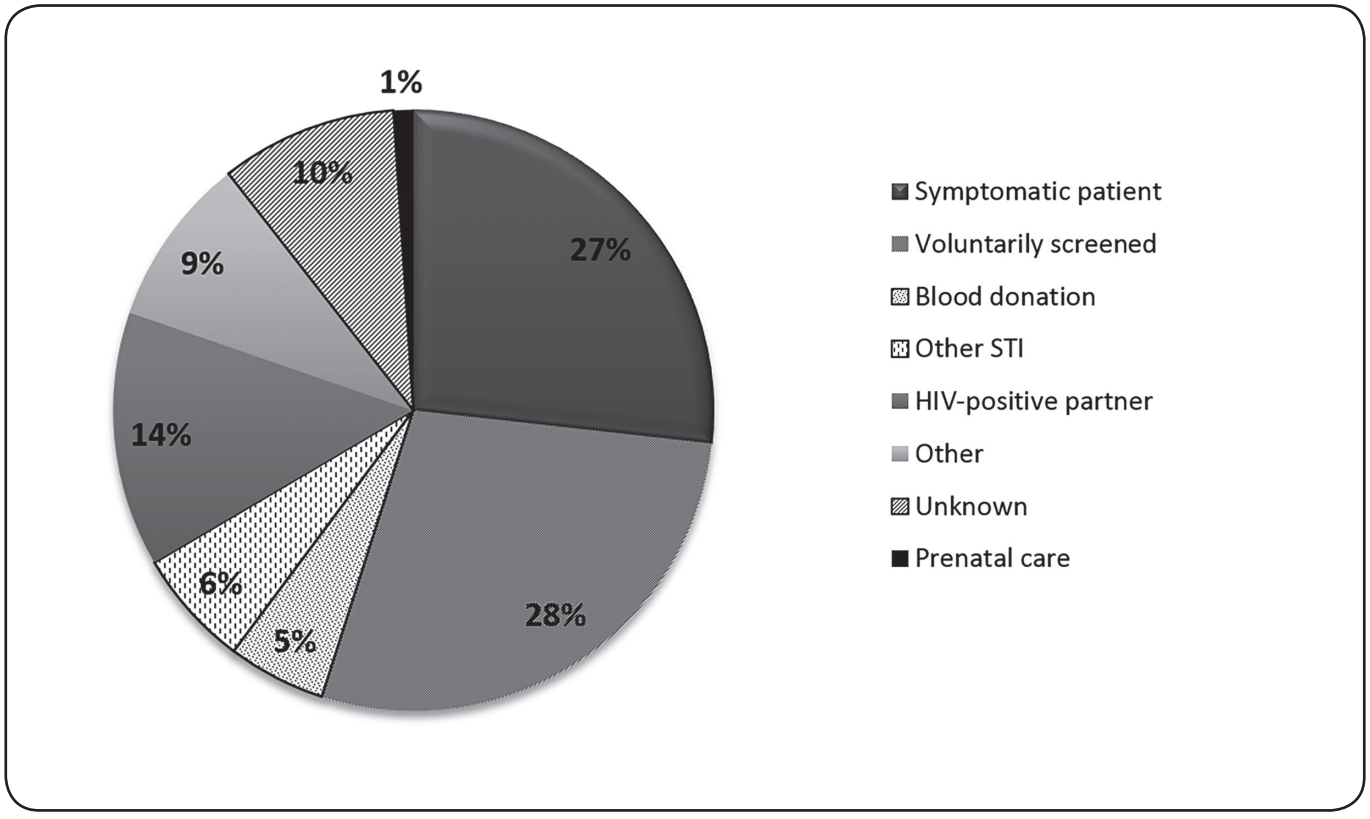

FIGURE 1: Reasons for anti-HIV serological testing among HIV-positive patients undergoing follow-up at the HIV/AIDS Specialized Care Service of the Integrated Medical Care Center, Fortaleza/CE, 2010-2014. **STI:** sexually transmitted infection; **HIV**: human immunodeficiency virus; **AIDS**: acquired immunodeficiency syndrome

TABLE 1: Analysis of epidemiological variables related to early or late diagnosis among HIV-positive patients undergoing follow-up at the HIV/AIDS Specialized Care Service of the Integrated Medical Care Center, Fortaleza/CE, 2010-2014.

Variables	Late diagnosis		Early diagnosis		Prevalence ratio (CI)	P-value
	n	%	n	%		
Epidemiological						
Sex						
male	91	80.5	146	85.4	0.8 (05–1.1)	0.28**
female	22	19.5	25	14.6		
Mean age in years (standard deviation)	35.2 (± 11)		30.5 (± 10,3)		-	**0.002*** **
Location						
Fortaleza	100	89.3	152	91.0	0.89 (0.57–1.3)	0.63**
other	12	10.7	15	9.0		
Good educational background*						
yes	54	62.0	92	65.7	09 (0.6–1.2)	0.57**
no	33	38.0	48	34.3		
Vulnerability						
HIV-positive partner						
yes	14	12.4	39	22.8	0.68 (0.3–1.2)	0.20**
no	18	15.9	29	17.0		
unknown	81	71.7	103	60.2		
Number of partners						
fixed partner	7	6,2	14	8.2	1.1 (0.6–2.2)	0.64**
multiple partners	41	36.3	65	38.0		
unknown	65	57.5	92	53.8		
Relationship with an HIV-positive partner						
yes	21	18.6	45	26.3	0.9 (0.4–1.7)	0.79**
no	10	8.8	19	11.1		
unknown	82	72,6	107	62.6		
Previous IV drug use						
yes	5	4.4	6	3.5	1.1 (0.5–2.2)	0.73**
no	73	64.6	108	63.2		
unknown	35	31	57	33.3		
Drug addiction on diagnosis						
yes	9	8	15	8.8	0.9 (0.6–1.2)	0.63**
no	104	92	156	91.2		
Alcohol use on diagnosis						
yes	47	41.6	76	44.4	0.9 (0.6–1.6)	0.81**
no	66	58.4	95	55.6		
Previous pulmonary tuberculosi						
yes	8	7.1	14	8.2	0.9 (0.5–1.6)	0.73**
no	105	92.9	157	91.8		
Previous STI						
yes	56	49.5	82	47.9	1.04 (0.7–1.3)	0.79**
no	57	50.5	89	52.1		
Total	113		171			

HIV: human immunodeficiency virus **AIDS:** acquired immunodeficiency syndrome; **CI**: confidence interval; **STI:** sexually transmitted infection**; IV: intravenous. n:** number of patients; **%:** percentage of patients *Patients who completed high school at least. **chi square test. ***Student T test**.**

However, the tests covered mainly the female population because screening is mandatory for prenatal care. Thus, late diagnosis is more common among men[1]. This study could not identify a statistically significant difference with regard to patient sex when comparing the two groups. International data also show a tendency toward earlier diagnosis of HIV infection. According to data from the Centers for Disease Control and Prevention (CDC) in the United States, 25.4% of patients older than 13 years of age had progressed to stage 3 HIV infection (AIDS) at diagnosis in 2009. This prevalence decreased to 23.6% in 2013[5].

Analysis of the reasons that led to the diagnosis of HIV infection revealed that most patients (28%) were asymptomatic and were screened voluntarily, whereas 27% of the patients had symptoms related to HIV infection, which led to their diagnosis. The latter had a low median CD_4TL count (265 cells/dL). Studies have shown that symptomatic individuals diagnosed

with so-called *B* symptoms according to the 1993 CDC classification criteria[6] (including oral candidiasis, herpes zoster, and constitutional symptoms, among others) may have been diagnosed late and might have a significant risk of developing AIDS within 6 months and higher 12-month mortality rates[7]. Thus, the treatment for symptomatic individuals with *B* or *C* symptoms is critical to avoiding rapid disease progression. Nearly one-third of the patients in this study were diagnosed with a poorer immune response and therefore presented a higher risk of developing AIDS or more severe complications. The seropositive population, even when asymptomatic, should initiate ART as soon as possible as it is an important measure for reducing harm and improving the quality of life. Early diagnosis, together with early ART initiation, may contribute to reduced transmission, as asymptomatic seropositive individuals who are unaware of their serological status may continue the same risky behaviors that led to their infection[8].

Even though significant data were missing, the analysis of sexual partnerships showed that 37.3% of patients reported having many partners. In addition, 23.2% reported having had sex with a partner known to be HIV-positive. These findings, coupled with the fact that statistics on drug use were low, suggest that sexual exposure must have been the primary form of HIV transmission. These findings are concordant with domestic and international data, which suggest that sexual intercourse is the most significant form of HIV transmission in both men and women. Another important factor is multiple sexual partners, especially casual partners[9]. Over the years, a decline has been observed in the percentage of exposure to injection drug use in Brazil[1].

This study showed a prevalence of younger people in the group with an early diagnosis. Data from the 2015 Epidemiological Bulletin reported a similar finding, showing that elderly people tend to be diagnosed later[1]. CDC data from 2013 also showed the prevalence of symptomatic patients among groups of elderly people. According to these data, the prevalence of patients diagnosed with stage 3 HIV infection (CD_4TL counts < 200 cells/dL) was 23.6% in the United States. Among these cases, most were heterosexual men older than 55 years[6].

Several studies have highlighted the fact that older people have been diagnosed with lower levels of CD_4TL. This is because the infection progresses more rapidly in this age group because of immunosenescence and the presence of multiple comorbidities and because these individuals are tested less often than younger people[10]. Stigma, refusal to test, and misperception of patients and professionals about risks are barriers to early diagnosis in this age group. Even in places with a high prevalence of HIV infection, where the CDC recommends screening of all sexually active people and injection drug users, elderly individuals often postpone testing, mainly because of the lack of perception of risk behaviors in their population. These misconceptions prevent the diagnosis in individuals in whom the infection rapidly progresses to AIDS, leading to increased mortality in the short term[11].

Although 48.6% of the patients in this study reported previous STIs, no difference in STI prevalence was found between the groups ($p = 0.79$). Only 6% of the patients reported a current STI as the reason for requesting the anti-HIV serological test. STIs are known risk factors for HIV infection, which are also included in this group because of shared transmission routes. Individuals with non-ulcerative STIs have a 3- to 10-fold increased risk of becoming infected with HIV, whereas those with ulcers in the genital tract have an 18-fold increased risk[12]. Thus, as risk behaviors are shared between STIs and HIV infection, HIV testing is recommended whenever a patient is diagnosed with an STI, either currently or previously, for early diagnosis and breaking the chain of transmission[13]. Therefore, the findings of this study indicate a failure in the indications for screening tests, which should be performed when patients with a history of STIs are identified, regardless if the history is previous or current.

In this study, about 5% of patients were diagnosed when they volunteered to donate blood. Unfortunately, this is a common finding in other studies. One of the reasons is that some individuals seek to donate blood to undergo anti-HIV serological screening as they view themselves to be at risk for this infection. Although altruism is the primary motivation among blood donors, many seek this strategy to also be tested free of charge and without further counseling[14]. In addition, some donors omit information about their risk behaviors in specific questionnaires, which is a reason for concern[15]. These findings reinforce the hypothesis that, although less prevalent, the transfusion route of HIV transmission should be a constant concern and that measures to identify HIV-positive donors should be further improved.

The findings of this study may be limited because the sample included only patients from a single SAE, which limits the extrapolation of the results to the general population of those recently diagnosed with HIV.

The results of this study showed that although most patients were diagnosed with a reasonable immunological status (median CD_4TL 399 cells/dL) more than a quarter of them were diagnosed with symptoms related to HIV infection. The results also showed an increased prevalence of elderly patients in the late diagnosis group. Finally, although almost half of the patients reported the occurrence of STIs, in only 6% was it the reason for requesting anti-HIV serological tests.

These findings suggest that both SAEs and competent authorities should engage in the global fight against HIV more fully, including developing strategies to encourage the population to undergo testing in order to identify individuals with HIV infection in its asymptomatic phase, with a particular focus on individuals who are sexually at-risk and on elderly people. This is the only approach in which we will be able to participate in the global fight against the AIDS epidemic, the efforts of which are ultimately focused on the early diagnosis of HIV infection so that ART may be initiated in at least 90% of HIV-positive patients.

Ethical considerations

The study was approved by the Institutional Review Board of the University of Fortaleza (Opinion no. 355.510).

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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