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Trends in HIV-2 Seroprevalence at the National Reference Center of HIV from 2005 to 2014 in Lome, Togo

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Abstract

Background: In Togo, the HIV/AIDS epidemic is characterized by the circulation of the 2 subtypes of HIV. Thus, patients infected with HIV-2 are diagnosed and monitored in the care centers. **Objective**: To document the trend of HIV-2 prevalence over a decade of activities of the National Reference Center for HIV tests and screening (CNR-VIH). **Methods**: A cross sectional study was carried out from the screening data archived from January 2005 to December 2014 at the CNR-VIH, a laboratory located in the Sylvanus Olympio University Hospital (CHU SO) Lome. The sampling consisted of adults and children outpatients or those who were hospitalized in CHU SO, subjects presenting for voluntary testing, pregnant women and patients or samples referred for HIV confirmation. All samples were tested for HIV-1 and HIV-2 infections by combining ELISA and rapid diagnostic tests. **Result**: During the decade, 34,077 subjects were screened for HIV infection. The overall prevalence of HIV infection was 20.70% (7055/34077). In 10 years, the prevalence of HIV infection in CNR-VIH decreased significantly from 35.40% $CI_{95\%}$ [34.50% - 36.20%] in 2005 to 14.20% $CI_{95\%}$ [13.60% - 14.70%] in 2014 ($p = 0.03$). The prevalence of HIV-1, HIV-2 and dual HIV1&HIV-2 was respectively 20.40%, 0.23% and 0.07%, with annual prevalence of HIV-2 between 0.07% and 0.39%. The differences between the HIV-2 prevalence over the decade were not statistically significant ($p > 0.15$). A 4-year-old child from mother-to-child HIV-2 transmission was diagnosed. Sixty-five percent of adult patients were over 40 years of age with an average age of 43.5 ± 11.3 years. **Conclusion**: Data from the National Reference Center for HIV Tests in

Togo over the last ten years confirm the existence of a weak epidemic of HIV-2 infection with a tendency towards stability.

Keywords

HIV-2, Seroprevalence, Togo

1. Introduction

As compared to the global HIV-1 pandemic, HIV-2 is endemic in West Africa. It was first isolated in West Africa in 1985 and has been reported in many countries of Western Africa such as Gambia, Guinea, Ghana, Cape Verde, Guinea-Bissau, Ivory Coast, Liberia, Senegal and Mali [1] [2]. Out of Africa, HIV-2 infection is sporadically detected in countries with large migrations from these areas [3] [4] [5].

The HIV-1 and HIV-2 show a very distinct epidemiology. HIV-2 is different from HIV-1 most strikingly in its low rate of progression and infectivity, with the majority of those infected individuals likely to be long-term non-progressors [6]. Those with progressive disease show the same likelihood of morbidity and mortality as HIV-1 cases [7] [8] [9] and with advance HIV-2 infection, they need treatment with antiretroviral therapy (ART) which susceptibility differs significantly between HIV-1 and HIV-2. HIV-2 is intrinsically resistant to two of the major classes of antiretroviral drugs: the fusion inhibitors and the nonnucleoside reverse transcriptase inhibitors (NNRTI) based regimens that are the standard therapy for HIV-1 in West Africa. Some protease inhibitors, particularly those without ritonavir boosting, are not sufficiently effective against HIV-2 [10] [11].

Since 1990, most West African countries have reported a decrease in HIV-2 prevalence [12] [13] [14]. How are the trends in terms of HIV-2 seroprevalence in Togo? To document this question, we conducted the present study in the National Reference Center for HIV tests and screening (CNR-VIH) located in Lome the capital city of Togo.

Togo is a country of 6,191,155 inhabitants. The capital city Lome account for 1,479,686 inhabitants which represent 23,9% of the whole population [15]. The CNR-VIH belongs to HIV national laboratory network.

2. Methods

A cross sectional study was conducted to assess the prevalence of HIV-2 among individuals received for HIV screening at the CNR-VIH located in the Sylvanus Olympio University Hospital (CHU SO) in Lome from January 2005 to December 2014.

2.1. Study Population

The study population consisted of all individuals received at CNR-VIH for HIV testing. These individuals include outpatients and those who were hospitalized

in CHU-SO, subjects presenting for voluntary testing, pregnant women, external people and samples referred for HIV confirmation. Adults and pediatric cases were all included. All were provided with appropriate counselling for HIV testing according to the national guidelines [16].

All samples were tested for HIV-1 and HIV-2 infections. This study includes the results of all HIV tests that were carried out at CNR-VIH during 10 years.

2.2. Laboratory Methods

Five ml of venous blood was obtained in vacutainer tubes from each patient and used for sera preparation. The sera were tested immediately or stored at −20˚C for later use. Sera were screened according to national HIV testing algorithm based on three tests. First, we used an ELISA test, VIRONOSTIKA HIV Uni-Form II plus O (Organon Teknika) and later VIRONOSTIKA HIV Uni-Form II Ag-Ab (BioMérieux, Geneva, Switzerland). Therefore, reactive sera were confirmed with Rapid Diagnostic Tests (RDT), HIV TRI-DOT (J. Mitra & Pvt Ltd. New Delhi-110-India Co.) or FIRST RESPONSE HIV 1-2-0 (PMC Medical, Nani Daman, India). We performed a third test (Western or dot blot) when the second test was negative or in front of exceptional cases of HIV-2 and dual HIV-1/HIV-2 infections because of the high cross-reactivity rate between the two viruses. The third test used was HIV IMMUNOCOMB COMBFIRM HIV 1-2 (Orgenics, Yavne, Israël) or INNO-LIA HIV I/II Score (Fujirebio, Ghent, Belgium).

2.3. Statistical Analysis

Data was analysed using SAS ® 9.4 (SAS Institute Inc., Cary, NC, USA). The no parametric test of Kolmogorov-Smirnov was use to compare the prevalence of HIV-2 infection from year to year. The P-value < 0.05 was considered statistically significant.

3. Results

From January 2005 to December 2014, at the National Reference Center for HIV (CNR-VIH) 34077 subjects were received for HIV diagnosis. Of them, 7055 (20.70%) were diagnosed HIV infected. Among HIV infected patients, subjects aged ≤ 15 years represented 7.65% (540/7055). The number of HIV-2 cases diagnosed at CNR-VIH per year from 2005 to 2014 is shown in **Figure 1**.

3.1. HIV Infection Seroprevalence

Upon 10 years of testing, the mean HIV seroprevalence was high and decreased significantly from 35.40% $IC_{95\%}$ [34.50% - 36.20%] in 2005 to 14.20% $IC_{95\%}$ [13.60% - 14.70%] in 2014 (p = 0.03) (**Figure 2**).

The global prevalence of HIV-1, HIV-2 and dual infection was respectively 20.40%; 0.23% and 0.07%. The prevalence of HIV-2 is 88-fold lower than that of HIV-1.

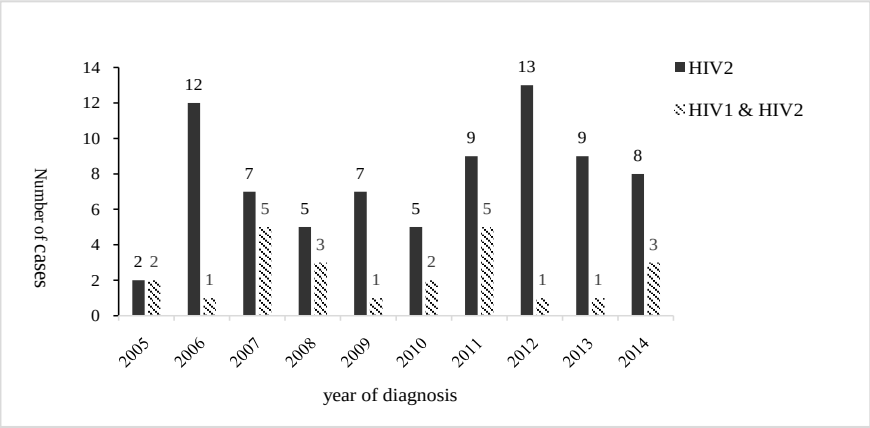

Figure 1. The number of HIV-2 cases and HIV-2 & HIV-1 cases diagnosed annually in Togo.

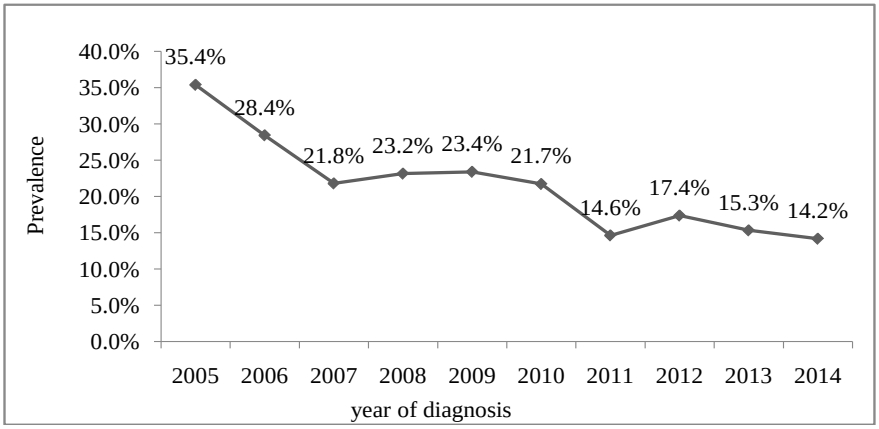

Figure 2. Trend in HIV seroprevalence at the National Reference Center for HIV tests and screening in Togo.

3.2. HIV-2 Infection

The average age of the HIV-2 infected patients (n = 77) was 43.5 ± 11.3 years with a minimum of 4 years and a maximum of 70 years. There were more women with a sex ratio 0.75. It was notified a dominance of adults (65.0%) aged over 40 years (Table 1).

One case of mother to child transmission of HIV-2 was diagnosed. This concerned a 4 years old child born from an HIV-2 infected mother.

The annual prevalence of HIV-2 infection ranging between 0.07% and 0.39% (Figure 3).

Over the decade, variations in prevalence data for HIV-2 were not statistically significant ($p > 0.15$). In the other hand, the prevalence of HIV-1 found at CNR-VIH decreased significantly during the decade from 35.30% $IC_{95\%}$ [34.40% - 36.10%] in 2005 to 13.9% $IC_{95\%}$ [13.40% - 14.50%] in 2014 ($p = 0.03$).

4. Discussion

This study is the first of its kind on HIV-2 prevalence knowledge in Togo.

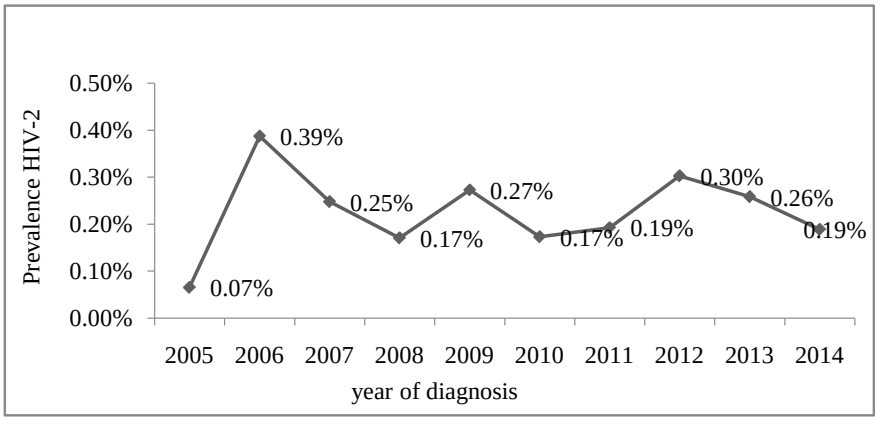

Figure 3. Trend in HIV-2 seroprevalence at the National Reference Center for HIV tests and screening in Togo.

Table 1. Demographic characteristics of HIV-2 infected patients diagnosed at the National Reference Center for HIV tests and screening in Togo.

	n (%)
Sex	
Male	33 (42.9)
Female	44 (57.1)
Total	**77 (100)**
Age group at diagnosis	
0 - 12 years	1 (1.3)
13 - 19 years	0 (0.0)
20 - 29 years	8 (10.4)
30 - 39 years	18 (23.4)
40 - 49 years	26 (33.7)
50 - 59 years	18 (23.4)
≥ 60 years	6 (7.8)
Total	**77 (100)**

Mean age at diagnosis: 43.5 ± 11.3 years; minimum 4 years; maximum 70 years.

During the decade of study (January 2005-December 2014), the overall HIV prevalence at the CNR-VIH was 20.7% out of 34,077 individuals screened and the annual prevalence of HIV-2 has never been above 0.5%. Our study has some limitations because there was a selection bias in the data collected. Indeed, the CNR is the reference center for serological diagnosis of suspicious cases. In addition, when the serological status is found undetermined at the lower level of the health pyramid, sample is also send to CNR-VIH for the confirmation.

As in most countries in West Africa, both of two types of HIV circulate in Togo. Our data showed a mean prevalence of HIV-2 infection of 0.23%. This prevalence remains very low, as reported by several studies conducted in others

countries of West Africa outside Guinea-Bissau and neighboring countries, which is the epicenter of HIV-2 infection [12] [17] [18].

In this study, HIV-2 prevalence is very low and over the decade it has remained stable under 0.5%. This finding is consistent with most studies reporting a significant decline in the prevalence of HIV-2 infection in the young population and in countries with high prevalence [13] [14] [19]. In Togo, from 2012 to date, HIV-2 annual seroprevalence decreases but the difference not statistically significant. For example, in a rural area of northwestern Guinea-Bissau, the HIV-2 prevalence dropped from 8.3% in 1990 to 4.7% in 2000. These trends may be related to the lower transmission efficiency of HIV-2 compared with HIV-1 [14]. Over the decade, only a case of mother to child aged of 4 years was reported. The ANRS study of the EPF-CO1 cohort carried out from 1986 to 2007 in France has clearly demonstrated the low mother to child transmission of HIV-2 infection [20]. Among a prospective cohort of women in Ivory Coast in the early 1990s, the rate of perinatal transmission of HIV-2 was 1.2% compared to 24.7% for HIV-1 (relative risk 21-fold lower for HIV-2) [21]. More recently, in a study in The Gambia, the mother-to-child transmission rate of HIV-2 was 4%, 6-fold lower than the HIV-1 transmission rate of 24.4% [22]. A recent study based on a mathematical model predicts extinction of HIV-2 during the second half of century [23].

Thus, with a low rate of transmission, compare to HIV-1, HIV-2 infects old people aged more than 40 years old [17] [24]. This finding was confirmed in our study where the mean age was 43.5 years and 65.0% of HIV-2 infected patients were at least 40 years old.

5. Conclusion

Togo belongs to West Africa region, which includes the epicenter of HIV-2 infection. However, our data showed that the country is characterized by a very low prevalence of HIV-2 infection. Moreover, the epidemic is stable with a non-significant number of cases. Thus, this infection could become less worrying and the consequence would be to perceive it as a neglected disease while new patients are being screened. In Togo, such as in most of West African countries, the virological monitoring is unavailable for HIV-2 patients. With the access to anti-retroviral therapy (ART), it is very important to implement virological monitoring because of the risk of the emergence of resistant strains.

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