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Prevalence of human immunodeficiency virus, hepatitis C virus, hepatitis B virus and syphilis among individuals attending anonymous testing for HIV in Luanda, Angola

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Background. Human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis remain major infections around the world. In Angola, about 166 000 individuals are living with HIV, representing a prevalence of 1.98% in adults between 15 and 49 years of age. In a 2003 study in Luanda, 4.5% of pregnant women had antibodies to HIV and 8.1% to HBV, and 5.4% were infected with *Treponema pallidum*.

Objectives. The aim of this study was to determine the prevalence of HIV-1 and 2, HBV, HCV and *T. pallidum* serological markers, and hence the prevalence of these infections, in individuals attending a sexually transmitted disease clinic in Luanda, Angola, and the burden of these infections in the Angolan population.

Methods. Individuals attending a centre for anonymous testing for HIV were randomly included in the study. All samples were tested for HBV surface antigen (HBsAg), anti-HCV and anti-HIV-1 and 2 antibodies and antibodies to *T. pallidum.*

Results. A total of 431 individuals (262 women and 169 men) were studied, of whom 10.0% (43/431) were seropositive for *T. pallidum* and 4.6% had active syphilis; 8.8% (38/431) were seropositive for HIV-1 and/or HIV-2 (of these, 78.9% were HIV-1-positive, 2.6% HIV-2-positive and 18.4% co-infected); 9.3% (40/431) were HBsAg-positive, while 8.1% (35/431) had antibodies to HCV. Of 102 patients with positive results, 26 (25.5%, or 6.0% of the total of 431 patients) were positive for more than one of the organisms studied. Rates of co-infection were as follows: 2.3% (10/431) for HIV/HBV, 0.9% (4/431) for HIV/HCV, and 0.9% (4/431) for HCV/HBV. Three individuals with active syphilis had viral co-infection, hepatitis B in 1 case and HIV in 2. Five individuals (1.2% of the total) were seropositive for 3 infections: HIV, hepatitis B and hepatitis C in 3 cases and HIV, hepatitis C and syphilis in 2.

Conclusions. A high prevalence of co-infection with the infections studied was found in this population, including HIV infection (8.8%). These results demonstrate the need to improve screening for and treatment of HIV and other sexually transmitted infections in Angola, and for educational campaigns to prevent not only the morbidity and mortality associated with these diseases, but also their further transmission.

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Rates of morbidity and mortality due to human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis infection are still very high, and these infections remain an enormous burden, especially to women and infants born to infected mothers.[1, 2]

It is estimated that every year around 3 - 4 million individuals are infected with HCV and 2 billion with HBV, and in 2010 around 34 million were living with HIV.[3-5]

The World Health Organization reports that in Africa between 2005 and 2006 the median seroprevalence of syphilis among antenatal clinic attendees ranged from 0.9% in Botswana to 4.6% in the Comores to 5.3% in Madagascar. In 2006 in South Africa, the seroprevalence of syphilis ranged from 1.1% in Limpopo province to 8.5% in the Northern Cape, while in Ghana it ranged from 0% in Tongu (a rural site) to 24% in Odoben Bakwa.[6]

Recent studies in antenatal clinics have found seroprevalences of antibodies to Treponema pallidum and to HIV ranging from 3% to 11% and 1.8% to 5%, respectively. The prevalence of hepatitis B surface antigen (HBsAg) was 4 - 6% and that of HCV 0.5 - 2%.[7-9] Among prison inmates in Ghana, the prevalence of antibodies to HIV and HCV was 19% for each infection, while prevalences of HBsAg and syphilis were 17% and 11%, respectively.[10]

Estimates of the prevalence of HBV co-infection among adults with HIV in South Africa range from 5% in urban cohorts to 20% in a cohort of goldminers from rural areas.[11] Data from Luanda, from a sentinel site in a surveillance programme, showed that 4.5% of pregnant women had antibodies to HIV, 8.1% to HBV and 5.4% to syphilis.[12] HIV prevalences in the remaining provinces, sentinel sites in the same study, were 3.2% in Benguela, 3.2% in Cabinda, 0.7% in Malanje, 1.5% in Lunda-Sul and 1.3% in Huila.[12]

In Angola there are approximately 166 000 people living with HIV, representing a prevalence of 1.98% among adults aged 15 - 49 years.[13]

The present study was undertaken to assess the prevalence of HIV, HBV, HCV and syphilis seropositivity in individuals attending a sexually transmitted disease clinic in Luanda, with the aim of evaluating the burden of these infections in the Angolan population.

Patients and methods

A total of 431 individuals attending a centre for anonymous testing for HIV, run by a non-governmental organisation, the Instituto Português de Medicina Preventiva, consented to be included in the study. All answered a questionnaire including socio-demographic characteristics and other factors that could be related to acquisition of HIV, HBV, HCV and syphilis, and had a physical examination.

Blood samples were collected from each individual and centrifuged, and the serum was kept at -20ºC until analysed locally for antibodies to T. pallidum (rapid plasma reagin (RPR) test) and HIV (Hexagon 3rd-generation and Determine tests). Results in every sample were confirmed in Lisbon, using RPR tests, T. pallidum haemagglutination assays (TPHAs) and Western blot tests for the detection of antibodies to T. palllidum and HIV.

HCV antibodies and HBsAg were determined with two enzyme-linked immunosorbent assays, the HCV-Ab DIA.ProDiagnostic Bioprobes for HCV and the DRG Hepatitis B Surface Antigen (DRG International) for HBsAg. The database was analysed with the SPSS program. The chi-square test was used for analysis of the differences between proportions, with a value of $p>0.05$ being considered significant.

Results

Of the study population, 60.7% (262/431) were females and 39.2% (169/431) males, and their ages ranged from 15 to 72 years (median 28 years). Factors that could have influenced acquisition of the infections studied are set out in Table 1.

Table 1. Selected characteristics of the study population

Variables	Women (*N*=262) *n* (%)	Men (*N*=169) *n* (%)	Total (*N*=431) *n* (%)
Sexual partners >1 (past 6 months)	6 (2.3)	48 (28.4)	54 (12.5)
Surgical operations	25 (9.5)	21 (12.4)	46 (10.7)
Tattoos	29 (11.1)	34 (20.1)	63 (14.6)
Blood transfusions	23 (8.7)	8 (4.7)	31 (7.1)

Of the subjects, 20/431 (4.6%) were found to have active syphilis (based on positive RPR and TPHA results); 23/431 (5.3%) only had a positive TPHA, probably representing treated syphilis. In total, around 10% had been in contact with T. pallidum at some point during their lives. Thirty-eight of the

431 subjects (8.8%) were positive for HIV-1 and/or HIV-2, and of these 78.9% (30/38) were infected with HIV-1 only, 2.6% (1/38) with HIV-2 and 18.4% (7/38) with both. A total of 40/431 patients (9.3%) were HBsAg-positive, while 35/431 (8.1%) had antibodies to HCV.

Of 102 individuals (23.6%) with positive results, 26 (25.5%, or 6.0% of the total number of patients) were positive for more than one of the organisms tested for, an indication of co-infection. The most common co-infection was HIV and HBV (10/431, or 2.3%), followed by HIV and HCV and HBV and HCV (both 4/431, or 0.9%). Three individuals with active syphilis had viral co-infection, HBV in 1 case and HIV in 2. Five individuals (1.2% of the total of 431) were seropositive for three infections, HIV, HBV and HCV in 3 cases and HIV, HCV and syphilis in 2.

Discussion

Our subjects were attending an anonymous HIV testing clinic, and it is likely that most had high-risk sexual behaviour. Nevertheless, the majority said that they had had only one sexual partner in the past 6 months. More men (28.4%) than women (2.3%) admitted to having multiple sexual partners.

The prevalences of antibodies or antigens related to the infections studied were found to be high, and similar to studies performed in other African countries.[14-16]

A total of 10% of our subjects were seroreactive to T. pallidum, with 4.6% having active syphilis. Moreover, 4.6% of the total of 262 women had active infection, which could be transmitted to the fetus if they became pregnant. In this study women had a higher burden of infections than men, although they admitted to fewer sexual partners than their male counterparts.

With regard to HIV infection, the prevalence of infection with HIV-2 was higher than expected (1.9%). Since HIV-2 infection cannot be treated with the less costly antiretroviral agents such as non-nucleosides, the relatively high number of affected patients adds to the difficulty and expense of treatment, especially in a country where antiretroviral therapy is not universally available owing to its high cost.

Nearly a quarter (23.6%) of this clinic population had reactive antibodies/antigens to at least one of the infections studied. Among the 6% who had more than one reactive test, the most frequent co-infection was HIV and HBV.

In conclusion, a high prevalence of the sexually transmitted infections studied was found in this clinic population. These results indicate a need to improve screening and treatment of HIV and STIs in Angola, and for health promotion campaigns aimed at reducing the morbidity and mortality associated with these diseases, and prevention of their transmission.

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