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Prevalence and Risk Factors of HIV Infection, Syphilis, Genital Chlamydia and Viral Hepatitis B and C in a Pregnant Women's Population of Southwest Madagascar

Summary

The epidemiology of HIV, Chlamydia trachomatis (Ct), syphilis and hepatitis B (HBV) and C viruses were investigated among pregnant women in the area of Tuléar, Madagascar, using a cross sectional methodology, during the summer 2000. Using blood biological markers, no case of HIV infection was detected, whereas syphilis was highly prevalent (8.2% of active syphilis) as well as antibodies against Ct and VHC and HBs Ag (respectively 25.8%, 3.3% and 11.5%). Risk profiles for presenting these markers are reported in this work. These results suggest that the fight against syphilis and HBV must be reinforced in emergency. We insist on the need to preserve such a situation for HIV, to avoid the dreadful spreading of the virus as observed in neighboring countries of Southern Africa.

Keywords: Madagascar; Epidemiology; HIV; Sexually transmitted infections; Viral hepatitis

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Resume

A cross-sectional survey investigated the epidemiology of HIV, Chlamydia trachomatis (Ct), syphilis, and hepatitis B (HBV) and C (HCV) viruses in pregnant women in the Tuléar region of Madagascar during In the summer of 2000. No cases of HIV marker seropositivity were detected, while those of syphilis were highly prevalent (8.2% active syphilis) as well as anti-Ct, anti-HCV and Than the HBsAg level of 25.8%, 3.3% and 11.5%, respectively. The risks of presenting these serological markers are reported in this document. These results suggest that the fight against syphilis and HBV should be strengthened urgently. They emphasize the need to provide the necessary resources to preserve this unexpected HIV situation, at the risk of the virus spreading and spreading in an explosive fashion, as was the case in most Neighboring countries of Southern Africa.

Introduction

Madagascar is one of the only countries in sub-Saharan Africa to be very unaffected by the HIV / AIDS pandemic (with a prevalence of 0.3% in the general population in 2000.[1]) On the other hand, other sexually transmitted infections (STIs) are widespread. Syphilis was found in 12.1% of a sample of pregnant women.[2], and 10.9% of a sample of women attending clinics dedicated to STIs in the capital had genital Chlamydia trachomatis.[3] The highlands and western parts of the country are said to be areas of high endemicity to hepatitis B virus (HBV), as prevalence rates of 5.3 to 30.5% of HBsAg have been reported in rural areas.[4-6] Finally, seroprevalence of hepatitis C (HCV) ranges from 1.2% to 3.3% for highland regions.[4,7], as no information concerning viral genotypes present in Madagascar is available day.

Few epidemiological findings are known concerning the southern province of the country which has nearly two million inhabitants and whose capital Tuléar is distant of nearly 1 000 km of Antananarivo. It is a "semi-urban" city of 100,000 to 150,000 inhabitants, with a very particular socio-cultural context, including extreme endemic poverty. The epidemiology of STIs and viral hepatitis is likely to be different from that found in the highlands and in the rest of the country. Our objective was to report the seroprevalence and risk factors associated with HIV, syphilis, Chlamydia trachomatis and Viral hepatitis B and C in a sample of pregnant women attending antenatal clinics in the urban and peri-urban area of Tuléar. These data, interpreted in parallel with a study investigating the level of knowledge and attitudes about HIV / AIDS and STI.[8], were intended to provide local health authorities with the information they need to monitor their regional programs of control Against HIV and STIs, complementing only the national data available so far.

Methodology

A cross-sectional survey was conducted in collaboration with public health authorities and clinicians in the city, using a participatory methodology. The recruitment of pregnant women was carried out during the months of July and August 2000 in 5 urban and peri-urban clinics of Tuléar offering prenatal consultations. The individual benefit for pregnant women was to be offered free biological tests and pre and post-test counseling sessions for STIs other than HIV infections. The screening was confidential, anonymous and uncorrelated with respect to HIV.[9] and was confidential, anonymous and correlated for other pathologies. Two verbal consents were required before take the biological samples and submit a standardized questionnaire, the

interviews being conducted with strict confidentiality. Two samples of 10 ml of venous blood have allowed biological analyzes: about HIV, two studies of HIV antibodies were performed on blood samples: IgG anti-HIV and p24 antigen were sought by VIDAS HIV-DUO BioMérieux, France), as well as IgG by GENSCREEN HIV1 / 2BIORAD, France). A third ELISA technique (ORTHO HIV1 / 2) ORTHO CLINICAL DIAGNOSTICS, USA) was used for dubious cases. For syphilis, a non-treponemal screening test was initially performed (Rapid Plasma Reagin -RPR-, BioMérieux, France). If this was positive, two more specific tests were performed: Treponema pallidum

Haemagglutination assay (TPHA, BioMérieux, France) and FTA IgM (IgM research by immunofluorescence, BioMérieux, France). Pregnant women with the pair of positive RPR and TPHA tests were classified as active syphilis. The anti-Chlamydia trachomatis IgG serology was assayed using an ELISA comb technique (Immunocomb Chlamydia Bivalent IgG(BioMérieux, France), and in the case of positivity, the AgHBe-AcHBe pair was analyzed by EBK®PBS Orgenics), allowing semi-quantitative IgG research against Chlamydia trachomatis The specificity of this test was improved by raising the detection threshold by one step (1 / 64th instead of 1 / 32th proposed by the manufacturer). In the case of hepatitis B, the HBs antigen was searched by Vidas HBsBayer Diagnostics, USA). The anti-HCV IgG assay was performed using the ORTHO HCV 3.0(DiaSorin, Italy) and the viral nucleic acid was searched with a detection threshold of 700,000 copies / ml (Quantiplex HBV DNA Assay-bDNA-(Ortho-Clinical-Diagnostics, USA), and strains were serotyped by Murex HCV serotyping 1-6 assay Abbott USA). Comparisons were made using a Chi Pearson or Fisher Chi test to compare categorical variables, and the Chi two trend test. The Student's T-test allowed comparison of the means, the Anova or Kruskal-Wallis test the variances. Confounding effects were detected in the case of a relative difference of more than 10% between the gross and adjusted ORs of Mantel Haenszel and the Breslow-Day test (critical value of p: 0.05) in a logistic regression model. Multivariate analysis was carried out by integrating variables and potentially relevant interaction variables into the model. These analyzes were carried out using the software EpiInfo (6.04d and 2000) and SPSS11.0. A quality management system was set up during this survey (training of staff, conducting interviews, conducting biological analyzes, managing statistical information). All the results obtained were presented to Malagasy partners as soon as available in 2001. This study, conducted under the authority of the Inter-Regional Health Development Directorate of the province of Tuléar, received ethical authorizations from the National Program for the Fight Against AIDS

Results

Socio-demographic characteristics396 pregnant women agreed to participate in the survey, out of 403 women contacted and the biological analyzes were carried out in 392 of them. The socio-demographic characteristics of these women are reported in Table 1: the mean age was 25.3 years. The majority lived in Tulear or its vicinity (258, or 85.7%), while 14.3% (43) lived in peri-urban areas (more than 5 km from the city center). Almost 3 out of 4 women (293 out of 388, or 75.5%) belonged to one of the 5 majority ethnic groups in southwestern Madagascar. The median age of first sexual intercourse was 16 years (min.10, max.27), and 1.92 the mean number of live children. 56.7% (220) of the women had never attended school or had a primary level, while 43.3% (168) had one or more elementary certificates. 62.7% (230) lived in a family earning less than the average Malagasy income (300,000 Malagasy francs or FMG, ie 50 €). Single and common-law women were significantly more likely to be below the average income threshold than married women (p <10-3). 5.3% (19 out of 360) said they had obtained money for sex in the past year. Concerning the condom 19.4% (76) had used it before a desired period of pregnancy. Of the 111 women who reported using contraception outside ofdesired pregnancy periods, only 5.4% (6) used condoms for this purpose.

Seroprevalences

The prevalences and their 95% confidence intervals are reported in Table 2. Of the 32 pregnant women who had a positive RPR and TPHA test, 17 (i.e. 53.1% of the 32) had anti-syphilitic IgMs detectable by immunofluorescence. Of the 45 pregnant women with HBs antigen, 4 had HBsAg (8.9%), 18 HBsAc (40%), and 9 (20%) were positive for viral DNA. HCV serotyping was obtained for 8 of 13 pregnant women with anti-HCV IgG. These are type 1 in 3 cases and type 2 for the other 5.

Risk factors

The results are reported in Tables 3 for syphilis, 4 for hepatitis B, 5 for hepatitis C and 6 for Chlamydia trachomatis. There was no association between the presence of HBsAg and HCV seropositivity (p = 0.38), presence of active syphilis (p = 0.86), or seropositivity to chlamydial IgG Trachomatis (p = 0.62). Women with active syphilis were more likely to have anti-Chlamydia trachomatis IgG (OR: 3.70, 95% CI:.[1].[77-7].[72], p <10-3).

Discussion

This study estimated seroprevalence and risk factors related to HIV, syphilis, Chlamydia trachomatis and viral hepatitis B and C in a sample of pregnant women attending antenatal clinics in the urban and periurban area of Tuléar. Comparison of the characteristics of this sample with national data.[10] suggests that pregnant women recruited in this study were generally more educated than women in the southern province and had a later age of sexual initiation. The results obtained should not be generalized to all women. Pregnant women in the province because only those who consulted urban and peri-urban clinics offering prenatal care could be included. Other limitations of this work come from the methodology used: in a cross-sectional study, the temporal relationship between exposure and disease can sometimes be difficult to define. The absence of probability sampling may also have biased the statistical results and the number of pregnant women recruited may appear limited in order to detect the role of certain risk factors.

HIV

No cases of seropositivity to anti-HIV antibodies and P24 antigen were detected in this study. This information is consistent with the classification of the HIV / AIDS epidemic in Madagascar as a low prevalence epidemic in the early 2000s. Insularity and sociopolitical isolation may explain this result. One could add the low population density, a rare injection drug use, and limited male homosexuality or the weakness of a road network. Other possibilities that have not yet been studied are the possibly attenuated virulence of the HIV strains present on the island, comparable to those found in Senegal.[11] or even a lower natural genetic susceptibility to infection.

Syphilis

The prevalence observed is consistent with previous findings, and confirmsthe threat posed by this infection to public health in

Madagascar. Celibacy and non-marital conjugal life would be risk factors independently related to active syphilis, while being of a South-West ethnic group and low educational level would represent risk- Expressing in univariate analyzes. Various studies carried out in Madagascar have already reported that syphilis is linked to low schooling.[3,12] The relationship suggesting that South West ethnic groups would be particularly at risk, coupled with the notion that celibacy and common-law unions would be more prevalent among women of one ethnic group, would allow for the assumption that Syphilis would be highly prevalent in this peri-urban area of the city of Tuléar, particularly among women from the Southwest. Moreover, the materno-fetal transmission of this infection probably contributes to the high rate of infant and juvenile mortality recorded in the province of Tuléar (160.3 ‰.[10]) at Chlamydia trachomatis (Ct)The data obtained indicate that at least 25% of pregnant women have contracted Ct in the past or suffer from active infection. Despite the existence of appropriate treatments available to developing countries, this bacterium remains the leading cause of conjunctivitis in infants worldwide and frequently causes ocular and respiratory complications in infected infants at birth.[13,14] In women, Ct frequently causes fertility and pregnancy disorders that are dramatic in these regions of the world.[15,16] The national tools for probabilistic diagnosis and treatment used in Tuléar were inadequate with international references.[17,18] as they recommended strategies that would not effectively treat ocular and pulmonary infections affecting infants and children. For pregnant women, most clinics participating in this study did not have the appropriate antibiotic. The search for risk factors associated with anti-Ct IgG seropositivity is a risk profile for urban, multiparous women who have received money for sex during the past year and who use condoms. It has already been observed that STIs are more frequent in the city than in rural areas.[19] Women from one of the ethnic groups in the southwest would be more at risk, which would require local preventive interventions. The condom was associated with a higher probability of presenting IgGs against Ct which seems paradoxical. This paradox is not uncommon and has already been reported in Madagascar: women who have had a first STI may be able to protect themselves more than women who have never had it.[20,3]

HBV

The prevalence of hepatitis B biomarkers confirms the idea that Madagascar is a hyper-endemic area for hepatitis B. The proportion of highly contagious women, namely HBsAg-positive and HBeAg-positive , Suggests that nearly one in ten pregnant women would be highly infectious for their child. Considering the viral nucleic acid search data, this proportion reaches 20%. This difference between these two viral replication biomarkers could be explained by the possible presence of mutant strains in the pre-core HBV gene in Madagascar. Considering that 90% of children born to mothers with viral genetic material in their blood would have been infected with hepatitis B.[21], and that almost all of them would have become chronic carriers of the virus, Between 1 and 2% of infants born to pregnant women studied would be carriers of HBsAg. These children are sources of contamination for those around them, and some of them will suffer from HBV-induced pathologies. The search for risk factors to present a positivity to HBsAg would reinforce the hypothesis that this virus would be more widely spread in rural than in urban areas in Madagascar.[5]. In contrast to the risk profiles usually observed for STI markers, an early age of sexual initiation would be protective of the presence of HBsAg. This can be interpreted because of the non-sexual transmission of HBV in early childhood, which would be the most common route of transmission of HBV in this region. It is confirmed by the cross-analyzes indicating the absence of significant relationships between the presence of HBsAg and other biomarkers, whereas there is a strongly significant relationship between active syphilis and seropositivity to chlamydia IgG Trachomatis.

HCV

This first information obtained would place the city of Tuléar in a zone of high HCV endemicity; Genotypes 1 and 2 would be the most represented, limiting the validity of this information to the fact that these data were obtained only on 8 viral strains. Only belonging to a non-majority ethnic group in the South-West would be independently linked to an anti-HCV IgG seropositivity. This information would need to be confirmed by also investigating other factors such as transfusion history or blood rites in populations more representative of the general population.

Conclusion

This work stresses that the fight against STI needs to be strengthened in the Tuléar region: in addition to cases of syphilis affecting adults, it is highly likely that many children will suffer or die as a result of this infection. This health emergency can be controlled because, in addition to the preventive tools, diagnostic and therapeutic means are readily available, even for developing countries such as Madagascar. Another health emergency would correspond to the high presence of the hepatitis B virus, and this would justify the introduction of vaccination against this virus in the context of the EPI. The HIV / AIDS pandemic appeared to be low in Madagascar in 2000, although in such an epidemiological situation, to obtain more relevant information, it is advisable to carry out these surveillance operations preferentially with groups at risk such as Prostitutes.[20] This study would reinforce the idea that many factors favoring the evolution of an HIV epidemicAccording to an explosive mode are assembled, in Madagascar in general, and in the region of Tulear in particular. The latest epidemiological data indicate that HIV prevalence will start to increase significantly recently in Madagascar.[22]

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