Short Communication

Seroprevalence of Syphilis and HIV-1 during Pregnancy in a Teaching Hospital in Northwest Ethiopia

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SUMMARY: Ethiopia is one of the countries in which sexually transmitted infections are highly prevalent. However, the data needed to present a realistic picture of the infections are lacking. This study was therefore designed to determine the seroprevalence of syphilis and HIV-1 among pregnant women at the University of Gondar Teaching Hospital. A prospective cross-sectional hospital-based study was conducted between March and June, 2005. Blood samples were collected from 480 pregnant women attending the antenatal clinic of the hospital. Sera were tested for syphilis using the Rapid Plasma Regain (RPR) and Treponema pallidum hemagglutination (TPHA) kits, and serostatus for HIV infection was checked using rapid HIV diagnostic test kits following the manufacturers’ instructions. The mean (±SD) age of the study participants was 26.1 (±7.2) years. The seroprevalence of syphilis was 1%. Antibodies against HIV-1 were detected in 9.6% of the pregnant women. A higher HIV-1 prevalence (13%) was observed in the 25- to 29-year-old age group followed by the 30- to 34-year-old age group (10.2%). Only one subject (2.2%) was found to be positive for both HIV-1 and syphilis. The data indicated a relatively declined prevalence of syphilis and HIV-1 among pregnant women in an urban antenatal clinic. However, incidence and behavioral studies are required to substantiate the findings.

Sexually transmitted infections (STIs) represent a major public health problem in developing countries, including Ethiopia. Millions of people, especially women, suffer from them. The impact of STIs is particularly severe for women of reproductive age, since such infections have few symptoms and may go untreated until serious problems develop (1). In sub-Saharan Africa, syphilis remains an important cause of morbidity. Its prevalence among pregnant women has been found to vary from 0.24% in Burkina Faso (2), to 3% in Kenya (3) and 12.8% in Tanzania (4).

A few previous studies have shown the prevalence of syphilis among pregnant women in Ethiopia, which was found to range from 2.2 to 27% in different parts of the county (5-8). In addition, Ethiopia, like most African countries, has been experiencing a severe HIV/AIDS epidemic with an estimated 1.5 million people living with HIV/AIDS (9). In addition, a survey involving antenatal care (ANC) attendees indicated a prevalence of HIV-1 from as low as 0.5% to as high as 30.2% in the country (10). Screening pregnant women for sexually transmitted diseases like syphilis and determining the seroprevalence of HIV-1 infection in this group could provide important clues to help control these diseases in the general population. Moreover, it could aid in evaluating the effectiveness of HIV-1 prevention and control programs.

This prospective cross-sectional hospital-based study was, therefore, conducted to determine the seroprevalence of syphilis and HIV-1 among pregnant women who visited the ANC clinic of the University of Gondar Teaching Hospital, Gondar, Ethiopia, from March to June, 2005. Ethical approval was obtained from the Research Ethics Committee of the University. The University of Gondar Teaching Hospital is a tertiary-level teaching and service-rendering hospital that provides health services to over 4 million people in Northwest Ethiopia.

The study subjects were pregnant women in the age range of 16-43 years who were seeking routine ANC in the study period. A total of 480 pregnant women who visited the ANC clinic during the study period were included. As part of the routine antenatal management of pregnant women in the ANC clinic, about 5 ml of venous blood was collected from each subject for syphilis screening and blood grouping during the subject’s first visit to the ANC. Sera were separated from the cells following standard procedures. The Rapid Plasma Reagin (RPR) slide agglutination test was employed according to the manufacturer’s instructions (Becton Dickinson Microbiology Systems, Cockeysville, Md., USA) to diagnose for syphilis. The specificity of the test ranges from 84 to 99% (11), and up to 16% of primary syphilis patients who were positive for RPR will have a negative Treponema pallidum hemagglutination (TPHA) result (12). Pregnant women who were found to be positive were managed according to the routine management protocol by clinicians after they were counseled. The leftover sera from all pregnant women were stored for further investigation at −20°C in the clinical bank of the laboratory. Unlinked anonymous testing was used to test the sera for the presence of HIV-1 antibodies using rapid HIV-1 diagnostic test kits with a sensitivity of 99.9% and a
specificity of 98% following the manufacturers’ instructions. The results were interpreted using the current national algorithm for the screening of sera for HIV-1 infection that was adopted from the World Health Organization (13). Data were entered and analyzed using SPSS version 10 statistical software. Pearson chi-square analysis was used to assess the correlation between age and HIV-1 or RPR positivity. Odds ratios (OR) and 95% confidence intervals (CI) were used to measure the strength of association, and P values less than 0.05 were considered significant.

A total of 480 pregnant women were included in the study. Their mean (±SD) age was 26.1 (±7.2) years, (range, 16 to 43 years). As indicated in Table 1, the majority of the pregnant women (146/480, 30.4%) belonged to the 25- to 29-year-old age group followed by the 20- to 24-year-old age group (133/480, 27.7%). Twenty (4.2%) of the pregnant women were more than 40 years of age, and 74 (15%) were below the age of 20 years. The seroprevalence of syphilis was 1% (5/480) among the pregnant women. There was no significant association between the age group of the women and the prevalence of syphilis ($\chi^2 = 4.807, DF = 5, P = 0.4$). However, the majority (4/5, 80%) of syphilitic cases were found in the age range of 20-30 years. Only one syphilitic case was found in a woman over 30 years of age.

As indicated in Table 2, the seroprevalence of HIV-1 among the study participants was 9.6% (46/480). A higher HIV-1 prevalence (13%) was observed in the age group from 25 to 29 years old. This was followed by prevalences of 10.3, 10.0, 9.0 and 6.8% in the age groups 30-34, >40, 20-24 and 15-19 years, respectively. There were two pregnant women who were positive for HIV-1 at the age of 18 years. However, no significant correlation was observed between the age of the women and positivity for HIV-1 ($\chi^2 = 4.975, DF = 5, P = 0.4$) (Table 2).

With regard to HIV-1 and syphilis co-infection, only one subject (2.2%) who was 41 years old was found to be positive for both HIV-1 and syphilis. On the other hand, 45 pregnant women (9.5%) who were negative for syphilis were found to be positive for HIV-1, and 4 women (0.8%) who were negative for HIV-1 were found to be positive for syphilis.

In comparison to previous reports of syphilis in pregnant women from Ethiopia and other African countries (3-7,10), the 1% seroprevalence of syphilis observed in the present study was the lowest rate aside from one report from Burkina Faso (0.24%) (2). A cross-sectional study conducted in Debretabor Hospital, Northwest Ethiopia, 10 years ago showed a 13.7% seroprevalence of syphilis among pregnant women (6). This shows that the seroprevalence of syphilis in the urban population in Ethiopia has been decreasing markedly in the last decade. This low seroprevalence of syphilis may be due to over-the-counter use of antibiotics for minor complaints and the easy availability of drugs in the locality (14).

The 9.6% seroprevalence of HIV-1 among pregnant women receiving antenatal services at the University of Gondar Teaching Hospital observed in the present study was lower than the recent figure reported for Gondar city (13.9%) in the year 2003 and several other cities in Ethiopia (10). The highest age-specific seroprevalence (12.2%) of HIV-1 among pregnant women was observed in the 25- to 34-year-old age group, followed by a 9.2% prevalence in the 15- to 24-year-old age group in this study. The latter age group is where sexual debut often occurs, and thus this prevalence is sometimes used as a proxy for recent infections. This figure is in agreement with the current national ANC-based age-specific HIV-1 prevalence (9). Also, there are encouraging signs of a declining trend in HIV-1 seroprevalence among pregnant women in Addis Ababa, where a decline from 21.2% in 1995 to 15.6% in 2001 was reported (15).

The decline in the seroprevalence of HIV-1 antibody observed in the present study may be associated with the expansion of intervention programs such as information education and communication, behavior change communication, condom promotion and distribution, voluntary HIV counseling and testing, the management of STIs, blood safety, universal precautions, and the prevention of mother-to-child transmission of HIV-1 in the area and in the country at large (10). Even though our study did not show a significant correlation between HIV-1 and syphilis co-infection, other studies have linked the presence of STIs to a higher risk of HIV-1 (16-18). However, our finding of a 2.2% seroreactivity for syphilis in pregnant women found to be positive for HIV-1 antibody compared to a 9.4% HIV-1 prevalence among pregnant women found to be negative for syphilis is inconsistent with another report using similar subjects elsewhere (9). However, it has been emphasized that an efficient STIs control program in countries like Ethiopia will have a good impact on the spread of infection, particularly HIV-1/AIDS (19).

In conclusion, this study showed that the prevalence of syphilis and HIV-1 among pregnant women attending the ANC clinic at University of Gondar Teaching Hospital had declined relative to the prevalence rates observed previously. This encouraging beginning should be further strengthened by studies targeting behavioral change and incidence. In addition, intensified prevention and intervention activities are of paramount importance in halting the spread of infection.

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