HUMAN IMMUNODEFICIENCY VIRUS (HIV) AND TREPONEMA PALLIDUM INFECTIONS IN MOTHERS AND THEIR BABIES AT DELIVERY IN JOS

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ABSTRACT

Two hundred serum samples were collected from mothers and babies at delivery and screened for both human immunodeficiency virus (HIV) and Treponema pallidum infections. The tests used are the Enzyme linked immunosorbent assay (ELISA) and Western blot (WB) for HiV and the rapid plasma reagin (RPR) and the Treponema pallidum haemagglutination (TPHA) test for T. pallidum. Of the 100 mothers screened 5 (5%) showed RPR positivity while 2 (2%) were TPHA positive. 2 (2%) of the babies were RPR seropositive but none was TPHA positive. Both of the RPR positive patients had no clinical signs and symptoms of the disease (syphilis). Five mothers were reacitve for HIV while four of the babies belonging to such mothers were also reactive. Using the WB technique, 4 mothers had confirmed infection while 2 babies out of the 4 belonging to the WB positive mothers were also WB positive. However, one of the babies died before confirmation was made.

The results emphasise the need for medical workers to be cautious when handling patients in our hospitals and clinics. It also shows the need to screen all women attending antenatal clinics. Finally, the results show the need to step up the campaign against HIV infection and other sexually transmitted diseases in Nigeria.

INTRODUCTION

Sexually transmitted diseases are the most international of all diseases affecting mankind, and in all countries, they are of major social and public health importance. During the recent past decades, there has been a worldwide increase in the incidence of these diseases especially gonorrhoea and now AIDS [1,2]. In the developing countries, it has been shown that there is a higher incidence of STD's, perhaps one reason for this higher incidence of STD's in the developing countries is lack of available funds for research and of trained personnel.

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There are at present no reliable statistics on the true prevalence of STDS in the developing countries of tropical Africa. In developed countries where reliable statistics are available, STDs Constitute a major social and medical problem. This was particularly so in the case of gonorrhoea, syphilis and now AIDS and HIV infection. The same pattern can therefore be predicted for developing countries where facilities for correct diagnosis and treatment for these diseases are unfortunately inadequate. The general impression is that, the STDs have reached endemic proportions in urban areas of many countries of tropical Africa with increasing spread to rural areas [3,4,5].

HIV and human papillomavirus infections and other newly identified STDs are already attracting much attention but there is also the added need to be vigilant to the serious sequelae of syphilis and other traditional venereal diseases especially in areas they have not been effectively policed. While a lot of research has been done on the prevalence of HIV infection and syphilis world-wide, little has been done on HIV and syphilis in mothers and their babies with a view to ascertaining the rate of vertical transmission especially in Africa and most especially Nigeria.

MATERIALS AND METHODS

Selection of Subjects:

The subjects used in this study include one hundred randomly selected mothers that came for delivery at the labour ward of the Jos University Teaching Hospital (JUTH) between May and September, 1992. Also included are one hundred babies delivered to such mothers. Most patients (95/100) had a normal vaginal delivery with a few (5/100) undergoing caesarean section.

Sample Collections:

5ml of blood was collected from mothers and their babies. The mothers' blood was obtained by venepuncture while cord blood was used for the babies. All samples so collected were allowed to clot naturally and were then centrifuged at 3,000 rpm for 5 minutes to separate the serum which was used for the tests. All such sera were stored at -20°C until the time they were used.

LABORATORY ANALYSIS

i. **Screening Test for Syphilis:**
The rapid plasma reagin (RPR) card test was used to detect the presence of both antitreponemal and anticardiolipin antibodies according to the method of March and stiles, 1980 (6).

ii. **Confirmatory Test for Syphilis:**
All samples that were positive using the RPR test as above were further tested using the Treponema haemagglutination assay (TPHA) as described by Garmer et at, 1972 (7). This test is specific for syphilis unlike the RPR test. A major demerit of the test however remains that it detects both past and current infection without distinction. Therefore for current infection there has to be the clinical signs and symptoms of the disease especially in the baby or the detection of immunoglobulin M (IGM) antibodies to T. pallidum. All samples of patients that gave positive TPHA result coupled with clinical signs and symptoms of syphilis, were followed up for 12 - 14 months. All babies who tested positive after the follow-up period, were diagnosed as having acquired the infection from the mother.

iii. **Screening Test for HIV**
The Enzyme linked immunosorbent assay (ELISA) technique, using wellcozyme HIV recombinant EIA (Wellcome Diagnostics, Dartford, UK) Kit, was used to screen for the presence or absence of antibodies to HIV.

iv **Confirmatory Test for HIV**
All samples that were reactive using ELISA were further tested using the Western Blot technique (Dupont de remours, USA). All babies whose mothers were confirmed positive were followed up for 12 - 14 months from delivery and retested for HIV. A positive WB as recorded in this study was defined by the presence of at least one band reactive to a core protein (p17, p24, p55) plus one reactive to an envelope protein (gp41, gp120, gp160) of HIV-1. All sera including those that showed unusual immunoblot patterns not consistent with the accepted criteria for HIV-1 were further tested for HIV2 using LABVLOT - II kits (Diagnostic pasteur, France). A sample was considered positive for HIV - 2 if it showed at least two envelope glycoproteins (gp105, gp36) with or without any other band.

v. **Counselling of Patients**
All patients that gave a positive reaction were counselled by a team of medical doctors and nurses as regards the infection they have and its consequences.

RESULTS

Results of Syphilis Screening and Confirmation

Of the total number screened, 5 (5%) of the mothers samples were reactive using the RPR card test. 2 (2%) out of the 5 RPR positive samples gave a positive result with the TPHA test. No woman however showed any clinical signs and symptoms of the disease.

On screening the 5 babies serum samples belonging to the mothers whose blood also tested positive with the RPR test, 2 (2%) were reactive with the RPR test while none was positive using the TPHA test after the 12 - 14 months. One was however positive at birth using the TPHA. There were no clinical signs and symptoms of the disease. No baby tested positive whose mother was reactive for both RPR & TPHA test. The result is shown in Table I.

Results of HIV Screening and Confirmation

Of the total number of samples screened, 5 (5%) of the mothers samples were reactive for HIV. On screening the 5 babies serum samples belonging to the mothers whose samples also tested positive with the ELISA test, 4 (4%) were reactive.

Using the Western Blot technique, 4 (4%) of mothers were found positive (3 HIV-1 and 1HIV-2) while 2 out of the 4 (50%) babies that were reactive with ELISA were positive with WB. One baby died before the age of 6 months thereby making confirmation after the 12 - 14 months impossible.
The results are shown in table II.
From this study no woman had both HIV and syphilis infections.

TABLE I
RESULTS OF SYPHILIS SCREENING AND CONFIRMATION

S/No	RESEARCH CODE	Mother RPR	Mother TPHA	Baby RPR	Baby TPHA at birth	Baby TPHA after 12-14 months
1.	009	+	+	+	-	-
2.	010	+	+	+	+	-
3.	034	+	-	-	-	-
4.	080	+	-	-	-	-
5.	088	+	-	-	-	-

TABLE II
RESULTS OF HIV SCREENING AND CONFIRMATION

S/NO	RESEARCH CODE	Mother ELISA	Mother WB	Baby ELISA	Baby WB at birth	Baby WB after 12-14 months
1.	047	Reactive	+	Reactive	ND	+
2.	077	"	+	"	"	died
3.	079	"	-	"	"	-
4.	084	"	+	"	"	+
5.	085	"	+	"	"	-

ND = DONE

DISCUSSION

Serological testing showed that 5% of mothers screened showed RPR positivity while 2% had confirmed infection though all cases were devoid of clinical signs and symptoms. This result is in agreement with reports in the Literature that showed a prevalence rate of between 5-15% in pregnant women in several African countries between 1970-1985 (8). The confirmed cases could be cases of previous but treated infection since the confirmatory test used is capable of detecting both current and old infections. It could also be that the infection is in the latent phase which is most often than not devoid of clinical signs and symptoms (3).

Though none of the patients screened showed any sign of active syphilic disease, it is distressing to note that cases of active syphilis exist. This becomes particularly disturbing considering the fact that the magic year 2000 AD (when Health for all has been guaranteed) is less than half a decade away from now.

From the babies, the fact that some were seropositive at birth exposes them to the risk of developing congenital syphilis as explained by Hira et al, 1982 (9). It would be valid to relate these findings among post natal women to the general population.

It is appreciated that in Nigeria as in other tropical African countries, interpretation of serological tests for syphilis is difficult. The situation is compounded by the existence of conditions which give a biological false positive reactions such as malaria, pregnancy, bacterial, viral and parasitic infections, collagen diseases and vaccination procedures, (10). It becomes easy therefore, to say that false positive reactions in the category of patients used for this study, (antenatal women) should be a common phenomenon.

Another important factor which affects seroreactivity is the widespread and indiscriminate use of antibiotics in this country. The antibiotics frequently taken for the prophylaxis and treatment of urethritis and other infections, abort syphilis in the incubation period and prevent antibody production leading to a weak sero-reactivity (10).

Reports in the literature indicate that a baby born to a syphilitic mother has a 33% chance of acquiring the infection (8). This study could not record any case of congenitally acquired infection. This could be as a result of improved antenatal care in the hospital and also possibly as a result of higher level of awareness in the group studied. The fact that the Venereal Disease Research Laboratory (VDRL) screening test is done routinely in the hospital for this group of patients supports the former possibility.

Sero-reactivity using ELISA for HIV in this study was 5% with 4% confirmed cases among the mothers. There was also a 4% prevalence rate among the babies using the ELISA technique and a 50% (2 out of 4 cases) confirmed infection rate using Western blot in relation to the mothers.

The results of the mothers are consistent with the prevalence rate of patients screened routinely in the same hospital (JUTH) which has a prevalence rate of about 6% of confirmed cases (11). The lower prevalence rate 4% recorded for this study when compared to 6% for the hospital is statistically insignificant.

Also, in this study, there was a 5% sero-reactivity in the babies after 12-14 months from the time of delivery. This result compares well with 2 studies conducted by the World Health Organization (W.H.O). In a 15 month follow-up study of 100 infants born to HIV infected mothers in six (6) European countries, 25% were found to be HIV infected. This compares with a 25 - 50% infection rate for a similar number of infants born to HIV infected mothers and periodically checked for 12 months after birth at 2 different centres in Kinshasha, Zaire, (5).

Most mothers in the European study had history of injecting drug use, and for two thirds of the women it was their first child. Only 5% of these mothers however had AIDS of ARC before delivery. In the Kinshasha study, 29% of the HIV infected mothers had AIDS and for most of the women, this pregnancy was their second or third, (5). In the present study, however it was a group comprising of women in both categories. Most of the women that had confirmed HIV infection were patients that had already been confirmed positive by the hospital through the routine screening exercise. It is however necessary to point out the fact that a woman that had declined being tested for HIV was found to be positive in this study.

It has been reported that a pregnant woman infected with HIV has an approximately 30% chance of passing the virus to her foetus or new born baby. Little is known about the precise mechanism or timing of transmission. There is evidence that infection can occur as early as the first 12-15 weeks of gesttion, but what proportion of foetuses are infected this early and what proportion become infected in utero or during the birth process is unknown.

The W.H.O. reports that women that become infected with HIV after giving birth and whose infants subsequently become infected show that the virus can be transmitted through breast feeding. Such reports have been rare however. The risk from breast feeding for a child born to a seropositive mother appears to be comparatively low and should be weighed against the benefits that breast feeding offer. That being so, it could be said that it is possible that the babies that were infected in this study got a reinforcement of the antigen during breast feeding. This situation is compounded in Africa and Nigeria in particular by the long breast feeding periods. It is also possible that infection in the babies could result from immunization processes as is obtainable under the Expanded Programme on Immunization (EPI) or even injections in hospitals (12). An important factor to consider is that such babies were seropositive at birth.

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