

Sero-prevalence of Hepatitis B virus among middle to high socio-economic antenatal population in Sierra Leone

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Summary

This study was designed in order to find out the prevalence of HBV markers amongst pregnant women of middle and high socio-economic class in Sierra Leone. The aim was to determine the necessity and likely benefits of a scheme aimed at the vaccination of children of seropositive mothers who can afford the cost until mass immunisation is possible.

A total of 302 women were studied. The seroprevalence rate formed in this study population was 6.2%. The proposed intervention would markedly reduce the HBV status in Sierra Leone, taking into account the high prevalent rate amongst this group. The low anti-HBs found in this population was surprisingly (5.1%); considering the high degree of antigenemia, this should be a subject for future research.

Keywords: *Hepatitis B virus, Sero-prevalence, Sierra Leone, Socio-economic.*

Résumé

Cette étude a été faite pour la recherche d'une prédominance de HVB sur les femmes enceintes d'un niveau moyen socio-économique à un niveau supérieur en Sierra Leone.

Le but a été de déterminer le nécessité et les avantages d'un plan destiné à vacciner les enfants de ces mères ainsi infectées et qui ont les moyens de payer jusqu'à ce qu'il sera possible une immunisation de masse.

Le nombre de femmes considérées a compté 302. Le taux de cette prédominance sérique était notamment 6.2%. La mesure proposée ci-dessus réduira considérablement cette situation en Sierra Leone à l'égard de taux de fréquence dans ces groupes. Le taux bas des anti-HB trouvé parmi ces gens était étrangement 5.1% en tenant compte du pourcentage élevé d'antigènes, ce qui fera un projet de recherche à l'avenir.

Introduction

Hepatitis B virus (HBV) infection has been recognised by WHO as a serious public health problem. It is estimated to cause about two million deaths yearly worldwide. Around 10% of infected individual become chronic carriers and this occurs mainly in Africa and Asia. Primary Liver Cell carcinoma (PLCC) is one of the most important sequelae attributed to chronicity. The development of PLCC is preceded by the integration of HBV DNA into the hepatocyte DNA by months or years.^{1,2}

Factors responsible for the high burden of HBV infection in Africa include: Bloodletting procedures such as tribal marks, tattoo marks, ear piercing, and circumcision by traditional surgeons with unsterilised sharps. Vertical transmission from infected mothers to their children, prenatal or postnatal, child to child transmissions are also very important modes of

transmission especially with the close body contacts and interaction in sub-Saharan communities. Blood transfusion is also an important route of HBV acquisition since most units transfused are not tested due to lack of facilities and limited resources. Figures for blood donors in the capital are alarming, in 1996/98, the prevalence for those tested was 15.5% (n = 2593) (Blood Bank, Ministry of Health, personal communication).

Recent studies have documented a high seroprevalence for HBV amongst different population groups in Sierra Leone.^{3,4,5} In a study done to find out the seroprevalence of HBV amongst rural and peri urban pregnant women 11.2% tested positive for HBsAg.⁵

HBV vaccination is not included in the EPI programme in Sierra Leone and there is no plan for its inclusion in the near future. Despite being in the endemic zone, screening of pregnant women for HBV is not included in the routine antenatal check nationally except through private medical care. However, it may be an important starting point if HBV screening is offered to pregnant women who can afford to pay for the cost. The infants of HBV positive mothers could be targeted for vaccination at delivery thereby greatly reducing the possibility of infection.

This study was thus designed to find out the prevalence of markers of HBV infection (HbsAg and antiHBs) amongst Sierra Leonean pregnant women of the middle and high socio-economic class, the most likely beneficiaries of the proposed facility.

Materials and methods

The study population comprised of pregnant women attending antenatal clinics of obstetricians in private practice in the capital city. The majority of the participants had secondary or post secondary school educational backgrounds and could afford to pay for the laboratory investigations.

These women can be classified as being within the middle and high socio-economic class. The age of the participants ranged from 16 - 40 years (mean 28 years). Primigravida accounted for 46% of the study population and only 6.2% have had 3 or more children.

HBV serology

302 pregnant women provided venous blood sample during their first antenatal check. The serum was separated and stored at -20°C until analysis. These samples were tested in batches of 8 including controls for HbsAg by R-PHA using the Serodia HBs kit (Fujirebio Inc., Tokyo, Japan).

The presence of HbsAg was confirmed by two independent methodologies. One was the use of the ICT hepatitis B surface antigen test card (ICT Diagnostic, Brockville, Australia). The test principle is based on the

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formation of HbsAg complexes with gold-labelled monoclonal antibodies impregnated on the test pads. The second tests utilised the passive agglutination technique on HBV antibodies coated latex particles (Spinreact S. A., Spain).

Detection of anti HBs in the sera was done using the Serodia R-PHA technique in which sensitised red cells are agglutinated especially in the presence of anti HBs in the serum.

Result

The results obtained from this study are displayed in Table 1, of the 177 pregnant women screened 6.8% (12) were positive for HbsAg and 5.1% (9) positive for anti-HBs. None of the samples were reactive for both HbsAg and antiHBs.

Table 1 Prevalence of hepatitis B markers amongst Sierra Leone pregnant women of middle and high socio-economic status

| Total Number Screened | HbsAg Positive | % | Anti HBs | % | HbsAg and AntiHBs | % |
|-----------------------|----------------|-----|----------|-----|-------------------|---|
| 302 | 19 | 6.3 | 15 | 5.0 | 0 | 0 |

Table 2 Hepatitis B markers in peri-urban and rural Sierra Leone pregnant women⁵

| Total Number Screened | No positive HBsAg | % | No positive for both HBs and HBeAg | % | No positive HbsAg and Anti HBe | % |
|-----------------------|-------------------|------|------------------------------------|-----|--------------------------------|-----|
| 179 | 20 | 11.2 | 7 | 3.9 | 11 | 6.1 |

Therefore a total of 11.9% (21) have been exposed to HBV infection.

Discussion

In this study, we found a prevalence rate of 6.2% for HbsAg amongst pregnant women of middle and high socio-economic status in Sierra Leone. This figure confirms the high endemicity of HBV in Sierra Leone documented from previous studies^{3,4,5} and compares favourably with the high prevalence rate in the antenatal population of other West African Countries.^{6,7,8}

Comparing the prevalence rate of HbsAg of this study (6.2%) to that of pregnant women from the rural and peri urban areas in a previous study⁵ (11.2%) (Table 2) there is an indication that there could be an association. However this high proportional difference is not statistically significant ($p = 0.21$) and could best be described as a weak association. Nonetheless these figures indicate a trend and the reason for this pattern is unclear. However, environmental and cultural factors rather than genetic may be responsible since the ethnic backgrounds of both study groups are similar.

In Sierra Leone, blood-letting procedures such as scarification marks, circumcision, tattooing, ear piercing and tribal marks though practiced in both rural and urban areas, the use of unsterilised implements is much more commonly done in rural areas. This may be a major contributory factor in causing this significant difference of HbsAg seroprevalence between the two populations.

In rural areas blood is hardly screened for HbsAg whilst

a high proportion of blood now transfused in urban areas is screened. Furthermore, the use of unsterilised needles for injections may also partly account for the higher prevalence rate of HbsAg in the rural and peri urban areas. These communities usually prefer injectable form of medication for treatment.

Another factor that also should be considered, is the modernisation in the urban areas, which limits body contacts through households, preventive awareness and better health facilities.

The implications of these results to the spread of HIV infection and other borne pathogens should warrant attention. HIV and to some extent HBV are sexually transmitted. The rebel war in Sierra Leone that started in 1991 has caused an increase in not only promiscuity but also forced sex. The war is now practically over and it may serve useful purpose if a survey is conducted to find out the prevalence of HIV and HBV amongst the rural population with emphasis on those who were behind rebel lines and in refuge camps both in Sierra Leone and neighbouring countries.

We also suggest an intensification of the public awareness campaign to help reduce the spreading of these deadly disease via these routes; secondly a deliberate policy should also be instituted to ensure that all units of blood for transfusion are screened for pathogens.

The prevalence rate of anti-HBs in this study is 5.0%. Both antiHBs and antiHBe are markers of past infection and non-infectivity. The prevalence rate of antiHBs obtained in this study is low compared with other studies which have reported a prevalence rate of over 70% in highly endemic areas.^{4,9} The reason for this marked difference is not known and needs to be revisited. The prevalence of HbeAg was not done as part of this study but it would be reasonable however to assume that a good number of the pregnant women with HbsAg positively would be potentially infectious taking into cognisance the over 10% "high risk" cases in the rural and peri urban population.⁵

Immunisation for HBV is not done routinely in this country. In view of the high endemicity and the potential of vertical transmission, screening of middle and high class Sierra Leonean pregnant women who can afford the cost of laboratory analysis and HB vaccination for their babies should be undertaken. This venture should prove worthwhile in reducing the high prevalence of HBV in Sierra Leone until mass immunisation of children is feasible.

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