Hepatitis B Virus Vaccine: The Nigerian Story

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ABSTRaCT

Hepatitis B (HBV) virus in endemic in Nigeria. Infection is acquired mainly in childhood through horizontal transmission. The infection is preventable by vaccination. Universal childhood vaccination against the infection started in Nigeria less than ten years. Hepatitis B vaccine coverage in Nigeria is 41%, though now it has increased over the last few years. An example of community based privately financed vaccination project is given where HBV coverage rate is 58% and the vaccine efficacy against infection is 80%.

INTRODUCTION

Hepatitis B virus (HBV) infection is a major public health problem globally. There are over 400 million carriers worldwide.[1] Man is the reservoir of infection. The infection is transmitted sexually, through blood and body secretions, through the use of infected needles and by materno-fetal routes. Infection in children leads to chronicity while the reverse is true in adults. Chronic HBV infection leads to complications such as liver cirrhosis, hepatic failure and primary liver cancer. [2,3].

HEPATITIS B IN NIGERIA

Hepatitis B infection is hyper-endemic in Nigeria. The carriage rates vary widely between 4-38% [4-9]depding on the population studied but the average is about 10%.[4] In Maiduguri, Borno State, amongst patients suffering from liver disease, the surface antigen (HBsAg) rate was 38%.[3] In Jos, Plateau State, the carriage rate was 10% with the highest rates recorded in traders and students. [4]Amonsgt blood donors, patients with sexually transmitted infections and pregnant women in Ilorin, Kwara State, the sero-prevalence rates were 22%, 36% and 16% respectively. [5] A study amongst children in Jos, Plateau State, showed HBsAg rates of 23% in patients with sickle cell anaemia and 20% amongst controls. The study did not find any association between known risk factors such as blood transfusion, parental injections and HBV infection. [6] In Sabongida-Ora, Edo State, the carriage rate was 5% in unvaccinated children. [7] In Nnewi, Anambra State, the carriage rate was 8% and in conformity with study from Jos, [6] the study did not find any significant association with the known risk factors for HBV infection. [8] Amongst medical students in Lagos, the carriage rates was 3% and 72% were susceptible to the infection. [9]

These studies show that Nigerian children are exposed to large pool of carriers and are therefore at "risk". The maternal sero-prevalence reported in one study was 2% with neonatal sero-prevalence of 1% and a vertical transmission rate of 43%. Thus two out of every five women may pass the infection to their children. The women in this study did not have a history of blood transfusion, intravenous drug use or HBV vaccination. [10] Another study amongst pregnant women revealed a carriage rate of 4%.[11] Thus it is clear that by both vertical and horizontal routes, Nigerian children are at "risk" although the horizontal route seems to be more important.

HEPATITIS B VACCINE IN NIGERIA

Hepatitis B is preventable through vaccination. Plasma derived and genetically engineered vaccines are available and immunogenic. The vaccine efficacy of the genetically engineered vaccine is 95% .[12] The World Health Organization since 1997 has recommended that HBV vaccine be incorporated into National Immunization Programmes of all countries irrespective of carriage rates in order to reduce the disease burden and complications.[13] Various studies have documented the successful integration of HBV vaccine into EPI.[14, 15] The vaccine is given intra muscularly, at a dose of 0.5 mg and three doses are required for complete protection. Much earlier, a study conducted in Nigeria confirmed the immunogenicity of HBV vaccine.[16] However, probably due to the cost of the vaccine; it was included in the National Programme of Immunization (NPI) until 1993. The schedule at that time was a dose at birth, second dose at six weeks and the third dose at months. The vaccine was not available on a nation-wide basis until after another 10 years due to the same reason although some pockets of groups were vaccinated in a haphazard manner. Vaccination against HBV was commenced in Nigeria around 2003 and has now been successfully integrated into the NPI. The schedule is now modified; the first dose is given at birth, the second dose at six weeks and the third dose at 14 weeks. This is a faster completion schedule and is likely to result in a higher coverage as many children do not receive measles vaccine at nine months of age. The genetically engineered vaccine is currently used in Nigeria, both the single dose and multi-dose presentations are

being used. The multi-dose presentation requires pooling of children for vaccination unlike the single dose presentation. Combined diphtheria, pertussis and tetanus (DPT)-HBV vaccine is not used in the Nigerian NPI. The combined vaccine offers the advantage of the child receiving fewer injections than if separate DPT and HBV vaccines were to be given. However, the combined vaccines are more costly than the separate costs of the individual vaccines and cannot be given earlier than six weeks of life. This is the more important reason for their non-use in Nigeria as the dose at birth must be given in Nigeria. The WHO estimates for HBV third dose for Nigeria in 2005 was 41% indicating a less than optimal uptake. [17] The pharmaceutical sector has played a major role in advocating the use of HBV vaccine in Nigeria. An example of such a project is discussed below.

In 1998, a pharmaceutical company (GlaxoSmithKline) commenced vaccination services at no cost to Sabongida-Ora, Owan West Local Government Area, Edo State.[18] The author had the privileged of establishing the project. It was established as a philanthropic gesture by the organization to meet the dwindling vaccine coverage in Nigeria at that time. [19] The Programme provided the host communities all the NPI vaccines including HBV and used the combined vaccine in addition to a single HB dose at birth. The programmed achieved a significant increase in complete vaccination coverage from 43%[20] at inception to 78% and HBV coverage stood at 58% from within two year of operations.[18] In addition, another study of the project showed a significantly lower carriage rate in vaccinated children (1%) compared with unvaccinated (5%), with a vaccine efficacy of 80%.[7] Thus there is evidence that in this community that the use of HB vaccine is likely to lead to a reduction in carriage rate and reduced likelihood of complications of the infections. Further work has been ongoing in this community to determine the long-term efficacy of HBV vaccine.

Aggressive health education by health workers and continuing government commitment and funding are crucial to sustaining and increasing universal childhood HBV immunization in Nigeria. This is important if morbidity and mortality from HBV is to be reduced. Besides, the country has to plan for "catch up" vaccination for children who have not benefited from the scaling up of HBV vaccination in Nigeria.

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