HEPATITIS B VIRUS VERTICAL TRANSMISSION IN BOOKED PREGNANT WOMEN IN ABUJA, NIGERIA

Idris A[1], Isah AY[2], Ekele BA[2], Onafowokan O[2], Thairu Y[3]

[1]Department of Obstetrics & Gynaecology, Federal medical center, Keffi, Nasarawa state, Nigeria; [2] Departments of Obstetrics & Gynaecology, University of Abuja Teaching Hospital, Abuja, Nigeria. [3] Departments of Medical Microbiology, University of Abuja Teaching Hospital, Abuja, Nigeria

Abstract

Background: Perinatal (vertical) transmission has remained the most important route of spread of Hepatitis B Virus in many endemic areas worldwide. Determining magnitude of vertical transmission to the new born fetuses may allow for planning and modification of strategies to curtail the menace

Objectives: To determine the prevalence of vertical transmission and Sero-prevalence of Hepatitis B virus infection rate in pregnant women in Abuja, Nigeria.

Materials and Methods: This was a longitudinal, cohort study involving one hundred and five (105) pregnant women that were serially recruited between January 2nd and March 31st, 2013 and tested for serum Hepatitis B surface antigen (HBsAg) using commercial rapid diagnostic Elisa kits. Those women that were positive for HBsAg were tested for envelope antigen (HBeAg) variant. Recruited patients were followed up till delivery. The data was analyzed using statistical package for social sciences (SPSS) version 17. P-value of < 0.05 was considered as statistically significant. The results were presented as Simple per cents and chi square was employed to test for the significance.

***Results*:** There were 8 pregnant women that were positive for HBsAg among 105 consecutive women, giving a prevalence rate of 7.6%. There was no in-utero (vertical) transmission recorded in the study population.

***Conclusion*:** The prevalence of HBsAg is relatively high but with zero pre-natal vertical transmission. Proper precautionary measures at delivery are however advocated to keep the vertical transmission at its lowest bearable status.

Keywords: *Hepatitis B surface antigen, Prevalence, Pregnancy, Vertical transmission*

Introduction

Infection with Hepatitis B virus remains a public health challenge worldwide, and a major cause of chronic Hepatitis, liver cirrhosis, and hepatocellular carcinoma[1-5]. Transmission of Hepatitis B virus from carrier mothers to their babies can occur during the prenatal period, and is reported to be the most important factor in determining the prevalence of infection in high endemic city areas, particularly in Sub-Saharan Africa, and Asia[4, 5]. Before Hepatitis B virus vaccine was integrated into the routine immunization programs in some countries, the proportion of babies that became Hepatitis B virus carrier was about 10-30% for mothers who were HBsAg positive[6]. However, the frequency of perinatal infection becomes higher, between 70-90%, when the mother also had co-infection with HBeAg[6, 7]. There are known important routes of transmission of Hepatitis B virus from infected mothers to infants including antepartum transmission, in-utero, intrapartum, and postpartum transmission through breast milk during breast feeding[7]. In endemic areas, most individuals are infected by vertical transmission[7]. Hepatitis B virus infection in pregnancy is associated with a high risk of maternal complications, high rate of vertical transmission, causing neonatal hepatitis, and has been reported as a leading cause of neonatal morbidity and mortality[7]. Epidemiological data on Hepatitis B virus infection are important to program managers and health policy designers to plan vaccination and other preventive measures or strategies[8]. It is therefore important to ascertain data on Hepatitis B virus infection in pregnancy and note the rate of in-utero transmission of the infection to new born babies to aid planning and evaluation of the preventive strategies9. This study investigated the Sero-prevalence of Hepatitis B surface antigen (HBsAg) among pregnant women, and to document the in-utero infectivity status among the new born.

Corresponding author: Isah AY,
Departments of Obstetrics & Gynaecology, University of Abuja Teaching Hospital, Abuja, Nigeria
Tel: +2348035047547
E-mail: aliyuisah69@gmail.com
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Materials and Methods

This was a longitudinal, cohort study involving one hundred and five (105) pregnant womenthat were serially recruited between January 2nd and March 31st, 2013 and tested for serum Hepatitis B surface antigen (HBsAg) using commercial rapid diagnostic (enzyme linked immune-sorbent assay) Elisa kits. Those women that were positive for HBsAg were further tested for envelope antigen (HBeAg) as evidence has shown that co-infection with the later variant confers higher risk of vertical transmission. Recruited patients were followed up till delivery where the cord blood sample was obtained and tested for both Hepatitis B surface antigen (HBsAg) and Hepatitis B envelope antigen (HBeAg). All eligible participants were counseled for Hepatitis B

virus testing using opt-out methods in groups at recruitment while the post-testing counseling was conducted on an individual basis. Inclusion criterion was all eligible pregnant women who gave their consent during the study period until the required sample size was met. Those women who were not infected with Hepatitis virus as well as those that were Hepatitis B virus positive but declined or withheld consent were excluded. Pregnant women who were Human Immunodeficiency Virus (HIV) positive and those with co-existing medical disorders, such as Diabetes mellitus, chronic hypertension, chronic renal disease,

Haemoglobinopathies, acute hepatitis, acute or chronic symptomatic liver disease were also excluded. The study was conducted at the antenatal clinic of the Department of Obstetrics and Gynaecology, University of Abuja Teaching Hospital, Abuja, Nigeria. The hospital is the only teaching tertiary

Health institution located in the Nigerian capital city, Abuja serving about projected one million population. The data was analyzed using statistical package for social sciences (SPSS) version 17. P-value of < 0.05 was considered as statistically significant at 95% confidence level. Simple per cents were used to compare categorical variable and chi square was used to determine significant association.

Results

There were 8 pregnant women who tested positive for the HBsAg among 105 women recruited for the study, giving the prevalence of 7.6%. All the Sero-positive women however, tested negative for the Envelope (HBeAg) antigen. The age and parity distribution of the study population is shown in Table 1.

Table I: Age and Parity distribution

Variable	No	%
Age		
19 – 24	26	24.7
25 – 29	27	25.7
30 – 34	30	28.6
35 – 39	15	14.3
40 – 44	7	6.7
Total	105	100.0
Parity		
1	35	33.3
2 – 4	15	14.3
≥ 5	55	52.4
Total	**105**	**100.0**

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Majority (54.3%) of the study population were between 25 and 34 years with only 6.7% age 40 years and above. Over 52% of the whole study groups were grand-multiparous. Table 2 describes the percentage Sero-prevalence of HBsAg among the study group. Only 8 of the 105 were positive for HBV and none had HBeAg. Co-infection with HBeAg is said to facilitate vertical transmission. The comparative analysis of demographic and pregnancy outcome variables between Sero-positive and Sero-negative women is shown in

Table 2: Sero positivity status of the patients

Status	No	%
Sero-Positive	8	7.6
Sero-Negative	97	92.4
Total	**105**	**100.0**

The Sero-prevalence rate was 7.6%.

Table 3. The study demonstrated no statistical significant relationship between educational status and parity with HBsAg Sero-positivity. There was no vertical transmission among neonates for HBsAg using Elisa method, giving Zero in-utero vertical transmission rate. This suggests that as at the time of birth, the neonates were Sere-negative for both HBsAg and HBeAg. Whether they may acquire the particles during breast feeding is a subject of another research.

Table 3: Comparative analysis of demographic and pregnancy outcome

Parameter	Pos (+)	Neg (-)	Total	P-value
Educational level				
Non-formal	2	20	22	0.65
Formal	6	77	83	
Total	8	97	105	
Parity				
Nulliparity	2	18	20	0.20
Multiparity	6	79	85	
Total	8	97	105	
Pregnancy outcome				
No complication	8	90	98	0.08
With complication	0	7	7	
Total	**8**	**97**	**105**	

There was no statistical difference in the educational level, parity and antenatal complications between the Sero-positive and Sero-negative women in this study.

Discussion

The prevalence rate of 7.6% reported in this study is similar to earlier reports from Keffi4 in the same

geopolitical location and Lagos[9], South West Nigeria but relatively higher than the reported value of 5.5% from Port Harcourt, South-South Nigeria[3]. The similarity in the populations studied, the antenatal patients may have accounted for the observed similarity. Perhaps, a community based survey may have yielded more representative prevalence figure. The prevalence rate is however lower than those reported from Bangladesh[10] and Eastern Sudan[11]. While the study from Bangladesh was a National survey, the Sudanese study was on middle to high socio economic healthy non-pregnant population hence, the likely higher prevalence rates as opposed to our facility based study that focused on pregnant population. Differences in genetic factors, socio-economic status and cultural taboos may have also been additional contributing factors to these wide variations in the rate of Sero-prevalence of hepatitis B virus infection among the various pregnant populations. There was a gradual decline in the Sero-positivity status with increasing maternal age from 25% below the age 34 years to 12.5% above the age 35 years. The association was however, most probably a chance factor ($p > 0.05$). A similar association was demonstrated in a previous study from India[7]. Whether an advance maternal age is associated with prudent precautions against primary prevention may be a subject of further research. Perhaps, a larger community based study may be revealing in establishing a reasonable relationship between maternal age and Sero-positivity, if any. Educational level and parity were also found to have no significant association with likelihood of Sero-positivity (table 3) albeit, the small but appropriate sample size in this study. It may be likely that if the sample size was larger, a reasonable conclusion may be more evident. Unexpectedly, there was recorded maternal illness among 7 Sero-negative women compared with none among those that were Sero-positive. The difference was not statistically significant ($p = 0.08$). All but one of those 7 patients had confirmed malaria in pregnancy while the last had urinary tract infection in pregnancy. These febrile illnesses could not be attributable to maternal HBsAg positivity but rather an incidental finding. Given that both Sero-positive and negative patients had at least the standard 2 dose regimen of intermittent prophylaxis with sulphadoxine- pyrimethamine combination against malaria in pregnancy, a suspicious relationship of protection against malaria in those with Hepatitis B infection may be alluded. This may form the subject of further molecular studies in due course. It has been reported that tattooing and facial tribal marks are known risk factors for HBsAg transmission[12-16]. This was not corroborated in this study as those pregnant women who were HBsAg positive with tribal and tattoo marks showed no statistical difference with those that were negative ($p > 0.05$). Tribal marks are a common cultural norm in the study location by the Gbagyi, Igbira and Nupe speaking people. There was no detectable envelope antigen (e- antigen) among those that tested positive for HBsAg during the study period just as there was no detectable vertical transmission to the fetus as at the time of birth. The presence of the e-antigen has been associated with vertical transmission and infectivity of HBsAg virus 13-25. Arising from the above, the zero vertical transmission rate was therefore, not unexpected. It could probable be that a combination of e-antigen and HBsAg might be a more sensitive marker of vertical transmissions than HBsAg alone. All the babies were delivered by the vaginal route with strict compliance with preventive measures at birth toward limiting vertical transmission. They were all singleton babies. Probably the universal precautions employed during vaginal delivery could further have accounted for the Zero per cent vertical transmission rate. The finding of this study may be employed to allay fears among those pregnant women with HBsAg positivity that careful antenatal follow up and delivery safety measures may significantly reduce chances of neonatal infection at birth especially, when the envelope antigen is negative. The limited size of Sero-positive women however, made generalization of our finding difficult. Perhaps if this study was conducted among the pregnant women in the community as opposed to a hospital setting, it would have been more appropriate to generalize the research findings.

Conclusion

The study has shown a relative high prevalence rate of HBsAg among our pregnant population but with amazingly zero vertical transmission rate as at the time of birth. The feared complication of vertical transmission may not be as real as anticipated especially, when the maternal serum e-antigen is negative and careful antenatal / intrapartum precautions are adhere to. The younger mothers should be considered a high risk population for the viral infection. Health education on primary preventive measures could be sustained to reduce the burden of Hepatitis B Virus infection in pregnancy.

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