

ORIGINAL ARTICLE

SERO-PREVALENCE OF HEPATITIS B AMONGST PREGNANT WOMEN ATTENDING THE ANTENATAL CLINIC OF A TERTIARY CARE HOSPITAL, JAMNAGAR (GUJARAT)

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ABSTRACT

Background: Majority of the transmission of Hepatitis B in India and other developing countries occurs by vertical transmission from an infected carrier mother to the neonate, intrapartum or antenatally. Up to 90% of babies born to carrier mothers may also become carriers and they are at a very high risk of developing chronic liver disease at a younger age.

Aims & Objectives: Present study was done to know the determination of sero-markers of hepatitis B surface antigen (HBs Ag) amongst pregnant women. Further, to find prevalence of HBe Ag and Anti HBe-IgM Ab amongst HBs Ag positive pregnant women.

Methods: A retrospective study was done based on review of records of pregnant women. Blood samples were collected from 2050 pregnant women with age ranging from 16-40 years during the January 2001 to December 2003. Screening of HBs Ag was done by RPHA method and positive HBs Ag tests were confirmed by ELISA. The positive samples were then further tested for HBe Ag and Anti-HBe-IgM Ab.

Results: Amongst, 2050 pregnant women, 63 (3.07%) were positive by RPHA and ELISA. Statistically significant association was not found for age group ($\chi^2=8.05$, $P>0.05$), history of disease ($\chi^2=6.56$, $P>0.05$) and trimester of pregnancy ($\chi^2=1.66$, $P>0.05$) with HBs Ag positivity in pregnant women. Though, highest HBs Ag positivity was found with age group of 21-25 year (4.20%), history of Jaundice (13.95%) and third trimester of pregnancy (3.56%). Significant statistical association was found between HBs Ag positive carriers 63, with HBe Ag positive 11 (17.46%) and Anti-HBe IgM Ab positive 18 (28.57%) samples ($\chi^2=128.14$, $P<0.001$).

Conclusion: Screening of pregnant women for HBs Ag is necessary in order to identify those neonates at risk of transmission. Amongst HBs Ag positives, the test for HBe Ag and Anti HBe IgM Ab was significantly high, which suggests high chances of carrier state. The practical preventive measure against vertical transmission to neonates is immunization of the newborns for HBV.

Keywords : Hepatitis B, Pregnant women, Jaundice, HBs Ag, RPHA, HBe Ag, anti-HBe-IgM Ab

INTRODUCTION

Hepatitis-B Virus (HBV) infection is prevalent worldwide, but HBV carriers have wide global variation. In Asia, especially Southeast Asian countries, prevalence of HBV is 8-15% of the population which signifies high endemicity ^{1,2}. Remaining parts of the world has intermediate and low endemicity, with prevalence of 2-7% and $\leq 2\%$ respectively ³. Almost one-third of the carriers develop chronic liver diseases,

including chronic hepatitis, cirrhosis and hepatocellular carcinoma ⁴.

Transmission of HBV from carrier mothers to babies can occur during perinatal period, and is important factor in determining the prevalence of infection in highly endemic areas ⁵. Before HBV vaccine was integrated into the routine immunization programme, about 10% to 30% babies were becoming HBV carriers amongst mothers who were HBsAg positive but HBeAg negative. However, perinatal infection was

higher (70% to 90%), when mothers were also HBeAg positive ^{6,7}. Three possible routes of transmission for HBV from infected mothers to infants are; transplacental-in utero, natal-during delivery or postnatal-during infants care or through breast milk ⁸⁻¹⁰.

Passive (Hepatitis-B-Immunoglobulin -HBIG) and active (Hepatitis-B Vaccine) immunoprophylaxis in infants of HBV carriers, provide high levels of protection against vertical transmission. However, 10% child of HBV carrier mothers, are chronic hepatitis B sufferers during early life, even though these carrier mothers received routine neonatal immunoprophylaxis, which is due to infected uterus ¹¹. Viral hepatitis during pregnancy is associated with high risk of maternal complications, has high rate of vertical transmission causing foetal and neonatal hepatitis and is reported as leading cause of maternal mortality ¹²⁻¹⁵. Vertical and horizontal transmission in perinatal period and early childhood are major routes of this infection in India ⁵.

In view of above facts, this study was done to evaluate sero-markers of HBsAg amongst pregnant women and further Anti-HBe-IgM-Ab and HBeAg detection amongst the positive HBsAg cases.

SUBJECTS AND METHODS

It was a retrospective study based on review of records of pregnant women, who attended the antenatal clinics of Shri G G Hospital, a tertiary care teaching hospital at Jamnagar (Gujarat) were screened for HBs Ag after informed consent was obtained. Blood samples were collected from 2050 pregnant women. The age ranged from 16-40 years (mean age 27.4 year) during the January 2001 to December 2003.

The blood samples were collected from women attending the clinics for the first time during that particular pregnancy, irrespective of duration of gestation. Screening of HBs Ag was done by Rapid Plasma Heam Agglutination (RPHA) method and positive HBs Ag test was confirmed by Enzyme-Linked Immuno Sorbent Assay (ELISA). The HBs Ag positive samples were then further tested for HBe Ag and Anti-HBe IgM Ab, using the ELISA test. The results were analyzed by age distribution, women with history of diseases mainly for jaundice, surgery, blood transfusion, women whose husband has a history of jaundice and different trimester of pregnancy. Variance between categories were analyzed by Chi square (χ^2) and Fisher's exact test.

RESULTS

Total of 2050 pregnant women were screened, out of which 67 were HBs Ag positive by RPHA test. Further testing of these 67 positive tests determined that 63 were positive by ELISA. Therefore the overall HBs Ag positivity was found 3.07%.

While studying the prevalence of HBs Ag in pregnant women according to the age groups, significant statistical association was not found between age group and number of samples screened ($\chi^2=8.05$, $P>0.05$). However, the highest incidence of 4.20% (34/809) was found in age group 21-25 and the lower of 1.37% (4/291) was found in age group 31-35 (Table - 1).

Table 1:- The prevalence of HBs Ag in pregnant women, according to the age groups

Age group	No. of samples screened	HBs Ag positivity (%)
16-20	395	11 (2.78)
21-25	809	34 (4.20)
26-30	358	7 (1.95)
31-35	291	4 (1.37)
36-40	197	7 (3.55)

($\chi^2=8.05$, $P>0.05$)

Study of HBs Ag sero-positivity with history of diseases revealed that, significant statistical association was not found between samples screened with history of diseases (jaundice, surgery, blood transfusion and women's husband had history of jaundice) and HBs Ag pregnant women ($\chi^2=6.56$, $P>0.05$). However, the highest incidence of 13.95% (6/43) was found amongst HBs Ag positive pregnant women with history of jaundice (Table - 2).

Table 2:- HBs Ag sero-positivity with history of diseases studied

History	Samples screened	HbsAg Positivity (%)
Jaundice	43	6 (13.95)
Surgery	20	1 (5.00)
Blood Transfusion	18	1 (5.56)
Women's husband were history of jaundice	82	2 (2.44)

($\chi^2=6.56$, $P>0.05$)

Study of HBs Ag sero-positivity in different trimester of pregnancy revealed that, significant statistical association was not found between samples screened in different trimesters of pregnancy with HBs Ag positivity ($\chi^2=1.66$, $P>0.05$). However, the highest incidence of 3.56% (37/1040) was found amongst HBs Ag positive mothers during third trimester of pregnancy (Table - 3).

Table 3:- HBs Ag sero-positivity in different trimesters of pregnancy

Trimester	Sample screened	HBsAg positive (%)
First	272	7 (2.57)
Second	738	19 (2.57)
Third	1040	37 (3.56)

($\chi^2=1.66$, $P>0.05$)

Most importantly, the study of Hepatitis B markers in pregnant women found HBs Ag carriers revealed that, highly significant statistical association ($\chi^2=128.14$, $P<0.001$) was observed in between HBs Ag positive pregnant women (63) and Anti-HBe-IgM Ab (28.57% i.e. 18/63) and HBe Ag (17.46% i.e. 11/63) (Table – 4).

Table 4:- Hepatitis B markers in pregnant women found HBs Ag carrier

Test	Negative	Positive	Total
HBs Ag	1987	63	2050
Anti-HBe-IgM Ab (Amongst HBs Ag Positive)	45	18	63
HBe Ag (Amongst HBs Ag Positive)	52	11	63

($\chi^2=128.14$, $P<0.001$)

DISCUSSION

The study showed that the prevalence of HBs Ag in pregnant women was 3.07%. This rate was relatively low, compared to previous studies which showed the prevalence ranging between 4.1-8.4 percent¹⁶⁻²⁰. This may be due to the geographic variation among regions or due to a difference in the detection method used.

As regards to age, in present study high HBs Ag carrier rate in pregnant women was found in age group 21-25 i.e. 34 were positive of 809 screened (4.20%). In the study carried out by Sukone P et al. the carrier rate was found to be more in 31-35 years group²¹. The high incidence in our study was in age group 21-25 (4.20%) which may be due to the large number of samples screened in this group. However, this association is statistically not significant ($\chi^2=8.05$, $P>0.05$) in our study.

As regards to trimester in the present study HBs Ag positive was 3.56% in third trimester (37 / 1040), 2.57% in second (19 / 738) and first trimester (7 / 272). The chances of getting infection to infants are 8% when mother had an acute infection in first or second trimester. The prevalence increases to 38.5% to 67% if infection occurs in the third trimester²². However, maximum HBsAg positivity was found during third trimester (3.56%) but association of trimesters with HBs Ag positivity in our study was not statistically significant ($\chi^2=1.66$, $P>0.05$).

The pregnant women in our study were interviewed for the history of jaundice, blood transfusion etc. Out of 43 mothers who had history of jaundice, 6 (13.95%) were HBs Ag positive, 1 out of 18 (5.56%) with blood transfusion, 1 out of 20 (5%) with surgery and 2 out of 82 (2.44%) women's husband had history of jaundice. Though, the history of jaundice found highest (13.95%) but statistically significant association was not observed between the above history of diseases in HBs Ag positive pregnant women ($\chi^2=6.56$, $P>0.05$).

The highest risk of perinatal HBV transmission is in infants born to both HBs Ag and HBe Ag positive mothers and has been reported to range from 70-90%. In contrast, the risk in infants born to HBs Ag-positive, but HBe Ag-negative mothers is 5%-20%^{23,24}. In our study, 11 out of 63 (17.46%) HBs Ag positive was HBe Ag-positive suggesting the higher risk for transmission. Further, we observed that amongst 63 HBs Ag positive mothers 18 (28.57%) were positive for Anti-HBe-IgM Ab. Thus, we could establish high statistical significance between HBs Ag positive pregnant women with HBe Ag and Anti-HBe-IgM-Ab detection ($\chi^2=128.14$, $P<0.001$). This suggests the importance of detection of HBV markers amongst the HBs Ag positive mothers.

CONCLUSIONS & RECOMMENDATIONS

In conclusion, the high statistical significance of detecting HBV markers (HBeAg and Anti HBe IgM Ab) amongst HBsAg positive mother is established. This is important to rule out high risk of HBV transmission to infants.

Screening of pregnant women for HBsAg in order to identify those neonates at risk to whom preventive intervention can be instituted is presently practiced. We further recommend detection of HBV markers (HBeAg and Anti HBe IgM Ab) amongst HBsAg positive mother should be an extended practice.

To date, the only practical preventive measure available is immunization (passive and active) of the newborns so as the perinatal HBV carrier rates can be reduced significantly.

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