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**Research Article**

# Seroprevalence of Hepatitis B Surface Antigen among Rural Pregnant Women Attending a Tertiary Care Hospital

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**Abstract:** Hepatitis B virus infection (HBV) is one of the most important community health problems and also one of the most common infectious diseases in the world. The prevalence of chronic Hepatitis B infection varies widely in different parts of the world. HBV infection is transmitted sexually, parenterally and perinatally from mother to child. The objective of this prospective study, conducted over a period of one year, was to determine the prevalence of Hepatitis B carriers in rural antenatal mothers registered at Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research. The risk factors for HBV infection were also studied. Blood samples collected from the study populationunder standard procedure were investigated for Hepatitis Bsurface Antigen (HBsAg) by Rapid Immunochromatography test and positive samples were further confirmed by commercially available ELISA kit. Of the 1400 women who were recruited in this study, 54 (3.8%) tested positive to HBsAg, while 1346 were seronegative. Around 15% of the HBsAg seropositive women also tested positive for HBeAg. Early immunization of babies born from HBV infected mothers can prevent the risk of vertical transmission. The result of this study will help to identify HBsAg positive pregnant women and administer immunoprophylaxis to newborns of infected mothers, thus reducing the mother to child transmission risk. This emphasizes the need for mandatory HBsAg testing in pregnant mothers. Women of reproductive age should be involved in a routine vaccination schedule considering the high risk of HBsAg positivity in neonates through perinatal transmission.
**Keywords:** Antenatal Screening, HBsAg, Vertical Transmission**.**

## INTRODUCTION

Hepatitis B infection is one of the global public health problems. Its prevalence varies significantly between different populations of the world. The wide variations in social, economic and health factors in different regions may explain the variations in carrier rates from one part of the country to another. Hepatitis B virus causes a spectrum of disease from self-limited hepatitis to acute fulminant and chronic hepatitis which may result in sequelae like liver cirrhosis and hepatocellular carcinoma. It is estimated by WHO (World Health Organization), that about 2 billion people (one-third of the world population) have serological evidence of Hepatitis B infection and 350 million people (5-7% of the world population) harbor chronic infection, and approximately one million die annually from chronic liver disease [1]. The average estimated carrier rate of Hepatitis B infection in India is 4% (area of intermediate endemicity). It accounts for 10-15% of the entire pool of Hepatitis B virus carrier of the world [2].Hepatitis B infection is transmitted sexually, through blood products and through vertical transmission. About 80% of the infants infected perinatally become carriers [3]. Vertical transmission from mother to child is a major mode of transmission in endemic areas. Antenatal screening of all women for Hepatitis B virus infection and vaccination of babies born to carrier mothers would prevent transmission [4]. Serosurveys are one of the primary methods to detect the prevalence of HBsAgpositivity. This study was conducted to determine the prevalence of Hepatitis B surface Antigen (HBsAg)seropositivity in antenatal female attending the rural medical centre. The risk factors for Hepatitis B infection like sexual habits, intravenous drug use, previous blood transfusion, previous surgeries, and contact with infected persons, dental extractions, tattoos and sharing syringes were also evaluated, which would provide information to

institute public measures to reduce the transmission of infection.

## MATERIALS AND METHODS

The study was observational and prospective, undertaken over a period of one year from April 2011 to March 2012, approved by the Institutional Ethics Committee. The present study was conducted in Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, involving a population of 1400 pregnant women, aged 15–40 yrs attending antenatal clinic. Informed consent was obtained from the study group. Individuals were interviewed by structured questionnaire, including data regarding obstetric history, previous Hepatitis B vaccination, HBsAg status and risk factors for infection. Statistical Analysis was carried out using Statistical Package for Social Sciences (SPSS). The proportional data of this study were tested using Pearson's Chi Square Analysis test and Fisher exact probability test.

### Laboratory Assay

About 2 ml of venous blood was collected from each individual under strict aseptic precautions. Rapid Immunochromatography test (HEPA card, Reckon Diagnostics Private Limited, Vadodhara) with a sensitive range of 0.5 ng/ml was employed to detect the presence of HBsAg. For confirmation, blood samples tested positive for HBsAg were subjected to commercially available third generation ELISA (Enzyme Linked Immunosorbent Assay) kit (Bene Sphera HBsAg Microwell ELISA, Avantor Performance Materials India Limited, Uttarakhand) with an analytical sensitivity of 0.2IU/ml. Manufacturer's instructions were followed during the test procedure.

## RESULTS

A total of 1400 pregnant ladies attending antenatal clinic in a tertiary care hospital, situated in a rural area, were studied. All the women were asymptomatic and unaware of Hepatitis B vaccination. The age range of the subjects was 15-40 years with a mean age of 27.5 years. The seroprevalence of HBsAg positivity in this current study was 3.8%. Among the 1400 participants, 54 women tested positive for HBsAg.

The age distribution and HBsAg screening test results were given in Table 1. In statistical analysis, the p-value obtained was < 0.001 (statistically significant).

The distribution of trimester of pregnancy and HBsAg screening results were given in Table 2. The p-value obtained was > 0.05, which is statistically insignificant.

Analysis of age distribution of HBsAg positive women revealed a relative high prevalence among 26-30 years. Majority of them were multigravida (66.7%) in first trimester of pregnancy. Risk factors distribution among HBsAg positive women was shown in Table 3.

HBeAg and anti-HBeAb were also tested in HBsAg positive blood samples using commercially available ELISA kit.

ALT (Alanine Aminotransferase), liver enzyme marker assay, among the 54 Hepatitis B carriers revealed 2-fold increase in the reference values in 4 (7.4%) individuals. But these antenatal women were also asymptomatic (Fig-1).

**Table 1: Shows the age distribution and HBsAgstatus (N=1400)**

| Age Range | HBsAgPositive | HBsAgNegative |
|---|---|---|
| 15-25 yrs | 10 (0.71%) | 592 (42.3%) |
| 26-30 yrs | 26 (1.9%) | 478 (34.1%) |
| 31-35 yrs | 14 (1.0%) | 224 (16.0%) |
| 36-40 yrs | 4 (0.3%) | 52 (3.7%) |
| TOTAL | 54 | 1346 |

**Table 2: Trimester of pregnancy and HBsAgstatus (N=1400)**

| Trimester | HBsAgPositive | HBsAgNegative |
|---|---|---|
| First | 26 (1.9%) | 214 (15.3%) |
| Second | 12 (0.9%) | 635 (45.4%) |
| Third | 16 (1.14%) | 497 (35.5%) |
| Total | 54 | 1346 |

**Table 3: Risk factors observed in HBsAg positive women (N=54)**

| Risk Factors | No. of Antenatal Women |
|---|---|
| Previous Surgery | 19 (35.2%) |
| Dental Extraction | 8 (14.8%) |
| Tattoos | 5 (9.3%) |
| Blood Transfusion | 10 (1.9%) |

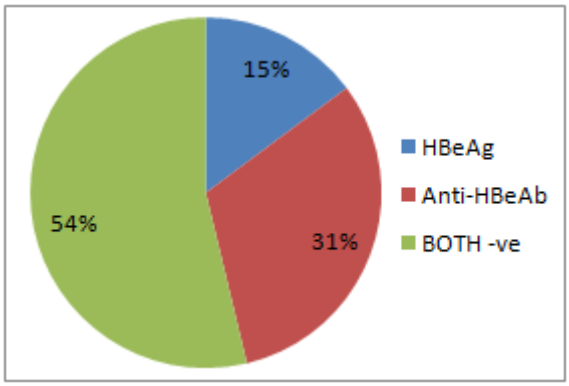


**Fig. 1: Serological status of HBsAg positive individuals**

## DISCUSSION

Hepatitis B virus infection is distributed worldwide and it is the10th leading cause of death. Screening for Hepatitis B infection in pregnant women identifies new borns that will require prophylaxis against perinatal infection. In India, HBsAg prevalence ranges from 2-8%, placing it in intermediate HBV (Hepatitis B virus)endemicity zone and the number of HBV carriers is estimated to be around50 million, forming the second largest global pool of chronic HBV infection [5]. While it is generally accepted that the modality of HBV transmission in India is horizontal, the recent report by Dwivedi *et al*.[6] showing a high prevalence of hepatitis markers suggest that there may be a significant role of vertical transmission as well. A large study involving 8575 pregnant women from Northern India, documented HBsAg carrier rate to be 3.7% [7]. Also a study from Eastern India demonstrated that HBsAg prevalence among antenatal mothers is in conformity with national average of HBsAg prevalence (3-5%) in India [8]. These studies are in consistence with this present study which showed a prevalence of 3.8% among antenatal women. A total of 26 pregnant women, belonging to the age group of 26-30 years were HBsAg carriers among the 54 HBsAg positive individuals. Similar finding was observed in the study by S U Mbamara *et al*.[9] Statistical analysis showed a significant association between age and HBsAgseropositivity. HBeAg indicates the presence of replicative virus. The highest risk of perinatal HBV transmission is in infants born to HBsAg and HBeAg positive mothers, and has been reported to range from 70-90%. In contrast the risk in infants born to HBsAg positive, but HBeAg negative mothers is 5-20% [10,11]. Among the HBsAg positive pregnant mothers, around 15% were positive for HBeAg which is comparable to the study by T.Kurien *et al*.[12]. A combination of Hepatitis B vaccine and human anti-HBs Immunoglobulin has been shown in many studies to be highly effective in reducing vertical transmission from chronically infected mothers [13, 14].

## CONCLUSION

The results of this study shed light on many important aspects of HBV infection. It provides information necessary to detect the risk factors and to formulate necessary preventive measures to lessen the burden of new infection. The finding of HBsAgseropositivity in pregnant women in this current study supports that antenatal screening for HBsAg is a helpful strategy for the prevention of vertical transmission of HBV infection. Public health policies should include routine universal antenatal screening of HBV infection and immunization of at risk infants immediately after birth.

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