

Seroprevalence of Hepatitis B Surface Antigen among Pregnant Women in a Tertiary Care Health Center of North India

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ABSTRACT

Objective: To establish the rate of seroprevalence of hepatitis B surface antigen among pregnant women in tertiary care health centre of North India.

Materials and methods: We included 2058 antenatal women attending the antenatal opd in our hospital S.N. Medical college Agra from January 2015 to 2016. All pregnant women attending antenatal OPD at their first antenatal visit were screened for HBsAg and verbally informed regarding study.

Results: A total of 42 women had positive HBsAg results. The mean age was 25.7 years, average parity of 2.3. All the 42 women positive for HBsAg were advised for HBeAg testing. And among these four were tested positive for HBeAg. There were no statistically significant association between sociodemographic characteristics evaluated age, gravidity, marital status and educational level and HBsAg status. In our study out of 42 HBsAg positive women two were found to be equally infected with HIV this implies the coinfection rate in our study was 0.09%. The association between HIV and HBsAg was not statistically significant in our study.

Conclusion: Hepatitis B remains a significant health problem in India. Programmes for prevention and control of hepatitis B should represent a priority for the government and health services in India. The first step in tackling the HBV disease burden in India is to have a more accurate assessment of the burden of the disease. This is possible with multicentric population based studies.

Keywords: Hepatitis B envelop antigen, Hepatitis B surface antigen, Hepatitis B virus, Human deficiency virus.

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INTRODUCTION

Hepatitis B virus (HBV) infection is a global health problem. The World Health Organization (WHO) estimated that 2 billion people worldwide have been infected with HBV; of these 240 million suffer from the chronic hepatitis B infection.^{1,2} India has 5 to 7% of the world's population and accounts for the large proportion of the worldwide HBV burden. It is estimated that India harbors around 40 million HBV carriers. It is reported that approximately 15 to 40% of the hepatitis-infected patients are likely to suffer from liver cirrhosis, liver failure, and hepatocellular carcinoma.³

It has been estimated that HBV infection is largely acquired by horizontal transmission in childhood and perinatal transmission plays a less important role.⁴ However, transmission of HBV from carrier mother to their babies can occur during the perinatal period, and appears to be the most important factor in determining the prevalence of the infection in high endemic areas, particularly in China and Southeast Asia.⁵ Consequently, the routine screening of pregnant women for hepatitis B surface antigen (HBsAg) is recommended by the WHO. This perinatal transmission of HBV leads to severe long-term sequelae. According to earlier studies, prevalence of HBsAg in Indian pregnant women was 2.3 to 6.3%.⁶⁻⁸ A large study from Northern India documented that the prevalence of HBsAg in pregnant women was 3.7%, hepatitis B viral protein (HBeAg)-positive rate was 7.8%, and vertical transmission rate was observed in 18.6%.⁹ However, Dwivedi et al⁹ show a lower prevalence rate of 0.9% and with high HBeAg-positive rate of 56.8%.

Only 10 to 30% of the babies become HBV when carrier mothers are HBsAg positive, but HBeAg negative; it is around 70 to 90% of infants that become carriers when HBsAg, and HBeAg are both positive in the pregnant mother.¹¹ Infection can be transmitted through transplacental route during pregnancy, natal route during delivery, or postnatal route through breast milk.¹²⁻¹⁴ Transplacental transmission of HBV to the fetus may be due to hematogenous route or cellular transfer; the placental tissue is infected by the high titer of HBV present in maternal blood and transfer effected from mother to fetus through the villous capillary endothelial cells.¹⁵

Parenteral transmission is also an important route of transmission of HBV and occurs through transmission

of infected blood or blood products, intravenous drug use, unsafe therapeutic injections, occupational injuries, or nosocomial transmission during health care-related procedures, such as surgery, hemodialysis, and organ transplantation. Injection drug abuse is not as widespread in India.

MATERIALS AND METHODS

The aim of the study was to determine the prevalence of HBV among the pregnant antenatal care (ANC) women attending the ANC outpatient department (OPD) in our hospital.

We included all ANC women attending the ANC OPD in our hospital – Sarojini Naidu Medical College – from January 2015 to January 2016. All pregnant women attending ANC OPD at their first ANC visit were verbally informed regarding the study, after routine ANC checkup. Informed written consent was taken, women interrogated to obtain sociodemographic information including maternal age, gravidity, gestational age, occupation, marital status, and level of education; history of previous blood transfusion and history of scarification were also taken.

All ANC women were sent to our pathology laboratory for testing for HBsAg. Participants were informed to collect the report and to be shown at the time of next ANC visit. All the participants did not pay for the test done; test results were provided to the women. All infants born to mothers positive for hepatitis received hepatitis B vaccine free of cost.

RESULTS

Table 1 illustrates all the pregnant women attending ANC during the study period and the sample eventually recruited in the study. All the women were screened for HBsAg; 42 tested positive. The 2,058 patients participat-

ing in this study were between 18 and 40 years, with the mean age of 27.6 ± 5.2 years. Table 1 summarizes the socio-demographic characteristics of the study participants.

The women who screened positive for HBsAg were not demographically different from the HBsAg-negative women.

The women who tested positive for HBsAg were almost at the same mean age as the HBsAg-negative women, namely 27.6 and 25.9 respectively.

A total of 42 of the pregnant women had positive HBsAg results. All the women positive for HBsAg were advised HBeAg testing. Only 11 women could be tested for HBeAg, due to financial constraints, as only HBsAg testing is available free of cost at our government center.

About 2,058 ANC women participated in the study, between the age group of 18 to 40 years, with a mean age of 27.6 ± 5 years (Table 1).

The HBsAg was detected in 42 women giving an overall prevalence of HBsAg of 2.04%. Among 42 HBeAg-positive women, 11 were available for HBeAg testing, and among these, four tested positive for HBeAg. This indicates that the proportion of the women was highly infectious, and, therefore, likely to transmit the virus to their offspring. The mean age among pregnant women, who were HBsAg positive, was 27.6 years. The prevalence of HBsAg was highest among the 20- to 30-year age group (Table 2). There was no statistically significant association between the sociodemographic characteristics that evaluated age, gravidity, marital status, and educational level and HBsAg status.

Table 2: Association between participant characteristics (sociodemographic and clinical) and HBsAg positivity

Variable	Hepatitis B infection (HBsAg result)	
	+ve	%
Overall prevalence	42	7.14
Age (years)	<20	3
	20–30.1	29
	>30	10
Education	Uneducated	7
	Primary	24
	Secondary	9
	Tertiary	2
Parity	0	22
	1–4	18
	+5	2
Occupation	Farmer	17
	Professional	2
	Service	22
	Scarification	
	Not done	13
	Done	29

Table 1: Sociodemographic characteristics of 2,058 ANC HBV participants

Variable	Frequency		%
	n = 2,058 tested		
Age	<20	205	10.00
	20–30	1,193	58.00
	>30	660	32.00
Education	Uneducated	172	8.37
	Primary	975	47.31
	Secondary	838	40.73
	Tertiary	73	3.57
Occupation	Farmer	664	32.285
	Service	481	23.36
	Other	913	44.355
Scarification	Not done	453	22.01
	Done	1,605	77.9
Parity	0	500	24.29
	1–4	1,282	62.29
	+5	276	13.41
Total ANC women	2,058		

DISCUSSION

In our study, the prevalence of HBV among ANC attenders is 2.04%. Various studies have shown a prevalence of HBsAg positivity between 2.3 and 6.3% in pregnant women.⁶⁻⁸ A recent study by Dwivedi et al⁹ reported a lower prevalence rate of 0.9% and high replicative rate of 56.8% being HBeAg positive. The overall rate of HBsAg positivity has been reported to range between 2 and 8% in most studies.¹⁶ The average estimated carrier rate of HBV is 4% placing India in the intermediate range for HBV endemicity. Lodha et al¹⁷ did a systemic review of the literature of prevalence of HBV in India and concluded that the true prevalence of HBV in India was 1 to 2%.

The prevalence of HBV infection is relatively lower in south Asia. The highest rates of prevalence are in Taiwan (>10%) and Thailand (>8%) among Southeast Asian¹⁸ countries. Fomulu et al¹⁹ reported HBsAg prevalence was 7.7% among ANC attenders in Yaoundé. These studies show high prevalence rate of HBsAg among pregnant women in comparison with our study, which is still low (2.04%). Luka et al²⁰ reported that prevalence of HBV infection was 8.3% in urban population in Nigeria, while Eke et al²¹ reported an 8.3% prevalence in the rural population of Nigeria. They are comparable with 6.4% HBsAg prevalence reported in Ghana,²² the 6.5% HBsAg prevalence reported in Congo,²³ the 9.3% reported in Kenya,²⁴ and 10.7% prevalence in Burkina Faso²⁵ among all pregnant women.

The hepatitis status and the HBV viral load are both factors known to be associated with vertical HBV transmission.²⁶ We did not evaluate the vertical transmission in our study, but used the presence of HBeAg which is a marker of high infectivity. The HBeAg-positive women are known to have a high viral load and transmit HBV to their offspring.²⁶ In our study, among 42 HBsAg-positive women, 11 were available for HBeAg testing, and among these, 4 tested positive for HBeAg. This is indicative that the proportion of the women was highly infectious, and therefore likely to transmit the virus to their offspring.

In our study, 9.5% (4 out of 42) women were HBeAg positive. Bayo et al²⁷ reported 15% HBeAg-positive mothers in Northern Uganda. In another study in Dar es salaam in Tanzania, researchers found all women tested were negative for HBeAg.²⁸

In our study, out of 42 HBsAg-positive women, 2 were found to be equally coinfecting with HIV (Table 3). This

Table 3: HIV status and HBsAg status

	HIV+	HIV-	Total
HBsAg(+) n = 42	2	40	42
HBsAg(-) n = 2016	13	2003	2016
Total no of patients			2058

Table 4: Association between HBsAg-positive status and predisposing factors

Sl. no.	Risk factors	no.	%
1	Nulliparity	18	42.8
2	Previous abortion or stillbirth	9	21.4
3	Previous cesarean section or any other surgery	3	7.1
4	History of blood transfusion	7	16.6
5	History of jaundice	12	28.5
6	History of sexually transmitted infection	23	54.7

implies that the coinfection rate in our study is 0.09%. In a study done by Brett Maclean et al²⁹ in Mali (2008–2009), the reported rate of coinfection was 0.38%. In our study, the coinfection rate is very less. The prevalence of HBV infection in HIV-infected person has ranged between 2.25 and 29.7%.

The association between HIV and HBV was not statistically significant in our study. Ahmed et al³⁰ in Malawi equally failed to find any statistical evidence for the association between HIV positivity and HBV infection.

The HBV coinfection rates among pregnant women in Awka, Nigeria,³¹ are lower than the 4.2% HIV/HBV coinfection rate among pregnant women reported by Eke et al²¹ in Nigeria, but are lower than 4.2% HIV/HBV coinfection rate among pregnant women is low.

The prevalence of HBV infection in our study was highest at 69% in the 20 to 30 years age group (Table 2) as compared with the older (23.8%) and younger age groups (7.14%). Our finding is, however, similar to the results from a study by Fomulu et al¹⁹ who also reported the mean age of HBsAg positivity was the 26.9 years age group. The HBsAg seroprevalence was equally high (10%) among the 16 to 20 years age group. Vazquez-Martinez et al³³ reported that the average age of women infected with HBV was 26 years.²⁹ In a Nigerian study, Eke et al²¹ reported the highest prevalence of HBsAg from 15 to 19 years. The high prevalence of HBV infection among the younger age group may be related to high vulnerability of the younger women to sexually transmitted infections (STIs). In our study also, 54% women reported with a history of STIs (Table 4).

Bayo et al²⁷ also reported that the age of HBV infection was higher in women aged 20 years or younger (20%) compared with older women (8.7%) in Uganda. The overall mean age in Tanzania was 28.5 years.²⁸

CONCLUSION

Hepatitis B remains a significant public health problem in India. Programs for the prevention and control of HBV should represent a priority for the government and health services in India. The cost and difficulties associated with their initiation are a major problem at present.

There is an intermediate risk of HBV infection among pregnant women attending ANC in our hospital as also

the increase in the risk of perinatal transmission of HBV to their unborn babies. These babies are at high risk of becoming chronic carriers of HBV infections and subsequently increasing the population pool of the virus.

The first step in tackling the HBV disease burden in India is to have a more accurate assessment of the burden of the disease. This is possible with a multicentric population-based study. There is also a need to map out areas of high endemicity levels within each state in greater detail. These areas of high endemicities should be the focus of intensive screening and protective measures. Screening of high-risk individuals is a must including intravenous drug users (IVDUs), persons who receive repeated blood transfusions, acupuncture, tattooing, unsafe injection practices, and health care workers (HCWs) at risk of occupational exposure, etc. Screening of pregnant women is already in place at most centers. In our study, 16% HBsAg-positive women reported with history of blood transfusion (Table 4).

Most important would be the role of health education not only for the population in general, but for the high-risk population also.

The Government of India has included HBV vaccine in the national universal immunization program in the entire country in 2011–2012.¹⁹ Various studies have been carried out, which show that the inclusion of HBV vaccine in the national immunization will be cost-effective. The study showed that inclusion of HBV vaccine in India's national immunization program would lead to a reduction in HBV carrier role from 4.0 to 1.15%.

The autodisable syringe has been shown to be a cost-effective alternative to the reuse of syringes in India.³²

The IVDUs need to be educated about transmission of infection and to avoid sharing of needles and syringes.

In conclusion, the 2.4% hepatitis-positive rate indicates intermediate risk for perinatal transmission. Following universal precautionary steps can reduce transmission of HBV infection in health care settings. The unnecessary use of blood transfusion, where these are not indicated, should be curbed. Prevention of needle stick injuries and postexposure prophylaxis need to be advocated among HCWs by alerting them about transmission of infection and they should be cautioned to avoid sharing of the needles and syringes.

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