Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com/sjams/

OPEN ACCESS

Virology

Hepatitis B Virus Seroprevalence amongst Pregnant Women Attending Antenatal Clinics of a Tertiary Care Centre of Bihar

Dr. Vidyut Prakash[1], Dr. Nidhi Prasad[2*], Dr. Dipali Prasad[3], Dr. S. K. Shahi[4]

[1]Senior Resident, Department of Virology, IGIMS, Patna, Bihar, India
[2]Assistant Professor, Department of Virology, IGIMS, Patna, Bihar, India
[3]Associate Professor, Department of Obstetrics & Gynaecology, IGIMS, Patna, Bihar, India
[4]Professor and HOD, Department of Microbiology, IGIMS, Patna, Bihar, India

DOI: 10.36347/sjams.2020.v08i02.010 | **Received:** 13.01.2020 | **Accepted:** 20.01.2020 | **Published:** 08.02.2020

***Corresponding author:** Dr. Nidhi Prasad

Abstract | **Original Research Article**

Background: Prevalence of hepatitis B virus (HBV) infection in pregnant woman worldwide is 1.5 to 2.5% whereas in India it varies from 0.2 to 7.7%. Vertical transmission of infection early in life is of grave concern as it increases the risk of progression to chronic liver disease, development of cirrhosis, and progression to hepatocellular carcinoma. It is now a well-accepted fact that universal immunization of the new-borns is the most effective way to eliminate HBV infection. Keeping these facts in mind we conducted a study to determine Hepatitis B virus (HBV) seroprevalence amongst pregnant women attending antenatal clinics of a tertiary care centre of Bihar. Material and Methods: The study was conducted from 1st April 2018 to 30th April 2019 and all pregnant females attending the ANC of a tertiary care centre of Bihar during the study period, who gave consent to participate in the study, were evaluated by taking detailed history, physical examination followed by routine laboratory investigations and HBs Ag testing by ELISA. ***Result:*** During the study period, out of a total of 1440 new asymptomatic ANC cases, 12 (0.83%) pregnant women were found to be seropositive for HBsAg. The highest prevalence was observed in the age group 26-33 years (50 %) ,followed by the age group 18- 25years (33.3%),followed by the age group 33-40years (16.7%). ***Conclusion:*** HBsAg seropositive pregnant women are mostly asymptomatic. In this study HBV seroprevalence amongst asymptomatic pregnant women was found to be 0.83%. So, universal screening of all pregnant women for HbsAg should be done as per the guidelines, irrespective of risk factors, to determine the accurate seroprevalence, prevent transmission of infection in their offsprings and to intervene timely before they progress to chronic hepatitis, cirrhosis and hepatocellular carcinoma. Prevention of transmission of infection in neonates would also be helpful to reduce the overall carrier rate in community.

Keywords: HBsAg, Pregnancy, seroprevalance, chronic hepatitis, carrier, hepatocellular carcinoma, cirrhosis.

INTRODUCTION

Hepatitis B virus (HBV) is a small double-stranded DNA virus which predominantly affects the liver. Worldwide about 240 million people are having chronic hepatitis B virus (HBV) infection and majority of them belong to low-and middle income countries particularly in Asia and Sub-Saharan Africa with a prevalence rate of 10-20%. HBV is a major causative agent of acute and chronic liver disease. Chronicity of HBV infection may lead to liver cirrhosis and hepatocellular carcinoma [1, 2].

There is great variability in prevalence of HBV infection in different geographical region. On the basis of prevalence, World Health Organization (WHO) has classified these HBV endemic areas into high (>8%), intermediate (2-7%) and low (<2%) endemic regions. HBV prevalence in India falls in intermediate endemic range. Every year 100,000 Indians die due to HBV infection related illnesses [3]. Prevalence of hepatitis B in pregnant woman worldwide is 1.5 to 2.5% whereas in India it varies from 0.2 to 7.7%. The prevalence of mean HBV carriers in India is 0.82% according to chatterjee *et al.* [4]

The genome of HBV contains four open reading frames, which encodes for four major proteins. Major products of these are surface protein (HBsAg), envelop protein (HBe Ag), core protein (HbcAg), DNA polymerase and X protein. When a person is infected with HBV, HBsAg is the first virological marker detected in serum followed by elevation of serum

transaminases and development of clinical symptoms. HBsAg seropositivity remains detectable during the entire icteric or symptomatic phase of acute hepatitis B infection and also beyond it.

Mode of transmission of Hepatitis B infection is mainly through blood, blood products and sexual contacts. Infrequent modes are transplacental transmission of virus to the foetus and through infected needle stick injury. Vertical transmission of infection mainly occurs during peripartum period, through infected genital secretions and breast milk [5]. The occurrence of HBV infection early in life is of grave concern as it increases the risk of progression to chronic liver disease, development of cirrhosis, and progression to hepatocellular carcinoma. It is now a well-accepted fact that universal immunization of the new-borns is the most effective way to eliminate HBV infection [6]. The first strategy was to vaccinate all children born to mothers infected with HBV. It involves a systematic screening for HBV markers of infection (HBsAg) and replication (HBeAg) in pregnant women. If positive for either of these markers, it is followed by active-passive immunization of the newborn within the first 24 hours of life. Active and passive immunization involves hepatitis B vaccine and hepatitis B immunoglobulin (HBIG) injected at two different sites. This strategy may reduce the mother-to-child HBV transmission by 75–90% [7]. Keeping these facts in mind we conducted a study.

AIMS AND OBJECTIVES

To determine Hepatitis B virus (HBV) seroprevalence amongst pregnant women attending antenatal clinics of a tertiary care centre of Bihar

MATERIAL AND METHODS

This cross sectional study was conducted at the virology lab in association with Obstetrics and Gynaecology department of Indira Gandhi Institute of Medical sciences, Patna, a major referral centre of Bihar, where antenatal clinics (ANC) are held every day. The study was conducted from 1st April 2018 to 30th April 2019. Awareness about this study was created amongst the staff of ANC antenatal clinic and all pregnant females attending the ANC during the study period, who gave consent to participate in the study, were included in this study. Each one of the participant were evaluated by taking detailed history followed by physical examination. They were counselled for Hepatitis B virus test and other routine tests. The routine laboratory investigations and viral marker (HBV, HCV &HIV) were requested for all the patients. The pre-test counselling was done in groups, while the post-test counselling was done individually.

Laboratory methods for HBs Ag test

Under aseptic technique about (4 mL) of blood was obtained through venepuncture from all clients using sterile disposable 5 ml syringes with 20 gauge needle in a plain vial by a trained laboratory technologist who is also an experienced phlebotomist. All the collected samples were transported to the virology lab for testing. On receipt of sample care was taken to accept and process only the good quality and adequate samples. If blood sample was inadequate or was haemolysed due to any reason, fresh samples were taken as far as possible. HBs Ag ELISA was done on all samples using HBsAg Microwell, 3rd Generation ELISA (IHF) Kit having diagnostic sensitivity and specificity of 100 % & 99.5 % respectively. The whole procedure of testing and calculation of results were performed according to the manufacturer instructions.

OBSERVATION AND RESULT

During study period, a total of 3373 ANC were done. Out of these 3373 cases, 1440 were new and 1933 were old cases. Only 1440 new cases that came for ANC visit were included in this study. The age group of study population was 18-40 years. Out of 1440 new cases, 12 pregnant women were found to be seropositive for HBs Ag. The prevalence rate was found to be 0.83%. The highest prevalence was observed in the age group 26-33 years (50 %), followed by the age group 18- 25years (33.3%),followed by the age group 33-40years (16.7%).

Table-1: HBsAg seroprevalence

Total new ANC cases	HBsAg seronegative Cases (%)	HBs Ag seropositive Cases (%)
1440	1428 (99.16%)	12 (0.83%)

Table-2: HBsAg - Age specific seroprevalence

Age groups (year)	HBsAg positive cases (%)
18-25	4 (33.3%)
26-33	6 (50%)
34-40	2 (16.7%)

DISCUSSION

HBsAg seropositive pregnant women are mostly asymptomatic which is of grave concern. About 90% of neonates born to HBV carrier mothers develop chronic liver disease, at a younger age and represent the most important reservoir of infection in the community. Since the HBV infected neonates are at higher risk of developing chronic hepatitis, cirrhosis and hepatocellular carcinoma, therefore, according to USPSTF recommendations, in pregnant women, HBV infection screening is necessary at their first antennal visit [8]. If the pregnant mother is found seropositive for HBV infection, it is followed by active-passive immunization of the newborn within the first 24 hours of life. Active and passive immunization involves hepatitis B vaccine and hepatitis B immunoglobulin (HBIG) injected at two different sites. This strategy may reduce the mother-to-child HBV transmission by 75–90%. Prevention of transmission of infection in

neonates would also be helpful to reduce the overall carrier rate in community.

In the present study the seroprevalence of HBsAg among asymptomatic pregnant women was found to be 0.83%. This is comparable to the seroprevalence of 0.9% reported by Dwivedi M *et al*. and 0.82% reported by Chaterjee S *et al*. [9, 10]. HBsAg seroprevalence among pregnant women in our study was comparatively low as compared to following studies carried out in different part of India [Table/Fig-2].

Table-2: Seroprevalence of HBsAg positivity among antenatal female in different studies

Study	Year	Location	Sample Size	Prevalence Rate
Sibia P *et al*. [11]	2016	Patiala	3686	1.1%
Bakthavatchalu *et al*. [12]	2012	Bangalore	500	7.8 %
Khakhkhar *et al*. [13]	2012	Jamnagar	2050	3.07%
Paranjothi *et al*., [14]	2009	Krishnagiri	762	5.1%

According to Lodha *et al*.'s review article on hepatitis B epidemiology, prevalence rate of HBV infection in India was 1-2% [15]. In our country there is a wide variation in prevalence of HBV infection in the different regions. High prevalence (9.5%) has been reported by Prakash et al in North India [16]. An extensive review by INASL has shown a consensus figure of 4.7 % as the national average for HBV carrier state [17].

In our study the prevalence of HBV infection was highest in the age group 26-33 (50 %), comparable to study of Sibia P *et al*. they also found 25-30 years to be the most common age group with highest HBV infection [11].

Pontius Bayo *et al*. [18] found that the prevalence of HBV infection was higher among women aged 20 years or younger(20%) compared with the older women, while Frambo AAB *et al*. found that the highest prevalence was in age group 15-19 (20%) followed by age group 30-34(13.64%) [19].

About 30-40% of all chronic HBV infection results from perinatal transmission. Neonates who are infected by hepatitis B will have an almost 90% risk of developing chronic hepatitis B surface antigen carriage and chronic liver disease [21]. In order to prevent perinatal transmission and spread of infection within the larger community, pregnant mothers should be screened for HBV infection. USPSTF found convincing evidence that universal prenatal screening for HBV infection and appropriate and timely management of infected pregnant mother substantially reduces perinatal transmission of HBV and the subsequent development of chronic HBV infection. The infants born to seropositive HBsAg mothers should receive 0.5 ml Hepatitis B Immunoglobulin and Hepatitis B vaccine within 12 hours of birth [20]. USPSTF also found that that there are no published studies that describe harms of screening for HBV infection in pregnant women [21].

LIMITATIONS OF THE STUDY

Only HBsAg was tested as a marker for HBV infection. If other markers were combined with HBsAg, the study would have been more informative and reliable. Moreover in a country like India where a large number of deliveries are still non-institutional, many seropositive cases are still unknown.

CONCLUSION

HBsAg seropositive pregnant women are mostly asymptomatic. In this study HBV seroprevalence amongst asymptomatic pregnant women was found to be 0.83%. So, universal screening of all pregnant women for HbsAg should be done, irrespective of risk factors, to determine the accurate seroprevalence, prevent transmission of infection in their offspring's and to intervene timely before they progress to chronic hepatitis, cirrhosis and hepatocellular carcinoma. Prevention of transmission of infection in neonates would also be helpful to reduce the overall carrier rate in community.

REFERENCES

1. Shao ER, Mboya IB, Gunda DW, Ruhangisa FG, Temu EM, Nkwama ML, Pyuza JJ, Kilonzo KG, Lyamuya FS, Maro VP. Seroprevalence of hepatitis B virus infection and associated factors among healthcare workers in northern Tanzania. BMC Infect Dis. 2018 Sep 21;18(1):474.
2. Belongia EA, Costa J, Gareen IF. "National Institutes of Health Consensus Development Conference Statement: management of hepatitis B," Annals of Internal Medicine. 2009; 150: 104–110.
3. World Health Organization. Hepatitis B [Internet]. Fact sheet N°204. 2015 [cited 2015 Aug 20]. Available from:http://www.who.int/mediacentre/factsheets/fs204/en/
4. Chatterjee S, Ravishankar K, Chatterjee R, Narang A, Kinikar A. Hepatitis B Prevalence during pregnancy. Indian Pediatrics. 2009; 46(11):1005-8.
5. Yang HI, Lu SN, Liaw YF, You SL, Sun CA, wang LY. Hepatitis B e antigen and the risk of

hepatocellular carcinoma. N Engl J Med. 2002; 347:168-174.
6. Chen DS. Hepatitis B vaccination. The key towards elimination and eradication of hepatitis B. *Journal of Hepatology*. 2009;50(4):805–816.
7. Chen HL, Lin LH, Hu FC, Lee JT, Lin WT, Yang YJ, Huang FC, Wu SF, Chen SC, Wen WH, Chu CH. Effects of maternal screening and universal immunization to prevent mother-to-infant transmission of HBV. Gastroenterology. 2012 Apr 1;142(4):773-81.
8. Screening for Hepatitis B Virus Infection in Pregnancy: U.S. Preventive services task Force Reaffirmation Recommendation Statement. Annals of internal Medicine. 2009;150(12):869-74.
9. Dwivedi M, Misra SP. Seroprevalence of hepatitis B infection during pregnancy and risk of perinatal transmission. Indian J Gastroenterol. 2011;30:66.
10. Chatterjee S, Ravishankar K, Chaterjee R, Narang A, Kinikar A. Hepatitis B prevalence during pregnancy. Indian Pediatr. 2009;46:1005-8.
11. Sibia P. Seroprevalence of Hepatitis B Infection among Pregnant Women in One of the Institute of Northern India. Journal of Clinical and Diagnostic Research. 2016;10(8):QC08-9.
12. Bakthavatchalu S. Hepatitis B surface antigen carrier state among asymptomatic pregnant women and its correlation with vertical transmission. Int J Res Pharm Sci. 2012;2(3):111–20.
13. Khakhkhar VM, Bhuva PJ, Bhuva SP, Patel CP, Meera S C. Seroprevalence of hepatitis b amongst pregnant women attending the antenatal clinic of a tertiary care hospital, jamnagar (Gujarat) Natl J Med Res.2012;2(3):362–65.
14. Paranjothi S, Vijayarani H. Prevalence of hepatitis b virus surface antigen in pregnant women attending a private hospital in krishnagiri. Adv Bio Tech. 2009;9(5):38–40.
15. Lodha R, Jain Y, Anand K, Kabra SK, Pandav CS. Hepatitis B in India: A review of disease epidemiology. Indian Pediatrics. 2001;38(4):349-71.
16. Prakash C, Sharma RS, Bhatia R, Verghese T, Datta KK. Prevalence of North India of hepatitis B carrier state amongst pregnant women. Southeast Asian J Trop Med Public Health. 1998; 29:80-4.
17. Indian Association for Study of the Liver (INSAL). Hepatitis B in India; therapeutic options and prevention strategies-Consensus statement. Indian J Gastroenterol. 2000; 19:C4-66.
18. Bayo P, Ochola E. High Prevalence of hepatitis B virus infection among pregnant women attending antenatal care: a cross-sectional study in two hospitals in Northern Uganda. BMJ Open. 2014; 4:e005889.
19. Frambo AA, Atashili J, Fon PN, Ndumbe PM. Prevalence of HBsAg and knowledge about hepatitis B in pregnancy in the Buea Health District, Cameroon: a cross-sectional study. BMC Res Notes. 2014; 7:394.
20. Screening for Hepatitis B Virus Infection in Pregnancy: U.S. Preventive services task Force Reaffirmation Recommendation Statement. Annals of internal Medicine. 2009; 150(12):869-74.
21. Shyamala R, Janardhan Rao R. Seroprevalence of Hepatitis B surface antigen among pregnant women attending antenatal clinic in a teaching hospital. J Microbiol Biotech Res. 2012; 2(2):343-5.