

An Epidemiological Assessment of the Seroprevalence of Hepatitis B Virus Infection among Pregnant Women

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Conflict of interest: Nil

Abstract

Aim: To investigate the seroprevalence of Hepatitis B virus infection among pregnant women receiving treatment at a tertiary hospital in Bihar

Material and Methods: This study was conducted in the Department of Microbiology, Anugrah Narayan Magadh Medical College, Gaya, Bihar, India from Jan 2018 to December 2018. Every pregnant woman coming for antenatal care at the study location was screened for Hepatitis B virus according to national guidelines. All pregnant women were evaluated for serum HBsAg using ELISA (Merilisa kit) and Rapid immunographic test. (Reckon Kit). This retrospective study was conducted to determine the seroprevalence of the HBsAg.

Result: Total 4131 antenatal women were screened for Hepatitis B Surface Antigen. A total of 21 cases were found to have HBsAg positive out of 4131 who underwent testing, indicating a prevalence rate of 0.50%. Such low prevalence is suggestive of increased awareness of people towards vaccination and routine antenatal screening. The mean age of HBsAg positive pregnant women was 26.23 years. Four subjects (19%) were from rural area while 17 (81%) were residing in urban area. None of these antenatal women had HBV-HCV or HBV-HIV co-infection. Most common age group with HBV infection was 25 – 30 years, with 21 subjects indicating a prevalence rate of 0.50%.

Conclusion: The risk of chronic infection in Hepatitis B is more if the infection is acquired in early age. The risk of chronicity is >90% in newborn. Neonates who acquire infection from their mother during pregnancy have higher chances of becoming chronic carrier. Such babies develop chronic liver disease at a younger age and represent the most important reservoir of infection in the community.

Keywords: HBV, HBsAg, Antenatal women, Prevalence, RSUTH

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Introduction

Hepatitis B virus (HBV) infection remains a significant global health concern, particularly affecting vulnerable populations such as pregnant women. Antenatal screening for HBV is crucial due to the risk of vertical transmission to the newborn, which can lead to chronic infection and associated complications later in life. Seroprevalence studies provide essential epidemiological insights into the prevalence and distribution of HBV infection among pregnant women, guiding public health strategies and interventions aimed at prevention and management. [1-4] Studies conducted worldwide have shown varying prevalence rates of HBV among antenatal women. More than a one third of global population is estimated to be infected by HBV. About quarter of them become HBV carriers. Worldwide about 1 million deaths occur each year

due to chronic form of disease. [5] The sera of infected patients may contain as many as 1010 infectious Virion per ml³. The natural reservoir of HBV is man. Hepatitis B virus attacks liver cells and can lead to liver failure, cirrhosis or cancer of liver later in life. The asymptomatic HBsAg positive pregnant women can be identified by detecting HBsAg in their blood. [6-9] Transmission can occur at any stage; in utero, during delivery (maximum risk) and during breast feeding. Risk is maximum if mother is HBeAg positive. If mother is positive for HBsAg) then immediate care of baby to be taken in form of immunoglobulin and vaccination. Antenatal screening will also help in preventing further transmission to her spouse by taking due precaution during sexual contact. [10]

Material and Methods

This study was conducted in the Department of Microbiology, Anugrah Narayan Magadh Medical College, Gaya, Bihar, India from Jan 2018 to December 2018 for the present study 4131 pregnant women were studied for detection. Every pregnant woman coming for antenatal care at the study location was screened for Hepatitis B virus according to national guidelines. [11] All pregnant women were evaluated for serum HBsAg using ELISA (Merilisa kit) and Rapid immune graphic test. (Reckon Kit). This retrospective study was conducted to determine the seroprevalence of the HBsAg.

Inclusion Criteria

All the pregnant women who visited for antenatal care at the institute

Exclusion Criteria

Women who were not pregnant.

Result

Total 4131 antenatal women were screened for Hepatitis B Surface Antigen. A total of 21 cases were found to have HBsAg positive out of 4131 who underwent testing, indicating a prevalence rate of 0.50%. Such low prevalence is suggestive of increased awareness of people towards vaccination and routine antenatal screening. The mean age of HBsAg positive pregnant women was 26.23 years. Four subjects (19%) were from rural area while 17 (81%) were residing in urban area. None of these antenatal women had HBV-HCV or HBV-HIV co-infection. Most common age group with HBV infection was 25 – 30 years, with 21 subjects indicating a prevalence rate of 0.50%.

Table 1: Overall Screening Results

Total Antenatal Women Screened	HBsAg Positive Cases	Prevalence Rate (%)
4131	21	0.50

Table 2: Demographic Characteristics of HBsAg Positive Cases

Mean Age (years)	Residence (Urban/Rural)	Co-infection Status (HBV-HCV/HBV-HIV)
26.23	Urban: 17 (81%), Rural: 4 (19%)	None

Table 3: Age Distribution of HBsAg Positive Cases

Age Group (years)	Number of Cases	Prevalence Rate (%)
25 - 30	21	0.50

Discussion

Seroprevalence of hepatitis B virus in antenatal women was 0.50% in our study. We have also compared some other studies from different parts of India showing different prevalence of Hepatitis B virus in antenatal women. Our study showed Hepatitis B prevalence rate 0.50% out of 4131

samples in antenatal women which is lower than the previous studies mentioned in the above table which might be due to increase awareness in form of increase number of screening in antenatal population, due to availability of an effective vaccine against Hepatitis B and awareness amongst population for use of this vaccine.

Table 4

Name of study	Year of Publication	Sample size	Prevalence rate
Mehta K <i>et al.</i> [15]	2013	1810	2.9
Bakthavatchalu <i>et al.</i> [16]	2012	500	7.8 %
Khakhkhar <i>et al.</i> [17]	2012	2050	3.07%
Dwivedi M <i>et al.</i> [13]	2011	4000	0.9
Pande C <i>et al.</i> [14]	2011	20104	1.2
Chaterjee S <i>et al.</i> [12]	2009	36379	0.82

Mehta K *et al.* (2013) indicated a moderate prevalence rate of 2.9% based on a substantial sample size of 1810 participants. Bakthavatchalu *et al.* (2012) reported the highest prevalence rate at 7.8%, despite a smaller sample size of 500, suggesting a significant occurrence in their studied population. Khakhkhar *et al.* (2012) found a slightly higher prevalence rate of 3.07% with a sample size of 2050, providing a considerable dataset for

analysis. Dwivedi M *et al.* (2011) reported a relatively low prevalence rate of 0.9% with a large sample size of 4000. Pande C *et al.* (2011), with the largest sample size of 20104, reported a prevalence rate of 1.2%, indicating a low occurrence but with robust data support. Chaterjee S *et al.* (2009) involved the largest sample size of 36379 and reported the lowest prevalence rate at 0.82%, suggesting a very low occurrence in the studied population. In summary, the prevalence rates of the

condition ranged from 0.82% to 7.8%, indicating variability across different studies. Studies with larger sample sizes (Pande et al. and Chatterjee et al.) generally reported lower prevalence rates, which may suggest a broader and potentially more representative population sample. Bakhavatchalu et al. reported the highest prevalence rate, possibly influenced by study design, population characteristics, or regional differences. These studies collectively highlight the importance of sample size and study design in determining the prevalence rate of medical conditions.

Conclusion

The risk of chronic infection in Hepatitis B is more if the infection is acquired in early age. The risk of chronicity is >90% in newborn. Neonates who acquire infection from their mother during pregnancy have higher chances of becoming chronic carrier. Such babies develop chronic liver disease at a younger age and represent the most important reservoir of infection in the community. Thus early screening and detection helps in prevention of vertical transmission from mother to foetus and decreases overall carrier rate. Perinatal transmission can be prevented by administration of HBIG to babies within 48 hours of birth. The risk of transmission increases if mother is Hepatitis B envelope Antigen (HBeAg) positive. So, along with HBsAg detection, HBeAg detection should be included in antenatal screening. To further reduce the prevalence, awareness campaign should be run among community regarding modes of transmission, screening and availability of effective vaccine for hepatitis B virus.

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