

## Seroprevalence of Hepatitis B Virus among Patients at a Tertiary Health Care Centre in Rajasthan

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### Abstract

### Original Research Article

**Objective:** To ascertain the prevalence of Hepatitis B infection among patients visiting a tertiary care center in Jaipur, Rajasthan. **Material and methods:** An observation analytic study was done at a tertiary care center affiliated to Medical College with retrospective analysis of the hospital data of two calendar years. During this period HBV infection screening was offered to every suspected patient admitted in hospital and every pregnant women visiting antenatal care clinic. Patients with history of Hepatitis B vaccinations in last 30 days were not screened for HBs antigen at our center. The HBV screening was done using commercially available enzyme linked immunosorbent assay kits (ELISA) for detection of surface antigen (HBs Ag). **Results:** The study prevalence of HBV infection was 1.35% (441/32,772). The prevalence was more in male (2.14%) than females (1.22%). The study prevalence of HBV among pregnant females was 1.13% (232/20565). Maximum positive cases (290/441, 65.76% positive cases) were in the age group of 21-40 years. **Conclusion:** In this study, prevalence of HBV infection was 1.35%. The study prevalence of HBV among pregnant females was 1.13%. Maximum positive cases (290/441, 65.76% positive cases) were in the age group of 21-40 years. This study aids in view to strengthen proper screening for HBV (HBs antigen) and effective vaccination for Hepatitis B virus to reduce HBV related morbidity and mortality.

**Keywords:** HBV infection, HBs antigen, pregnant female, screening, prevalence.

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## INTRODUCTION

The prevalence of HBV infection is different in various part of the world [1, 2]. India is in the low endemicity zone ( $\leq 2\%$ ) with prevalence of about 1.5% in general population with maximum prevalence of 1.9% reported from south India [3, 4]. In the 20<sup>th</sup> century in India, the prevalence of HBV infection was 2-8% with 0.6% to 11.2% among pregnant women in different studies [5]. Over the years, the figures have shown improvement due to better hygiene and medical delivery scenario.

Of the various modalities of HBV transmission, vertical mother to child transmission & transmission through blood products are avoidable. In order to achieve the WHO goal of elimination of viral hepatitis (HBV) as a public health threat by 2030, these transmission routes have to be addressed in full measure [6]. For a given population, prevalence rates of HBV infection must be ascertained at suitable periods to

monitor the decline / rise of the rates. Irony of HBV infection per se is the paucity of symptoms. Global emphasis is on wide surveillance, particularly in pregnant women [1]. In Rajasthan, under the Mukhyamantri Nishulk Jaanch Yojna (MNJY), HBsAg test (screening for HBV infection) is made available to the population, free of cost. This would have a tangible impact in the decades to come.

We are reporting the HBV prevalence figures which are perhaps the largest report of its kind ever done and spread over 24 months from a tertiary medical care center [7].

## MATERIALS AND METHODS

The present study was an observation analytic study done at a tertiary care center affiliated to Medical College in the capital city of Rajasthan. The hospital data of two calendar years were analysed retrospectively. During this period HBV infection

screening was offered to every suspected patient admitted in hospital and every pregnant women visiting antenatal care clinic. Patients with history of Hepatitis B vaccination in last 30 days were not screened for HBs antigen at our center.

Five ml of venous blood sample was collected from left antecubital vein under all aseptic precautions from each eligible patient and was transported immediately to the laboratory for testing. In case of delay, serum sample was separated & stored in refrigerator at 2-8°C till testing. Serum was separated in clean test tube after clotting via centrifugation. The HBV screening was done using commercially available enzyme linked immunosorbent assay kits (ELISA; Trustwell, Athenese-Dx Pvt. Ltd, India) for detection of surface antigen (HBs Ag) in institutional premises, after consent of the patient and according to manufacturer's instructions. The person performing the test was blinded to the clinical state of the patient.

When the serum sample was found positive for HBs Ag then the patient was labeled as HBV infected.

## RESULTS

In this study, total 441/32,772 samples were found positive for HBs Ag so the study prevalence of HBV infection was 1.35%. The prevalence was more in male (2.14%) than female (1.22%) (Table No 1).

The study prevalence of HBV among pregnant female was 1.13% (232/20565) (Table No.2).

Maximum positive cases (290/441, 65.76% positive cases) were in the age group of 21-40 years (sexually active group) and minimum positivity was found in children (00 case, 0-10 years age). (Table No 3).

**Table-1: Seroprevalence of HBs antigen among study population**

Sex	Positive		Negative		Total	
	N	%	N	%	N	%
Male	93	2.14	4243	97.86	4,336	100
Female	348	1.22	28088	98.78	28436	100
Total	441	1.35	32,331	98.65	32,772	100

**Table-2: Seroprevalence of HBs antigen among Female subjects**

	Positive n		Negative		Total	
	N	%	N	%	N	%
Pregnant	232	1.13	20,333	98.87	20,565	100
Non-pregnant	116	1.48	7,755	98.52	7,871	100
Total	348	1.22	28088	98.78	28436	100

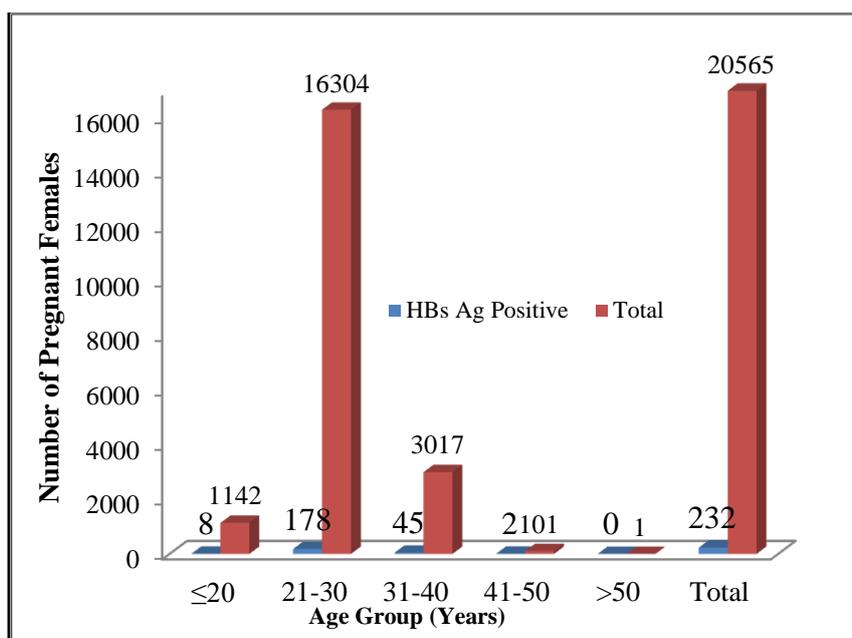
**Table-3: Age wise distribution of study population**

Age (years)	HBs Ag Positive		Total	
	N	%	N	%
0-10	0	00	195	0.59
11-20	14	3.17	1940	5.92
21-30	216	48.97	18816	57.41
31-40	74	16.78	5206	15.89
41-50	42	9.52	2143	6.54
>50	95	21.54	4472	13.65
Total	441	100	32,772	100

## DISCUSSION

Hepatitis B virus is a formidable public health problem with catastrophic consequences like chronic hepatitis, liver cirrhosis & hepatocellular carcinoma. More importantly, the carriers serve as reservoirs to spread the infection onwards. We are reporting the HBV prevalence figures, the sample size of which is perhaps the largest of amongst such studies [7].

In India, overall prevalence of HBV is reported to be 1-2% [8]. In our study, the prevalence of HBV infection is 1.35%. It is less than other reports from different parts of India, Chennai (1.9%) and Vellore (1.7%) [6, 9] Sood *et al.* [10] conducted a similar study in Jaipur and noted lower (0.87%) prevalence of HBV seropositivity compared to our study [10] The sample size of their study was 3196 with a duration of study was 14 months in 2010[10].



**Fig-1: Age wise distribution of pregnant females**

In neighbouring countries like Nepal and Pakistan, the sero-prevalence of HBV infection were reported as 2.5% and 2.28% respectively [11, 12]. India is in the low endemicity ( $\leq 2\%$ ) with prevalence of 1.5% in general population [3]. Hepatitis B prevalence is highest in the WHO Western Pacific Region and the WHO African Region, where 6.2% and 6.1% respectively of the adult population is infected. In the WHO Eastern Mediterranean Region, the WHO South-East Asia Region and the WHO European Region, an estimated 3.3%, 2.0% and 1.6% of the general population is infected, respectively [3]. Worldwide, the prevalence is lowest in developed countries practicing healthy living including effective vaccination, improved sanitation and safe transfusion measures.

In our study, 86.77% of the study subjects were female and out of them 72.32% were pregnant. The prevalence of HBV among males was 2.14% and among females was 1.22%. The prevalence of HBV among pregnant females was 1.13%. In a study from Eastern India, 3.9% seroprevalence of HBV was reported among pregnant women [13]. The seroprevalence of Hepatitis B virus infection varies between 4-8% in pregnant women in South Africa and 4.1-8.4% in Thailand [14, 15].

Screening of pregnant women for HBs Ag infection is an important tool to decrease the risk of vertical transmission by timely immune prophylaxis to neonates of infected mothers. Universal screening of pregnant women, immunisation of negative mothers and proper immune prophylaxis of newborns of positive mothers will prove helpful in reducing the transmission of hepatitis B virus in general population [13].

In the current study, maximum positive cases (290/441, 65.76% positive cases) were in the age group of 21-40 years (sexually active group). Similar to our study in western India, studies in south India also reported highest seropositivity of HBV among 21-40 years age group and lowest among 0-20 years [16]. In echo with our study, maximum seropositivity was found in 21-30 years of age group in Delhi [17]. Similar to our study, the increase in seropositivity of HBV with age was also shown in other reports [17]. The possible explanation of this age related increase in seropositivity probably is the cumulative increase in the risk of exposure with increasing age [17]. The high prevalence rates of HBs Ag in 21-40 years group is due to increased sexual activity, blood transfusions, tattooing and intravenous drug abuse among the young adults [18].

In our study, children (0-20 years) has low seropositivity (14/2135, 0.66%). A study done in Maharashtra also found low seropositivity (0.73%) in children with similar age group [19]. These finding of low seropositivity indicates that the HBV infection is not due to vertical transmission in current scenario and horizontal transmission is more significant. The significance of horizontal transmission of HBV infection in India has also been stressed by Aggarwal *et al.* [20] who reported horizontal transmission in majority of children (85%) as possible route. Hepatitis B sero-surveillance began in full measure in the ending years of 20<sup>th</sup> century. Data of age groups with seropositivity indicate that children (0-15 year's age) tested positive because of vertical transmission [21]. Due to effective management of newborn against Hepatitis B, risk and disease has led to very low seroprevalence among the children. India, with the largest birth cohort in the world, introduced Hepatitis B

vaccine coverage to all parts of the country in 2011 and it has been accepted well by both the community and healthcare workers resulting in low HBV infection in children [2].

In Rajasthan, under the Mukhyamantri Nishulk Jaanch Yojna (MNJY), HBsAg test (screening for HBV infection) is made available to the population, free of cost. Though this make the screening easy, to achieve the WHO goal of elimination of viral hepatitis (HBV) as a public health threats by 2030, periodical Surveillance of the HBV along with modifications in the approach towards HBV carrier's are required at stakeholder's level. In a population-based study, when anti-HBe Ab testing was performed in HBs Ag positive cases, 90% were found to be positive for anti-HBe Ab [22]. To achieve the WHO goal, a step beyond the current practices is needed. Other hepatitis markers like HBeAg and Anti-HBe Ab would make the whole effort more incisive. The inclusion of Anti-HBe Ab test will improve the management of HBV.

The other distinctive test for HBV infection is anti-HBc which can be detected throughout the course of HBV infection. The IgM anti-HBc is an indicator of acute HBV infection and is the sole marker of HBV infection during the window period, IgG anti-HBc persists along with anti-HBs in patients who recover from acute hepatitis B or in chronic HBV infection indicating infection in remote past. Patients with isolated IgM anti-HBc (as occur in window period) can transmit HBV to others especially via blood or organ donation [23]. The addition of anti-HBc in screening will improve detection of HBV infection.

### Limitations

This study was done at a tertiary care center with limited study population and the duration. A multicenter, long duration study with large sample size is required to validate the results across the state or country. The current study definitively has built a platform for such larger studies.

### CONCLUSION

In this study, prevalence of HBV infection was 1.35%. The study prevalence of HBV among pregnant females was 1.13%. Maximum positive cases (290/441, 65.76% positive cases) were in the age group of 21-40 years.

This study aids in view to strengthen proper screening for HBV infection and effective vaccination for Hepatitis B virus to reduce HBV related morbidity and mortality.

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