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A Sentinel Surveillance Study on the Prevalence of Hepatitis B Infection in a Tertiary Care Hospital in Eastern India

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Abstract: Objectives: *The purpose of this study was to establish the current prevalence of hepatitis B virus among patients attending Dept. Of Microbiology in a tertiary care hospital in eastern India for detection of Hepatitis B infection.*

Method: *10485 serum samples were tested for detection of HBsAg using commercially available kits, over a period of 1 year from August 2013 to July 2014. Results were evaluated according to age groups, sexes, likely mode of transmission and probable cause for screening . HBsAg reactive samples were tested for HIV and HCV detection.*

Result: *During the study period, prevalence rates of HBV infection was 2.64 % & more prevalent (58.5%) in male patients. HBsAg reactivity was highest (66.4%) in 15-45 yrs of age group .Most cases were detected during antenatal screening(23.1%). Sexual transmission was most significant route in adults.Childhood infections were mostly horizontally transmitted. Only 2 thalassemic children and 1 HIV seropositive adult suffered from dual infections by HBV & HCV. 21 patients tested positive for HIV among Hepatitis B infected patients.*

Conclusion: *This study highlights the prevalence rate of HBV to be highest among asymptomatic pregnant women and sexual transmission to be most significant, thereby indicating further need for epidemiological studies for better prevention of disease transmission*

Keywords: *HepatitisB, HBsAg, ViralHepatitis, Chronic hepatitis*

I. Introduction

Hepatitis B virus (HBV)continues to impart a major burden on the public health system across the globe. India due to sheer enormity of its population contributes significantly to the global pool of hepatitis infected cases.HBV infection is prevalent worldwide affecting more than 2 billion people causing chronic hepatitis in over 350 million among them[1].

HBV is the second most common cause of acute viral hepatitis after HEV in India. With a 3.7% point prevalence and over 40 million HBV carriers, India is considered to be in the zone of intermediate prevalence by WHO[2].Spread of HBV infection in many South Asian countries is attributed to unsafe blood supply, reuse of contaminated syringes, lack of maternal screening to prevent perinatal transmission and delay in the introduction of hepatitis B vaccine .The predominant mode of transmission is horizontal rather than vertical in India[3]. A high endemicity of HBV infection has been reported in the tribal populations which has been attributed to inbreeding, poor hygienic living conditions, close person-to-person contact and certain socio-cultural practices which may facilitate transmission of HBV[4,5].

HBV can lead to a wide range of symptoms ranging from those associated with acute hepatocellular necrosis to more chronic cases, even resulting in distant sequel like cirrhosis and hepatocellular carcinoma .After introduction of the infection, the first viral marker to be positive in case of hepatitis B in 1-12 weeks is HBsAg . The 350–400 million HBsAg carriers in the world constitute the main reservoir of hepatitis B in human beings. A diagnosis of HBV infection can usually be made by detection of HBsAg in serum. Infrequently, levels of HBsAg are too low to be detected during acute HBV infection, even with contemporary, highly sensitive immunoassays. In such cases, the diagnosis can be established by the presence of IgM anti-HBc[6]

The present study is undertaken to establish the current prevalence of hepatitis B among patients attending a tertiary care hospital in eastern India .Our objective was to assess the demographic profiles of the HBsAg positive persons and to highlight the most probable mode of transmission of the disease in them .We also looked for the presence of dual infection with HCV and/or HIV in those patients.

II. Materials & Methods

The present study was undertaken in the Microbiology department of a tertiary care hospital in eastern India. Blood samples were collected at the Serology laboratory in the Dept. of Microbiology from August2013 to July2014 for detecting the presence of Hepatitis B infection in patients attending OPD or admitted in different wards in our hospital and were undergoing these laboratory procedures as part of routine pre-operative screening or for diagnostic purpose.

At least 5ml of blood was collected by venepuncture aseptically and was then transferred into sterile, disposable collection vials without anticoagulants labelled with patient identification. The request form was properly filled up. Sample was allowed to clot at room temperature for about 1 hr for clot retraction. Serum was separated by centrifugation at a speed of 3000 rpm for 10minutes & stored up to 48 hrs. at 2^0-8^0C

Patient's sera were subjected to qualitative detection of HBsAg by sandwich ELISA method using ErbaLisa Hepatitis B kit. All samples were tested as per the manufacturer's instructions with adequate quality control & the absorbance values were read at 450nm as reference wavelength by ELISA reader All positive cases were subjected to oral questionnaire to find out the demographic profiles, marital status, probable cause for testing, symptomatic evidence & probable mode of transmission subsequently.

All samples positive for HBV were further tested for the presence of HIV and/or HCV infections. Presence of IgM Anti-HCV antibody was detected by Rapid immunochromatography using SD Bioline HCV kit. Detection of HIV was done using CombAids kit and the serum indicative of positive result by CombAids test, were further tested using Triline & Trispot kits as second & third line tests .The samples showing positive result for all of the three tests above were counted as HIV sero-positive in the study.

III. Results

A total of 10485 serum samples were collected for detection of HBsAg. During the study period, prevalence rate of HBV infection was 2.64 % (n=277)

Table 1 – Prevalence Of Hepatitis B Infection Among Patients In A Tertiary Care Hospital

	Total number of sample received	No. of positive samples	Percentage of positive samples
HBsAg	10485	277	2.64

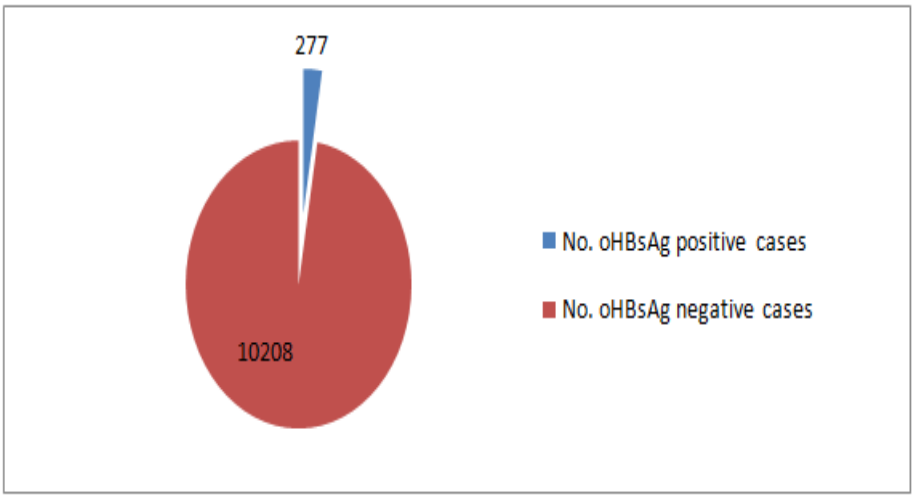

Figure 1- Prevalence Of Hepatitis B Among Patients In A Tertiary Care Hospital.

HBsAg positivity was highest (66.4%) in 15-45 yrs age group. HBV was slightly more prevalent in male(58.5 %) than in female(41.5 %) patients.

Table2 - Percentage Prevalence Of Hepatitis B Among Patients Of Different Age Groups.

Age groups	<5years	5-15years	15-45years	45-60years	>60years
Total no. of HBsAg positive cases (n=277)	22%	5.4%	66.4%	16.2%	9.7%

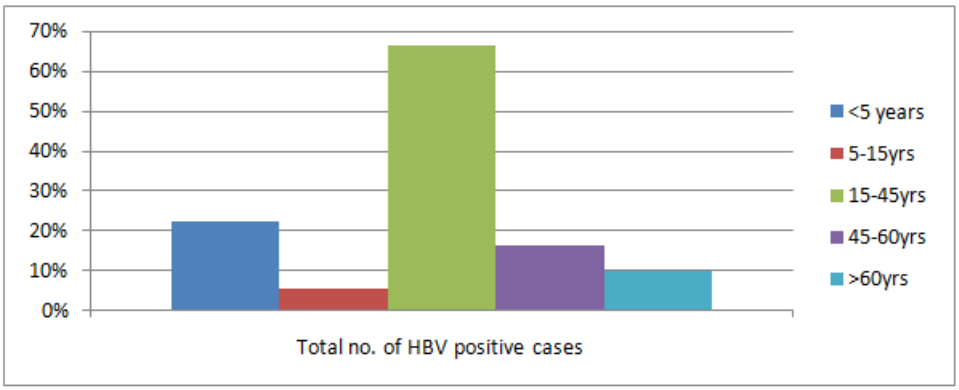

Figure 2- Percentage Prevalence Of HbsAg Positive Patients In Different Age Groups.

Table 3- Sex Prevalence Of HBV Infection In Percentage

	Male	Female
Total no. of HBsAg positive cases (n=277)	58.5%	41.5%

Most of the Hepatitis B cases were asymptomatic and was detected during routine screening for antenatal (23.1%) and pre-operative(18.8%) cases. Symptomatic cases mostly presenting with hepatitis & related gastro-intestinal symptoms accounted for 21.3% of all positive cases. Only 4.3% of Hepatitis B cases were diagnosed in patients attending Hematology OPD & requiring frequent blood & related product transfusion for diseases such as Thalassemia,Haemophilia & Aplastic anaemia.

Table 4- Categorization Of Hepatitis B Patients Depending Upon The Probable Cause For Undergoing Investigations

Indication	no. of HBV infected patients	Percentage of HBV infected patients(%)
Hepatitis & GI symptoms	59	21.3
Patients attending Haematology OPD	12	4.3
Pre-operative screening	52	18.8
Antenatal screening	64	23.1

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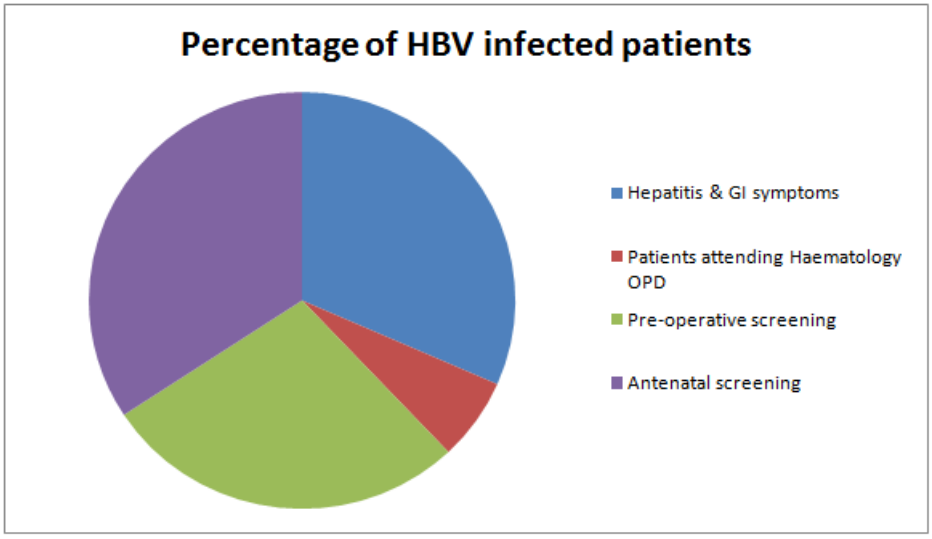

Figure 3: Categorization Of Hepatitis B Patients Depending Upon The Probable Cause For Undergoing Investigation.

Lack of safe sexual practices was reportedly the most significant risk factor(67.87%) associated with HBV infection in our study.21 patients tested positive for HIV among these Hepatitis B infected patients .Only 2 `thalassemic children and 1 HIV sero-positive adult suffered from dual infections by HBV & HCV. Prior history of multiple blood transfusion was obtained in 6.86% of patients. 2.53% infection was reported in infants whose mothers were HBsAg positive.

Table 5- Categorization Of Hepatitis B Patients According To The Risk Factors Associated

Associated RISK FACTORS	No. of HBV infected patients	Percentage of HBV infected patients
Multiple blood transfusion	19	6.86%
Multiple sexual partner/spouse HBV positive	188	67.87%
IV drug abuse	4	1.44%
Hemodialysis patients	1	0.36%
Infants born to HBV infected mothers	7	2.53%
Associated HIV/HCV infection	23	8.3%

Out of the 76 children of less than 15 years of age included in our study ,risk factors such as multiple blood transfusion in patients with haematological disorders or birth to a HBsAg positive mother was associated in 14.47% & 9.21% respectively. Others presented with no identifiable risk factors.

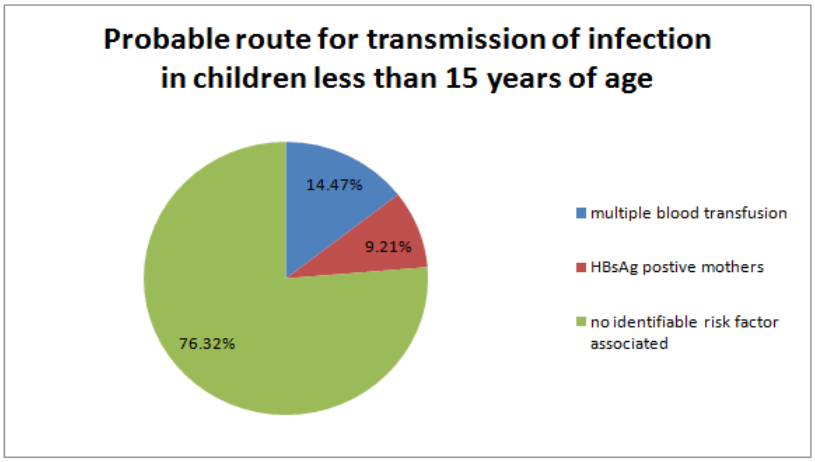

Figure 4-Probable Route Of Hepatitis B Infection Transmission In Children Less Than 15 Years Of Age.

IV. Discussion

Hepatitis B is mostly prevalent among people living in poor socio-economic conditions. About 43% of world's population lives in areas of intermediate endemicity , where the prevalence is 1-7% and the lifetime risk of infection ranges from 20-60%[17].There are varying reports of overall rate of HBsAg positivity in India ranging between 2-4.7% which is in concordance with our study[7,8].

Our study suggested that the disease is more common in male than female population. No plausible explanation has been given for the higher prevalence in males in the general population but probably females clear the HBV more efficiently as compared to males.[9]

According to our study, most of these HBV infected patients were asymptomatic .Different studies suggest HBV to cause chronicity rather than presenting with acute symptoms. Only 6% of deaths of HBV infected patients were directly related to acute HBV infection. HBV infection is estimated to be the cause of 30% of cirrhosis & 53% of liver cancer in the world [10].94% of HBV related deaths were attributed to complications like cirrhosis & HCC [11].

The prevalence of HBsAg positivity in pregnant women has been reported to range from 0.9-6.3% in India [12,13].This study found out that the infection was mostly incidentally detected during antenatal and pre-operative screening.9.21% of the cases occurring under 15 years of age probably contracted the infection through exposure to HBV infected mothers which is significant as the risk of progression to chronic liver disease and development of hepatocellular carcinoma in individuals who acquire the infection at birth is high. Pregnant women constituted the single largest group identified to be HBsAg reactive in our study, thereby highlighting the importance of HBsAg detection & prevention of vertical transmission as a very significant area for the public health system workers.

As revealed in this study, HBV co-infection with HIV and/or HCV is another area of concern[14].The cause of HBV & HCV co-infection in our study was multiple blood transfusions in two thalassemic children & sexual promiscuity in a single adult patient who was also HIV positive. among the 21 patients suffering from dual infections with HIV & HBV, sexual route was probably responsible for these infections in 9 patients .5 patients had received multiple transfusions in past ,2 were chronic intra-venous drug abuser among them. Rest of the patients were unable to disclose any suggestive history for their illness.

It was observed in other studies that HBV was more prevalent in unmarried patients, as HBV can be transmitted through sexual contact [15], and thus these patients are free to indulge in more sexual activity. Unsafe sexual behaviour was the most significant risk factor associated with the cases in our study. This calls

for better strategy to identify the high risk groups and proper education to them to curb the transmission rates of not only HBV but also HIV and other sexually transmitted infections in near future. 76.32% infections in childhood was horizontally transmitted probably due to poor quality of living in a developing country like India as also suggested by other studies[12].The predominant mode of transmission is horizontal rather than vertical in India[3]The specific modality of horizontal transmission is unknown but close contact to a infected person resulting in exposure of non-intact skin or mucous membranes with tears, saliva or blood containing secretions or through sharing of toothbrushes may be the responsible factor[16].

V. Conclusion

Hepatitis B virus transmitted predominantly through the horizontal route, is continuously rising as a silent epidemic in India. Chronic carriers being unaware of their infective status, continue to infect others for long and eventually burden the society with loss of productive workforce, and the health care system with a serious challenge of managing those chronic complications which are financially difficult to handle in a developing country like India. The ideal way to decrease HBV related deaths is to first prevent infection through vaccination & strategies related to reduction of transmission & to prevent progression of disease in those already infected[3]. An overall decline in the prevalence of the disease due to global infant and childhood vaccination programmes ,post-exposure prophylaxis and anti-viral therapy has brought us hope to improve the prevailing condition in our country & resulted in a scaled up operation countrywide since 2011[3].in India the transmission is mostly through childhood horizontal spread due to sub-optimal hygiene and crowded living conditions as observed in our study and also other studies from different regions of India. As per a recent global policy report (2013), India still needs to work in areas of generating data for evidence based policies, implementing preventive measures raising awareness and partnerships, and screening and management. We hope that our study will help in this direction by providing valuable epidemiological informations[14]. Our study re-emphasizes the importance of antenatal screening & implementation of post-exposure prophylaxis in newborn babies of the affected mothers to prevent vertical transmission as a serious attempt by the national health system to prevent further disease transmission. Sincere efforts regarding implementation of infant vaccination programs and prevention of morbid consequences through appropriate & affordable anti-viral therapy holds the key to success in declination of HBV infection in the current Indian scenario.

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