Epidemiological and Clinical Analysis of Hepatitis B Virus Infection in West Bengal.

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ABSTRACT

Background: At present, about 250 million people are living with Hepatitis B virus infection globally, and in India, it is about 30 million individuals, with an increasing trend in many places. In India, the hepatitis B virus (HBV) is still a serious public health issue, and its prevalence varies by location. In most of the studies from India, the overall rate of Hepatitis B has been reported to range from 2-8%. Comprehending the laboratory, clinical, and demographic aspects of infection is essential for efficient disease management.Thus, frequent studies of associated factors may lead to newer strategies for disease control.

Methodology: Data from 217 HBV-positive patients who were identified at a tertiary care hospital in Kolkata (Medical College and Kolkata) between 2018 and 2020 were examined in this retrospective analysis. ICT and ELISA assays were used to screen the patients, and the Gene Xpert System was used to confirm the viral load. Clinical, occupational, and demographic data were analyzed to find trends linked to infection.

Results: Males were more impacted than females, and the highest prevalence was seen in the 21–40 age range. The largest occupational category consisted of housewives (35.02%), and 71.4% of patients were married. The most frequent contributing factors were hepatomegaly and a history of blood transfusions. The majority of patients had normal serum bilirubin and SGPT levels and were asymptomatic; the HBeAg positivity rate was 8.7%.

Conclusion: The study pinpoints important clinical and demographic trends of HBV infection in West Bengal, which might inform preventative measures and bolster public health initiatives for the management of hepatitis B.

Keywords: Hepatitis B, Clinical findings, Laboratory data, Gene Xpert System.

1. INTRODUCTION

HBV is an enveloped hepatotropic non cytopathic virus that can cause acute and chronic hepatitis [1]. This is the only DNA virus among all hepatitis viruses discovered by Blumberg in 1963 . It belongs to the Hepadnaviridae family under the genus Orthohepadnavirus [2] . Viral markers for HBV infection that are detected in patient's blood include HBsAg (appearing within 8-12 wks following infection remaining elevated for the entire duration of acute illness rarely progressing beyond 6 months if disease progresses to chronicity) , HBV DNA and HBeAg (appearing shortly after the appearance of

HBsAg , indicating acute viral replication and can be present in acute , chronic or carrier states) , Anti HBc IgM Ab (appears within 1-2 wks after appearance of HBsAg and lasts for 3-6 months, indicating acute infection) , Anti HBc IgG Ab (appearing at late acute stage remaining indefinitely) , AntiHBs Ab(appears after the clearance of HBsAg indicating diminished viral replication and infectivity) , Anti HBe Ab (appears after the clearance of HBe Ag indicating diminished replication and infectivity) [2].

According to WHO Global Hepatitis Report, 254 million people were living with Hepatitis B virus infection in 2022 with India constituting 29.8 million individuals [3]. In most of the studies from India the overall rate of Hepatitis B has been reported to range from 2-8% [4]

The virus transmission occurs by multiple routes (by parenteral route via blood / blood product transmission and needle stick injury / inoculation during surgical or dental procedures / via shared razors , tooth brush ; sexual transmission ; vertical transmission from HBV carrier mothers to babies occurring at any stage in-utero , during delivery , breast feeding ; direct skin contact with infected open skin lesions . In developing countries parenteral route accounts for the most common route and in developed countries sexual route. [2]

The clinical manifestations of HBV infection vary in both acute and chronic diseases . During acute infection , patient can have subclinical or anicteric hepatitis , icteric hepatitis or less commonly fulminant hepatitis . In chronic infection , patient can have asymptomatic carrier state , chronic hepatitis , cirrhosis and hepatocellular carcinoma . Initial symptoms may include anorexia , nausea , vomiting , abdominal pain , jaundice . In severe liver damage , patient can develop jaundice , hepatic encephalopathy , ascitis , gastrointestinal bleeding secondary to esophageal varices, coagulopathy , infection [5]

Most acute Hepatitis B infections are self limiting do not require any specific treatment . Treatment may be needed in cases of acute hepatitis with acute liver failure / chronic active hepatitis with HBeAg positive , chronic inactive hepatitis with HBV DNA > 2000 IU/ml and elevated SGPT and evidence of liver fibrosis / associated cirrhosis / super carriers / immunotolerant hepatitis . Prophylactic measures with active immunization , passive immunization is also there [2].

2. MATERIAL AND METHODS / EXPERIMENTAL DETAILS / METHODOLOGY

This is a retrospective study from data obtained from 217 Hepatitis B positive patients during 2018- 2020 in a tertiary care hospital in Kolkata. All the above patients were first subjected to HBsAg immunochromatographic card test (ICT) using kit from BIOTECH PVT. LTD. All positive cases were first tested by ELISA test using kit from MEDSOURCE OZONE BIOMEDICALS PT. LTD. and if found positive were further tested by automated Gene Xpert System that makes use of the principle of real time PCR for quantitative assessment of the viral load of the patient . This system uses a single use disposable Gene Xpert cartridge that holds the PCR reagents and hosts the purification and PCR processes . The system also contains a personal computer and preloaded software for running the test and viewing the result. The PCR was performed with serum as sample with a minimum 600 µl volume which was put to a cartridge and tested further .

3. RESULTS AND DISCUSSION

Maximum positive cases were seen in the 21-40 age group (Fig.1). Children and infants below 10 years and the older age group above 70 years are not usually infected by HBV. In a study done by Kolou et al. [6], it was shown that the 20-39 age groups were mostly affected by Hepatitis B virus infection, which corroborates with our study. The higher incidence in this age group may be attributed to active work and the chance of more exposure in this age group.

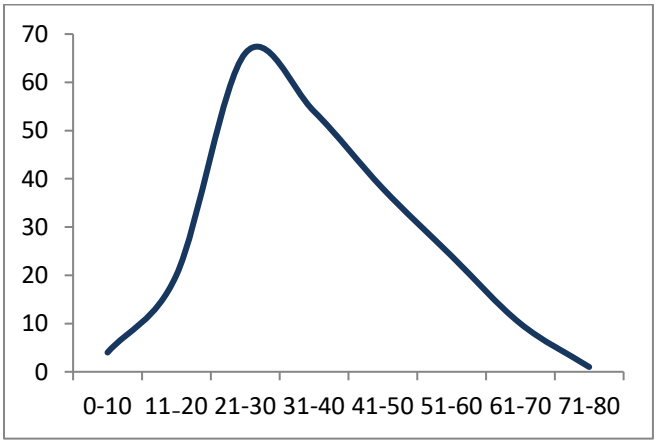

Fig 1: Showing age distribution of Hepatitis B positive cases. The X-axis indicates the age group in years.

In this study, males are more commonly affected than females (Fig.2). Out of 217 study populations, 121 are affected males (55.76%) and 96 are affected females (44.23%). In a study done by Kamat et al. [7] the positivity rate of Hepatitis B amongst the male population was 18.1%, which was higher than the female population (15.8%) which corroborates with our study

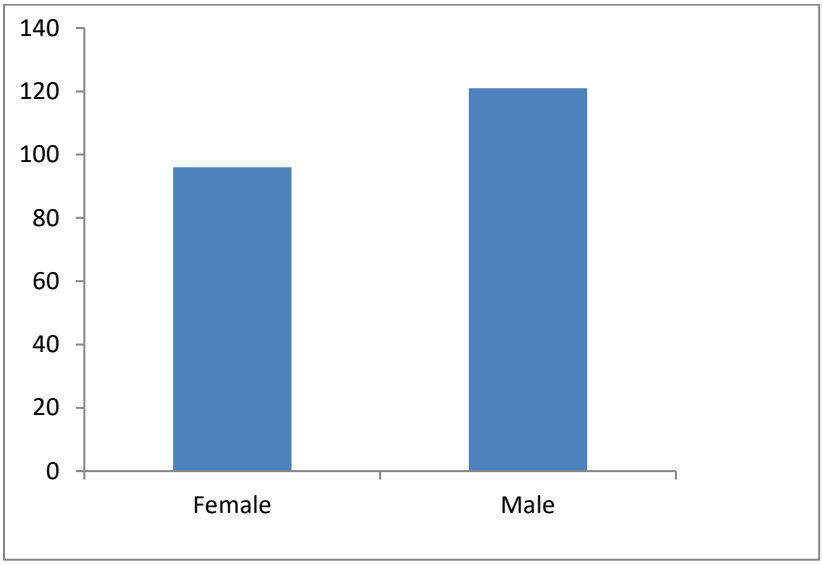

Fig: 2 Represents the sex-wise distribution of Hepatitis B-positive patients.

Our study shows that Hindus are more commonly affected than Muslims and Christians (Fig3). However, it may be due to higher Hindu population in the study area. In a study done by Kumar et al. [8] it was found that in all age and sex groups Hindu patients outnumber Muslim patients in positivity rate which corroborates with our study. In another study done by Ali Samo et al.[9], the religion-wise distribution shows in the Hindu community, the prevalence of HBs Ag was 9.8% and the prevalence in the Muslim community was 6.4% which also corroborates with our study

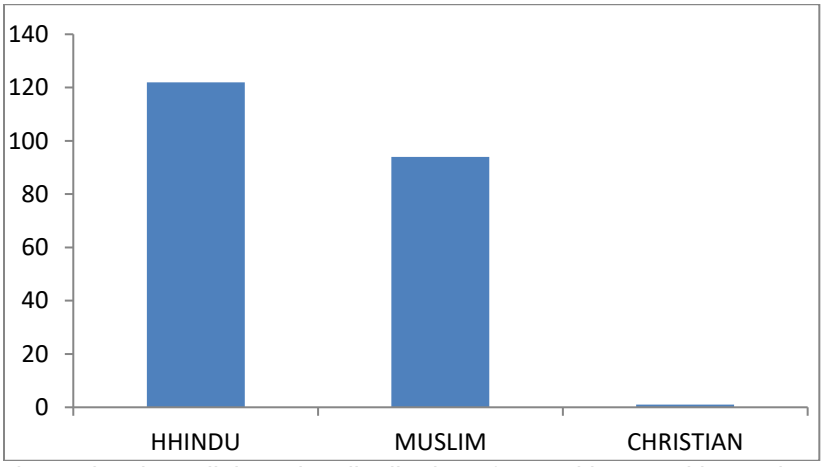

Fig 3: Showing religion-wise distribution of Hepatitis B-positive patients.

Out of 217 Hepatitis B-positive patients, 35.02% are housewives, 15.66% are laborers, 5.06% are blood donors, 0.46% are BSF Jawans, 1.38% are municipality workers, 2.30% are farmers, 0.46% are sex workers, 16.12% are students, 2.76% are fishermen, 2.30% are fruitseller, 2.30% are healthcare workers, 3.22% are truck drivers, 6.91 % in service holders(non-healthcare), 5.99% in unemployed patients (Fig.4)

In a study done by Natasha Samsunder et al.[10] , among 9791 household survey population HBsAg prevalence was 3.2% in women. This is contrary to our finding of 35.02%. In a study done by Debele Mekonnena et al.[11] out of a total of

548 participants , the overall prevalence of HBV infection was 2.92%. This is contrary to our finding of 5.06% . In a study done by Pankaj Puri et al. [12] among patients with acute viral hepatitis, hepatitis B surface antigen (HBsAg) positivity has been reported to be 12.5% from the Armed Forces which is contrary to our findings of 0.46%. In a study done by Alireza Ansari-Moghaddam et al. [13] the overall prevalence of HBV among municipal employees was 3.06% which is contrary to our finding of 1.38 % . In a study done by Ravinder Garg et al.[14]out of 1219 farmers screened, the prevalence of Hepatitis B positivity was 0.32% which is contrary to our finding of 2.30 % . In a study done by Desai Praseeda S et al. [15], the study group showed 8% HBsAg positivity among female sex workers , which is contrary to our finding of 0.46% . In a study done by Didier K. Ekouevi et al.[16] out of a total of 800 students screened, the overall prevalence of HBsAg was 4.6% . This is contrary to our findings of 16.12%. In a study done by Paul Kato Kitandwe et al. [17] with 517 participants, a total of 36 (7%) study participants in the fishing community had hepatitis B virus infection which is contrary to our findings of 2.76% . Specific data against fruitseller is unavailable in India. In a study done by Varsha Singhal et al . [18], the prevalence of hepatitis B in HCWs was reported to be 10% in 1992, in one study and 2.21% in another study done in 1998. More recently, a tertiary care hospital in Delhi reported that only 1% of healthcare workers were HBsAg positive which corroborates our finding of 2.30%. In a study done by Mohammad Reza Jahani et al [19], the prevalence of HBsAg in truck drivers showed a high prevalence of infection equal to 5.1% in central India which is contrary to our findings of 3.22% . According to the National Viral Hepatitis Control Programme Health & Family Welfare Department Govt of West Bengal Based on the prevalence of Hepatitis B surface antigen, different areas of the world are classified as high (8%), intermediate (2-7%) or low HBV endemicity. India falls under the category of intermediate endemicity zone (average of 4%). Hepatitis B surface antigen (HBsAg) positivity in the general population ranges from 1.1% to 12.2%, with an average prevalence of 3-4%. This corresponds to our findings of 6.9% among non-health service holders and 5.99% among the unemployed population. In a study done by Madhumita Premkumar et al [20], it has been said that India falls in the intermediate hepatitis B virus (HBV) endemicity group, with a prevalence rate of 2% to 4% in the general population.

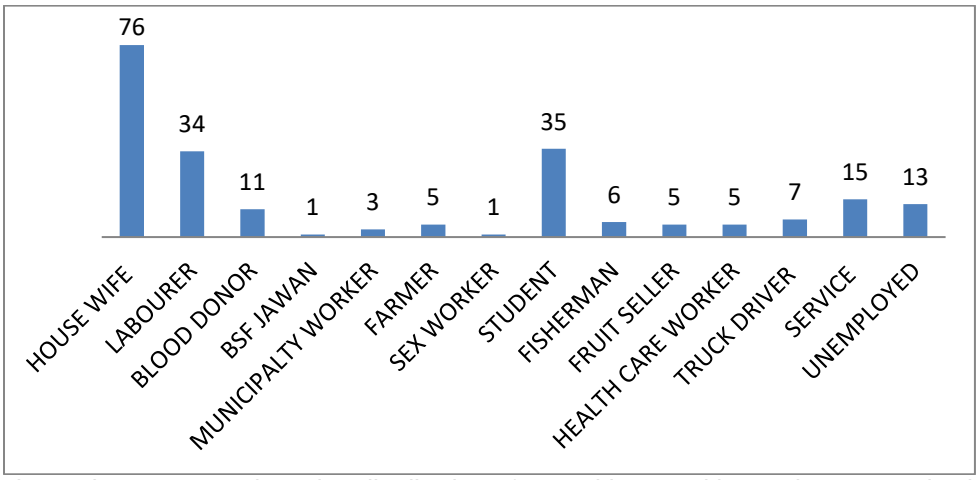

Fig: 4 Shows occupation wise distribution of Hepatitis B positive patients . X axis shows different occupations

In a study done by Abhra Banerjee et al. [21], out of 97 patients positive for HBsAg , 89.7% were married and 10.3% were unmarried. This is contrary to our findings of 71.42% married population (Fig.5)

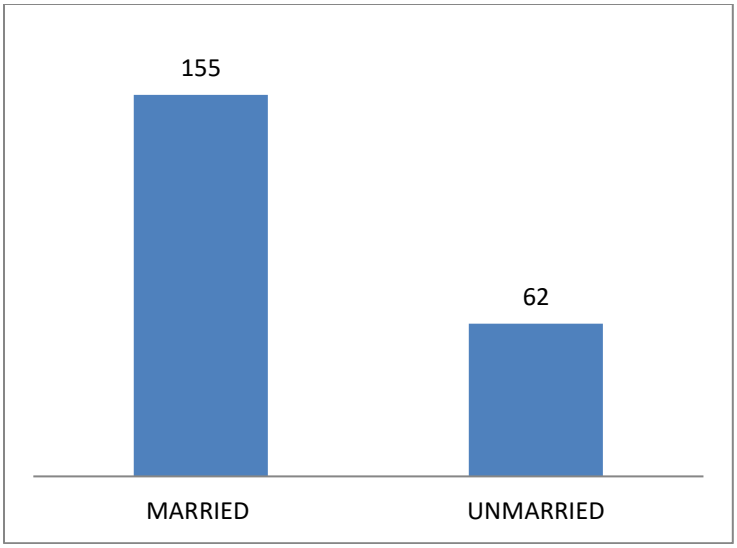

Fig 5: Showing the marital status of Hepatitis B-positive patients. The married population accounts for 71.42 %.

History of migration accounts for 7.83% (Fig.6). In a study done by Nicola Coppola et al.[22] it has been shown that among immigrants from different geographical areas, those from south east Asia showed a prevalence of 0-27.3% , that from sub Saharan Africa being 0-15% . This is contrary to our finding of 7.83%.

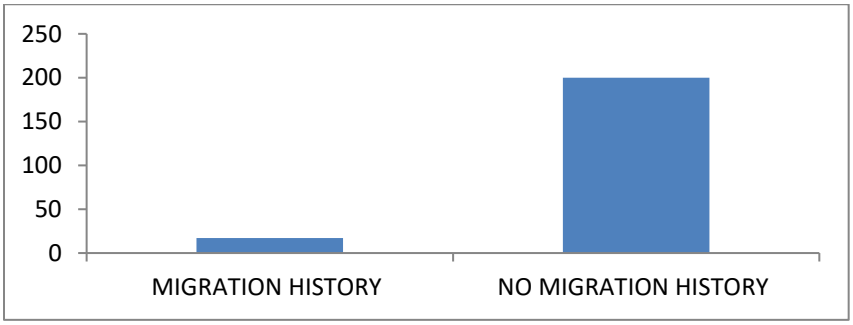

Fig 6: Showing the history of migration of Hepatitis B-positive patients.

In a study done by Rosman et al.[23] the prevalence of HBV in a cohort of 150 alcoholics and 166 non-drinkers was calculated and it was shown that there was no difference in the prevalence of HBV infection in drinkers and non-drinkers . This is contrary to our findings of positive association in 3.68% alcoholics (Fig.7).

Fig 7: Showing the history of alcoholism among Hepatitis B-positive patients. In our study, a positive association has been found in 3.68 % of positive cases.

In a study done by Suprabhat Giri et al. [24], a total of 44 studies with data on 272,595 patients were included in the meta-analysis. The pooled prevalence of hepatitis B surface antigen (HBsAg) in pregnant women was 1.6%. This is contrary to our findings of 11.05% (Fig.8).

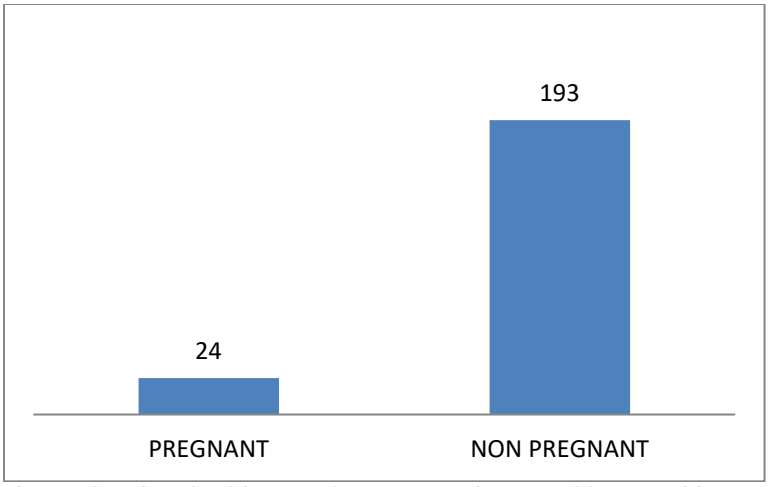

Fig 8: Showing the history of pregnancy in Hepatitis B positive patients
Positivity rate among pregnant ladies in our study is 11.05 %

The positivity rate of blood transfusion in our study is 26.72% (Fig.9). In a study done by Abhra Banerjee et al.[21], out of 97 Hepatitis B positive patients 27 patients had history of multiple blood transfusion which accounts to 27.83% . This closely matches our finding.

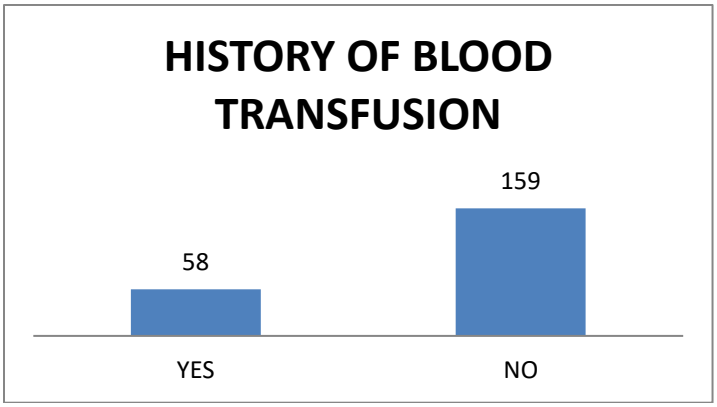

Fig 9: Showing the history of blood transfusion in Hepatitis B-positive patients
In our study, the HBV positivity rate of needle stick injury was 2.76% (Fig.10). In a study by Banerjee et al.[21], out of 97 Hepatitis B positive patients , 51 had history of needle stick injury accounting for 52.57%. This does not corroborate with our finding of only 2.76%.

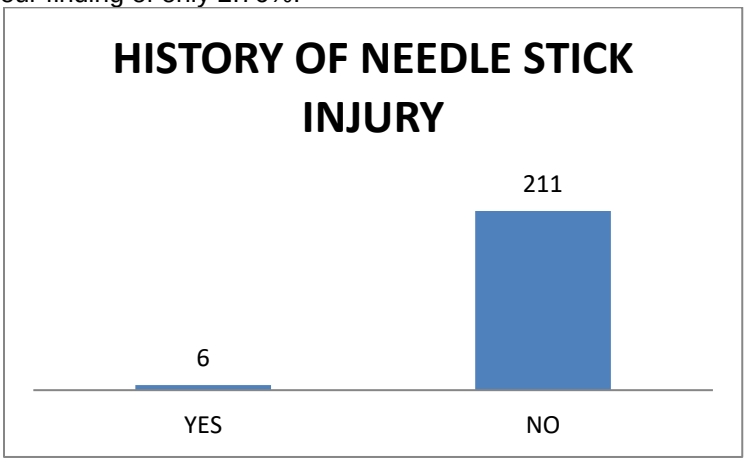

Fig 10: Showing the history of needle stick injury in Hepatitis B-positive patients

In our study family history of HBV positive cases, husband constituted 3.6 %, wife constituted 1.38%, of the mother 2.30%, and of the brother 1.38% (Fig.11). In a study by Guingané et al.[25], of 1000 HBsAg-positive women, HBsAg was detected in 55 (12.6%) partners and 24 (11.2%) children. In a study done by Alizadeh et al.[26] , 11% of all family

members were HBsAg positive. The higher rates of HBsAg marker were detected in the brothers (1-25%) and fathers (1-12.5%). The infection rate in husbands and wives of index cases was 10%. These findings partly match our findings.

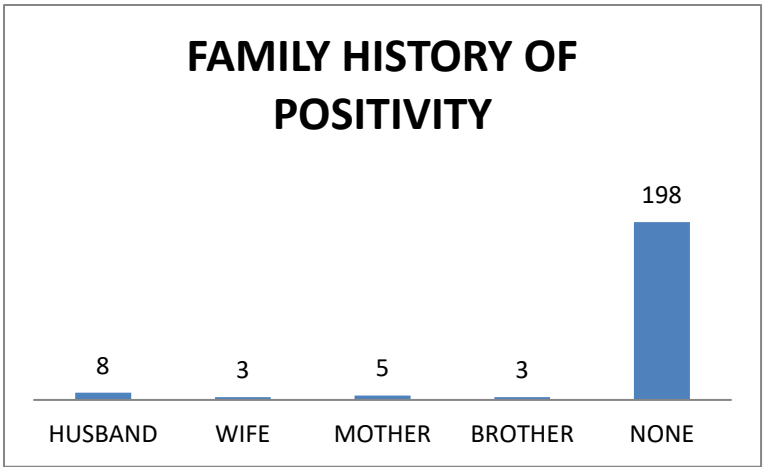

Fig 11: Showing family history of positivity in Hepatitis B – positive patients

In a study by Athalye et al. [27] 61 index cases and their 1083 family contacts were tested for markers of Hepatitis B. Among the screened family members, 9.23% were positive for HBsAg. However, in our study it was 1.38%, which is significantly less. Lodha et al [28] did a systemic review of the literature on the prevalence of hepatitis B in India and concluded that the true prevalence of hepatitis B in India was 1–2%, which corroborates with our findings of 1.84% following health check up in the general population. In a study done by Masood et al.[29] out of a total of 387 patients admitted for elective surgical procedures, HBsAg was positive in 6.5% of patients, this is contrary to our finding of 21.19 % of pre-operative screening cases, which is quite high. Another study done by Yeh et al.[30] during a mean 11.1-months of follow-up, 10.1% patients experienced HBsAg seroclearance and 38.0% HBV reactivation. In our study of 81 follow-up cases, 25.92 % showed positive results, the rest got cured following a mean of 3.5 years of follow-up. In a study done by Johnson et al. [31], the monthly incidence of HBV infection for long-term travelers to endemic countries ranges from 25 to 420(0.42%) per 100,000 travelers. In our study, the corresponding value is 0.46% which corroborates their findings (Fig.12).

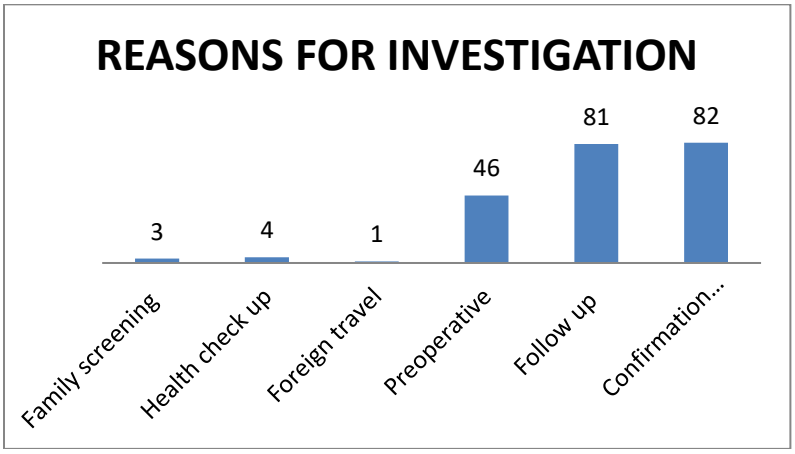

Fig 12: Showing reasons for HBV DNA test in the study population

In our study hepatomegaly has been diagnosed in 8.75% patients, cholelithiasis in 4.14% cases, fatty liver in 3.22% cases , splenomegaly in 2.76% cases , ascitis in 2.76% cases , renal calculi in 0.921% cases (Fig.13) , calcified granuloma in 0.46% cases, and a single case of hemangioma liver was diagnosed by USG examination of HBV positive cases. In a study done by Maurya et al.[32], out of 120 hepatitis B positive cases , hepatomegaly was seen in 104 (86.6%) of cases and splenomegaly was seen in 33 (27.5%) of cases. In a study done by kumar et al. [33] out of 110 positive patients , 22% showed presence of ascitis, which is in contrary to our finding of 2.76% ascites cases. In another study done by Shao-hui et al.[34] , out of 236 patients with chronic hepatitis B infection , incidence of gall stone disease was seen in 18.2% patients , this is contrary to our findings of 4.14 % cases of gall stones. In a case report done by Oluyemi et al. [35] it was shown that a single blood donor identified as Hepatitis B positive on pre screening showed presence of

hemangioma liver on Doppler USG. In one meta-analysis done by Xiong et al. [36], it has been suggested that the risk of NAFLD was significantly lower in HBV-infected patients than in uninfected controls, which corroborates with our findings of 3.22% NAFLD cases in this study. In one study done by Hou et al. [37], it has been shown that chronic HBV infection is strongly associated with upper urinary calculi, which are in contrary to our findings of only 0.921% cases. Lastly, in one study done by Mironova et al [38], it has been stated that liver granuloma is more commonly associated with tuberculosis leprosy and Hodgkin's disease, which corresponds to our finding of 0.46% such cases.

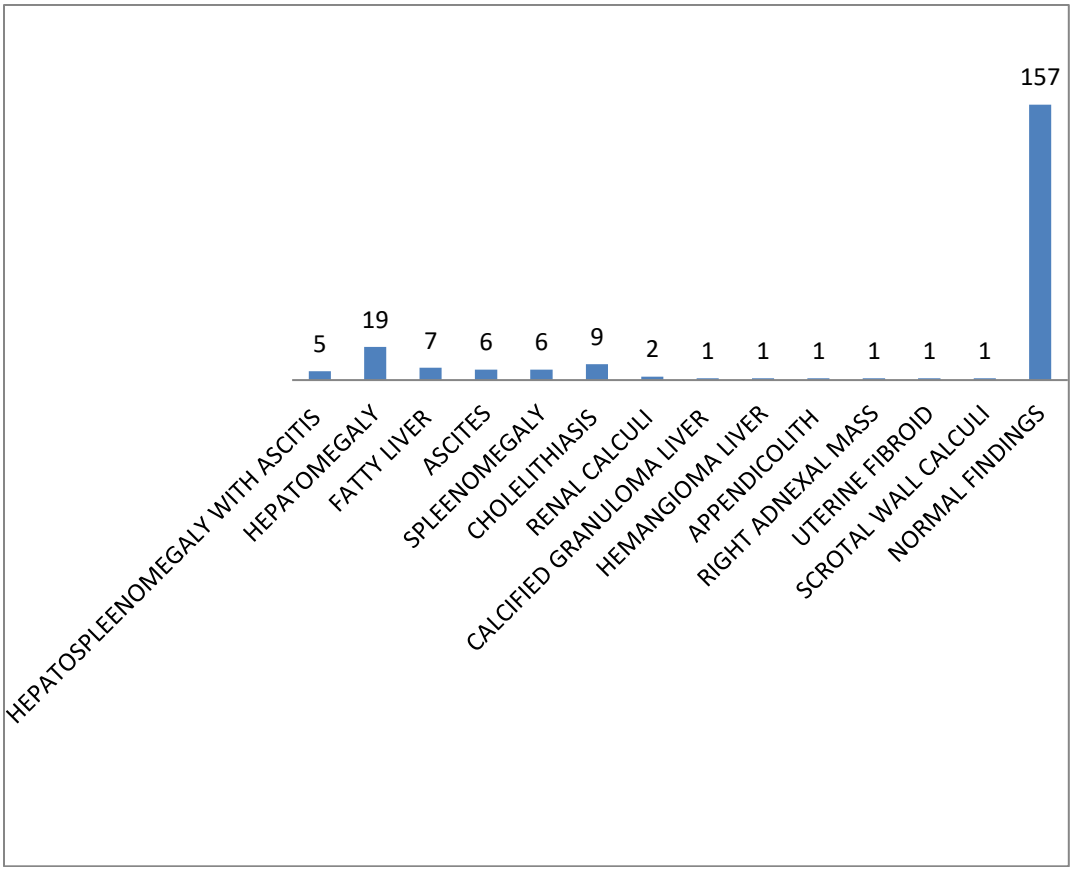

Fig 13 : USG findings in Hepatitis B positive patients

In our study, HBeAg positivity is seen in 8.7% of positive cases the average age of positivity being 36 yrs (Fig.14). In a study done by Devi et al.[39] out of 106 HBsAg positive patients , HBeAg positivity was seen in 35.85% of cases. HCV co-infection was seen in 3.22% of HBV positive cases. In a study done by Maqsood et al.[40], the frequency of HCV/HBV co-infection in HBsAg-positive persons was estimated to be between 5% and 20%. HIV co-infection was seen in 1.8% of HBV positive cases. In a study done by Leumi S et al. [41], globally, an estimated 8% to 10% of people with HIV have chronic HBV infection, although the prevalence of co-infection varies significantly by region.

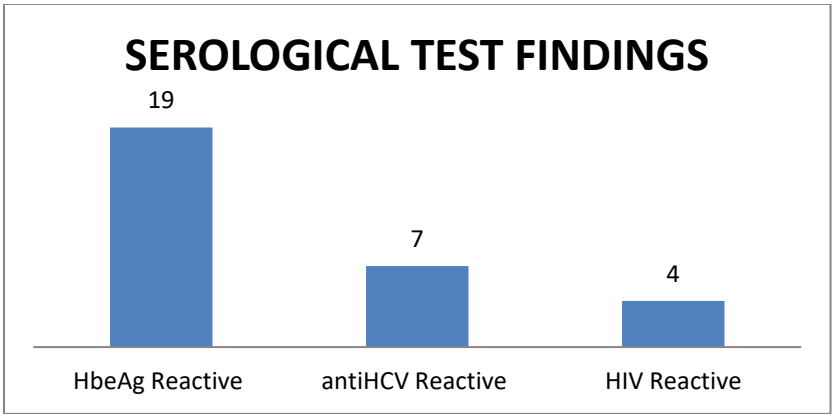

Fig 14: Serological test findings in Hepatitis B-positive patients

In a study done by Hann et al. [42], fatigue, headache, loss of appetite, nausea, jaundice, and liver pain symptoms were reported in the population as a whole irrespective of ethnicity. In another study done by Kumar et al[43].abdominal discomfort was reported by majority of patients (69.1%) followed by fever 71 (64.5%), fatigue 68 (61.8%), jaundice 40 (36.4%), loss of appetite 20 (18.2%), and abdominal distention 16 (14.5%).In this study most positive cases were asymptomatic, among different symptoms jaundice, fever, pain abdomen and dyspepsia are important (Fig.15).

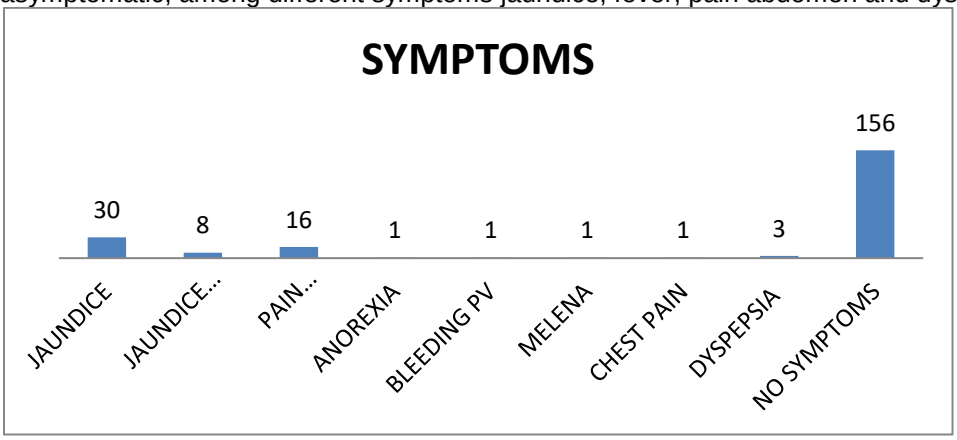

Fig 15: Symptoms in Hepatitis B positive patients

A previous history of surgery is a well known risk factor of hepatitis B infection (Fig.16). In this case transmission may occur from a surgeon, from infected blood or fluids, or from contaminated surgical instruments [44]. Immunization of surgeons and strict infection control can diminish this important problem.

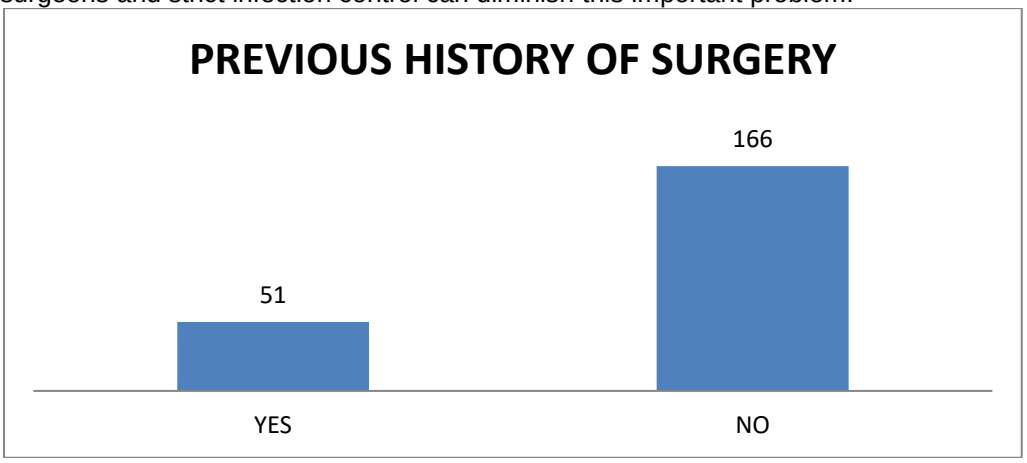

Fig 16 : Showing previous history of surgery in Hepatitis B positive patients

In our study, the rate is 6.45% (Fig.17). Exposure history of sexual contact, sharing needles, tattooing, needle stick injuries, body piercing etc. is crucial in hepatitis B infection [45]. In a study done by Roberts et al. [46], out of an estimated 124,000 acute HBV infections 38.2% were estimated to be sexually transmitted.

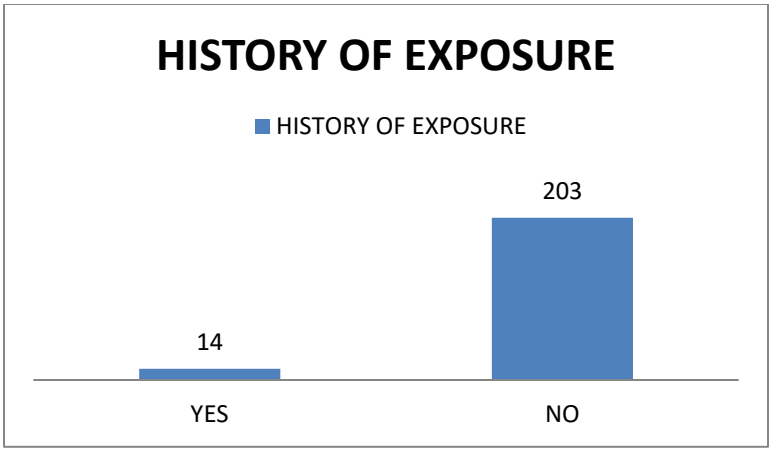

Fig 17: History of exposure in Hepatitis B-positive patients

In our study 73.27% of positive patients had normal serum bilirubin level and 26.72% patients had high levels (Fig.18). Normal value of total serum bilirubin is 1- 1.5 mg/dl [47]. In hepatitis B cases serum bilirubin level depends on severity of liver damage. In acute hepatits B cases a serum bilirubin level above 3mg/dl usually indicate a severe case and requires proper antiviral treatment. In chronic cases higher serum bilirubin levels may indicate increased fibrosis [48].

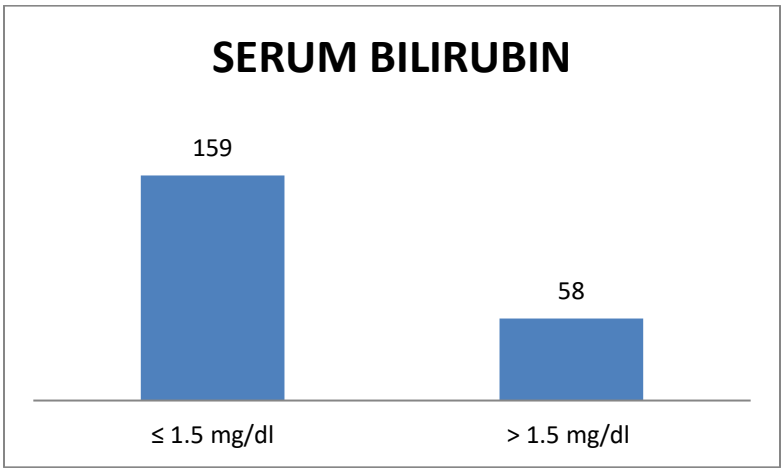

Fig 18 : Shows serum bilirubin levels of Hepatitis B positive patients

Some studies indicated that HBV infected cases may have a slightly lower level of total protein in blood than normal cases[49] (Fig.19). However, it mainly depends on individual health status, any co-infection, disease stage, and sometimes ethnic factors[50].

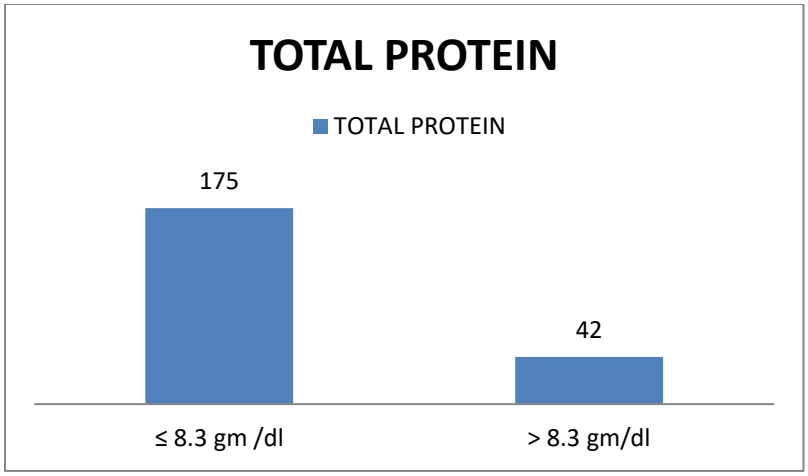

Fig 19: Shows total serum protein of hepatitis B positive patients

In our study serum SGOT value is normal in 55.29% patients and elevated in 44.70% patients (Fig.20). Normal value of SGOT is 10-40 IU/L[47]. Increased SGOT (AST) levels indicate hepatic damage [51].

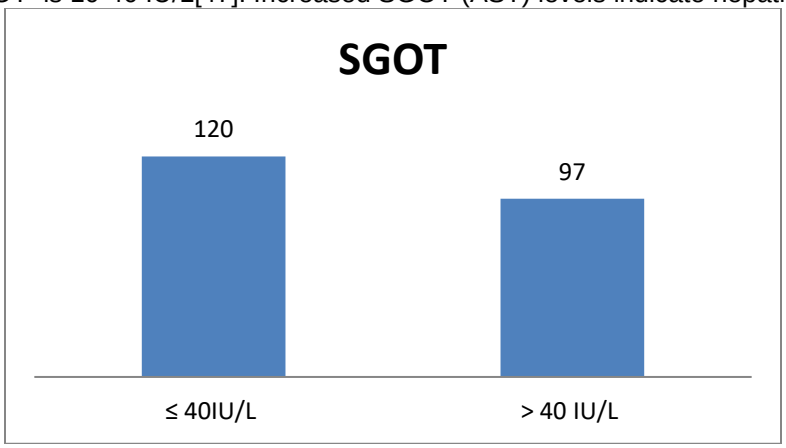

Fig20: Shows SGOT level of Hepatitis B positive patients

In our study , SGPT level is normal in 53.91% patients and elevated in 46.08 % patients (Fig.21) . Normal value of SGPT is 10-40 IU/L[47]. Elevated SGPT (ALT) levels is indicator of necessity of accentuated treatment, particularly due to possible poor disease progression[52].

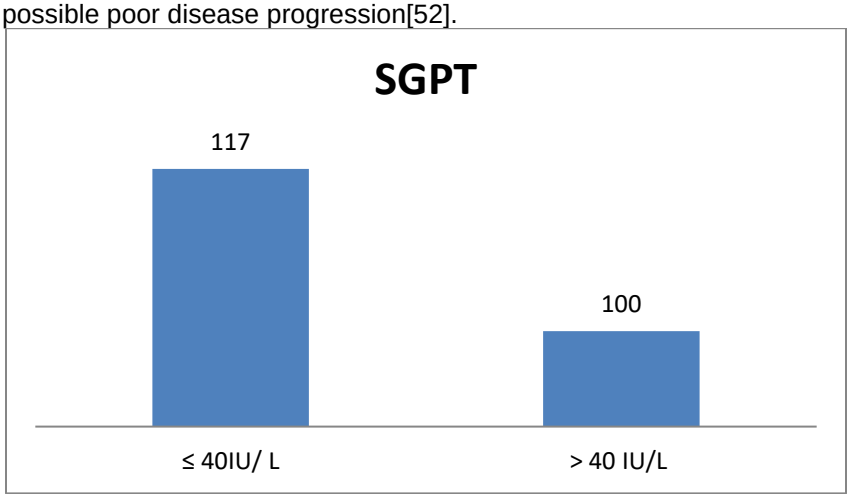

Fig : 21 Shows SGPT levels in hepatitis B positive patients

In chronic hepatits B cases alkaline phosphatise levels are usually elevated (Fig.22). However, the pattern of such elevation may vary. Again in HBeAg negative cases alkaline phophatase level is an independent indicator of fibrosis [53].

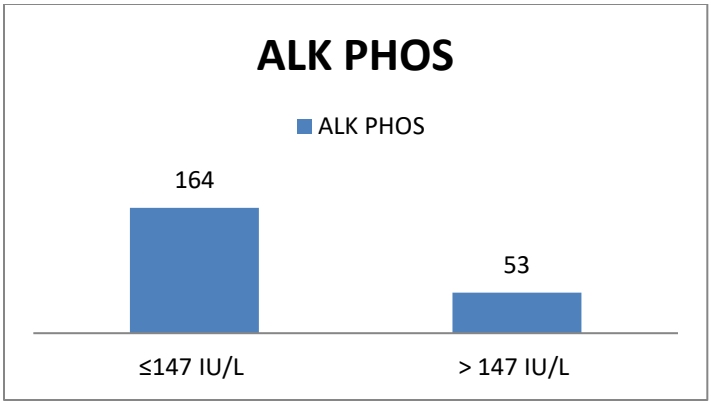

Fig 22: Shows Alk Phos level in hepatitis B positive patients

Prothrombin time is a crucial test to monitor the prognosis and severity in hepatits B cases (Fig.23). In liver damage prothrombin time is usually prolonged [54].

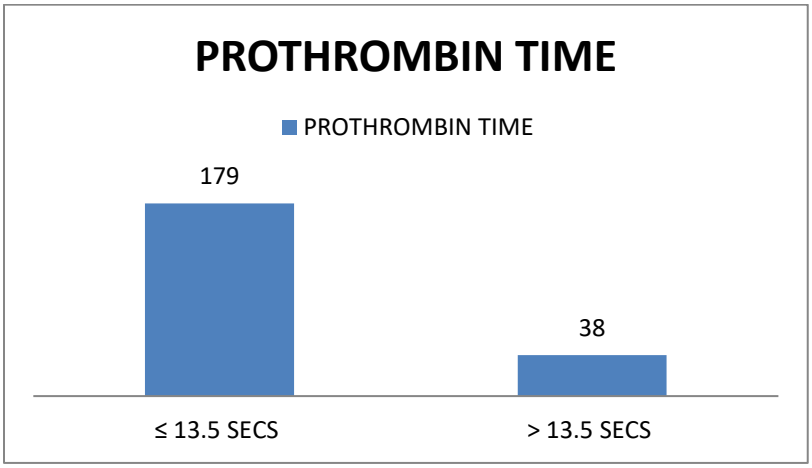

Fig : 23 Showing prothrombin time of Hepatitis B positive patients

In hepatitis B cases a higher INR value may indicate decreased synthetic function of the liver which may lead to poor prognosis [55]. A high INR indicates failure of liver in producing enough clotting factors (Fig.24). Model for End-Stage Liver Disease (MELD) score depends on INR which predicts mortality in hepatitis B cases.

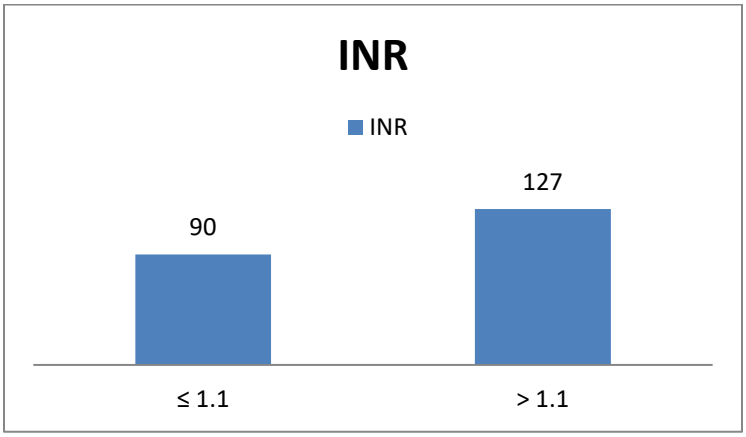

Fig 24 : Shows INR values of hepatitis B positive patients

Depending on the disease severity in Hepatitis B cases serum albumin level may be normal, or decrease (Fig 25). Decreased serum albumin indicates impaired hepatic function and may lead to serious complications [56]. Again effective treatment may lead to increased serum albumin level in blood.

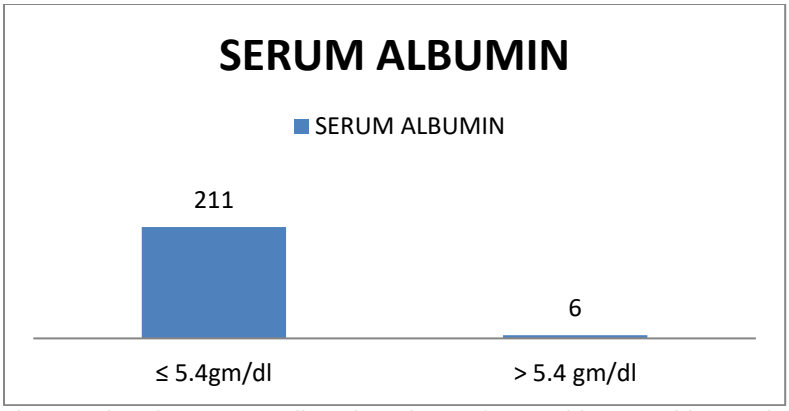

Fig 25: Showing serum albumin values of Hepatitis B positive patients

In hepatitis B positive cases if significant liver damage or fibrosis is present serum globulin may be increased [57] (Fig26). In fact, higher globulin level above 3.5 g/dl may indicate extensive fibrosis of the liver.

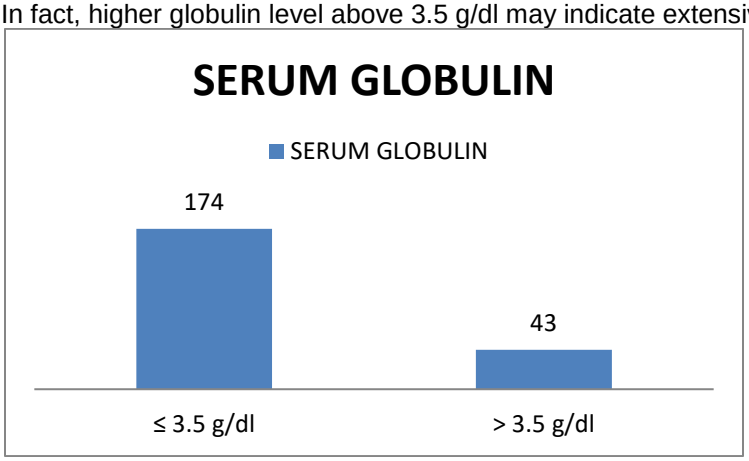

Fig 26: Showing serum globulin level of Hepatitis B positive patients

4. CONCLUSION

A Critical Analysis of Hepatitis B Associated Factors in West Bengal," is an essential addition to the scientific and medical communities. It provides a complete epidemiological and clinical assessment of hepatitis B virus (HBV) infection among 217 patients, highlighting the demographic, occupational, and lifestyle aspects impacting disease prevalence. Such region-specific data are useful for directing policy decisions, enhancing immunization and screening programs, and creating focused public health plans. Additionally, the study contributes to worldwide efforts to manage and eradicate HBV by improving understanding of HBV progression patterns in India's intermediate endemicity zones by comparing clinical data with laboratory results and existing literature.

Clinical and laboratory findings of hepatitis B-positive cases showed many important findings that will be beneficial in formulating a newer strategy to control this disease.

COMPETING INTERESTS

There is no competing interest of any author.

AUTHORS' CONTRIBUTIONS

AS- study design, collection and analysis of data, manuscript preparation; MS-study design; PG-manuscript correction

ETHICAL APPROVAL

The study was done as per ethical committee guidelines of the institute and all subjects were kept anonymous without their address or any contact numbers.

REFERENCES

1. Mustafa Sunbul. Hepatitis B virus genotypes: Global distribution and clinical importance . World Journal of Gastroenterology . 2014; 20 (18) : 5427-5433.
2. Apurba S Sastry , Sandhya Bhat . Essentials of Medical Microbiology: Viruses Causing Hepatitis . 4th edition . New Delhi : Jaypee Brothers Medical Publishers ; 2023 . 395- 408 .
3. Shekhar Swaroop , Shalimar et al . Hepatitis B virus prevalence in India : A wake – up call for action . Indian Journal of Gastroenterology . 2025 ; doi.org/ 10.1007/s12664-025-01804-5
4. Pankaj Puri . Tackling the Hepatitis B Disease Burden in India . Journal of Clinical And Experimental Hepatology . 2014; 4(4) : 312-319
5. Gan C, Yuan Y, Shen H, Gao J, Kong X, Che Z et al, Liver diseases: epidemiology, causes, trends and predictions. Signal Transduct Target Ther. 2025 ;10(1):33.
6. Kolou M, Katawa G, Salou M et al. High Prevalence of Hepatitis B Virus Infection in the Age Range of 20-39 Years Old Individuals in Lome. Open Virol J. 2017;11:1-7. doi: 10.2174/18743579017100110.
7.Shweta P . Kamat , Preeti R et al. Hepatitis B Virus (HBV) Infection in Liver Disease Patients in Mumbai, India with Special Reference to Hepatitis B Surface Antigen (HBsAg) Mutant Detection. Clin Diagn Res. 2014 Mar 15;8(3):19–21. doi: 10.7860/JCDR/2014/7202.4093
8. Nikhil Kumar , Piyush Patoliya , Ashok Gagiya et al. Prevalence of Hepatitis B and Hepatitis C Infection among Hemodialysis Patients in A Tertiary Health Care Centre Of South Gujarat . International Journal Dental and Medical Sciences Research (IJDMSR) ISSN: 2393- 073X. 2019;3(12):01-04.
9. Ayaz Ali Samo , Zulfiqar Ali Laghari , Nimra Masood Baig et al . Prevalence and Risk Factors Associated with Hepatitis B and C in Nawabshah, Sindh, Pakistan.Am. J . Trop. Med. Hyg.2020; 104(3):1101-1105. doi 10.4269/ajtmh.20-1228.
10.Natasha Samsunder , Sinaye Ngcapu , Lara Lewis et al . Seroprevalence of hepatitis B virus: Findings from a population-based household survey in KwaZulu-Natal, South Africa International Journal of Infectious Diseases. 2019; 85: 150-157 .
11. Debele Mekonnena, Tesfaye Solomonb , Mamo Nigatu . Prevalence of Hepatitis B virus and its predictors among volunteer blood donors in Jimma, Ethiopia, 2018: A cross-sectional study. Journal of Clinical Virology Plus .2022;2(4) , 100122
12.Pankaj Puri , PK Sharma , AK Nagpal . Viral hepatitis in India: Armed Forces perspective . Med J Armed Forces India. 2016; 72(3): 201-203.doi: 10,1016/ j.mjafi, 2016,07,004
PMCID: PMC4982957 PMID: 27546956.
13 Alireza Ansari-Moghaddam , Hossein Ansari , Soheila Khosravi et al. The Prevalence of Hepatitis B Virus Among Municipal Solid Waste Workers: Necessity for Immunization of At-Risk Groups. Hepat Mon .2016 ; 16(3) : e 30887 .doi : 10.5812/hepatmon.30887
14 Ravinder Garg , Shaminder Kaur , Rakesh Aseri et al. Hepatitis B & C Among Farmers – A Seroprevalence Study. J Clin Diagn Res. 2014; 8(11): MC09. Doi: 10.7860 / JCDR / 2014/ 9514. 5185
15. Desai Praseeda S , Dutta Anuradha , Shastri Jayanthi S. A Study on the HBV and the HCV Infections in Female Sex Workers and their Co-Infection with HIV.J Clin Diagn Res. 2013 ; 7(2): 234-237. doi 10.7860 / JCDR/2013 /.4322.2735
16. Didier K. Ekouevi, Anne Thomas, Dieudonné Sewu. Prevalence of Hepatitis B among Students from the University of Lomé, Togo in 2015. Open Journal of Epidemiology.2017;07(03):262-272.
17. Paul Kato Kitandwe, Teddy Nakaweesa , Annet Nanvubya et al. Hepatitis B prevalence and incidence in the fishing communities of Lake Victoria, Uganda: a retrospective cohort study .BMC Public Health .2021;21 : 394 .

18. Senoo-Dogbey VE, Ohene LA, Wuaku DA. Occupational exposure to Hepatitis B virus, disease burden and pathways for postexposure prophylaxis management: recommendations for healthcare workers in highly endemic settings. Infection Prevention in Practice. 2024 ;6(2):100354.
19. Mohammad Reza Jahani , Seyed Abbas Motevalian , Mahmood Mahmoodi. Hepatitis B carriers in large vehicle drivers of Iran.Vaccine.2003; 21 (17-18): 1948- 1951.
20. Madhumita Premkumar , Yogesh Kumar Chawla. Chronic Hepatitis B: Challenges and Successes in India. Clin Liver Dis (Hoboken). 2021; 18(3): 111-116 .doi: 10.1002/ cld.1125
21. Abhra Banerjee , Arup Bandyopadhyay , Uttam Kumar Paul. Urban Load of Hepatitis B: A Kolkata Based Study. International Journal of Scientific Study. 2019; 7 (2): 43-45.
22. Nicola Coppola Loredana Alessio Mariantonietta Pisaturo et al. Hepatitis B virus infection in immigrant populations .World J Hepatol . 2015; 7(30): 2955-2961. Doi: 10.4254/ wjh .v7.i 30 .2955
23. A S Rosman , A Waraich, K Galvin et al. Alcoholism is associated with hepatitis C but not hepatitis B in an urban population. Am J Gastroenterol, 1996 ; 91(3) : 498-505 .
24. Suprabhat Giri , Shradhanjali Sahoo, Sumaswi Angadi et al. Seroprevalence of Hepatitis B Virus Among Pregnant Women in India: A Systematic Review and Meta-Analysis.
Journal of Clinical and Experimental Hepatology. 2022; 12(6): 1408-1419.
25. Guingané AN, Kaboré R, Shimakawa Y et al . Screening for Hepatitis B in partners and children of women positive for surface antigen, Burkina Faso. Bulletin of the World Health Organization. 2022 Feb 22;100(4):256.
26. Alizadeh AH, Ranjbar M, Ansari S et al. Intra-familial prevalence of hepatitis B virologic markers in HBsAg positive family members in Nahavand, Iran. World Journal of Gastroenterology: WJG. 2005 Aug 21; 11(31):4857.
27.Athalye S, Khargekar N, Shinde S et al. Exploring risk factors and transmission dynamics of Hepatitis B infection among Indian families: implications and perspective. Journal of Infection and Public Health. 2023 Jul 1;16(7):1109-14.
28.Lodha R, Jain Y, Anand K et al . Hepatitis B in India: a review of disease epidemiology. Indian Pediatr. 2001;38: 349–371.
29. Masood Z, Jawaid M, Khan RA et al. Screening for hepatitis B & C: a routine pre-operative investigation. Pakistan Journal of Medical Sciences. 2005 Oct;21(4):455.
30. Yeh ML, Huang CF, Huang CI et al . Hepatitis B-related outcomes following direct-acting antiviral therapy in Taiwanese patients with chronic HBV/HCV co-infection. Journal of hepatology. 2020 Jul 1;73(1):62-71.
31. Johnson DF, Leder K, Torresi J. Hepatitis B and C infection in international travelers. Journal of travel medicine. 2013 May 1;20(3):194-202.
32.Maurya V, Ravikumar R, Gopinath M et al. Ultrasound in acute viral hepatitis: Does it have any role?. Medical Journal of Dr. DY Patil University. 2019 Jul 1;12(4):335-9.
33.Sanjay Kumar SK, Satyawali VN, Yatender Singh YS et al. Clinical profile of hepatitis B positive cases presenting at a tertiary care hospital in Kumaon region of Uttarakhand. Annals of International Medicine and Dental Research, 2018, 4:2.
34.Shao-hui TA, Qiu-yan HU, Jin-mei ZH et al. Risk factors of cholelithiasis in patients with hepatitis B virus-associated chronic liver diseases. Jie Fang Jun Yi Xue Za Zhi. 2014;39(6):485.
35.Oluyemi AO, Adeyomoye AO, Awolola NA. Hepatic hemangioma and focal nodular hyperplasia in a Nigerian patient with hepatitis B virus infection. Int J Case Reports Images. 2012 Nov 1;3:8-10.
36. Xiong J, Zhang H, Wang Y et al . Hepatitis B virus infection and the risk of nonalcoholic fatty liver disease: a meta-analysis. Oncotarget. 2017 Nov 3;8(63):107295.
37. Hou B, Lin C, Hao Z. Chronic hepatitis B virus infection increases the risk of upper urinary calculi. BMC urology. 2022 Jun 6;22(1):82.
38. Mironova M, Gopalakrishna H, Franco GR et al. Granulomatous liver diseases. Hepatology Communications. 2024 Apr 1;8(4):e0392.
39.Devi P, Sharma SR, Mishra A et al. Study of occurrence of HBeAg among Hepatitis-B surface antigen positive cases. IP International Journal of Medical Microbiology and Tropical Diseases. 2023 Jan 18;7(4):269-73.
40.Maqsood Q, Sumrin A, Iqbal M et al. Hepatitis C virus/Hepatitis B virus coinfection: Current prospectives. Antiviral therapy. 2023 Jul 14;28(4):13596535231189643.
41.Leumi S, Bigna JJ, Amougou MA et al. Global burden of hepatitis B infection in people living with human immunodeficiency virus: a systematic review and meta-analysis. Clinical infectious diseases. 2020 Dec 1;71(11):2799-806.

42.Hann HW, Han SH, Block TM et al. Symptomatology and health attitudes of chronic hepatitis B patients in the USA. Journal of viral hepatitis. 2008 Jan;15(1):42-51.
43.Sanjay Kumar SK, Satyawali VN, Yatender Singh YS et al. Clinical profile of hepatitis B positive cases presenting at a tertiary care hospital in Kumaon region of Uttarakhand. Annals of International Medicine and Dental Research, 2018, 4:2.
44. Harpaz R, Von Seidlein L, Averhoff FM et al. Transmission of hepatitis B virus to multiple patients from a surgeon without evidence of inadequate infection control. New England Journal of Medicine. 1996 Feb 29;334(9):549-54.
45.Afzal S, Bashir M. Determinants for transmission of hepatitis B and C. Annals of King Edward Medical University. 2009;15(4):192.
46. Roberts H, Jiles R, Harris AM et al. Incidence and prevalence of sexually transmitted hepatitis B, United States, 2013–2018. Sexually transmitted diseases. 2021 Apr 1; 48(4):305-9.
47.Harrisons Principle of Internal Medicine , Loscalzo , Fauci, Kasper et al . p – 2553 , 21st ed
48. Lei Q, Zhang Y, Ke C et al. Value of the albumin-bilirubin score in the evaluation of hepatitis B virus-related acute-on-chronic liver failure, liver cirrhosis, and hepatocellular carcinoma. Experimental and therapeutic medicine. 2018 Mar;15(3):3074-9.
49.He QY, Lau GK, Zhou Y et al . Serum biomarkers of hepatitis B virus infected liver inflammation: a proteomic study. Proteomics. 2003 May;3(5):666-74.
50. Shahriar S, Araf Y, Ahmad et al . Insights into the coinfections of human immunodeficiency virus-hepatitis B virus, human immunodeficiency virus-hepatitis C virus, and hepatitis B virus-hepatitis C virus: prevalence, risk factors, pathogenesis, diagnosis, and treatment. Frontiers in microbiology. 2022 Feb 3;12:780887.
51. Kew MC. Serum aminotransferase concentration as evidence of hepatocellular damage. The Lancet. 2000 Feb 19;355(9204):591-2.
52.Kalas MA, Chavez L, Leon M et al. Abnormal liver enzymes: A review for clinicians. World journal of hepatology. 2021 Nov 27; 13(11):1688.
53.Hu J, Zhang X, Gu J et al . Serum alkaline phosphatase levels as a simple and useful test in screening for significant fibrosis in treatment-naive patients with hepatitis B e-antigen negative chronic hepatitis B. European Journal of Gastroenterology & Hepatology. 2019 Jul 1;31(7):817-23.
54. Tripodi A, Caldwell SH, Hoffman M et al. The prothrombin time test as a measure of bleeding risk and prognosis in liver disease. Alimentary pharmacology & therapeutics. 2007 Jul;26 (2):141-8.
55. Zhou X, Chen X, Du H, Ye Y, Miu Y, Su T, Guo X, Wang S, Qiu Y, Wang J, Zhao W. Antithrombin III activity is associated with prognosis, infection, and inflammation in patients with hepatitis B virus-related acute-on-chronic liver failure. European Journal of Gastroenterology & Hepatology. 2023 Aug 1;35(8):914-20.
56 .Jagdish RK, Maras JS, Sarin SK. Albumin in advanced liver diseases: the good and bad of a drug!. Hepatology. 2021 Nov;74(5):2848-62.
57.Schmilovitz-Weiss H, Tovar A, Halpern M et al . Predictive value of serum globulin levels for the extent of hepatic fibrosis in patients with chronic hepatitis B infection. Journal of viral hepatitis. 2006 Oct;13(10):671-7.

Age range in years	Number
0-10	4
11 20	20
21-30	66
31-40	54
41-50	38

51-60	24
61-70	10
71-80	1

Table 1: Table showing age distribution of Hepatitis B positive cases

Sex Distribution	Number
Female	96
Male	121

Table 2: Table showing sex wise distribution of Hepatitis B positive patients

Religion wise distribution	Number
Hindu	122
Muslim	94
Christian	1

Table 3: Table showing religion wise distribution of Hepatitis B positive patients

Occupation	Number
HOUSE WIFE	76
LABOURER	34
BLOOD DONOR	11
BSF JAWAN	1
MUNICIPALTY WORKER	3
FARMER	5
SEX WORKER	1
STUDENT	35
FISHERMAN	6

FRUIT SELLER	5
HEALTH CARE WORKER	5
TRUCK DRIVER	7
SERVICE	15
UNEMPLOYED	13

Table 4: Table showing occupation wise distribution of Hepatitis B positive patients

Marietal Status	Number
Married	155
Unmarried	62

Table 5: Table showing marietal status of Hepatitis B positive patients

Migration history	Number
Present	17
Absent	200

Table 6: Table showing history of migration of Hepatitis B positive patients

History of alcoholism	Number
Yes	8
No	209

Table 7: Table showing history of alcoholism of Hepatitis B positive patients

History of pregnancy	Number
Yes	24
No	193

Table 8: Table showing history of pregnancy of Hepatitis B positive patients

History of blood transfusion	Number

Yes	58
No	159

Table 9: Table showing history of blood transfusion of Hepatitis B positive patients

History of Needle Stick Injury	Number
Yes	6
No	211

Table 10: Table showing history of needle stick injury in Hepatitis B positive patients

Family history of positivity	Number
Husband	8
Wife	3
Mother	5
Brother	3
No history	198

Table 11: Table showing family history of positivity in Hepatitis B positive patients

Reasons for investigation	Number
Family screening	3
Health check up	4
Foreign travel	1
Preoperative	46
Follow up	81
Confirmation of test result done by ELISA	82

507 Table 12: Table showing reasons for investigation in the study population

508
509

USG FINDINGS	Number
HEPATOSPLEENOMEGALY WITH ASCITIS	5
HEPATOMEGALY	19
FATTY LIVER	7
ASCITES	6
SPLEENOMEGALY	6
CHOLELITHIASIS	9
RENAL CALCULI	2
CALCIFIED GRANULOMA LIVER	1
HEMANGIOMA LIVER	1
APPENDICOLITH	1
RIGHT ADNEXAL MASS	1
UTERINE FIBROID	1
SCROTAL WALL CALCULI	1
NORMAL FINDINGS	157

510

511 Table 13: Table showing USG findings of Hepatitis B positive patients

Other positive Serological findings	Number
HbeAg	19
antiHCV	7
HIV	4

512

513 Table 14: Table showing associated serological findings in Hepatitis B positive patients

Associated symptoms	Number
JAUNDICE	30

JAUNDICE WITH FEVER	8
PAIN ABDOMEN	16
ANOREXIA	1
BLEEDING PV	1
MELENA	1
CHEST PAIN	1
DYSPEPSIA	3
NO SYMPTOMS	156

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515 Table 15: Table showing associated symptoms in Hepatitis B positive patients

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Previous history of surgery	Number
Present	51
Absent	166

521

522 Table 16: Table showing previous history of surgery in Hepatitis B positive patients

History of exposure	Number
Present	14
Absent	203

523

524 Table 17: Table showing history of exposure in Hepatitis B positive patients

Serum bilirubin level	Number

≤ 1.5 mg/dl	159
> 1.5 mg/dl	58

525

526 Table 18: Table showing serum bilirubin level in Hepatitis B positive patients

Serum total protein level	Number
≤ 8.3 gm/dl	175
> 8.3 gm/dl	42

527

528 Table 19: Table showing serum total protein level in Hepatitis B positive patients

Serum SGOT level	Number
≤ 40 IU/L	120
> 40 IU/L	97

529

530 Table 20: Table showing serum SGOT level in Hepatitis B positive patients

Serum SGPT level	Number
≤ 40 IU/L	117
> 40 IU/L	100

531

532 Table 21: Table showing serum SGPT level in Hepatitis B positive patients

Serum Alkaline phosphatase level	Number
≤ 147 IU/L	164
> 147 IU/L	53

533

534 Table 22: Table showing serum alkaline phosphatase level of Hepatitis B positive patients

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Prothrombin time	Number

≤ 13.5 sec	179
> 13.5 sec	38

Table 23: Table showing prothrombin time of Hepatitis B positive patients

INR	Number
≤ 1.1	90
> 1.1	127

Table 24: Table showing INR value of Hepatitis B positive patients

Serum Albumin level	Number
≤ 5.4 gm/dl	211
> 5.4 gm/dl	6

Table 25: Table showing serum albumin level of Hepatitis B positive patients

Serum Globulin level	Number
≤ 3.5 gm/dl	174
> 3.5 gm /dl	43

Table 26: Table showing serum globulin level of Hepatitis B positive patients