

*Original article***“ PREVALENCE, RISK FACTORS AND ENZYME PROFILE OF HEPATITIS B AND C VIRUS INFECTION, IN PATIENTS OF CHRONIC LIVER DISEASE, IN A RURAL AREA OF UP (INDIA)”**Sharma A K¹, Sharma S², Sujatha R³, Nidhi.P⁴

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Abstract: Infection with Hepatitis B and C virus has found to be closely associated with chronic liver diseases like Cirrhosis and Carcinoma. The problem of chronic liver diseases is emerging as a major public health problem in the developing world. **Aim & Objectives:** To determine the sero prevalence and risk factors causing the Hepatitis B and C infection and enzyme profile in patients of chronic liver diseases attending medical college hospital in Farrukhabad. **Material & Methods:** This study was conducted from Dec. 2010 to Sept. 2013 among 300 patients in the age group of 10-70 years of both the sex of chronic liver disease attending the hospital. All patients were screened for HBV and HCV and detailed history to probe into the risk factors causing the infection was taken. Liver enzyme profile was also conducted to find the correlation between these and disease status. **Result:** In the present study 36.3 % of the samples were positive for hepatitis B surface antigen. 3.7% were seropositive for HCV antibodies and 0.33% had concomitant infection with HBV and HCV. The major risk factors were needle prick (54.1% & 33.3%), tooth extraction (11.0% & 8.3%), blood transfusion (7.3 & 8.3%) and through sex workers (5.5 % & 8.3%) in cases of HBV & HCV respectively. In both the cases of Hepatitis B & C, rise in Total Serum bilirubin levels was moderate, whereas rise in levels of SGOT and SGPT was more pronounced in cases of hepatitis B. 73,8% cases of HBV had high to very high rise of SGPT (>50IU/L), whereas SGOT levels was (>40IU/L) in 50.9 % cases & very high (>80IU/L) in 18.1% cases. **Conclusion:** Our results indicate high prevalence rate of hepatitis B virus infection and hepatitis C virus infection among chronic liver disease cases in Farrukhabad. High prevalence of infection may be attributed to low literacy, low public awareness and inadequacy of detection and control programmes. All these factors coupled with low immunization coverage can be attributed to high prevalence of infection in rural areas. Concerted efforts coupled with multipronged strategy focusing on health education, awareness and immunization would help in improving the situation.

Key words: Chronic liver diseases, HBV, HCV, Prevalence

Introduction: Since the times immemorial viral hepatitis has been a part of recorded history. For centuries, epidemics have devastated military and civilian communities throughout the world^[1,2]. Over the next century, viral hepatitis was classified into the two diagnostic categories of epidemic and blood-borne jaundice^[3]. The discovery of the "Australian antigen" by Blumberg and Colleagues in 1965 and its subsequent association with Hepatitis B virus (HBV) initiated a period of accelerated hepatitis research. Worldwide, approximately 350 million people are estimated to be chronic carriers of HBV^[4] of which 34 million carriers are present in India itself^[5]. Hepatitis B virus (HBV) and hepatitis C virus (HCV) are endemic in India and have an aetiological role in acute hepatitis, 50 - 70% of which end up with chronic liver disease^[6]. The national average for HBsAg positivity in the healthy donor population in India is around 4.7%. Seroprevalence studies have also shown co-infection of HBV and HCV, although prevalence may vary from area to area and country to country^[7].

HBV is a DNA virus and the clinical disease profile ranges from asymptomatic and inapparent to fulminant and fatal infections on one hand to rapidly progressive chronic liver disease with Cirrhosis and even to hepatocellular carcinoma on the other hand. The infection is endemic in most regions of the globe. Besides perinatal and sexual transmission, direct inoculation of infected blood e.g., by transfusion or by needle

sharing in intravenous drug abusers (IVD) or by abrasion during contact is the major contributor in the transmission of Hepatitis B virus. Chronic carriers serve as the reservoirs of hepatitis B virus. The prevalence of hepatitis B in our country is estimated to be of intermediate magnitude 0.6 - 5.8%^[8,9]. The screening of blood donors for HBsAg, the isolation of infected patients and the vaccination of susceptible patients led to the control of this infection in many countries. On the other hand hepatitis C virus infection (HCV) still remains a major health problem since no vaccine has so far been developed.

Chatterjee et .al. found prevalence in West Bengal to be varying from 1.49% to 2.68% in studies conducted between the year 2000 to 2009^[10]. Ashish Batham et al reported a prevalence of Hepatitis B to be 15.9% and 2.4 % in tribal and non-tribal population respectively^[11]. Abha et. al., found that the incidence of HBsAg positivity among high risk hospital personnel was 8.7%^[12].

The interaction between HBV and HCV appears to be still more complex. HCV appears to suppress HBV replication and causes more severe liver damage^[13]^[14] suggested that HCV is the most important heterotrophic virus that enhances HBsAg clearance in chronic HBV infection and subsequently takes up the role of HBV to cause persistent Hepatitis with ALT elevation^[15]. Studies suggest that infection with HCV and HBV are associated with

reduced survival^[16] and main cause of death among these patients is liver failure. The present study was conducted to find out the prevalence of these viruses in patients of chronic liver disease as no such data has been reported from this part of the region.

Material and Methods: The present study was undertaken at Major S.D. Singh Medical College, Farrukhabad, in the department of microbiology and community medicine over a period of 3 years from 2010 to 2013, on patients attending the hospital for varying symptoms related to chronic liver disease. A total of 300 clinically diagnosed cases of chronic liver disease referred from the department of medicine, with a 3 to 6 months history of liver disease were studied. Patients diagnosed with any carcinoma, undergoing chemotherapy or having compromised immune system was excluded from the study.

Detailed history was taken and blood samples were collected after obtaining written consent and pre-test counseling. Serum bilirubin and aminotransferase levels of each patient were recorded. All patients included in the study were also probed in relation to their exposure to various risk factors associated with causation of hepatitis B and C virus infection. Serum was separated and tested for the presence of hepatitis B surface antigen (HBsAg) by ELISA method using 3rd generation screening. Kit (ERBA LISA TEST HEP B TRANSASIA Biomedicals Ltd) and anti-HCV antibody by in vitro ELISA was done by 3rd generation Kit (ERBA ELISA TEST

HEP C, TRANSASIA Biomedicals Ltd). The tests were performed according to the manufacturer's instructions provided in the kit. In all the positive cases, associated risk factors and predominant signs and symptoms were noted. Bilirubin and aminotransferase levels were studied in positive cases and were correlated with serological findings.

Results: Out of 300 patients included in the study 109 (36.3%) were found to be positive for HBsAg. 11 (3.7%) were positive for antibodies against HCV, and 1 case (0.33%) was positive for antibodies against HCV & HBV. Out of total patients tested positive for both the infections, 69.2% were male, indicating high prevalence (**Table 1**).

Probe in to various risk factors to which study subjects were exposed are listed in (**Table 2**). The most common probable mode of acquiring infection was found to be needle prick (54.4% & 33.3%), tooth extraction (11.0% & 8.3%), blood transfusion (7.3% & 8.3%) in cases of HBV & HCV respectively, other causes include contact with sex worker, surgery, and others. In the patient of co infection with HBV and HCV the probable mode of infection was needle prick, which is the major mode of transmission.

As regards to levels of TSB, SGOT and SGPT, all values were found to be moderately high in case of HCV in comparison of HBsAg positive cases. TSB values above 6 mg% were noticed in 50% cases of HCV, No case has values above 8 mg% (**Table 3**). Increase in values of SGOT

(**Table 4**) in cases of Anti HCV positive cases was moderate (below 50 IU/L in all cases, whereas in cases of HBsAg positive increase was moderate in 30.9 %, high (40-80 IU/L) in 50.9 % and very high (>80 IU/L) in 18.2 %cases. Increase in values of SGPT in cases of Anti HCV positive cases

was moderate (<40IU/l in 58.3% cases), whereas in cases of HBsAg positive, increase was moderate (< 50IU/L) in 34.6%, High (50-90 IU/L) in 66.4% and very high (>90IU/L) in 7.4 % cases. (**Table 5**)

Table 1: Serological markers in patients of chronic liver disease

Elisa Test Performed	Study group (n=300)		
	Total (%)	Male (%)	Female (%)
HbsAg only	109 (36.3)	77 (70.6)	32 (29.4)
Anti HCV only	11 (3.7)	7	4
HBsAg and anti HCV co infection	1 (0.33)	0	1
Total cases	121	84 (69.2)	37 (30.8)

Table 2: Risk factors (Probable source of infection) in HBsAg positive and HCV seropositive patients.

Risk Factor	HBsAg n=109 (%)	HCV n=11 (%)	HbsAg and HCV Co infection n=1 (%)
Needle prick	59(54.1)	3 (27.27)	1(100)
Tooth extraction	12 (11.0)	1 (9.09)	
Blood transfusion	8 (7.3)	1 (9.09)	
Contact with sex worker	6 (5.5)	1 (9.09)	
Minor surgery	4 (3.7)	-	
Contact with hepatitis case	3 (2.7)	-	
Major surgery	3 (2.7)	1(9.09)	
Injectable drug	3 (2.7)	1(9.09)	
Infected spouse	2 (1.8)	-	
Blood donation	1 (0.9)	-	
Unknown	8 (7.3)	3(27.27)	
Total cases	109 (100)	11 (100)	1(100)

Table 3: TSB levels in seropositive cases of viral hepatitis.

TSB range (mg%)	ANTI-HCV ELISA POSITIVE (Normal Range: 0.2-1.2 mg %) (N=11/300)	HBsAg POSITIVE (Normal Range: 0.2-1.2 mg %) (N=109/300)	HbsAg and HCV Co infection n=1 (%)
0-0.6	-	-	
0.7-1.2	-	-	
1.3-2	3 (27.27)	12 (11.0)	
2.1-4	3 (27.27)	48 (44.0)	
4.1-6	4 (36.36)	24 (22.0)	
6.1-8	1 (9.09)	18 (16.5)	1 (100)
8.1-10	-	4 (3.7)	
10.1-12	-	2 (1.8)	
12.1-14	-	1 (0.9)	
14.1-16	-	-	
Total cases	11 (100)	109 (100)	1 (100)

Table 4: AST (SGOT) levels in seropositive cases of viral hepatitis

AST (SGOT) range (IU/L)	Anti-HCV POSITIVE (Normal Range: 2-20 IU/L) (N=11/300)	HBsAg POSITIVE (Normal Range: 2-20 IU/L) (N=109/300)	HbsAg and HCV Co infection n=1 (%)
0-10	-	-	
10.1-20	-	5 (4.6)	
20.1-30	5 (45.45)	7 (6.4)	
30.1-40	6 (54.54)	22 (20.2)	
40.1-50	-	17 (15.6)	1 (100)
50.1-60	-	13 (11.9)	
60.1-70	-	11 (10.1)	
70.1-80	-	14 (12.7)	
80.1-90	-	11 (10)	
90.1-100	-	1 (0.9)	
100.1-110	-	2 (1.8)	
110.1-120	-	2 (1.8)	

>120	-	4 (3.6)	
Total cases	11 (100)	109 (100)	1 (100)

Table 5: ALT (SGPT) Levels in ELISA Ant HCV and ELISA HBsAg positive Patients.

ALT (SGPT) range (IU/L)	ANTI-HCV POSITIVE PATIENTS (Normal Range: 2-15 IU/L) (N=11/300)	HBsAg POSITIVE PATIENTS (Normal Range: 2-15 IU/L) (N=109/300)	HbsAg and HCV Co infection n=1 (%)
0-7	-	-	
7.1-15	-	-	
15.1-20	-	2 (1.8)	
20.1-30	1 (9.09)	11 (10)	
30.1-40	6 (54.54)	8 (7.3)	
40.1-50	4 (36.36)	19 (17.3)	
50.1-60	-	18 (16.5)	1 (100)
60.1-70	-	17 (15.5)	
70.1-80	-	12 (10.9)	
80.1-90	-	14 (12.7)	
90.1-100	-	3 (2.7)	
100.1-110	-	1(0.9)	
110.1-120	-	-	
> 120	-	4 (3.6)	
Total cases	12 (100)	109 (100)	1 (100)

Discussion: In the present study conducted in 300 clinically diagnosed cases of chronic liver diseases, 36.3% cases were positive for HBsAg. Various studies conducted in India, showed a wide range of prevalence rate 1-2%^[17], 2.97^[18] 12.8%^[19]. Sujatha et.al in her study reported prevalence rate of HBV infection to be 8.6% (High). The major risk factors were contact with infected person (41 %), blood transfusion (13.9%), through infected needle (11.6%) and through mother (2.3%). It was also found that there is striking elevation of serum aminotransferase, specially AST from mild to moderate increase of 3 to 10 fold to striking increase to >100 folds.^[18] In Uttar

Pradesh HBsAg prevalence varies from high to low 10.191^[19], 1.868^[20], 4.348^[21]. Similarly in Delhi a study showed reducing prevalence from 19.398 to 2.064^[22]. This can be attributed to increased awareness and improved preventive measures including improved immunization coverage.

Whereas in other studies HBsAg prevalence has been reported to be 40% and 43.7%^[23, 24]. It might be because in these studies various viral markers such as HBsAg, HBeAg and antibodies to HbeAg were detected. HCV positivity in the present study was 3.7%, whereas it has been reported to be 40.8 % in a study conducted

in Pakistan^[25]. Other authors ^[10, 23] have shown it to be 8.33%, 4.26% from cases of chronic active hepatitis respectively. 0.33 % was positive for antibodies co-infection was present in one, whereas other authors have reported it to be 2.59% ^[26].

Dual infection of HBV and HCV was found in 0.3% in the present study. In another study it has been reported to be 5% and more than 30% by other authors ^[6, 20].

AST and ALT Levels as shown in table 4 & 5 were almost twice in hepatitis B cases than hepatitis C cases. This is in concordance with the fact that enzyme levels in HCV are moderately elevated, fluctuating, and sometimes normal ^[21].

In the present study jaundice was the predominant sign in HBV cases which coincides with the findings of other authors ^[23]. Jaundice was also found in HCV positive cases, which is in contrast to the findings of above authors who have not reported jaundice in any case. These findings correlate with bilirubin levels recorded. Bilirubin levels among hepatitis B and hepatitis C in the present study coincided with the study of Arora et al ^[23]. It is reported in the literature that patients with HCV infection may present in anicteric, icteric, or fulminant form. So, it cannot be distinguished solely by clinical features or by biochemical markers, and therefore serology is a must.

As reported by Dien stag and Issebacher in cases of acute viral hepatitis due to HBV or HCV, serum bilirubin typically rises to

levels ranging from 5-20mg/dl. TBS level may continue to rises despite falling serum amniotransferase levels. In our study test 75% of HCV positive patients had elevated AST values and 100% had elevated ALT values which was significant compared value to patients positive for HBsAg with $p < 0.01$. This is similar to various 1999; Diestage and Isselbacher 1994 and Beld studies^[27] which have reported that ALT values are elevated slightly more than AST in HCV positive patients.^[28]

In the present study on comparison of ALT and AST levels it was found that cirrhotic with HCV infection presented with slightly higher levels of ALT in comparison to AST, while in HBV infection, all groups had slightly higher AST levels then ALT.

According to Dienstag and Isselbacher (1994)^[27] serum alkaline phosphatase (SAP) may be normal or only marginally elevated in case of acute and chronic viral hepatitis. This is in contrast to cholestatic jaundice where SAP level in highly elevated (Kann and Gerlich, 1996)^[29]. The normal range of SAP is between 3-13 KU/100ml. In the present study the observation were in accordance to those mentioned above.

Among a total of 300 patients 262 (87.3%) patients had SAP levels within the normal range of <14 ku/100ml. Among 38 (12.7%) patients elevated SAP levels, majority of 26 (68.4%) had moderately elevated SAP levels.

In the present study, the probable mode of transmission could be identified in table 2 positive cases. HBV is still the major cause of chronic liver disease, followed by HCV in this part of the region. Co-infection has been observed, and there is a danger of spread of combined infection in large proportion of cases. The prospects of a vaccine for HCV are still remote. So, great stress must be laid on proper preventive measures such as screening of blood, safe sexual practices, proper sterilization of instruments, proper disposal of contaminated material, and immunization of people at risk particularly health care workers.

Conclusion: The present study conducted in a rural area of UP, confirmed a high prevalence of Hepatitis B and C infection. The study also confirmed these to be an important precursor for chronic liver disease. The HBV and HCV infections are emerging as a major public health problem in the rural areas but were undetected till date. Contact with infected person, blood transfusion and unsafe methods of injections were risk factors for Hepatitis B infections. An effective education programme with robust immunization programme will reduce the burden of infection and morbidity. Recommendation of this study is to have an intense educational programme about risk of hepatic viral infections, routes of transmission and methods of protection. Concerted efforts of Government as well NGOs will go a long way in controlling and reducing the burden of disease.

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