



RELATIONSHIP BETWEEN HEPATITIS B AND C VIRUS PREVALENCE AND RISK FACTORS AMONG PATIENTS ATTENDING A RURAL MEDICAL COLLEGE

Medical Microbiology

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ABSTRACT

Background: Viral Hepatitis is a leading cause of death worldwide, with a higher mortality rate than that from human immunodeficiency virus (HIV), tuberculosis (TB) or malaria. Although Hepatitis B and C virus (HBV and HCV) infections are endemic worldwide, there is a significant geographic variability in its distribution. There is very limited epidemiological data pertaining to the prevalence of these infections in the general population of Rajouri district. **Objectives:** To evaluate seroprevalence of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) among patients attending GMC Rajouri. **Material And Methods:** It was a retrospective analysis of data of four years pertaining to total number of patient samples sent from various outdoor patient department & indoor wards. The samples were screened by Rapid HBV and HCV kits. Positive samples were confirmed for HbsAg or Anti HCV antibody on Enzyme linked immunosorbent assay (ELISA) test. **Results:** Seroprevalence of HBV and HCV were found to be 0.33% and 0.60%, respectively. Coinfection with HBV/HCV was seen in 0.02% of the individuals. Maximum number of positive cases were from General medicine (26.61%) followed by surgery (19.42 %). Prevalence was significantly higher in males and in age group 20-35 years old belonging to lower-middle class. Occupation showed higher positivity among farmers followed by drivers. High-risk behavior was an important risk factor contributing 18(36.73%) and 25 (30.48) of the HBV and HCV positive cases. 17 (20.73%) of the HCV positive cases had undergone tattoo making. 4 (8.16%) and 6 (7.31%) of HBV and HCV positive cases were also HIV positive. **Conclusion:** These findings underscore the need for targeted interventions, including awareness campaigns, preventive measures, and region-specific healthcare strategies, to reduce the burden of viral hepatitis in underserved populations.

KEYWORDS

Hepatitis, Mortality, Epidemiological, ELISA.

INTRODUCTION:

Viral hepatitis being a major global health problem affects approximately 400 million people globally. The current mortality rate from viral hepatitis is 1.46 million deaths each year, higher than deaths from HIV, TB or malaria.¹ It is estimated that about 2 billion people are exposed to Hepatitis B worldwide, with 350 million suffering from chronic infection. Similarly, more than 200 million people are estimated to be suffering from chronic infection with Hepatitis C throughout the world. Moreover, Hepatitis B is estimated to result in 563,000 deaths annually versus 366,000 deaths for Hepatitis C worldwide. The South-East Asia Region (SEAR) of the World Health Organization (WHO) carries approximately 30% of the global hepatitis burden, with India being a key contributor. In India, the prevalence of chronic HBV is estimated to be between 3-4%, while HCV affects approximately 1% of the population.²

There are five different types of Hepatitis viruses (A-E) that are responsible for viral hepatitis. Of these viruses, Hepatitis B and C viruses account for a substantial proportion of liver diseases and are responsible for liver damage ranging from minor disorders to liver cirrhosis and hepatocellular carcinoma (HCC).³ More than 95% of the Hepatitis B infected adults resolve the infection during the acute phase. However, about 80% of the patients with Hepatitis C progress to chronic infection. Hepatitis B and C are transmitted parentally mainly as a result of blood contact, including injury with contaminated instruments and sharing of needles, or by sexual contact and also through parental transmission from mother to child. Coinfection with HBV and HCV is not uncommon in areas with high endemicity.⁴

Although there has been extensive vaccination against HBV in many countries, yet HBV and HCV still rank among the most frequent reportable infectious diseases throughout the world even after considerable underreporting.

Rajouri is a rural district in Jammu and Kashmir with population of around 8.74 lakhs, very little data is available on the prevalence of Hepatitis B and C. The aim of the present study is to assess the seroprevalence of HBsAg and anti-HCV antibodies among different age groups attending our tertiary care hospital and to identify the possible risk factors for acquiring these infections.

MATERIAL AND METHODS:

This four-year retrospective study was conducted in the Department of Microbiology, Government Medical College, Rajouri from January

2020- December 2023. The study included patients who underwent HBV and HCV screening or presented with symptoms suggestive of acute or chronic liver disease. These patients were recruited from both outpatient and inpatient departments.

Data And Sample Collection -

Epidemiological data encompassing demographics (age, gender, occupation), clinical details, department/ward information, and potential risk factors were collected from patients during blood sample collection. Blood samples were obtained from all age groups and genders. Exclusion criteria included hemolyzed specimens, samples with incomplete data, and insufficient sample volume. Approximately 5 mL of venous blood was collected in plain vials and transported to the laboratory for analysis.

Sample Screening-

Following blood collection, samples were allowed to clot at room temperature before serum separation via centrifugation. Blood samples were screened for detection of Hepatitis-B surface antigen and anti-HCV antibodies by commercially available Rapid Immunochromatography test (SD BIOLINE HbsAg and SD BIOLINE HCV).

Confirmatory Test-

Samples demonstrating reactive results on the RDTs underwent further confirmatory testing using commercially available enzyme-linked immunosorbent assay (ELISA) kits for HBV and HCV. Samples were tested for HBsAg and HCV antibodies by enzyme-linked immunosorbent assay (ELISA) according to the standard instructions on the kit (HEPALISA and HCV Microlisa, J. Mitra and Co. Pvt. Ltd, New Delhi, India) along with validity check and incorporation of internal controls in each run.

RESULTS

In our study, a total of 14,804 patients were screened for Hepatitis B and 13,601 patients were screened for Hepatitis C during period of 4 years from January 2020 to December 2023. The overall prevalence of Hepatitis B during those 4 years was 49 (0.33%) and that of Hepatitis C was (82) 0.60%. The prevalence of Hepatitis B was highest (0.53%) during year 2021 and that of Hepatitis C was highest (0.80%) during year 2023. Coinfection with both HBV and HCV was found in 8 (0.02%) of the samples. (Table 1).

Table 2 shows the positive samples received from the various

departments for screening of HBsAg and Anti HCV. The majority of positive samples were from General Medicine (26.61%) Department followed by General surgery (19.42 %) and Emergency ward (12.23 %).

The prevalence of all three conditions (HBV, HCV and coinfection) was significantly higher in males compared to females (63.26%, 67.07% and 87.5%) (Table 3).

Analysis of age groups revealed a clear pattern for both HBV and HCV infection. The highest prevalence was concentrated in younger adults, specifically those between 20 -35 years old. This age range accounted for 44.9% (HBV) and 42.7% (HCV) of positive cases. (Figure 1).

Socioeconomic analysis revealed that majority of patients belonged to the lower and lower-middle socioeconomic class with 53.07% of HBV positive patients and 40.25% of HCV positive patients belonging to lower-middle class. (Figure 2). Seropositivity of Hepatitis B and Hepatitis C was high in farmers (42.85%, 48.78%) and drivers (24.48%, 13.41%) respectively. HCV positive cases were seen high in students. (15.85%). (Table 4)

Among the high-risk factors, it was seen that the patients undergoing Dialysis, 10 (12.19%) tested positive for Anti HCV, 4 (8.16%) were reactive for HBsAg. High-risk behavior was an important risk factor contributing 18(36.73%) and 25 (30.48) of the HBV and HCV positive cases. 17 (20.73%) of the HCV positive cases had undergone tattoo making. 4 (8.16%) and 6 (7.31%) of HBV and HCV positive cases were also HIV positive. (Table 5)

Table 1: Year-wise Distribution Of Prevalence Of Hepatitis B And Hepatitis C Among Screened Patients.

Year	Hepatitis B Screened	Hepatitis B Positive		Hepatitis C Screened	Hepatitis C Positive		HBV And HCV Co-infection Cases	
		Num ber	%age		Num ber	%age	Num ber	%age
2020	2249	4	0.17	1108	2	0.1	1	0.02
2021	2788	15	0.53	2221	9	0.18	1	0.01
2022	4878	20	0.41	5040	29	0.57	2	0.02
2023	4889	10	0.20	5232	42	0.80	4	0.03
Total	14,804	49	0.33	13,601	82	0.60	8	0.02

Table 2: Seropositivity Of Hepatitis B, C And Coinfection In Patients From Different Hospital OPDs And Wards

Department	HBs Ag Positive	Anti-HCV Positive	Co-infection Positive	Total Positive (%)
Emergency	8	8	1	17 (12.23)
General Medicine	14	21	2	37 (26.61)
Obstetrics and Gynecology	6	7	1	14 (10.07)
General Surgery	9	16	2	27 (19.42)
Pediatrics	3	4	0	7 (5.03)
Orthopedics	1	3	0	4 (2.87)
Dermatology	0	4	0	4 (2.87)
ENT	0	2	0	2 (1.43)
Ophthalmology	0	3	0	3 (2.15)
Dialysis Unit	5	9	2	16 (11.51)
ICU	3	5	0	8 (5.75)
TOTAL	49	82	8	139

Table 3: Gender-wise Seropositivity Of Hepatitis B, C And Coinfection.

Serological Markers	Male	Female	Total Positive
HBs Ag	31(63.26%)	18 (36.73%)	49
Anti-HCV	55 (67.07%)	27 (32.92%)	82
Co-infection	7 (87.5%)	1 (12.5%)	8
Total	93 (66.90%)	46 (33.09%)	139

Table 4: Occupation of Hepatitis B and Hepatitis C Positive Patients

Occupation	HBV Positive	HCV Positive
Farmer	21 (42.85%)	40 (48.78%)
Student	6 (12.24%)	13 (15.85%)
Security guard	7 (14.28%)	9 (10.97%)

Driver	12 (24.48%)	11 (13.41%)
Civil servant	2 (4.08%)	6 (7.31%)
Others	1 (2.04%)	3 (3.65%)
Total	49 (100%)	82 (100%)

Table 5: Risk Factors In Both Groups Of Patients

Risk Factors	Hepatitis B (N=49)	Hepatitis C (N=82)
Blood Transfusion	2 (4.08%)	6 (7.31%)
HIV positive	4 (8.16%)	6 (7.31%)
Surgical Procedure	8 (16.32%)	6 (7.31%)
Dialysis	4 (8.16%)	10 (12.19%)
High risk behavior	18 (36.73%)	25 (30.48%)
I/V drug abuse	11 (22.44%)	12 (14.63%)
Tattoo making	2 (4.08%)	17 (20.73%)

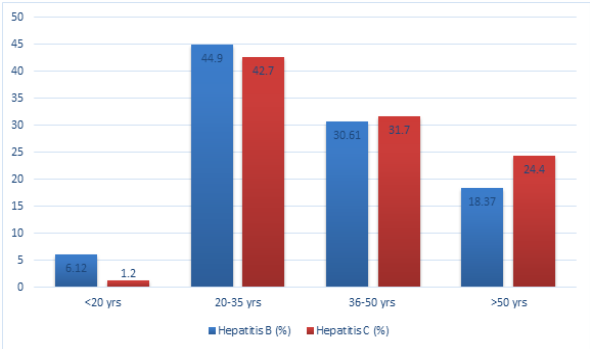


Figure 1: Age Wise Distribution Of Prevalence Of Hepatitis B And C Among Screened Patients.

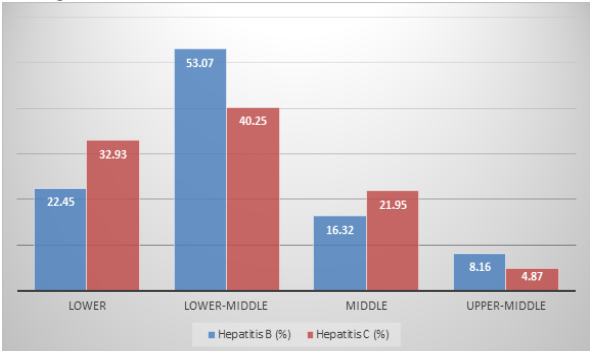


Figure 2: Socio-demographic Profile Of HBV And HCV Patients

DISCUSSION

Hepatitis B and C is a serious “silent epidemic” challenge to India. Chronic carriers are sometimes unaware of their status and continue to infect others. Coinfection increases the risk of liver failures, chronic liver diseases and cancers. Studies conducted at different areas and on different population regarding seroprevalence of Hepatitis B and C viruses and their associated risk factors have reported different findings.

In the present study, the overall seroprevalence of HBV infection was 0.33%, while that of HCV infection was 0.60% among the study population. This is indicative of low endemicity. Similar findings were seen in studies conducted by Sood et al⁵ (HBV-0.87%, HCV-0.28%) from Jaipur., Khankriyal et al² (HBV-0.53%, HCV-1.97%) from Uttarakhand., Prasad et al⁶ (HBV- 1.4%, HCV-0.4%) from Shillong. However, high prevalence rate was reported from studies conducted by Parveen et al⁷ (HBV- 5.23%, HCV-5.18%) from Haryana., Arup Roy et al⁸ (HBV-17.4%, HCV-41.7%) from Manipur. As was already established, there are significant regional variations in the prevalence and trend of Hepatitis B and C infections, which may be caused by host and environmental factors as well as cultural and behavioral norms. The relatively lower prevalence in Rajouri district reflects the success of the national immunization program and improved infection control practices.

Coinfection rate of HBV and HCV was found 0.02% in our study. Studies conducted by Khan et al⁹ and Anandh Perumal et al¹⁰ reported co-infection rate of 1.3% and 2% respectively.

Both HBV and HCV infection were more common in men and in the

age group 20 -35 years in this study. This reflects greater exposure to risk factors such as more active lifestyle, occupational hazards and cultural practices among young males. Increased prevalence of Hepatitis B and C among low-middle class population was seen in our study suggesting a correlation between low income and limited healthcare access. Limited healthcare access leads to late diagnosis and poor treatment. Similar demographic profile was seen in studies conducted by Yashovardhan et al¹¹, Antony et al¹², and Singh et al¹³. 4 and 6 of HBV and HCV positive cases were also HIV positive suggesting a strong co-relation of HIV and Hepatitis infection. The study considered the common belief that most of HBV and HCV coinfections in HIV-positive patients are due to the shared routes of transmission of the viruses. This is in concordance to studies conducted by Prasad A et al⁶ where co-infection of Hepatitis B and HIV were found in 4 patients and 1 patient was positive for Hepatitis C and HIV.

I/V drug abuse and tattoo making were also imp. risk factors seen in our study. Amongst the mode of transmission of these viruses, a very important mode would be the unsafe injection practice prevailing in the vast rural areas of the country. Unfortunately, the sterilization of syringes and needles are often improperly done in rural areas.

CONCLUSION

To the best of our knowledge, this is the first study evaluating the prevalence of Hepatitis B, C and co-infection in Rajouri district. Our study indicates a very low prevalence of HBV and HCV. The risk factors for acquisition of these viruses exist in our population. HIV and high-risk behavior are important risk factors seen in Rajouri district. Furthermore, injectable drug could also be one of the modes of transmission of blood-borne viruses in our population. Although it is well known that prevention is preferable to treatment, efforts should be undertaken to lower the prevalence of Hepatitis B and Hepatitis C by straightforward preventative measures such public education, blood and blood product screenings, and raising awareness of the value of immunization.

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