

# Assessment of Associated Risk Factors In Hepatitis B Virus and Hepatitis C Virus Infections

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## Abstract

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are common, especially among people at high risk for parenteral infection and in areas with a high prevalence of infection. Epidemiologic studies have identified several independent community associated and hospital associated risk factors for HBV and HCV infections in various communities. To detect the risk factors of Hepatitis B Virus and Hepatitis C Virus in chronic liver disease patients. The study was conducted on 50 clinically diagnosed chronic liver disease patients. Serum was screened for the presence of hepatitis B surface antigen and anti-hepatitis C virus antibodies using qualitative immune chromatographic method. We collected data using a structured questionnaire on putative community associated and hospital associated risk factors, and other known factors for HBV and HCV infections. Hepatitis B surface antigen was detected in 13 (26%) and anti-HCV antibody 9 (18%) patients clinically diagnosed to have chronic liver diseases. Contact with jaundiced person and tattooing on body were found to be the two most common risk factors showing 33.33% for HBsAg positivity. Whereas, shaving at barber shop showed 31.82% HBsAg positivity. Circumcision, dental extraction at home and tattooing on body have been found to be the most common risk factors for anti HCV antibody positivity, showing 50%, 37.5%, 23.81% positive result respectively. The results demonstrated that tattooing on body showed high association with the HBsAg positivity and HCV positivity was highly associated with the circumcision procedure and dental extraction at home. Hence to prevent the spread of HBV and HCV, people must be educated about these infections and their mode of transmission.

## Key Words

Hepatitis B virus , Hepatitis C, Liver Disease

## Introduction

Liver disease has a worldwide distribution. (1,2) In the developing countries of Asia and Africa, though hepatitis B virus (HBV) infection is the commonest cause of chronic liver disease, HCV is fast evolving as an equally important infection among these populations.(3) Approximately 7% of the world's population (350 million people) are infected with HBV and 3% (170 million people) with HCV.(4)

In India, the prevalence of HBV and HCV co-infection among patients has been reported to range from 3% to 56%.(5-7) India has over 40 million HBV carriers and accounts for 10-15% of the entire pool of HBV carriers of the world. Of the 25 million infants born every year in India, it is estimated that over 1 million run the lifetime risk of developing chronic HBV infection. Every year over 100,000 Indians die due to illnesses related to HBV infection.(8,9)

HBV is transmitted through exposure to infective blood, semen, other body fluids, or from infected mothers to infants at the time of birth. Transmission may also occur through transfusions of HBV-contaminated blood and

blood products, contaminated injections during medical procedures, and through injection drug use. HCV is mostly also transmitted through exposure to infective blood through transfusions of HCV-contaminated blood and blood products, contaminated injections during medical procedures, and through injection drug use. Sexual transmission is also possible.(10)

Needle stick injuries are responsible for 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in health-care workers around the world.(11) A better understanding of the epidemiology of viral hepatitis and the risk factors involved is among the priorities of any nation.(12,13) Reliable epidemiological data on prevalence rates and transmission routes of viral hepatitis are essential for designing national control policies.(14,15)

## Material & Methods

A cross sectional study was conducted in our institution. 50 clinically diagnosed cases of chronic liver disease attending Medicine OPD/IPD was included in present study. The diagnostic criteria for grouping patients as chronic liver disease were based on history, clinical,

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ultrasound, and impaired liver function tests (increased levels of Alanine aminotransferases and bilirubin). Alcoholic and drug abuser, intravenous drug user were excluded. Ethical clearance was been taken from the Institutional Ethics committee.

Five milliliter of blood sample was collected from the patient and stored at  $-20^{\circ}\text{C}$  until used. Serum was separated from the blood by using the centrifuge machine. The blood samples were screened for markers of various hepatitis B and C viruses by using rapid visual test kits. Hepatitis B antigen (HBsAg) was detected by HEPACARD and Hepatitis C Virus (anti HCV antibody) was detected by HCV TRI-DOT, manufactured by Diagnostic Enterprises, Himachal Pradesh (India).

An in-person interview with each study subject was conducted using a structured questionnaire on various potential exposures to blood or blood products (e.g., history of hospitalization, surgical procedures, therapeutic injections/intravenous infusions received), household exposure to hepatitis, dental treatment received etc.

The Chi-square test was utilized in assessing statistical significance of association that could exist between measured variables. Odds ratio (OR) and 95% confidence interval (CI) were used to measure the strength of association.  $p$  value  $<0.05$  was considered as significant.

## Results

The results of the current Study are depicted in *table 1 & 2*

## Discussion

HBV and HCV infections are among the most prevalent infectious diseases in humans worldwide. Both infections are associated with a broad range of clinical presentations ranging from acute or fulminant hepatitis to chronic infection that may be clinically asymptomatic or may progress to chronic hepatitis and liver cirrhosis. HBV infection has several modes of transmission of which perinatal transmission and transfusion of infected blood and blood products are most important. Other important modes include sexual transmission, tattooing, needle stick exposure etc. (16,17)

Among 50 CLD patient 13 patients shown HBsAg positivity and 9 patients were anti HCV Ab positive. Many studies had been done to know the risk factor associated with the acquisition of HBV and HCV in leading to CLD. Hence the presence study also evaluated the risk factors and these risk factors were grouped into community associated and hospital associated.

Out of 50 patients with CLD, 42% had history of tattoo on body; of those 33.33% were positive for HBsAg. 36% had history of ear piercing; out of those patients 16.67% were positive for HBsAg. 44% patients shaved at local barber shop and among those 22 patients 31.82% were HBsAg positive. Participants who had contact with jaundiced person were 12 (24%); from whom 33.33% were positive for HBsAg. Out of 4 patients 1 (25%)

were HBsAg positive of those who had circumcision. Out of 50 CLD patients 8 patients had dental extraction at home from whom 2 (25%) were positive for HBsAg.

Amongst the patients with CLD, 27 (54%) had history of hospital associated factors. 7 (14%) had history of either a minor or major surgery. Of those with surgical procedures, 28.57% were positive for HBsAg. 11 (22%) patients had the history of sharing of glass syringes; amongst these patients 18.19% were HBsAg positive. Of those who were admitted to hospital, 5/15 (33.33%) had a history of blood transfusion, but none was HBsAg positive. 4 women had been aborted, among them 1 (25%) HBsAg positive.

Patients with CLD studied, 23.81% were anti HCV Ab positive those who had tattoo on body. Among 18 (36%) ear piercing patients 2 (11.11%) were positive for anti HCV Ab. 22 participants who had the history of shaving at local barber shop, 4 (18.19%) were anti HCV Ab positive. Out of 12 patients who were contact with jaundiced person, nobody was anti HCV Ab positive. Out of 4 patients 2 (50%) were anti HCV Ab positive of those who had circumcision. 8 (16%) patients with CLD had history of dental extraction at home, from whom 37.5% were positive for anti HCV Ab.

27 patients of CLD had prior history of hospital admission. Of those 5 patients had some history of blood transfusion, but no one was anti HCV Ab positive. Among the 50 patients, 7 had history of surgical procedure and out of those patients 3 (42.86%) were anti HCV Ab positive. 11 patients had the history of sharing of glass syringes, among them 3 (27.28%) were anti HCV Ab positive. 4 patients were of abortive case but out of those patients no one was Anti HCV Ag positive.

Among the community associated risk factor it was observed that out of 50 patients, 21 had tattooing on their bodies and 7 out of them were HBsAg positive. Similarly shaving at barber shop and contact with jaundiced person showed 31.82% and 33.33% positivity for HBsAg respectively. But study also revealed that none of these factors showed significant statistical association ( $p>0.05$ ). A comparable study from Chennai, India showed that 37.5% people were HBsAg positive, those who had tattoo on their body. (18) Furthermore according to an Ethiopian study 42.3 % patients were HBsAg positive, those who were shaved at barbershop. (19)

In our present study, statistical analysis revealed high frequency of anti HCV Ab among patients who were practicing circumcision and had history of dental extraction at home showing 50% and 37.5% positivity respectively. A similar study in Ethiopia showed a rate of anti HCV positivity (19.5%) with dental extraction at home. (19)

Results of present study indicate an increase with prevalence risk of hepatitis C infection among those who have tattooed on body (23.81%). An Australian study reported that risk of hepatitis C increased due to tattooing

**Table 1. Distribution of Community and Hospital Associated Risk Factors Among the Hbsag Positive Patients**

Associated risk factors		Total no. of patient	Positive HBsAg no. (%)	OR	95% Confidence Interval		P Value
					Lower	Upper	
Community associated	Tattooing on body	21	7 (33.33%)	1.917	.535	6.872	.314
	Ear piercing	18	3 (16.67%)	.440	.103	1.871	.259
	Shaving at barber shop	22	7 (31.82%)	1.711	.479	6.109	.406
	Jaundiced person contact	12	4 (33.33%)	1.611	.392	6.627	.506
	Circumcision	4	1 (25%)	.944	.089	9.972	.962
Hospital associated	Dental extraction at home	8	2 (25%)	.939	.165	5.362	.944
	Blood transfusion	5	0 (0%)	.711	.590	.857	.162
	Surgical procedure	7	2 (28.57%)	1.164	.197	6.881	.867
	Sharing of glass syringes	11	2 (18.19%)	.566	.105	3.046	.503
	Abortion	4	1 (25%)	.944	.089	9.972	.962

**Table 2. Distribution of Community and Hospital Associated Risk Factors Among the anti HCV Ab Positive Patients**

Associated factors		Total no. of patient	Positive Anti HCV Ab no. (%)	OR	95% Confidence Interval		P Value
					Lower	Upper	
Community associated	Tattooing on body	21	5 (23.81%)	1.953	.455	8.384	.363
	Ear piercing	18	2 (11.11%)	.446	.082	2.425	.342
	Shaving at barber shop	22	4 (18.19%)	1.022	.239	4.368	.976
	Jaundiced person contact	12	0 (0%)	.763	.639	.911	.063
	Circumcision	4	2 (50%)	5.571	.670	46.354	.082
Hospital associated	Dental extraction at home	8	3 (37.5%)	3.600	.676	19.163	.117
	Blood transfusion	5	0 (0%)	.800	.691	.926	.269
	Surgical procedure	7	3 (42.86%)	4.625	.822	26.028	.065
	Sharing of glass syringes	11	3 (27.28%)	2.063	.422	10.080	.365
	Abortion	4	0 (0%)	.804	.698	.928	.329

if surface area is increase.(20) Another study from the United States also observed that the incidence of hepatitis C after tattooing has been shown to have a direct association with the number of tattoo experiences.(21)

Another risk factor that was common in present study in positive HCV patients was shaving at barber shop. It may be due to the low level of awareness among barbers about hepatitis and its risks of transmission. And in this rural region of Haryana the practice of razor reuse, which may spread hepatitis, is common and many tools are not sterilized, the tattoo artist does not follow proper infection-control procedures (e.g. washing hands, using latex gloves, and cleaning and disinfecting surfaces and instruments). Furthermore many of the patients coming to this tertiary care hospital were not aware of risk of using unsterilized instruments. People were practicing circumcision without proper precautions.

The prevalence of HBV and HCV among CLD patients who had history of either minor or major surgery was 2/7 (28.57%) and 3/7 (42.86%) respectively. However, history of either minor or major surgery could not be inferred from this study as a cause of infection by HBV. Similarly study in Pakistan among patients undergoing surgery reported a low prevalence of HBsAg

(3.2%).(22)

In our present study 18.19% positive HBV reported to have the history of sharing of glass syringes. A comparable study of 26.7% HBsAg positive and 25.3% anti HCV Ab patients had the history of exposure to unsterilized syringes and needles reported from Chennai, India.[18] A quite similar study from Amritsar reported that 15.38% anti HCV Ab positivity from surgical intervention patients.(23) From our results 27.28% patients were anti HCV Ab positive those who were exposure to unsterilized syringes and needles. It may be due to quacks are in habit of using same glass syringes. Furthermore poor rural patients are not educated or lack of awareness for this diseases.

**Conclusions**

The practice of tattooing on body strikingly showed high association with the HBsAg positivity though statistically insignificant. However, HCV positivity was highly associated with the circumcision procedure and dental extraction at home. Hence to prevent the spread of HBV and HCV, people must be educated about these infections and their mode of transmission. Despite recent control efforts, inadequate infection control practices in healthcare settings seem to continue to play a role in the

spread of HBV and HCV. Especially awareness should be created regarding the proper sterilization of the instruments even in the routine activity like the shaving at barber shop, tattooing on the body. All the hospitals should implement proper infection control strategies. Multi-disciplinary efforts involving healthcare professionals and communities are needed to control HBV and HCV transmission in developing countries.

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