**Original Article**

# Factors Associated With Seropositivity Of Hepatitis B & C: A Case-Control Study At Azad Jammu And Kashmir

**Muhammad Abdul Quddus[1], Rizwan Saeed Kiani[2], Arslan Shahzad[3], Muhammad Nadeem[4], Jhangir Zaib[5], Rukhsana Munawar[6]**

[1,2] Assistant Professor Gastroenterology, PMC Rawalakot
[3] Associate Professor Gastroenterology, Fazaia Medical College, Islamabad.
[4] Associate Professor Medicine, PMC Rawalakot.
[5] Assistant Professor Medicine, PMC Rawalakot
[6] Assistant Professor Pharmacology, PMC Rawalakot

**Author's Contribution**
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[3] *Manuscript Writing*
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[5,6] *Facilitation and Material analysis*

**Corresponding Author**
*Dr. Arslan Shahzad*
*Assistant Professor*
*Department of Gastroenterology*
*Fazaia Medical College*
*Islamabad*
*Email: drarslanshahzad@hotmail.com*

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## Abstract

**Objective:** To determine the factors associated with seropositivity of hepatitis B and C at Azad Jammu and Kashmir.
**Study Design:** A case-control study.
**Settings and Duration:** Department of Gastroenterology Sheikh Khalifa Bin Zayed Al Nahyan Hospital/ AK Combined Military Hospital Rawalakot, from 1st January 2021 to 30th June 2021.

**Methodology:** This study involved 173 patients suffering from Hepatitis B or C.144 age and gender-matched healthy controls were enrolled from within the hospital. Detailed socio-demographic proforma was filled by both the cases and controls which included all the relevant factors. Pearson chi-square test was applied to look for statistically significant differences in factors associated with seropositivity of hepatitis B and C among cases and controls.

**Results:** A total of 317 participants were included in the study. 144 were healthy controls and 173 were patients suffering from hepatitis B and C. 149 (86.1%) had hepatitis C while 24 (13.9%) had hepatitis B. Mean age of the study participants was 36.95±3.19 years. Marital status, positive family history of hepatitis B and C, and history of surgery or dental procedure had a statistically significant relationship with seropositivity of Hepatitis B and C (p-value<0.05)
**Conclusion:** Individuals who were married or had anybody in the family positive for hepatitis B and C were more at risk of having these infections. In this study dental procedures, surgeries and family history of these infections have the highest incidence of risk factors associated with HCV & HBV infections.
**Keywords:** Association, Factors, Hepatitis B, Hepatitis C.

## Introduction

Viral infections make up a huge bulk of communicable diseases across the globe.1 Viruses affecting vital organs like the liver have been major causes of mortality and morbidity in all parts of the world.2 Situation is not different in our part of the world. Hepatitis C has been one of the most prevailing viral infections in Pakistan leading to serious health-related consequences including death.3,4 Though active vaccinations have reduced the burden of Hepatitis B infection still it's not eradicated and is significantly prevalent in our population.[5,6]

Clinicians and researchers have been keenly interested in looking for the factors associated with the seropositivity of dangerous viral infections like hepatitis B, C, and HIV. Wang et al. published a large study on more than 6000 patients in China with the objective to look for epidemiological data regarding Hepatitis B and C. They concluded that the male gender and not being vaccinated for hepatitis B were risk factors significantly associated with the seropositivity of this viral agent. 7 Ashraf et al. conducted a similar study in Bangladesh and published it in 2010. They concluded that family history of hepatitis infections, history of surgical procedure or needle stick injury, animal bites, history of shaving in males from barbers, and ear and nose piercing in females were the factors associated with seropositivity of hepatitis B and C among their study participants.8Tufon et al. published a cross-sectional survey in 2019 regarding risk factors responsible for the transmission of hepatitis B in Cameron. They revealed that cohabiting with an HBV-infected sexual partner was a strong risk factor for having a hepatitis B infection. They found out that age, years spent with HBV-infected partners, unprotected sex, and marriage were not the risk factors associated with HBV seropositivity.[9]

Pakistan has been facing problems related to communicable diseases for a long. Each year a huge number of patients die because of deadly infections which could have been easily prevented. Seerat et al. published a study in 2020 regarding the frequency of hepatitis B virus (HBV) and hepatitis C virus (HCV) infection and the associated horizontal risk factors in children being screened for viral hepatitis in Lahore, Pakistan. They came up with the findings that the frequency of HCV infection was higher than that of HBV infection among Pakistani children aged ≤15 years and several horizontal risk factors were found to cause viral hepatitis.10Limited local data has been generated on the adult population to look for risk factors associated with these viral infections. We, therefore, designed this case-control study with the rationale to determine the factors associated with the seropositivity of Hepatitis B and C at Azad Jammu and Kashmir.

## Methodology

This case-control study was conducted at the department of Gastroenterology, Sheikh Khalifa Bin Zayed Al Nahyan Hospital/ AK Combined Military Hospital Rawalakot, from 1st January 2021 to 30th June 2021. The sample size was calculated by using the WHO sample size calculator by using the population prevalence proportion of seropositivity of hepatitis B as 4%.11 Patients were selected by Non-Probability, Consecutive Sampling. Patients of both genders between the ages of 18 and 60 years diagnosed with Hepatitis B, C or both on the ELISA method were included in the study. Patients who were HIV positive or were less than 18 years or more than 60 years of age were excluded from the study. Patients who did not consent or did not complete the full proforma were excluded as well. Controls were age and gender-matched individuals from hospitals who were seronegative for Hepatitis B and C infection. 3ml of blood was acquired by venipuncture from the cubital fossa. The sample was allowed to clot and a separate third-generation ELISA kit for Hepatitis B and C was used to determine seropositivity from the isolated serum of the sample. An immediate single line (≤5sec) was a marker of accurate test and a double line within 5 minutes was taken as a marker of seropositivity.12 All the cases and controls who met the inclusion criteria were enrolled in this study and underwent ELISA. Detailed history and written informed consent were obtained from all the study participants. 3 ml of blood was taken by venipuncture from the cubital fossa and seropositivity for Hepatitis B and C was checked. Patient's demographic details along with all the socio-demographic variables noted (name, age, gender, marital status, history of surgery, history of dental procedure, history of transfusion, family history of viral infections, tattooing, diabetes mellitus), and recorded into the attached proforma. All the samples and tests were performed by a single resident

to eliminate bias. Confounding variables were controlled by exclusion.

All the collected data was entered and analyzed through SPSS version 23.0. Numerical variables like age were presented by mean ±SD. Categorical variables were presented by frequency and percentage. The Chi-square test was applied taking p≤0.05 as significant to look for the association of various variables with seropositivity of Hepatitis B & C.

## Results

A total of 317 participants were included in the study. 144 were healthy controls and 173 were patients suffering from hepatitis B and C. 149 (86.1%) had Hepatitis C while 24 (13.9%) had Hepatitis B. Table I shows the general characteristics of study participants. The mean age of the study participants was 36.95±3.19 years. 159 (50.1%) were male while 158 (49.9%) were female. 280 (88.3%) were married while 37 (11.7%) were single. Table II shows the results of the chi-square analysis. Marital status, positive family history of hepatitis B and C, and history of surgery or dental procedure had a statistically significant relationship with seropositivity of Hepatitis B and C (p-value<0.05).

**Table-2** Association of various factors with seropositivity of Hepatitis B and C: Chi-square test

| **Factors studied.** | **Cases** | **Controls** | **p-value** |
|---|---|---|---|
| **Gender** | | | |
| Male | 81 (46.8%) | 78 (54.2%) | 0.193 |
| Female | 92 (53.2%) | 66 (45.8%) | |
| **Marital status** | | | |
| Single | 162 (93.6%) | 118 (81.9%) | 0.001 |
| Married | 11 (6.4%) | 26 (18.1%) | |
| **Family history of hepatitis B &C** | | | <0.001 |
| No | 124 (71.7%) | 131 (90.9%) | |
| Yes | 49 (28.3%) | 13 (9.1%) | |
| **History of surgery** | | | |
| No | 96 (55.4%) | 101 (70.1%) | 0.007 |
| Yes | 77 (44.5%) | 43 (29.9%) | |
| **History of Dental procedure** | | | <0.001 |
| No | 66 (38.1%) | 114 (79.2%) | |
| Yes | 107 (61.9%) | 30 (20.8%) | |
| **History of Blood transfusion** | | | 0.952 |
| No | 168 (97.1%) | 140 (97.2%) | |
| Yes | 05 (2.9%) | 04 (2.8%) | |
| **Tattooing** | | | |
| No | 148 (85.5%) | 127 (88.2%) | 0.488 |
| Yes | 25 (14.5%) | 17 (11.8%) | |
| **Diabetes Mellitus** | | | |
| No | 146 (84.4%) | 122 (84.7%) | 0.936 |
| Yes | 27 (15.6%) | 22 (15.3%) | |

## Discussion

Chronic viral infections have been the leading cause of liver damage all around the world.13 Prevention of these infections or early recognition and treatment is the only solution to reduce the mortality and morbidity related to these conditions.14 It would be of utmost importance if healthcare workers identify the high-risk population and devise a strategy to screen high-risk groups at regular intervals to identify the affected individuals early. This would not only be beneficial for the individual but also for the healthcare system as the spread of the virus could be reduced if infected individuals are identified early. We, therefore, planned and conducted this study with the aim of determining the factors associated with the seropositivity of hepatitis B and C at Azad Jammu and Kashmir.

**Table-1** Baseline Characteristics of Study Sample

| **Characteristics** | **Participants n=317** |
|---|---|
| Mean Age (years) | 36.95±3.19 years |
| **Gender** | |
| Male | 159 (50.1%) |
| Female | 158 (49.9%) |
| **Hepatitis Serology** | |
| Hepatitis B | 24 (13.9%) |
| Hepatitis C | 149 (86.1%) |
| **Marital status** | |
| Married | 280 (88.3%) |
| Single | 37 (11.7%) |
| **History of Blood Transfusions** | |
| No | 308 (97.1%) |
| Yes | 09 (2.9%) |
| **Diabetes mellitus** | |
| No | 268 (84.5%) |
| Yes | 49 (15.5%) |

Iradukunda et al.15 published a study from Rawanda in 2020 with an objective to determine the seroprevalence of Hepatitis B and C and their associated factors in people more than 45 years of age. They concluded that age, unsafe sexual practices, and history of blood transfusion were strongly related to the seropositivity of these viruses. Our results supported their findings as the history of blood transfusion was a risk factor associated with seropositivity of Hepatitis B and C in our data set as well.

Samo et al.16 published a similar study on the Sindhi population and revealed that hospitalization, blood transfusion, needle injury, multiple sex partners, reused syringe, dental extraction, surgery, injectable drug abuse, and shaving at barbershops were risk factors significantly associated with seropositivity of hepatitis B and C in a small set of local Pakistani population. We studied different risk factors profiles and concluded that marital status, positive family history of hepatitis B and C, and history of surgery or dental procedure had a statistically significant relationship with seropositivity of Hepatitis B and C.

A Polish study in 2012 determined the seroprevalence of HBV and HCV infections in elderly individuals. It was concluded that age, sex, alcohol consumption, nutrition, marital or economic status, educational level, and site of residence were not significantly associated with seroprevalence of hepatitis B and C.17 Marital status was significantly associated with Hepatitis.

B and C seropositivity along with a few other factors in our study participants. Cultural differences may be responsible for differences in the results of our study with the Polish Data set.

Khan et al. screened the Punjabi population with the aim to investigate the epidemiology and risk factors of HBV infection. They came up with the findings that barber risk, blood transfusion, history of injection, reuse of syringes, dental risk, and surgical procedure were significantly associated with HBV infection. Our results on the population of AJK were not very different from the results of Khan et al. on the population of Punjab and marital status, positive family history of Hepatitis B and C, and history of surgery or dental procedure emerged as potential risk factors for HBV and HCV infections. Only the adult population was considered, which undergoes transfusion not very often and that too under controlled conditions therefore the rate of infection was low. The situation may be different in the pediatric age group where it more often transfusions are done. The high rate of infections in patients with DM may be because these patients acquire hospital

services or parenteral treatments more than other people.

The case-control study design was the main strength of this study but the small sample size and that too from one hospital setting was a limitation of our data set. Future studies with large population-based data sets may generate more generalized results.

## Conclusion

Multiple factors were associated with the seropositivity of Hepatitis B and C among the participants in our study. Individuals who were married or had anybody in the family positive for Hepatitis B and C were more at risk of having these infections. Patients having surgical or dental procedures were also found to have an increased risk for seropositivity of these Hepatitis B and C.

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