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Research Article

**INVESTIGATION OF HEPATITIS B TRANSMISSION RISK  
FACTORS IN PATIENTS WITH HIV**Dr. Maleeha Saleem<sup>1</sup>, Dr. Abdul Rafaih Khan<sup>3</sup>, Dr. Nouman Ikram<sup>3</sup><sup>1</sup> Rawalpindi Medical University<sup>2</sup> Bacha Khan Medical College, Mardan<sup>3</sup> DHQ hospital, Rawalpindi

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**Abstract:**

**Aim:** Co-infection with Hepatitis B (HBV) virus and HIV is common due to similarity of their transmission methods. However, the prevalence of concurrent infection in different societies, shows the crucial role of various risk factors in different populations. Therefore, the present study was performed to examine risk factors of transmission of HBV in patients with HIV.

**Methods:** This case-control study was conducted on 60 HIV positive patients (in two 30-member experiment and control groups), who visited the Medicine departments of Holy Family Hospital Rawalpindi for one-year duration from March 2019 to March 2020. Registered patients were informed of the purpose and procedure of this study and were given written leave and excluded those who could not allow participation. All procedures in this study have been approved by the Ethical committee. They were adjusted in terms of age group (18-30, 30-40, 40-50, and 50-60), gender (male and female), and marital status (married, single, divorced, and widowed) and visited by an infectious disease's specialist according to routine examinations. Data was recorded in a questionnaire for each subject. The mean age for the experimental group was  $35 \pm 6.1$ , and for control group was  $36.6 \pm 5.7$  years.

**Results and Conclusion:** Both univariate and multivariate analyses of development of HBV infection and variables including Illegitimate sexual intercourse, use of intravenous injection drugs, positive history of imprisonment, and tattooing ( $p$  value  $< 0.05$ ) showed existence of significant relationships. Injection of illegal intravenous drugs, history of imprisonment, illegitimate sexual intercourse, and tattooing are four important risk factors for transmission of HBV infection to HIV patients. In addition, the master risk reduction program may include provision of clean disposable tools for intravenous injection of drugs and tattooing.

**Keywords:** Hepatitis B, HIV, Infection.

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## INTRODUCTION:

Hepatitis B (HBV) and HIV infection are one of the main health problems in societies. This is very common due to the similarity of HBV transmission methods and the simultaneous development of HIV for these two infections<sup>1-2</sup>. According to previous research, more than 4-7 million people worldwide suffer from HBV and HIV at the same time. The simultaneous development of these infections reduces the purity of HBV and severely impairs the cell immune response of HBV. It also accelerates the chronic process of development of the disease and fibrosis of the liver and significantly increases the complications of infection. On the other hand, HBV infection is an important factor in disease progression and treatment of HIV patients. In other words, it largely contributes to problems related to liver toxicity after treatment with antiretroviral drugs. As a result, these cases show significantly lower survival rates than HIV or HBV patients. The difference between the prevalence rate of concurrent infections in different studies reflects the decisive role of risk factors in different countries and even in different regions of one country<sup>3-4</sup>. Therefore, identifying the main risk factors in each geographical region is important to prevent the simultaneous development of these two infections. Some of the factors that play a role in the simultaneous development of these two infections are intravenous drug intake injection, study/region area, frequency of infections, tattoos, piercings, hygienic sharing, gender, prison history, marital status, etc<sup>5-6</sup>. Therefore, it is necessary to properly control these factors. However, based on previous studies that exclude taking the drug intravenously, which is reported as a risk factor in almost all studies and geographic regions, there is no consensus on other variables, and various studies have reported different risk factors. Therefore, this study was conducted to investigate risk factors for HIV transmission in HBV infected patients

## MATERIALS AND METHODS:

### Working procedure

This case-control study was conducted on 60 HIV positive patients (in two 30-member experiment and control groups), who visited the Medicine departments of Holy Family Hospital Rawalpindi for one-year duration from March 2019 to March 2020. Registered patients were informed of the purpose and procedure of this study and were given written leave and excluded those who could not allow participation. All procedures in this study have been approved by the Ethical committee.

### Study population

The group members were randomly selected using a simple random sampling method for HIV patients over the age of 18 who were diagnosed with HBV infection. The members of the control group were selected from HIV-infected patients who were synchronized with patients in the experimental group in the age group (18-30, 30-40, 40-50 and 50-60), gender (male and female) and marital status (married, single, divorced and widowed). Excluding criteria within 6 weeks of entry, active opportunistic infection, serum transferase amino levels (ALT), 1000 IU/l, concomitant cytotoxic chemotherapy malignancy, other causes of chronic liver disease were more than three times higher than alpha fetoprotein (ULN) and Child-Pugh class C or decompensated cirrhosis.

### Data collection

Patients and individuals who regularly visited the hospital were evaluated by fully trained interviewers using a national standard study used in behavioral clinics. The study included demographic characteristics (age, gender, race, education and residence), moral characteristics (a history of imprisonment or imprisonment for more than a week, common hygiene tools and tattoos), a history of blood transfusions, dialysis and thalassemic, the use of prohibited intravenous drugs, and a history of illness such as illegal sex. Participants in this study were visited at least twice by an infectious disease expert, and one visit took place in the last 12 months. Routine tests include social status and accurate medical details, hematological and biochemical tests, physical examination, chest X-ray, HIV titer, CD4 measurement, toxoplasmosis and PPD tests in patients with suspected tuberculosis using the ELISA test method in HBsAg and HVC tests.

### Statistical analysis

McNemar's tests and conditional logistics studies were used to investigate the relationship of HBV infection with variables of one variable and variables of a multidimensional state (simultaneous analysis of test variables). From two to 0.05, the site was considered statistically significant.

## RESULTS AND DISCUSSIONS:

During the investigation, none of the participants was excluded from the study. The mean age of the experimental group was 35-6.1 and 36.6 x 5.7 years for the control group. The age range for both groups was 18-60 days. Twenty-three men (76.67%) and 7 women (23.33%) and 20 men (66.67%) and 10 women (33.33%).

**Table 1. Demographic and baseline characteristics of the study population**

Variables	Experimental group	Control group	P value
	N (%)	N (%)	
Age			>0.05
18-30	8 (26.67%)	7 (23.33%)	
30-40	11 (36.66%)	12 (40%)	
40-50	6 (20%)	6 (20%)	
50-60	5 (16.67%)	5 (16.67%)	
Gender			>0.05
Male	23 (76.67%)	20 (66.67%)	
Female	7 (23.33%)	10 (33.33%)	
Marital status			>0.05
Married	6 (20%)	8 (26.67%)	
Single	16 (53.34%)	17 (56.67%)	
Divorced	4 (13.33%)	2 (6.66%)	
Widowed	4 (13.33%)	3 (10%)	

As shown in table (1), patients in experimental and control groups were synchronized in terms of age, marital status and gender. Most of the group studied came from single men aged 30 to 40. One variable analysis of the development of HBV and variable infections, including illicit sex (p-value, 0.0410), intravenous drug use (p value, 0.0287), positive incarceration history (p-value, 0.0020) and tattoo (p value, 0.0213) showed important relationships. The potential for the development of HBV in patients taking intravenous medicines, illicit sexual intercourse, patients with a history of meta-displaced and patients with tattoos 3.8235 (95%CI: 1.15 00 - 12 7129), 3 0000 (95%CI: 1 0462 - 8 6027), 7 428 6 (95 CP: 2 .0782 - 26.5537) and 5.2105 (95 CI: 1.2784 - 21.2373) more than ordinary participants (2 tables).

**Table 2. The univariate analysis of HBV-HIV coinfection and study variables**

Variables	Control group (N)	Experimental group (N)	Adjusted OR	95% CI	P value
Educational level			2.0714	0.1777 to 24.1495	0.5611
Academic	2	1			
Non-academic	28	29			
Sharing needles			0.7500	0.2615 to 2.1507	0.5925
Positive	12	10			
Negative	18	20			
Economic situation			3.1017	0.1214 to 79.2326	0.4936
Pleasant	1	0			
Unpleasant	29	30			
Habitat			1.1515	0.3600 to 3.6830	0.8120
Countryside	11	8			
Urban	19	22			
History of imprisonment			7.4286	2.0782 to 26.5537	0.0020
Positive	14	26			
Negative	16	4			
Illegitimate sexual intercourse			3.0000	1.0462 to 8.6027	0.0410
Positive	10	18			
Negative	20	12			
Tattooes			5.2105	1.2784 to 21.2373	0.0213
Positive	19	27			
Negative	11	3			
Intravenous drugs			3.8235	1.1500 to 12.7129	0.0287
Positive	17	25			
Negative	13	5			
History of blood transfusion			1.4082	0.4453 to 4.4533	0.5601
Positive	7	9			
Negative	23	21			

History of dialysis Positive Negative	5 25	3 27	0.5556	0.1201 2.5689	to	0.4518
Thalassemia Positive Negative	2 28	1 29	0.4828	0.0414 5.6282	to	0.5611
Anti HCV test Positive Negative	6 24	4 26	0.6154	0.1546 2.4497	to	0.4909
Tuberculosis (TB) Positive Negative	5 25	7 23	1.5217	0.4232 5.4719	to	0.5202
AIDS Positive Negative	17 13	14 16	0.6691	0.2418 1.8516	to	0.4391

On the other hand, multidimensional analysis, injection of the drug intravenously, prison history, unlawful sex and tattoos (as potential determinants) HBV, 0.31005 (95 CI: 1.1996 - 6.5228), 3.5213 (95 CI: 2.1304-12.0453) increases development chances) 12.0453, 2.6018 (95 CI: 1.0915 - 4.3200) and 3.9073 (95 CI: 1.4355 - 11.6012) times (Table 3).

**Table 3. The multivariate analysis of HBV-HIV coinfection and potential predictors**

Variables	Adjusted OR	95% CI	P value
History of imprisonment Positive Negative	3.5213	2.1304 to 12.0453	0.0027
Illegitimate sexual intercourse Positive Negative	2.6018	1.0915 to 4.3200	0.0480
Tattooes Positive Negative	3.9073	1.4355 to 11.6012	0.0279
Intravenous drugs Positive Negative	3.1005	1.1996 to 6.5228	0.0311

### DISCUSSION:

Our results showed that the use of intravenous drugs, tattoos, illegal sex and incarceration history is independently associated with a high risk of concomitant infections. Many previous studies have also highlighted the use of intravenous injectable drugs as an important risk factor, including HBV transmission<sup>7-8</sup>. Although the use of intravenous drugs is presented as a risk factor for concomitant infections, several studies have introduced this factor as a risk factor. Based on literature, this factor is particularly common among gay men<sup>9-10</sup>. On the other hand, concomitant transmission of these infections, bleeding during sex and accompanying infections have been reported as important risk factors. Therefore, this finding reflects the need to investigate gay men for this concurrent infection, regardless of the use of illegal intravenous drugs. There is no doubt that contaminated needles and syringes play an important role in the spread of this infection in populations with a high incidence of HBV infection and incarceration, but our results have denied this. Since prison-contaminated syringes are widely

used and the incidence of various infections, such as HBV and HIV, is very high. In addition, injected addicts entering prison can become injectable addicts mainly due to difficulty inhaling<sup>11-12</sup>. Therefore, prison is a very important factor in HBV transmission in injectable and injected addicts. In addition to prison, research shows that prison length is also directly related to the risk of transmission of HBV infection. According to the results of these studies, previous studies have also found that HBV tattoo transmission is a well-known tool. While some studies do not introduce tattoos as a risk factor, according to our findings, several studies have shown a direct link between the tattooed area and HBV infection and the number of tattoos. In other words, the risk of transmission increases with the increase in tattoo area and the number of tattoos. In addition, the risk of HBV transmission through tattoos depends on the prevalence in the population, as studies have shown that the risk is much higher among prisons<sup>13-14</sup>. HBV sexual transmission has been reported as a well-known tool in previous studies, but HBV transmission in HIV patients has been somewhat

studied. In this study, when one variable and multidimensional analysis, this factor was known as a risk factor in HBV transmission. Based on the results of this study, some researchers suggest that HBV transmission is higher in HIV patients. They attributed the combination of weakening the immune system and increasing the release of blood and HBV sperm virus. Restrictions have also been imposed on this investigation. Therefore, due to a lack of information on the duration of HBV and HIV development, it cannot be concluded that these risk factors make the HIV patient susceptible to HBV or whether these factors make HBV susceptible to HIV<sup>15</sup>. Of course, the work of the future cohort is necessary to answer this question. Given the results of these studies, the main risk reduction program may include methadone care therapy, as well as the provision of clean disposable tools for intravenous injection and tattooing (for rehabilitation and prevention of injectable conversion) in centers such as prisons. Illegal injection of the drug intravenously, history of incarceration, illegal sex and tattoo infection of HIV patients are the four main risk factors. The results of these studies highlight HBV, HIV and the prison triad, intravenous injection of illicit drugs, unlawful sexual and prison tattoos, as it clearly demonstrates the role of prison as a risk factor in the transmission of this virus.

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