

# IDENTIFICATION AND ASSOCIATION OF RISK FACTORS FOR HEPATITIS B AND C IN FAISALABAD, PAKISTAN

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#### DOI: https://doi.org/10.5281/zenodo.15308555

#### Keywords

Hepatitis B virus (HBV), Hepatitis C virus (HCV), Liver diseases, Viral hepatitis, Pakistan, Public health, Cirrhosis, Hepatocellular carcinoma, Disease transmission, Epidemiology.

#### Article History Received on 12 February 2025 Accepted on 14 March 2025 Published on 19 March 2025

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Corresponding Author: \* Zia Ashraf Abstract

Hepatitis B and C pose significant public health challenges in Pakistan, with high prevalence rates linked to inadequate healthcare practices and limited awareness. This cross-sectional study aimed to identify the risk factors and epidemiological patterns of HBV and HCV among 200 patients (65% male, 35% female) aged 15–60 years at ABWA Hospital, Faisalabad, from March to June 2022. Participants diagnosed via ICT, ELISA, or PCR were interviewed using structured questionnaires to collect demographic, occupational, medical, and behavioral data. Statistical analyses were performed using SPSS v26. The results revealed an HBV prevalence of 56.5% (n=113), HCV prevalence of 31% (n=62), and co-infection of 12.5% (n=25). The 30-50 years age group had the highest infection rate (48.5%), with males (65%) and rural residents (61% HBV positivity) disproportionately affected. Occupational risks were notable: jobholders (63% HBV) and businessmen (55% HBV) showed elevated rates. Surgical history (85% of HBV in those with prior surgery) and needle injuries (82% of HBV) have emerged as major risk factors. Vaccinated individuals had lower HBV infection rates (53% vs. 61% in unvaccinated individuals). None of the cases was linked to sexual transmission. This study underscores the urgent need for targeted vaccination campaigns, improved infection control in medical settings, and public health education, particularly in rural and high-risk occupational groups. Addressing these gaps is critical for mitigating Pakistan's hepatitis burden.

### INTRODUCTION

The word "hepatitis" originated from Latin and means an enlargement of the tissue that makes up the liver. In today's interconnected world of global communities, viral hepatitis poses a significant public health risk that endangers mankind on a massive scale, particularly in less developed nations in Asia (Lu, Plataniotis, & Venetsanopoulos, 2003). Most cases of hepatitis are caused by viruses, and the condition is often followed by liver-related disorders and, in rare cases, hepatocellular cancer (Grimes et al., 2017). Most cases are caused by infection with a single viral subtype; however, infections can also be

caused by a number of different viruses (Tsatsralt-Od et al., 2005). It is possible to take either an acute or chronic form, and it may eventually progress to more serious illnesses such as cirrhosis of the liver or cancer. Hepatitis can also be caused by drugs and autoimmune illnesses; however, viruses continue to be the most common cause of the disease (Khan et al., 2014).

Infection with hepatitis B virus (HBsAg) is widespread throughout the world's population; nevertheless, the developing world has the highest incidence rate. Two billion individuals worldwide have it (Liu, Hu, Lu, & Li, 2010). A type that lasts for a long time has been found in 400 million people. Because Pakistan is still a developing nation, the disease is guite widespread there, and it has already approximately nine million affected people. Compared to children and adults, the likelihood of an infection occurring in a newborn baby is significantly higher. More than 90 percent of newborn newborns are infected, but that number drops to twenty-five percent by the time the child is five years old (Bazhenova et al., 2020).

It is possible for liver disorders such as hepatocellular carcinoma and cirrhosis-related end-stage liver disease to be brought on by hepatitis B and C viruses. Both these conditions have the potential to affect a patient's life. Because of the alarmingly high infection rates, hepatitis B and hepatitis C epidemics require prompt global attention. More than 240 million people worldwide suffer from chronic liver infections. Worldwide, approximately 600,000 individuals lose their lives due to the acute or chronic effects of hepatitis B, and more than 350,000 people lose their lives each year due to hepatitis C-related liver illnesses (Bazhenova et al., 2020).

Flaviviridae is a family in which the Hepatitis C virus (HCV) is a member of (9.6 kb) positive-sense RNA genome. This virus is found in the bodies of three percent of people worldwide. On a global scale, it is more widespread in impoverished and developing continents, such as Africa (13 percent), with Egypt being the most endemic nation due to its high prevalence rate (>15%) (Moradpour, Penin, & Rice, 2007).

In Pakistan, around ten million individuals are infected with HCV. The chronic form of this disease



### ISSN: (e) 3007-1607 (p) 3007-1593

may cause liver cirrhosis. Classifying it as an epidemiological illness requires consideration of a variety of risk variables. It is estimated that over 10 million people in Pakistan are infected with HCV. Its frequency is not consistent over the entirety of Pakistan; rather, it varies considerably between various areas of the nation and the groups that make up those regions. In developed nations, the most common modes of transmission are needlestick injuries, hemodialysis, blood transfusions, intravenous drug use, tattooing, sexual contact, and contamination while pregnant. Other common modes of transmission include blood transfusion, blood injection, hemodialysis, and blood transfusion (Anjum et al., 2013).

It is estimated that between 8 and 16 million instances of HBV and between 2 and 5 million cases of HCV are transmitted every year in third-world nations owing to the use of unsterilized medical equipment, most often contaminated injections (Kane, Lloyd, Zaffran, Simonsen, & Kane, 1999). Although HCV infections seem to be on the rise in developed nations, the danger of contracting this virus in many developing countries is continually increasing. Over the course of the preceding two decades, there has been a dramatic rise in Pakistan. During the years 2007 and 2008, the first comprehensive nationwide study of HCV and HBV prevalence was carried out (Ali, Donahue, Qureshi, & Vermund, 2009).

The government launched a national hepatitis sentry site observation system in June 2010. However, owing to limited infrastructure and facilities, the scope of this observation system was reduced to just regional capital and Islamabad. Furthermore, the extent of the national survey was restricted to screening seropositivity among the general population, excluding high-risk groups (Mele et al., 2008).

### MATERIALS AND METHOD

This cross-sectional study was conducted at the ABWA Hospital and Research Center, Faisalabad, involving both hospitalized and outpatient individuals. Male and female patients aged  $\geq$  18 years diagnosed with either hepatitis B or C through ICT, ELISA, or PCR testing were included. Patients outside the ABWA Hospital and Research Center

were excluded from the study. Data collection took place over four months, from March 1, 2022, to June 30, 2022, following the approval of the synopsis by the Ethical Committee of Riphah College of Rehabilitation and Allied Health Sciences. Patients who recovered following interferon therapy were excluded. A total of 200 samples were collected. Written consent was obtained from all participants to ensure that their participation was entirely voluntary and that they could withdraw at any point without any consequences. Participants' confidentiality was fully maintained, and no harm was caused to any individual during the research process.

Data were collected through face-to-face interviews with patients after obtaining verbal consent, followed by the signing of a structured consent form designed in the national language, Urdu. A specially designed questionnaire was used to record detailed information, including age, sex, ethnicity, area of residence, hygienic practices, medical history, medication use, smoking habits, history of diabetes, blood transfusion history, and surgical and dental history. The primary variables defined in this study were professional occupation, transfusion history, surgical history, dental history, intravenous drug abuse, household contact, and sexual contact with infected individuals. Professions were categorized as healthcare professionals, barbers, sewage cleaners, and others. Transfusion history was classified based on whether the participants had received whole blood or blood products. Surgical history included only major surgeries requiring general anesthesia, while dental history included procedures such as professional cleaning, tooth filling, extraction, or dental surgery. Drug abuse was identified among individuals with a history of drug use via injections.

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Household contact was considered positive if an individual lived with someone diagnosed with hepatitis B or C, and sexual contact history was based on whether the participant's partner had hepatitis B or C infection. Furthermore, the place of residence was categorized as rural or urban based on geographic location.

Participants were further grouped into high-risk categories, including healthcare workers, intravenous drug users, factory workers, prisoners, pregnant women, and household contacts of hepatitis patients. The major risk factors identified were barbers, reuse of syringes, intravenous drug use, receipt of blood products, sexual transmission, ear and nose piercings, dental surgeries, and other types of surgery. Minor risk factors considered included sex, vaccination household and history, tattooing, contact, embroidery work. For statistical analysis, descriptive statistics were computed for the demographic variables. Data entry and analysis were performed using IBM SPSS Statistics version 26. The results were presented using bar charts and pie charts, where appropriate. Statistical methods were employed to explore the associations between variables.

#### RESULTS

A total of 200 blood samples were collected from indoor patients at the ABWA Hospital, with ages ranging from 15 to 60 years. Among the patients, 130 (65%) were male and 70 (35%) were female. The patients were divided into three age groups: 15–30 years, 30–50 years, and above 50 years. The majority of patients, 48.5% (n=97), belonged to the 30–50 years group, while 27.5% (n=56) were in the 15–30 years group, and 23.5% (n=47) were above 50 years (Table 1).

Table 1: Distribution of Fatients According to Age Group					
Age Groups	No. of Patients	Percentage (%)			
15-30 years	56	27.5%			
30-50 years	97	48.5%			
Above 50 years	47	23.5%			
Total	200	100%			
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Table 1: Distribution of Patients According to Age Group

Further analysis revealed the types of hepatitis infections among the different age groups. In the 15–30 years group, 66% (n=37) of patients had Hepatitis B, 26% (n=15) had Hepatitis C, and 8%

(n=4) were co-infected with both viruses. In the 30– 50 years group, 56% (n=55) had Hepatitis B, 34% (n=33) had Hepatitis C, and 10% (n=9) had both. Among patients aged > 50 years, 51% (n=24) had



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Hepatitis B, 24% (n=11) had Hepatitis	С,	and	25%
(n=12) had co-infections (Table 2).			

### Table 2: Age-wise Distribution of Hepatitis Type

Age Group	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
15-30 years	56	37	15	4
30-50 years	97	55	33	9
Above 50	47	24	11	12
Overall among	the 200 patients He	potitio P was	and $12.50(n-25)$	of nation to ware as infacted with

Overall, among the 200 patients, Hepatitis B was found in 56.5% (n=113), Hepatitis C in 31% (n=62),

and 12.5% (n=25) of patients were co-infected with both viruses (Table 3).

positive for Hepatitis B, 33% for Hepatitis C, and

12% had both. Housewives showed 47% positivity

for Hepatitis B, 36% for Hepatitis C, and 15% for

both, while among students, 55% had Hepatitis B,

31% had Hepatitis C, and 14% had both (Table 4).

#### Table 3: Overall Prevalence of Hepatitis Types

Type of Hepatitis	No. of Patients	Percentage (%)
Hepatitis B	113	56.5%
Hepatitis C	62	31.0%
Both	25	12.5%
Total	200	100%

When patients were classified by occupation, jobholders constituted the largest group (n=71), followed by businessmen (n=45), housewives (n=47), and students (n=38). Among job holders, 63% were positive for Hepatitis B, 26% for Hepatitis C, and 11% were co-infected. In businessmen, 55% were

#### Table 4: Occupation-wise Distribution of Hepatitis

Occupation	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
Job Holder	71	45	18	8
Businessman	45	25	15	5
Housewife	47	22	17	7
Student	38	21	12	5

According to marital status, 138 patients were married, while 62 were unmarried. Among married individuals, 53% were positive for Hepatitis B, 32%

#### Table 5: Marital Status and Hepatitis Prevalence

Marital Status	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV	
Married	138	73	44	21	
Unmarried	62	40	18	4	
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The area-wise distribution revealed that 84 patients were from rural areas and 116 were from urban areas. In rural patients, 61% had Hepatitis B, 28% had Hepatitis C, and 11% had co-infections. Among urban residents, 53% had Hepatitis B, 33% had Hepatitis C, and 14% had both (Table 6).

for Hepatitis C, and 15% for both. In unmarried

patients, 68% had Hepatitis B, 29% had Hepatitis C,

and 3% were co-infected (Table 5).

#### Table 6: Area-wise Distribution of Hepatitis

Area	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
Rural	84	52	23	9
Urban	116	61	39	16



In terms of education level, the majority of patients were matric pass (n=95), followed by graduates (n=61), intermediates (n=38), and masters (n=6).

Patients with Matric education had 53% Hepatitis B, 29% Hepatitis C, and 18% co-infection rates (Table 7).

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## Table 7: Education Level and Hepatitis Prevalence

Education Level	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
Matric	95	50	28	17
Intermediate	38	25	12	1
Graduate	61	35	20	6
Masters	6	3	2	1

Vaccination history showed that out of 200 patients, 119 were vaccinated against hepatitis, while 81 were unvaccinated. In vaccinated patients, 53% had Hepatitis B, 31% had Hepatitis C, and 16% were co-

infected. Among unvaccinated individuals, 61% had Hepatitis B, 31% had Hepatitis C, and 8% had both (Table 8).

### Table 8: Vaccination Status and Hepatitis

Vaccination Status	No. of Patients	Hepati	tis B Hepati	tis C Both F	IBV & HCV
Vaccinated	119	63	37	19	
Unvaccinated	81	50	25	6	
A positive history of disease was reported by 50			Patients without	it any history of c	lisease (n=150) had
patients, among whom 64% were positive for			54% Hepatitis B, 33% Hepatitis C, and 13% with		
Hepatitis B, 24% for Hepatitis C, and 12% for both.			co-infections (T	Table 9).	

## Table 9: Disease History and Hepatitis Status

	/			
Disease History	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
Positive	50	32	12	6
Negative	150	81	50	19
Regarding the history	of surgery, 28 patient	ts had	Those without surgio	cal history (n=172) showed 53%
undergone surgery and	exhibited 85% positiv	ity for	Hepatitis B, 35% He	epatitis C, and 12% co-infection
Hepatitis B, 4% for He	patitis C, and 11% for	· both.	rates (Table 10).	

#### Table 10: Surgical History and Hepatitis Prevalence

Surgical History	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
Yes	28	24	1	3
No	172	89	61	22

Similarly, 11 patients had a history of needle injury, with 82% positive for Hepatitis B, 9% for Hepatitis

C, and 9% for both. Patients without a history of needle injury (n=189) had lower rates (Table 11).

### Table 11: Needle Injury History and Hepatitis

Needle Injury	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV
Yes	11	9	1	1
No	189	104	61	24

None of the patients reported a history of sexual contact transmission (Table 12).



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Table 12: Sexual Contact History and Hepatitis							
Sexual Contact History	No. of Patients	Hepatitis B	Hepatitis C	Both HBV & HCV			
Yes	0	0	0	0			
No	200	113	62	25			

#### DISCUSSION

This study assessed the prevalence of Hepatitis B and C among indoor patients at ABWA Hospital. Hepatitis B was found in 56.5% of patients, making it more prevalent than Hepatitis C (31%), with 12.5% experiencing co-infection. The majority of infections occurred in the 30-50 year age group, reflecting higher exposure to surgical procedures, occupational risks, and possibly lower vaccination coverage during the earlier decades. Male patients were more frequently affected (65%), likely because of greater occupational and environmental exposure risks. Professionally, jobholders and businessmen showed higher infection rates, while housewives and students were also notably impacted, highlighting widespread transmission across different societal groups. Rural residents and individuals with lower educational backgrounds exhibited higher infection rates, suggesting disparities in healthcare access and awareness.

Vaccination played а critical role; status unvaccinated individuals had higher infection rates, particularly for Hepatitis B. A history of surgery and needle injuries have emerged as major risk factors. No cases were linked to sexual transmission in this study, possibly because of cultural factors or reporting bias. In summary, despite vaccination efforts, Hepatitis B and C remain significant health concerns. Strengthening vaccination programs, improving public health education, and enforcing infection control practices are essential for reducing the burden of these infections.

#### CONCLUSION

This study underscores the persistent burden of Hepatitis B and C infections in Faisalabad, Pakistan, with HBV (56.5%) significantly outweighing HCV (31%) and co-infections (12.5%). High-risk groups included males, rural residents, and individuals aged 30–50 years, with occupational exposure, surgical procedures, and needle injuries identified as key transmission pathways. The absence of sexual transmission highlights potential cultural or reporting bias. Crucially, unvaccinated individuals exhibit higher HBV susceptibility, emphasizing the urgent need for expanded vaccination programs and stringent infection control measures in healthcare settings. Addressing these challenges through targeted public health interventions, enhanced medical safety protocols, and community education is imperative to curtail transmission, reduce morbidity, and alleviate the burden of hepatitis in high-risk populations.

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ISSN: (e) 3007-1607 (p) 3007-1593

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