Original Research Article

PREVALENCE OF HEPATITIS B IN LOCAL AREA OF DISTRICT SIALKOT, PAKISTAN

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Abstract: *Hepatitis B virus (HBV), a small encapsulated DNA virus, predominantly infects hepatocytes, causing acute and chronic liver damage.* **Objective:** *This study aimed to assess the incidence of HBV among the population of the local area of district Sialkot.* **Methods:** *A hospital-based study was conducted at Tehsil Headquarters Hospital Daska between January 2022 and May 2022. Sixty participants were registered for the study, including males and females aged 7 to 68. Data collection was performed using a standardised questionnaire. Each participant provided 5 ml of blood for an immunochromatography test. Descriptive statistics were used to analyse the data.* **Results:** *Out of the 60 participants, 20 tested reactive for HBV, with 18 males and 2 females. Most of the reactive participants were males aged between 20 and 40, and most were married.* **Conclusion:** *The findings indicate a significant incidence of HBV among males, particularly those aged 20-40 years in the district of Sialkot. These results can inform public health initiatives to prevent HBV and promote precautionary measures.*

Keywords: Hepatitis B, Immunochromatography, Incidence, Liver Diseases, Pakistan, Sialkot

Introduction

Hepatitis B virus (HBV) is a small encapsulated DNA virus predominantly affecting hepatocytes, causing acute and chronic liver damage and potentially leading to hepatocellular carcinoma (HCC) (1, 2). A large body of epidemiological research supports the link between chronic HBV infection and HCC (3). Acute HBV can be treated effectively, but chronic HBV can lead to severe complications and even death (4, 5). Transmission of HBV occurs through contaminated needles, blood, unprotected sex, unsterilised dental instruments, and other routes (6). Dental settings are particularly prone to HBV transmission due to the frequent contact of instruments with infected saliva or blood (7). Symptoms of HBV can include fever, fatigue, loss of appetite, nausea, dark urine, pale stool, joint pain, and jaundice (8). The HBV genome is a partially double-stranded DNA of approximately 3,200 base pairs. HBV is a significant public health concern in Pakistan, leading to acute or chronic liver disease, substantial workforce reduction, and high healthcare costs (9). Many HBV infections are asymptomatic and detected only during routine check-ups. Chronic HBV can lead to cirrhosis or HCC, depending on various viral, host, and external factors (10). The prevalence of chronic HBV infection varies globally, with higher rates in regions where vertical transmission is standard. Effective treatment interventions are crucial to prevent the progression of decompensated cirrhosis or HCC (11). Understanding the natural history of HBV infection and the factors influencing its progression is essential for managing and controlling the disease. This study aims to determine the incidence of HBV infection in district Sialkot, providing data to inform public health initiatives and preventive measures.

Methodology

This descriptive, hospital-based study was conducted in the medicine ward of Tehsil Headquarters (THQ) Hospital Daska, district Sialkot, from January 2022 to May 2022.

A total of 60 male and female patients aged between 7 and 68 years were registered for the study. The selection criteria were based on symptoms indicative of HBV infection or a history of potential exposure to the virus. Before data collection, the study's purpose was explained to all participants, and verbal informed consent was obtained. The study protocol adhered to ethical standards, ensuring confidentiality and voluntary participation.

Epidemiological data were gathered using a structured questionnaire, which included demographic information, medical history, and potential risk factors for HBV infection. With the participants' permission, approximately 5 ml of blood was collected using venipuncture. The selected vein was cleansed with an alcohol pad, and blood was drawn using a sterile syringe. The blood samples were dispensed into sterile containers containing the anticoagulant ethylenediaminetetraacetic acid (EDTA).

Blood samples were centrifuged at 4000 rpm for 5–10 minutes to separate the plasma. The plasma was then stored at -20°C until analysis. HBV was detected using the immunochromatography test (ICT) method. Three drops of plasma were applied to the test strip, and the appearance of coloured lines indicated the presence of HBV antigens. Two lines signified a positive result, while a single line indicated a negative result. This method provided diagnostic outcomes within 10–15 minutes. The data was analysed using descriptive statistics, including frequency distributions, graphs, and tables. The analysis was conducted using Microsoft Excel 2016 and the Statistical Package for the Social Sciences (SPSS). All personal information was handled with strict confidentiality, and the analysis included only add data.

The immunochromatographic unit was assembled by attaching the sample pad to the membrane's tip. When applied to the pad, the plasma sample interacted with pre-coated antibodies on the test strip, forming an immunocomplex. A control line and a test line indicated a positive result, whereas only a control line indicated a negative result.

Data from January 2022 to May 2022 were evaluated using descriptive statistics. The statistical analyses included summarising the numbers, generating graphs, and creating tables to present the findings effectively. Microsoft Excel 2016 and SPSS software packages were utilised for data analysis, ensuring rigorous and comprehensive evaluation.

Figure 1: Kit used to assess HCV status:

Results

The study found that 33% of the patients in the Sialkot district were diagnosed with HBV over six months.

A total of 60 samples were collected from the district Sialkot population, 45 males and 15 females. The participants' ages ranged from 7 to 68, and they were further divided into age groups for analysis using the immunochromatography test (Figure 1).
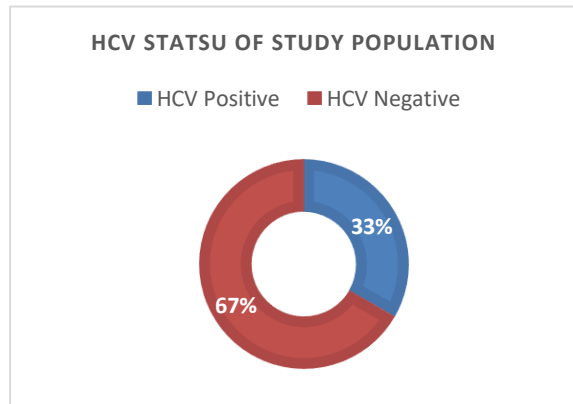

Figure 1: Distribution of HCV-positive cases in the study population

This table presents the distribution of HBV-positive participants by gender and age range. It shows that 18 males aged 7-68 years and 2 females aged 21-56 years tested positive for HBV, while the remaining participants were non-reactive (Table 1).

This table provides an overview of the gender distribution among HBV-positive participants, with 45 males and 15 females. Out of the total 60 participants, 20 tested positive for HBV (Table 2). This table illustrates the age distribution of HBV-positive participants across different age groups. Most cases (62%) were in the age group of 20-40 years,

followed by 31.66% in the age group of 40-60 years (Table 3).

The table depicts the marital status of HBV-positive participants, with 43 (71.67%) married and 17 (28.33%) single individuals out of a total of 60 participants (Table 4). This table highlights various risk factors associated with HBV infection in district Sialkot, including needle prick injury, history of blood transfusion, family history of HBV, and surgery history. The percentages represent the prevalence of HBV-positive cases within each risk factor category (Table 5).

This table outlines additional confounding factors affecting HBV prevalence, such as piercing practice, lifestyle (active or passive), living arrangements, and history of blood transfusion. The frequencies and percentages provide insights into the prevalence of these factors among HBV-positive individuals in the district (Table 6).

Table 1: Age and Gender Distribution of HBV Participants

Gender	Age Range	HBV Reactive (ICT +ive)	HBV Non-Reactive
Male	7-68 years	18	27
Female	21-56 years	2	13

Table 2: Gender Distribution of HBV Participants

Gender	Frequency	HBV Positive (HBV+)
Male	45	18
Female	15	2
Total	60	20

This table shows the gender distribution of HBV-positive respondents, with 45 males and 15 females and a total of 20 HBV-positive cases.

Table 3: Age Distribution of HBV Participants

Age Group	Frequency	%
1-20	2	3.33%
20-40	37	62.00%
40-60	19	31.66%
Above 60	2	3.33%

Table 4: Marital Status of HBV Participants

Marital Status	Frequency	%
Single	17	28.33%
Married	43	71.67%
Total	60	100%

Table 5: Epidemiological Risk Factors of HBV Infection in District Sialkot

Risk Factor	No. Tested	No. of HBV Positive (HBsAg+)	%
Needle prick injury	18	2	3.3%
History of blood transfusion	21	5	8.3%
Family history of HBV	6	0	0%
Surgery history	1	0	0%

Table 6: Confounding Factors Affecting HBV Prevalence in District Sialkot

Factor	Response	Frequency	%
Piercing practice	Yes	28	46.66%
	No	32	53.33%
Lifestyle	Active	17	28%
	Sedentary	43	71%
Living arrangements	Alone	11	18.33%
	Family	49	81.66%
History of blood transfusion	Yes	33	55%
	No	27	45%

Discussion

Hepatitis B infection poses a significant public health challenge globally, particularly in developing nations like Pakistan, where resources for combating infectious diseases are limited (12, 13). The prevalence of hepatitis B infection in Pakistan, including regions like Sialkot in the Punjab province, underscores the urgency of addressing this issue (14). Our study aimed to assess individuals' knowledge, attitudes, and preventive behaviours regarding hepatitis B in the Sialkot district.

Our findings reveal a concerning prevalence of HBV infection, with 33% of individuals in the Sialkot district testing positive. This highlights the pressing need for targeted interventions to prevent and manage hepatitis B in the region. Notably, the majority of HBV-positive individuals were found to reside in rural areas with poor economic status, indicating disparities in access to healthcare and preventive measures.

Gender disparities were observed, with a higher prevalence of HBV infection among males compared to females (15). This trend aligns with previous studies and may be attributed to various epidemiological factors and differential exposure to risk factors. Additionally, our study identified the 20- 40-year-old age group as the most affected by HBV infection, particularly among married males. This demographic insight is crucial for tailoring public health interventions and outreach efforts.

Immunochromatography accurately detected active HBV infection across different age groups and genders (16). Our findings corroborate existing research, suggesting a widespread distribution of HBV infection among both males and females, albeit with varying prevalence rates.

Interestingly, our study also found a higher prevalence of HBV infection among younger males, highlighting the vulnerability of this demographic to ongoing transmission and risk factors. This underscores the importance of targeted prevention strategies, particularly among high-risk groups.

Our results align with previous studies, such as the one conducted in Mardan, which similarly reported a higher prevalence of HBV infection among males in the younger age group. These consistent findings underscore the need for comprehensive public health interventions targeting specific demographics and risk factors.

Our study illuminates the prevalence and demographic patterns of HBV infection in the Sialkot district of Pakistan. By identifying critical demographic trends and risk factors, our findings can inform the development of targeted prevention and management strategies to mitigate the burden of hepatitis B in the region and beyond. Despite its valuable insights, our study exhibits several limitations. Firstly, the sampling strategy, confined to a single hospital setting, may introduce selection bias, limiting the findings' generalizability to the Sialkot district's broader population. Secondly, the cross-sectional design offers a snapshot of HBV prevalence and demographics but fails to capture longitudinal trends or establish causal relationships. Thirdly, reliance on self-reported data for assessing knowledge, attitudes, and preventive behaviours introduces potential biases, affecting the accuracy and reliability of responses. Fourthly, the study's focus solely on HBV prevalence overlooks other relevant factors such as socioeconomic status, access to healthcare, and cultural beliefs. Additionally, the diagnostic methodology, while helpful, may not capture all cases of HBV infection, and the study lacks consideration for confounding factors and a broader geographic scope. These limitations underscore the need for more comprehensive research methodologies and considerations in future studies to provide a more nuanced understanding of hepatitis B and inform effective public health interventions.

Conclusion

In conclusion, while our study offers valuable insights into hepatitis B prevalence in Sialkot, it's crucial to acknowledge its limitations. These include sampling bias, reliance on self-reported data, and a narrow focus on HBV prevalence alone. Moving forward, future research should aim for more representative sampling, longitudinal designs, and broader considerations of socioeconomic factors. Despite these limitations, our findings underscore the pressing need for targeted interventions to combat hepatitis B in the region, particularly among vulnerable populations. By addressing these challenges, we can work towards reducing the burden of HBV and improving health outcomes in Sialkot and beyond.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRB-55, SIH dated 10-10-21)
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Conception of Study, Final approval of manuscript.
MUHAMMAD ATIF
Manuscript revisions, critical input.
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Manuscript drafting.
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Data entry and Data analysis, drafting article.

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