



RESEARCH ARTICLE

Prevalence of Hepatitis B Virus and Hepatitis C Virus in Sub Division Ladha, South Waziristan

Akhtar Munir ^{a*}, Muhammad Sufyan ^b, Nadir Akhtar ^c, Jawad Ullah ^d, Muhammad Nadeem ^e, Amna Afzal ^f, Muhammad Tariq ^g

^a Department of Microbiology, Gomal University Dera Ismail Khan, KPK, Pakistan.

^b Department of Zoology, Khushal Khan Khattak University Karak, KPK, Pakistan.

^c Department of Zoology, Quad-I-Azam University, Islamabad, Pakistan,

^d Department of Microbiology, Hazara University Mansehra, KPK, Pakistan.

^e Department of Microbiology, University of Central Punjab, Lahore, Pakistan.

^f Department of Microbiology, University of Veterinary and Animal Sciences, Lahore, Punjab, Pakistan.

^g Department of Microbiology, Gomal University Dera Ismail Khan, KPK, Pakistan.

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ABSTRACT

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HBV belongs to the family of hepadnaviruses. The virion is 42 nm in diameter and has an icosahedral nucleocapsid core that houses a genome of partly double-stranded circular DNA. The surface antigen (HBsAg) protein found on the envelope is crucial for immunization and laboratory diagnosis. In a similar vein, HCV belongs to the flavivirus family. It is an enclosed virion with a positive polarity, single-stranded RNA genome. The virion polymerase is absent. Because the genes encoding one of HCV's two envelope glycoproteins vary, the virus has at least six genotypes and several subgenotypes. The envelope glycoprotein has a "hypervariable" area as a result of this genetic diversity. This genetic variation results in a "hypervariable" region in the envelope glycoprotein. The high rate of mutation in the envelope gene and the lack of a proofreading mechanism in the RNA polymerase encoded by the virion are the causes of genetic heterogeneity. As a result, an infected person's blood frequently contains many subspecies (quasispecies) at the same time. About 75% of infections in the US are caused by genotype 1. The disease-causing viruses HBV and HCV are found in practically every part of the globe. Based on indications and symptoms, blood samples from a thousand people were taken in Subdivision Ladha, South Waziristan, Pakistan, to look into these and their consequences on the general populace. Three hundred four people were found to be positive for HBV and HCV using the Immune Chromatographic Test (ICT) of them, 235 were men (34.20%), 61 were women (24.11%), and 8 were children (13.34%). The viruses mentioned above did not affect the others. In addition, it was determined that 77 of the men had HCV (32.77%) and 158 had HBV (67.23%). In a similar vein, among the females, 38 tested positive for HBV (62.29%), and 23 tested positive for HCV (37.71%); moreover, three tested positive for HCV (37.50%), and five tested positive for HBV (62.50%).

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1. Introduction

In Pakistan, blood-borne transmission continues to be a major source of Hepatitis B and C infections, impacting around 7.6% of the populace. Both syphilis and HIV are uncommon, yet syphilis incidence is greater among High-Risk Groups (HRGs) [1]. The primary viruses responsible for liver-related illness and death are the hepatitis B and hepatitis C viruses. HBV causes hepatitis B. Chronic hepatitis is the main cause of liver-related illness and death. Of the several liver viruses, hepatitis B (HBV) and hepatitis C are two. It has been established that (HCV) is the main cause of chronic hepatitis [2].

Globally, 500 million individuals have chronic viral hepatitis, and over a million people pass away from HBV-related illnesses every year [3]. Globally, liver cancer ranks as the fourth most prevalent cause of cancer-related deaths. In 15–40% of HBV patients, cirrhosis, liver disease, and hepatocellular carcinoma manifest. Globally, liver cancer ranks as the fourth most prevalent cause of cancer-related deaths. 15–40% of HBV patients develop cirrhosis, liver disease, and hepatocellular cancer [4].

HBV belongs to the family of hepadnaviruses. The virion is 42 nm in diameter and has an icosahedral nucleocapsid core that houses a genome of partly double-stranded circular DNA. For laboratory diagnosis and immunization, the envelope's surface antigen (HBsAg) protein is essential. Within the core lies a DNA polymerase. The surface antigen has been encoded by the S gene, the core and e antigens by the C gene, the polymerase by the P gene, and the X protein (HBx) by the X gene. The four genes (four open reading frames) that make up the genome together encode five different proteins. The tumor suppressor protein p53 can be rendered inactive by HBx, indicating a potential involvement in the development of cancer. It is a transcription activator for viral RNA. DNA polymerase possesses both RNA-dependent (reverse transcriptase) and DNA-dependent functions. Three different sorts of particles are seen in a patient's blood when examined under an electron microscope: numerous 22 nm spheres, a few 42 nm virions, and lengthy filaments made of surface antigens that are 22 nm broad. The only human virus that causes the patient's blood to contain such a high concentration of these spheres and filaments is HBV. [5]

The core antigen (HBcAg) and the e antigen (HBeAg) are two other critical antigens found in the virus's core in addition to HBsAg. As the name suggests, the nucleocapsid protein, which makes up the virion's core, contains the core antigen. On the other hand, the e antigen is soluble and enters the bloodstream through infected cells [6].

The antigen is a crucial transmissibility sign. Based on HBsAg, HBV has a single serotype that is used in vaccines. For epidemiological reasons, however, there are two sets of

mutually exclusive epitopes, d or y and w or r, and a group-specific antigen, "a," which determine the four serologic subtypes of HBsAg. This results in four serotypes that are useful in epidemiologic studies: adw, adr, ayw, and ayr. These serotypes are concentrated in certain geographic locations [7].

HCV belongs to the family of flaviviruses. It is an enclosed virion with a single-stranded, positive-polarity RNA genome within. The virion polymerase is absent. Cirrhosis alters the natural liver's structure by causing fibrosis and regenerating nodules that obstruct liver function. Cirrhosis is associated with risk factors such as frequent drinking, aging, and chronic hepatitis C virus (HCV) infection. After HCV infection, cirrhosis usually takes 30 years to develop; however, this varies greatly from person to person [8]. Hepatitis B and C infections pose a severe risk to health in Pakistan, the sixth most populous country in the world, where there are an estimated 20 million cases of the illness nationally. Finding out the prevalence, course, and necessity of preventive measures for the deadly hepatitis B and C among Pakistan's most vulnerable, impoverished orphans was the main objective of this nationwide study [9].

2. Methodology

2.1 Sample collection

The sample was taken by sanitizing the epidermis, where the vein was visible and accessible for blood collection with 70% ethanol-soaked cotton. There was a band around the tight area above the elbow. After inserting the syringe needle into the vein, 3–4 milliliters of blood were extracted and carefully removed. Two drops of serum and one drop of buffer (included with the kit) were applied to serological strips following the serum separation process. Five minutes later, the reading was taken.

2.2 Study Area

Samples were collected in Ladha from different age groups of individuals. A total of one thousand (1000) individuals were collected for this study.

2.3 Sample Size

A thousand samples in all were collected from different places. The blood was drawn into the syringe, transferred to an EDTA tube, and then refrigerated at -20 degrees Celsius until the serological test was conducted. The tubes were spun at 10,000 RPM for five minutes at the diagnostic laboratory following the blood transfer.

2.4 Immuno-chromatographic tests (ICT)

Immuno-chromatographic technique (ICT) kits and screening were used to test donors for HBV, HCV, HIV, syphilis.

3. Results

Table No. 1 reflects the results of a population sample categorized by gender and age groups. Among males, comprising 687 individuals, 235 were detected positive, accounting for 34.20% of this group, leaving 452 individuals undetected, representing 65.79%. In the female category of 253 individuals, 61 tested positive, equivalent to 24.11%, while 192 were negative, constituting 75.88%. Children with a sample size of 60 had eight positive cases, indicating a 13.34% detection rate, with 52 children not detected, amounting to 86.67%. The total number of detected instances across all categories was 304, but percentages for the total detected and non-detected cases were not provided. These findings suggest variations in detection rates across gender and age groups, with males showing a higher detection rate than females. At the same time, children displayed the lowest detection rate among the groups studied. Table No. 2 data presents the detection rates for Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) across different gender and age groups. Among males, 235 cases were detected for HBV, with 158 individuals testing positive, accounting for 67.23% detection, while 77 cases were detected for HCV, representing a 32.77% detection rate. In females, 61 cases were detected for HBV, with 38 individuals testing positive (62.29%) and 23 cases detected for HCV, resulting in a 37.71% detection rate. Among children, 8 cases were detected for HBV, with five testing positive (62.50%), and 3 cases were detected for HCV, with a 37.50% detection rate.

Table 1: Total number of detected and non-detected subjects for HBV and HCV

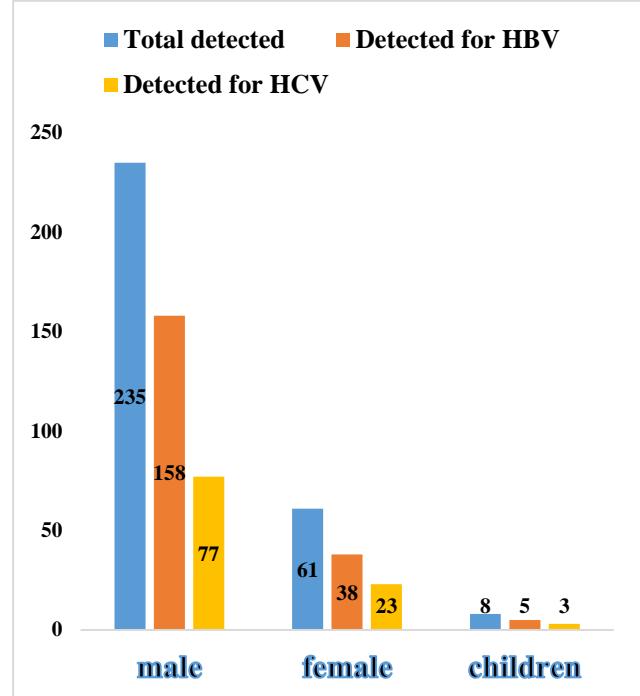
Population sample	Number screened	Detected	Percentage Detected	Non-Detected	Percentage
Male	687	235	34.20	452	65.79
Female	253	61	24.11	192	75.88
Children	60	8	13.34	52	86.67
Total	1000	304	-	-	-

Table 2: Total detected patients of HBV and HCV

Category	Total detected	Detected For HBV	Percentage detected	Detected for HCV	Percentage detected
Male	235	158	67.23	77	32.77
Female	61	38	62.29	23	37.71
Children	8	5	62.50	3	37.50

Overall, the data indicates higher detection rates for HBV compared to HCV across all groups, with males exhibiting the highest detection rates for both viruses, followed by females and children. In addition, it was determined that 77 of the men had HCV (32.77%) and 158 had HBV (67.23%). In a similar vein, among the females, 38 tested positive for HBV (62.29%), and 23 tested positive for HCV (37.71%); moreover, three tested positive for HCV (37.50%), and five tested positive for HBV (62.50%) (Figure 1).

Figure 1: Shown the positive number of HBV and HBC



4. Discussion

There are several research on the prevalence of HBV or HCV in patients and healthy individuals, but none on patients who may have hepatitis. The suspected patients were examined for both HCV and HBV since the signs and symptoms in our study are imprecise and untrustworthy for the diagnosis of hepatitis B or C. It was anticipated that a greater percentage of patients with suspected hepatitis would be referred for further evaluation by specialists. Since most of these patients were referred from private clinics, this study must take into account the low-income socioeconomic segment of society, as some studies have defined it. According to the statistics, the frequency of TTI was 5.1%, 4.1, 2.9, and 4.4%, respectively, among donors who were 45–64, 25–44, 18–24, and 16–17 years old. In particular, TTI positivity was higher in donors above 45 (5.1%) and donors below 17 (4.4%).

5. Conclusion

People from lower socioeconomic backgrounds are the ones who are seeing the disease's fast spread. In a similar vein, prevalence and education level are correlated. It is more common in those without formal education than in those with it, as well as in those with one or more medical conditions such as fatigue, anorexia, fever, joint pain, malaise, stomach discomfort, nausea, dark yellow urine, and jaundice. Reusing syringes and shaving blades, as well

as general surgery, are important ways that HBV and HCV can spread. Strong links have been found between intra-family transmission, smoking and drug addiction, and body piercings and tattoos. Hairdressers and other healthcare professionals need to be properly taught in order to stop the spread of the Hepatitis B and C viruses. Comprehensive awareness campaigns should be launched in addition to existing therapeutic and preventative measures.

HIV, HBV, malaria, and syphilis were reported to have seroprevalences of 0.03%, 0.49%, 0.009%, and 0.05%, respectively. In the current investigation, the seroprevalence of HCV was determined to be 0.50 %.

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