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PREVALENCE OF HEPATITIS B AND C AMONG THE EMPLOYEES OF SARHAD UNIVERSITY OF SCIENCE AND INFORMATION TECHNOLOGY

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Abstract

Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infections pose significant public health challenges worldwide, particularly in Asia. HBV is a double-stranded DNA virus with a high prevalence in Asia, primarily transmitted through blood and body fluids. High-risk groups include individuals undergoing blood transfusions, dialysis, intravenous drug users, and healthcare workers. This cross-sectional study aimed to determine the prevalence of HBV and HCV among employees of Sarhad University of Science and Information Technology, Peshawar. A total of 45 employees, aged 25 years and above, were selected using random sampling. Participants provided informed consent and completed questionnaires capturing demographic and medical history. Venous blood samples were collected, labeled, and transported to the laboratory for testing using the ICT method. Hepatitis B surface antigen (HBsAg) and hepatitis C antibody (anti-HCV) were detected using specific ICT kits. The prevalence rates for HBV and HCV were calculated, and data were analyzed using statistical software. The study found a prevalence rate of 4.44% for HBV and 2.22% for HCV among the sample population, indicating the presence of these infections among university employees.

INTRODUCTION

Hepatitis is one of the most hazardous aspects of the global healthcare system, with an estimated 2.3 billion infections of various hepatitis types. Hepatitis is a viral infection that causes the deaths of about 1.4 million people each year. As per a study directed by the Pakistan Medical Research Council, about 13 million residents of Pakistan were experiencing Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV .(Samo *et al., 2021).* Chronic HBV victims are at greater risk of developing liver failure, cancer, or cirrhosis. One in 4 people with chronic HBV infection are at a risk of premature death from cirrhosis or liver cancer(Shahzad *et al.,* 2023)

Hepatitis is a crucial global health issue, and it is estimated thatHepatitis B virus(HBV) has infected two billion people worldwide. Approximately 10–30 million people get Hepatitis B infection every year and majority of them are children and infants. Infants have 90% of the risk to get a hepatitis infection and act as a carrier of HBV. This risk lowers down to 25% by 5 years of age and further reduces to 10% by 15 years of age (Anwar *et al.*, 2021). HBV and HCV viruses resulted in severe infection but it remains in some patientsbody and could be chronic liver failures. Approx 16 to 26 percent of chronic liver patients of HBVhave severeliver problems such as hepatocellular and cirrhosis carcinoma. In medical treatment, a vaccine is used for the prevention of HBV but for the prevention of HCV there is no vaccine or medication6.The indications of HBV comprise ofappetiteloss, fever, nausea, abdominal pain, vomiting,joint pain, jaundice, and dark urine (Asif *et al.*, 2022). In the event that you have infectious types of hepatitis that are chronic, similar to hepatitis B and C, you may not watch manifestations in the first place. They include: unexplained weight reduction, stomach upset, loss of hunger, influenza like side effects dull pee, pale stool, yellow skin and eyes, which might be indications of jaundice (Muhammad *et al.*, 2022).

Chronic HCV (CHCV) is a common and important cause of hepatitis leading towards endstage liver disease liver cirrhosis, and cancer and Insulin resistance that is a metabolic disorder leading to the development of Diabetes mellitus. HBV and HCV are reported to be one of the most common causes of Hepatocellular carcinoma (HCC). HCC contributes 90% to the third most common cause of cancers associated deaths (Khan *et al.*, 2020). Depending on its genetic variability HCV has been typed into seven genotypes and numerous subtypes. (Ejaz *et al.*, 2023).

Refugee communities are more vulnerable to HBV and HCV infections due to a lack of access to health care facilities and an inability to obtain information on the spread and prevention of these diseases from various sources. In the USA, among immigrants, 16.7% of the tested population (89/534) was found with HBsAg prevalence, including 41 males and 48 females.(Kazmi *et al.*, 2022). Serological surveys estimating the prevalence of different markers of HBV infection such as hepatitis B surface antigen (HBsAg), antibodies to core antigen (anti-HBc), and surface antigen (anti-HBs) are recommended to measure the impact of the Hep-B vaccination program. Fewstudies have reported the impact of HB vaccination in a limited geographical area (Murhekar*et al.*, 2020).

Vaccination at birth effectively prevents HBV infection, yet vaccine coverage remains insufficient in low-income countries . The identification of current HBV infection relies on serological testing for the presence of the hepatitis B surface antigen (HBsAg) . According to the WHO, the global prevalence of HBsAg was

estimated at 3.8% in 2019, indicating that 296 million individuals were enduring chronic HBV infections . The estimated annual number of new HBV infections in 2019 was 1.5 million .While there is currently no vaccine available for HCV infection, the advent of the curative pan-genotypic direct-acting antivirals (DAAs) exhibiting a sustained virological response exceeding 95% across all HCV genotypes signifies a groundbreaking development in HCV treatment and control '. The enhanced accessibility of DAAs, facilitated by generic formulations and substantially reduced prices in resource-limited countries , underscores the potential to eliminate HCV infection as a public health threat '. HCV testing typically involves serological assays to identify HCV-specific antibodies, and individuals testing positive for antibodies undergo a molecular test to confirm the virus's presence and diagnose current infection (Nasrallah *et al.,* 2024)

METHODOLOGY

Study Design

This cross-sectional study aimed to determine the prevalence of hepatitis B and C among employees of Sarhad University, Peshawar.

Sample Collection

A total of 45 employees were selected using random sampling.

Inclusion criteria

The inclusion criteria were all consenting employees, aged 25 years and above.

Exclusion criteria

Employees with a known history of hepatitis B or C infection or those who had been vaccinated against hepatitis B were excluded from the study.

Sample collection and processing

Participants were recruited through internal communication channels. Participants who consented to participate were asked to fill out a questionnaire capturing demographic information (age, gender, job title, and duration of employment) and medical history related to liver disease and hepatitis vaccinations.The cubital fossa area of the participant's arm was sterilized using an alcohol swab. Using a sterile syringe, 5 ml of venous blood was drawn from each participant. Each blood sample was labeled with a unique identification number to ensure anonymity and traceability. Blood samples were transported in iceboxes to the laboratory and stored at -20°C until testing

Hepatitis B Testing:

- A drop of serum was added to the sample well of the HBsAg test cassette.
- Two drops of the provided buffer were added to the sample well.
- The test was allowed to develop for 15 minutes, after which the results were read.

Hepatitis C Testing:

- Similarly, a drop of serum was added to the sample well of the anti-HCV test cassette.
- Two drops of buffer were added to the sample well.
- The test was allowed to develop for 15 minutes before reading the results.

Interpretation of Results:

- **Positive Result:** The appearance of both a test line and a control line within the result window indicated a positive result for hepatitis B or C.
- **Negative Result:** The appearance of only the control line indicated a negative result.
- **Invalid Result:** If the control line did not appear, the test was considered invalid and was repeated with a new test cassette.

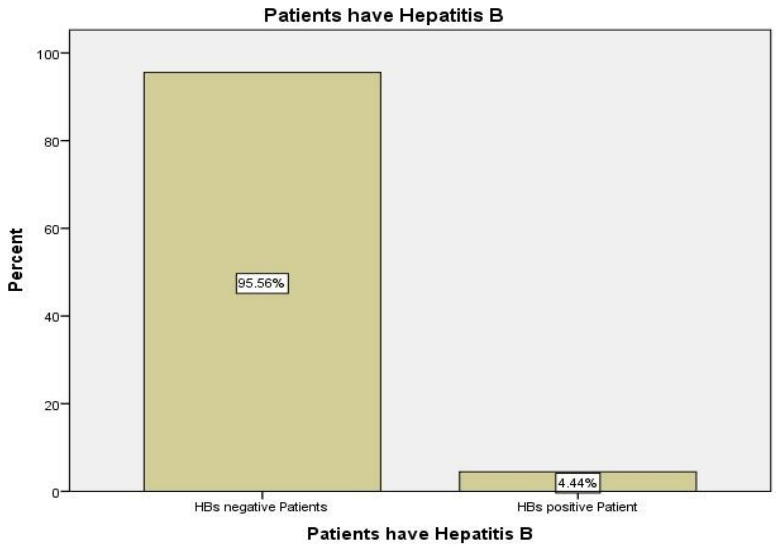
Data Analysis

The prevalence of hepatitis B and C was calculated by dividing the number of positive cases by the total number of participants.

RESULTS

Prevalence of Hepatitis B

Out of the 45 samples tested, 2 were found to be positive for hepatitis B, resulting in a prevalence rate of approximately 4.44%. This finding is significant as it highlights the presence of hepatitis B among the university employees, which may have implications for workplace health policies and preventive measures.



Prevalence of Hepatitis B

Prevalence of Hepatitis C

In this study, 1 out of the 45 samples tested positive for hepatitis C, indicating a prevalence rate of approximately 2.22%. The presence of hepatitis C, albeit lower than hepatitis B, underscores the need for continued vigilance and health monitoring within the university environment.

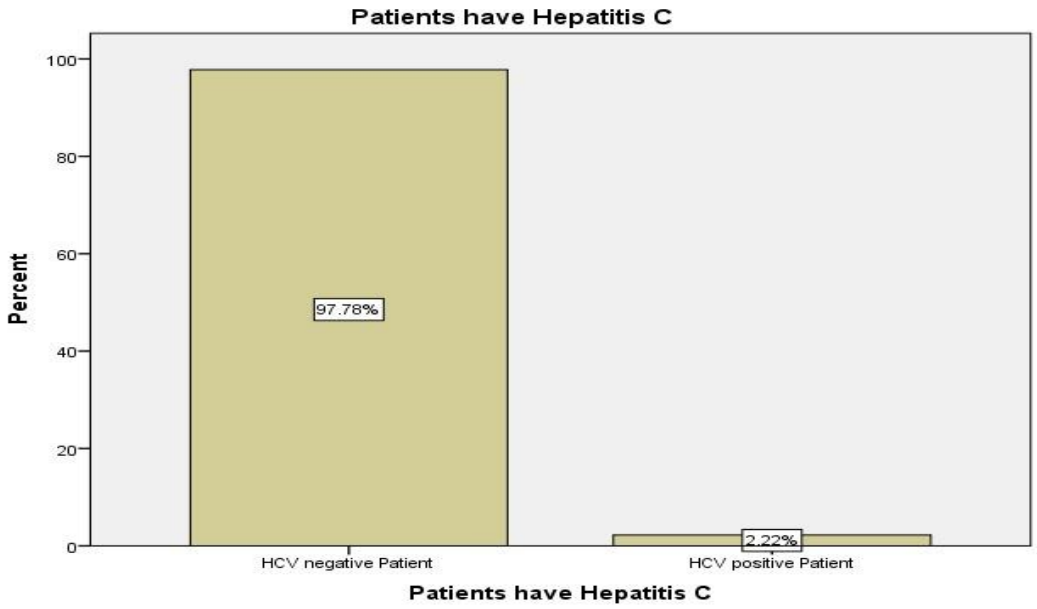


Fig . Prevalence of Hepatitis C

Age Wise Distribution of Hepatitis

The data shows the age distribution of 45 individuals. The majority, 86.7%, are aged between 36 and 45 years, while a small portion, 2.2%, are between 25 and 35 years, and 11.1% are between 46 and 55 years. This indicates a predominantly middle-aged group with a minor representation from the younger and older age brackets.

Table: *Age Wise Distribution of Hepatitis*

Age of individual		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 years to 35 years	1	2.2	2.2	2.2
	36 years to 45 years	39	86.7	86.7	88.9
	46 years to 55 years	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

Percentage of Positive and Negative Cases of Hepatitis B

The data shows that 95.6% of the 45 patients are HBs negative, while 4.4% are HBs positive. This indicates that the vast majority of patients do not have Hepatitis B.

Table: *Percentage of Positive and Negative Cases of Hepatitis B*

Patients have Hepatitis B	Frequency	Percent	Cumulative Percent
HBs negative Patients	43	95.6	95.6
HBs positive Patient	2	4.4	100.0
Total	45	100.0	

Percentage of Positive and Negative Cases of Hepatitis C

The data indicates that 97.8% of the 45 patients are HCV negative, with only 2.2% being HCV positive. This suggests that Hepatitis C is rare among the patients in this group.

Percentage of Positive and Negative Cases of Hepatitis C

Patients have Hepatitis C	Frequency	Percent	Cumulative Percent
HCV negative Patient	44	97.8	97.8
HCV positive Patient	1	2.2	100.0
Total	45	100.0	

DISCUSSION

Hepatitis is one of the most hazardous aspects of the global healthcare system, with an estimated 2.3 billion infections of various hepatitis types. Hepatitis usually causes inflammation of the liver that sometimes leads to chronic and even death. HBV is a DNA virus with a diameter of 42-47 nm that commonly enters the liver through blood circulation. HBV is a vaccinepreventable liver infection. However, HCV is an enveloped RNA virus, much smaller in size. HCV has no vaccine yet for treatment, so it is known to be more fatal than HB (Ditta*et al.*, 2024)

Our study supported by Ahmed *et al.* (2020) evaluated the prevalence of hepatitis C virus (HCV) and hepatitis B virus (HBV.. A total of 697 (72.99%) cases out of 955, were found to be infected with hepatitis viruses, among which, 681 (71.3%) were infected with HCV and 16 (1.68%) with HBV. HCV was found more prevalent in females while more cases of HBV were reported in males. Overall age ranged from 31 to 60 years, with females from 51-60 years; infected with HCV and HBV in male with age range 19-30 years infected with HBV Ahmed *et al.* (2020).

Viral Hepatitis B and C are common blood –borne infections and lead to chronic liver diseases and causes economic burden on country.. An overall prevalence of HBV 2.5% and HCV 14.5% was observed. The study included a total of 13295 samples. The study population consisted of 30.2% (N=4016/13295) of males and 69.8% (N=9279/13295) of females. The data was further categorized into age groups ranging from 1 to 10 years to over 70 years Ali *et al.* (2023).

These results support the current study results Asif *et al.* (2022) evaluated that Hepatitis B (HBV), and Hepatitis C (HCV. In this study, we examined 1050 patients with liver diseases, out of 1050 We found 135 patients had both Hepatitis B (HBV) and Hepatitis C (HCV), 55 (5.23%) patients were found +Hepatitis C, and 80 (7.62%) patients were found +HBV. The mean age calculated was 36.05 years. Of 135 patients of HBV and HCV, men were 45 (33.33%) and 68 (50.37%) were women while 22 patients were aged <18 years Asif *et al.* (2022).

CONCLUSION

The research conducted on the prevalence of hepatitis B and C among employees of Sarhad University Peshawar has yielded critical insights into the health status of this populatiosn. The study revealed a 4.44% prevalence rate for hepatitis B and a 2.22% prevalence rate for hepatitis C among employees aged 30 to 50 years. These findings highlight the presence of hepatitis infections within the university workforce, underscoring the necessity for ongoing health monitoring and preventive strategies. However, the study's limitations, including the small sample size, restricted age range, and crosssectional design, suggest the need for further research. Future studies should include larger and more diverse samples to provide a comprehensive understanding of hepatitis prevalence and its implications.

RECOMMENDATIONS

To conduct studies with larger and more diverse sample sizes, including different age groups and both genders, to enhance the generaliz ability and comprehensiveness of the findings.

To implement longitudinal research designs to track changes in hepatitis B and C prevalence over time, providing insights into trends and the long-term effectiveness of preventive measures.

To explore specific occupational and environmental factors contributing to hepatitis infections among university employees, to develop targeted intervention strategies and improve workplace health policies

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