INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

HEPATITIS PREVALENCE IN POPULATION OF KALLAR KAHAR PUNJAB PAKISTAN A CROSS-SECTIONAL STUDY

Original Research

Anam Khan[1], Shanza Akbar[2]*, Saqib Hussain[3]
[1]Postgraduate Trainee, Fauji Foundation Hospital, Rawalpindi, Pakistan.
[2]Research Scholar, Department of Clinical Psychology, Riphah International University (Gulberg Green Campus), Islamabad, Pakistan.
[3]Medical Superintendent, THQ Hospital, Kalar Kahar, Chakwal, Pakistan.
Corresponding Author: Shanza Akbar**,** Research Scholar, Department of Clinical Psychology, Riphah International University (Gulberg Green Campus), Islamabad, Pakistan**,** shanzaakbarmalik@gmail.com
Acknowledgement: The authors are grateful to the participants and hospital staff for their valuable cooperation in this study.

Conflict of Interest: None
Grant Support & Financial Support: None

ABSTRACT

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) are major global health threats, particularly in endemic countries such as Pakistan. These viruses are responsible for chronic liver disease, cirrhosis, and hepatocellular carcinoma, placing a significant burden on the healthcare system. Despite the availability of effective antiviral therapies and preventive strategies, the prevalence of HBV and HCV remains high. Understanding the local epidemiology, risk factors, and distribution patterns is essential to strengthen public health interventions and align with elimination targets.

Objective: The study aimed to determine the frequency of HBV and HCV infections in the local population of Kallar Kahar, identify demographic trends, assess associated risk factors, and provide evidence-based recommendations for prevention and control.

Methods: A cross-sectional study was conducted over six months, from January 2021 to July 2021, at the Hepatitis Clinic of THQ Hospital, Kallar Kahar. A total of 2000 individuals were recruited through randomized sampling. Inclusion criteria required availability of CNIC/Form-B, absence of prior hepatitis screening or treatment, and verbal informed consent. Screening was performed using an immunochromatographic test for anti-HCV and an ELISA kit for HBsAg. All positive samples were further confirmed through polymerase chain reaction (PCR). Data on demographics, vaccination status, and potential risk exposures were collected using structured interviews. Statistical analysis was carried out using SPSS software.

Results: Out of 2000 participants, 68% (n=1360) were females and 31% (n=640) were males, while 71.9% (n=1437) fell in the 15–49 years age group. Screening identified 3.4% (n=67) as positive and 96.7% (n=1933) as negative. Among the 67 positives, PCR confirmed 26.9% (n=18) as HCV positive and 20.9% (n=14) as HBV positive, while 7.5% (n=5) samples were rejected.

Conclusion: The study confirms that HBV and HCV infections are endemic in Pakistan, with a higher prevalence of HCV compared to HBV in this population. These findings highlight the urgent need for improved awareness, routine screening, vaccination programs, and stricter infection control practices. Community engagement and policy-level interventions are essential to reduce the burden and prevent further transmission.

Keywords: Cross-Sectional Studies, Hepatitis B, Hepatitis C, Pakistan, Polymerase Chain Reaction, Prevalence, Risk Factors.

INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

INTRODUCTION

Viral hepatitis remains a major global health challenge, with nearly 325 million people currently living with an active infection and an estimated 58 million suffering from chronic hepatitis C virus (HCV) infection, with 1.5 million new cases emerging annually. Chronic hepatitis B virus (HBV) infection affects approximately 296 million people worldwide, reflecting its significant contribution to the global burden of liver disease (1). Despite advances in science and medicine, awareness and diagnosis remain limited, as only 15% of HCV-infected individuals are estimated to be aware of their condition, while nearly 30% may spontaneously clear the infection without treatment (2,3). Since its discovery in 1989, HCV has continued to spread across populations despite decades of research aimed at understanding its transmission and disease course (4,5). Similarly, HBV was first identified through the discovery of the Australian antigen nearly 50 years ago, a milestone that eventually enabled its classification as the HBV surface antigen and revolutionized our understanding of viral hepatitis (6). The clinical and epidemiological consequences of HBV and HCV are particularly devastating in low- and middle-income countries (LMICs), where approximately two-thirds of hepatocellular carcinoma (HCC) cases are attributable to these infections (7). Among vulnerable groups, the prevalence of anti-HCV antibodies is highest in people who inject drugs (PWID), ranging from 79–82%, followed by prisoners (7–41%), HIV-positive men who have sex with men (MSM) (1.8–7.1%), HIV-negative MSM (0.22–1.8%), pregnant women (0.1–0.3%), and first-time blood donors (0.03–0.09%) (8). HBV transmission occurs primarily through vertical routes, blood transfusion and organ transplantation, hemodialysis, and sexual contact (9). Healthcare-associated exposures further amplify the risk, particularly in settings where infection prevention protocols are suboptimal (10,11). In regions such as Pakistan, co-infection with hepatitis C and D among HBsAg-positive patients has also been documented, highlighting the compounded disease burden and complexity of management (12). Importantly, the likelihood of developing chronic infection is inversely related to the age at which HBV infection occurs, with infants and young children being far more vulnerable than adults (7).

The burden of chronic HBV and HCV is disproportionately concentrated in Asia and Africa, with Pakistan experiencing an HCV epidemic of historic proportions (5,13). Although national health systems in resource-limited settings face significant barriers, efforts in Pakistan are increasingly directed toward strengthening prevention, early diagnosis, and equitable access to treatment (14). Prevention remains the cornerstone of viral hepatitis control. The HBV vaccine, introduced in 1982, provides 98–100% protection and is highly effective in reducing transmission and subsequent complications (15,16). Infection acquired in adulthood results in chronic disease in fewer than 5% of cases, whereas early childhood infections progress to chronic hepatitis in nearly 95%, underscoring the importance of prioritizing childhood immunization programs (1). Unlike HBV, HCV still lacks an effective vaccine, making prevention through behavioral modification, safe medical practices, and harm-reduction strategies the only viable means of control. In light of this global and regional health challenge, this study seeks to explore the burden, transmission dynamics, and prevention strategies for HBV and HCV, with a particular focus on high-prevalence regions such as Pakistan. The objective is to assess the current state of knowledge and interventions, identify persisting gaps, and rationalize the urgent need for integrated preventive and therapeutic strategies aimed at reducing the burden of cirrhosis and hepatocellular carcinoma worldwide.

METHODS

This study was designed as a descriptive cross-sectional survey conducted at the Hepatitis Clinic of THQ Kallar Kahar. A total of 2000 individuals were enrolled through randomized sampling. Of these, 68% were females and 31% were males, with the remaining percentage reflecting discrepancies in reporting. The majority of participants (71.9%) were between 15–49 years of age, 28% were above 50 years, and only 0.2% were younger than 15 years. Eligibility was determined based on clearly defined inclusion criteria: the availability of a Computerized National Identity Card (CNIC) or Form-B, absence of current hepatitis treatment, and no prior screening at any hepatitis clinic. Verification of previous screening and vaccination history was obtained through official screening and vaccination cards. Individuals who fulfilled these criteria and provided verbal informed consent were included in the study. Screening for HCV was performed using an immunochromatographic test (ICT) kit (One Step Anti-HCV Test, Bioline No. 02Fk10), while HBV surface antigen was detected through an enzyme-linked immunosorbent assay (ELISA) kit (Determine HBsAg2 REF7D2942/7D2943), following the manufacturer's instructions for both. Samples that tested positive for HCV or HBV were subsequently subjected to polymerase chain reaction (PCR) testing for confirmatory diagnosis. To ensure accuracy and minimize the risk of duplicate testing, each sample was coded

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

with a unique identifier linked to the participant's CNIC. Samples were barcoded, centrifuged in the laboratory, and stored for short periods before being dispatched biweekly for PCR analysis. PCR results were usually available within 2–3 days, after which participants were informed of their status and, if required, provided with treatment and counseling. Data collection included demographic variables such as age, gender, vaccination status, and previous history of hepatitis, alongside assessment of risk factors, which were explored through structured interviews. All responses were recorded systematically to enable subsequent analysis. Ethical approval was obtained from the Institutional Review Board (IRB) and the study was conducted in accordance with the principles of the Declaration of Helsinki. Informed verbal consent was taken from all participants prior to their inclusion in the study.

RESULTS

A total of 2000 individuals were screened, comprising 31% (n=640) males and 68% (n=1360) females. The majority of participants, 71.9% (n=1437), were between 15 and 49 years of age, while 28% (n=560) were above 50 years. Only 0.2% of the participants were younger than 15 years. Screening tests revealed that 3.4% (n=67) of participants were positive for hepatitis, whereas 96.7% were negative. Among the 67 initially positive individuals, confirmatory PCR testing indicated that 20.9% (n=14) were HBV positive, 26.9% (n=18) were HCV positive, and 7.5% (n=5) samples were rejected. Furthermore, 10.4% (n=7) were negative for HBV and 34.3% (n=23) were negative for HCV, indicating discrepancies between screening and confirmatory testing. Gender-specific analysis showed that 2.7% (n=37) of females and 4.68% (n=30) of males tested positive for viral hepatitis. Age-specific distribution indicated that 3.34% (n=48) of positive cases were in the 15–49 years group, while 3.39% (n=19) were above 50 years of age. Among those who tested positive, 64.2% (n=43) had received hepatitis vaccination at the clinic. Descriptive statistics highlighted additional variables. Past medical and surgical history showed that 100% (n=2000) of participants reported receiving injections at some point, while 0% reported undergoing surgery. Risk factors revealed that 76% (n=1520) had a history of nose piercing, tattooing, or visiting barbers, 68% (n=1360) reported being under medical or surgical care, and 32% (n=640) had undergone tooth extraction. Spousal infection was reported in 4% (n=80) of cases. Vaccination coverage was recorded in 1892 participants, with 97% compliance. Further analysis of PCR-confirmed positive cases revealed that important risk factors were prevalent among those affected. Among the 37 individuals confirmed positive, a significant proportion reported prior exposure to unsafe medical or community practices. Specifically, a history of receiving therapeutic injections was universal, while nearly three-quarters of confirmed cases had undergone nose piercing, tattooing, or barber-related exposures. More than half had been under the care of medical or surgical facilities, and nearly one-third had a history of tooth extraction. Spousal infection was reported in a small but notable fraction of cases, suggesting possible intrafamilial transmission.

Table 1: Descriptive Statistics

	N	Mean	Std. Deviation
Gender	2000	1.68	.467
Age	2000	1.28	.452
Hepatitis B vaccination	1892	.97	.162
Screening test	2000	.03	.180
Type of hepatitis	2000	3.88	.513
PCR	2000	.03	.180
PCR Report	2000	.10	.582
Got injections in Past	2000	1.00	.045
Had any kind of surgery in Past	2000	.00	.063
Nose piercing, tattooing or visiting barber shop	2000	.76	.426
Under care of medical or surgical	2000	.68	.467
Tooth extraction	2000	.32	.466
Is your spouse also effected from Hepatitis B or C	2000	.04	.203
Valid N (list wise)	1892		

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Table 2: Risk Factors Among PCR-Confirmed Positive Cases

Risk Factor	Frequency (n)	Percentage (%)
Received injections in the past	37	100.0
History of surgery	0	0.0
Nose piercing, tattooing, or visiting barber shop	28	75.7
Under care of medical or surgical facility	23	62.2
Tooth extraction	12	32.4
Spouse also affected with HBV or HCV	2	5.4

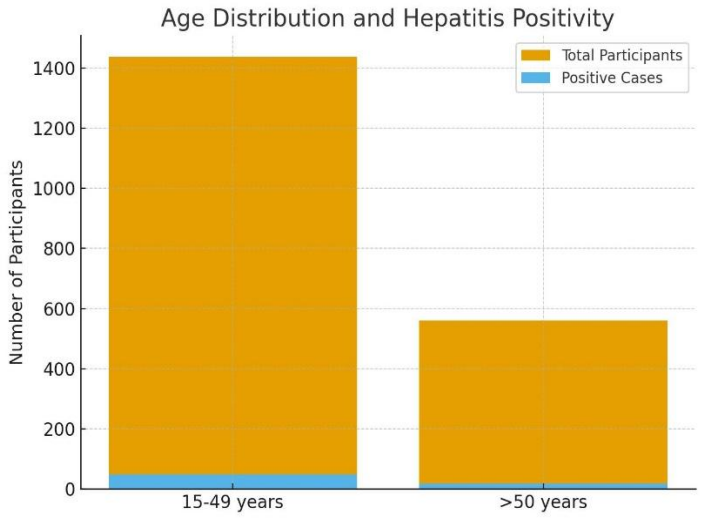

Figure 2 Age Distribution and Hepatitis Positivity

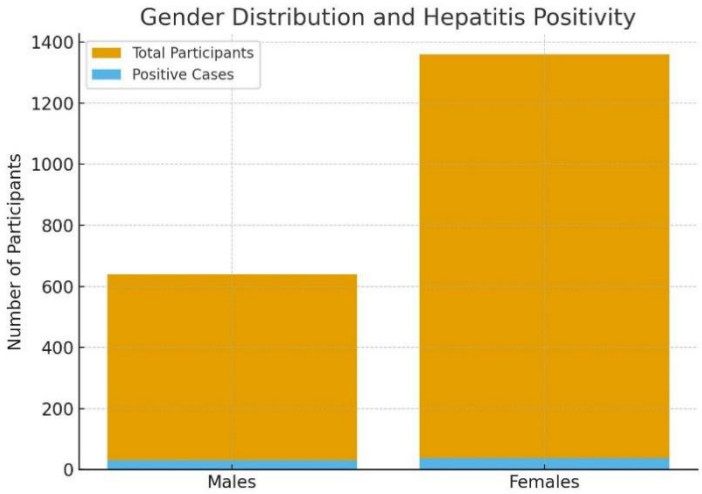

Figure 2 Gender Distribution and Hepatitis Positivity

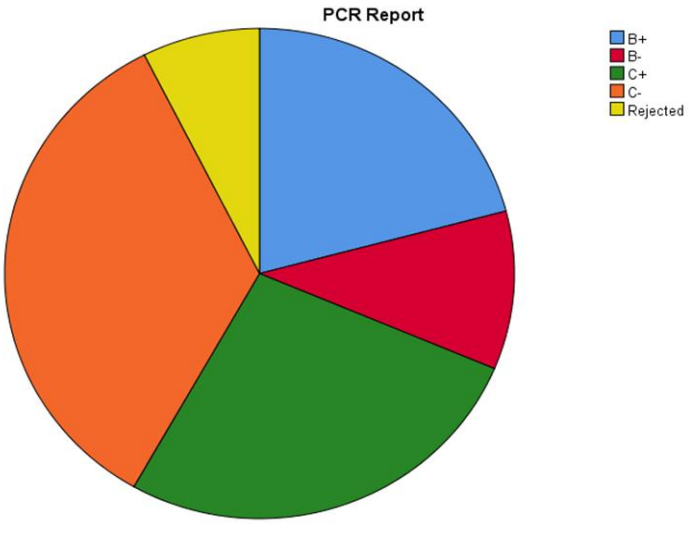

Figure 4 PCR Report

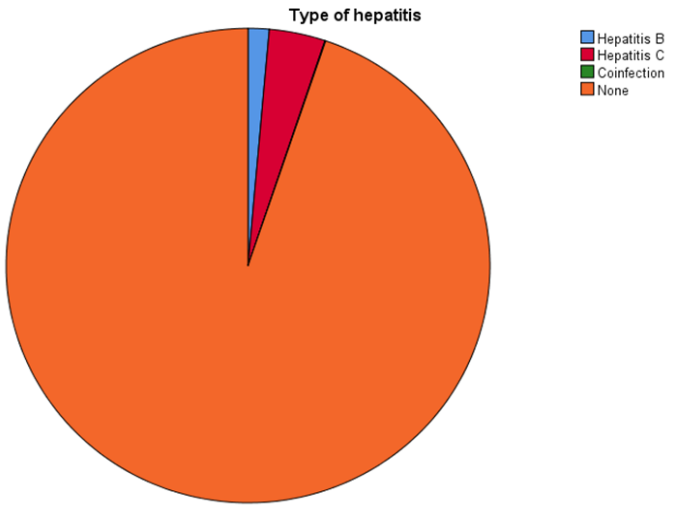

Figure 4 Type of Hepatitis

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

DISCUSSION

The findings of this study reaffirm the serious public health burden posed by hepatitis B and C infections in Pakistan and across Asia, where both viruses continue to occur in endemic and epidemic patterns. The observed prevalence in the present population highlights that a large proportion of individuals remain undiagnosed, consistent with global estimates that suggest 65–75% of infected persons are unaware of their disease status (13). The predominance of infection in the 15–49 year age group underscores the cumulative risk associated with prolonged exposure over time, a trend supported by previous reports which identified similar age-related susceptibility (14). Low prevalence in children, with figures as low as 0.2% under the age of 12 and 0.4% in those aged 12–19 years, has been described in prior surveys, aligning with the current findings where childhood infection was negligible (15). The present study demonstrated that among positively screened patients, HCV remained more prevalent than HBV, with PCR-confirmed results showing 26.2% for HCV and 20.9% for HBV. These values differ from the national hepatitis prevalence survey, which reported HCV prevalence at 6.7% and HBV at 2.4% in Punjab (16). This discrepancy may reflect local epidemiological variations in Kallar Kahar, as well as potential clustering of risk exposures in this region. High-risk behaviors identified in the study, including frequent therapeutic injections, barber practices, nose piercing, and surgical or medical interventions, were strongly associated with positive cases. The frequency of unsafe injection practices is of particular concern, as previous community-based studies in Pakistan have shown an average of 13 injections per person per year in Sindh, with nearly half considered unsafe (17). Another local study found that 81% of patients received an injection during a single clinic visit, illustrating the deeply entrenched culture of unnecessary and unsafe injection use (18). In the current study, every PCR-positive participant reported receiving more than four injections annually, a finding that directly supports the established link between unsafe injection practices and the transmission of viral hepatitis. Other potential transmission routes also require consideration. The role of barber shaving practices and roadside salons remains highly relevant, as prevalence rates of infection associated with these exposures have been reported between 34% and 49% in countries including Pakistan, Ethiopia, and Bangladesh (19). Similarly, inaccuracies in blood bank screening practices continue to pose challenges to safe transfusion in Pakistan, further contributing to transmission risk (20). Additionally, the presence of a large population of intravenous drug users, estimated at nearly half a million heroin addicts, exacerbates the risk of hepatitis C transmission, a factor of growing concern in public health planning (21).

The study also highlights the role of vaccination in controlling hepatitis. Among positively screened patients, 64% were recorded as having received vaccination at the hepatitis clinic, suggesting gaps in coverage and possibly delays in vaccine administration. While past efforts for hepatitis B vaccination were limited in effectiveness, recent prioritization of immunization programs is a positive development. Strengthening these programs is critical as global initiatives led by the World Health Organization urge countries to work toward the elimination of hepatitis by 2030 (22). The strength of this study lies in its inclusion of a large sample size with both genders and a wide age distribution, enabling analysis of demographic associations with viral hepatitis. The use of confirmatory PCR testing also strengthens the validity of prevalence estimates. However, several limitations must be acknowledged. The sampling was labeled as randomized, yet details of the process were not sufficiently elaborated, raising concerns of potential selection bias. Additionally, while risk factors were broadly assessed, the lack of stratified analysis linking individual exposures with PCR-confirmed outcomes limited the ability to quantify associations. Another limitation was reliance on self-reported history for exposures such as injections and barber visits, which may have introduced recall bias. Finally, the use of mean and standard deviation to describe categorical variables in descriptive statistics was inappropriate and should have been replaced by frequencies and percentages for greater epidemiological clarity. Overall, the results demonstrate that unsafe healthcare practices, community behaviors, and inadequate screening and vaccination programs remain central to the persistence of hepatitis B and C in Pakistan. There is a pressing need to strengthen infection prevention protocols, enforce safe medical practices, regulate barber and salon procedures, and enhance blood bank safety standards. Future studies should focus on analytic approaches that stratify confirmed infections by specific risk factors to better establish causal pathways. Moreover, longitudinal designs could help clarify the natural history of infection and monitor the effectiveness of vaccination and treatment strategies. With sustained awareness campaigns, policy reforms, and coordinated public health interventions, meaningful progress toward reducing the burden of hepatitis in Pakistan and aligning with global elimination goals can be achieved.

CONCLUSION

Pakistan continues to face a significant burden of hepatitis B and C, underscoring the urgent need for comprehensive action in line with global elimination targets set for 2030. The findings of this study highlight the critical importance of prioritizing awareness among the general population, ensuring free access to screening and treatment, and addressing the behavioral and healthcare-related factors that

drive transmission. Strengthening vaccination coverage, particularly for hepatitis B, alongside outreach through medical camps in underserved areas, remains vital for reducing new infections. Equally important are preventive strategies within healthcare and community settings, supported by systematic data collection and research to accurately assess the disease burden and inform policy. By integrating these measures into a unified strategic plan, meaningful progress can be made toward controlling and ultimately eliminating viral hepatitis in Pakistan.

AUTHOR CONTRIBUTION

Author	Contribution
Anam Khan	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Shanza Akbar*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Saqib Hussain	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published

REFERENCES

1. Alberts CJ, Clifford GM, Georges D, Negro F, Lesi OA, Hutin YJ, et al. Worldwide prevalence of hepatitis B virus and hepatitis C virus among patients with cirrhosis at country, region, and global levels: a systematic review. Lancet Gastroenterol Hepatol. 2022;7(8):724-35.
2. Ahmed S, Ayub M, Naeem M, Nazir FH, Hussain A, Ghilzai D, et al. Thalassemia Patients from Baluchistan in Pakistan Are Infected with Multiple Hepatitis B or C Virus Strains. Am J Trop Med Hyg. 2021;104(4):1569-76.
3. Israr M, Ali F, Nawaz A, Idrees M, Khattak A, Ur Rehman S, et al. Seroepidemiology and associated risk factors of hepatitis B and C virus infections among pregnant women attending maternity wards at two hospitals in Swabi, Khyber Pakhtunkhwa, Pakistan. PLoS One. 2021;16(8):e0255189.
4. Wu S, Wang J, Guo Q, Lan H, Sun Y, Ren M, et al. Prevalence of human immunodeficiency virus, syphilis, and hepatitis B and C virus infections in pregnant women: a systematic review and meta-analysis. Clin Microbiol Infect. 2023;29(8):1000-7.
5. Vincent JP, Nyamasege C, Wang S, Madec Y, Shimakawa Y. Prevalence of hepatitis B, C, and D virus infection in Haiti: A systematic review and meta-analysis. Front Public Health. 2022;10:1099571.
6. Miyano S, Pathammavong C, Ichimura Y, Sugiyama M, Phounphenghack K, Tengbriacheu C, et al. Prevalence of hepatitis B and C virus infections in Lao People's Democratic Republic: The first national population-based cross-sectional survey. PLoS One. 2022;17(12):e0278933.
7. Jørgensen A, Bjørn-Mortensen K, Graff Jensen S, Sloth Andersen E, Ravn P. Prevalence of hepatitis B and C at a major tuberculosis centre in Denmark. Infect Dis (Lond). 2021;53(3):196-200.
8. Bitty-Anderson AM, Ferré V, Gbeasor-Komlanvi FA, Tchankoni MK, Sadio A, Salou M, et al. Prevalence of hepatitis B and C among female sex workers in Togo, West Africa. PLoS One. 2021;16(12):e0259891.
9. Shah H, Ur Rahman Z, Khan M, Zaman F, Badshah S. The Prevalence of Blood Borne Diseases in Blood Donors of Peshawar, Khyber Pakhtunkhwa, Pakistan. Recent Adv Antiinfect Drug Discov. 2023;18(3):215-20.
10. Raziq K, Shah SQA, Tariq M, Badshah S, Riaz U, Ibáñez-Arancibia E, et al. Prevalence and risk factors of hepatitis B and C in Bahawalpur: a hospital-based study. Braz J Biol. 2025;85:e288357.
11. Samo AA, Laghari ZA, Baig NM, Khoso GM. Prevalence and Risk Factors Associated with Hepatitis B and C in Nawabshah, Sindh, Pakistan. Am J Trop Med Hyg. 2020;104(3):1101-5.
12. Muhammad SK, Shaikh BA, Gurbakshani KM, Jalbani AU. Frequency triple hepatitis (hepatitis B and C and D virus) in HBs Ag positive patients. Rawal Medical Journal. 1970 Jan 1;37(2):142-.
13. Chang CH, Liu CY, Chen SJ, Tsai HC. Hepatitis C virus and hepatitis B virus in patients with schizophrenia. Medicine (Baltimore). 2021;100(22):e26218.

14. Souza-Silva G, Mol MPG. Hepatitis B or C prevalence in waste pickers from South America: a systematic review. J Public Health (Oxf). 2021;43(4):e578-e83.
15. Chikwendu A, Unikutelle HL, Olumide AT. Hepatitis B and C virus prevalence among patients and healthcare workers' prevention practices towards the viruses in a secondary healthcare facility in Northern Nigeria. Pan Afr Med J. 2023;46:82.
16. Lo Presti A, Ceccarelli F, Dorrucci M, Farchi F, Pirone C, Garufi C, et al. Hepatitis B and C virus infection in patients with Systemic and Cutaneous Lupus Erythematosus. New Microbiol. 2022;45(4):296-303.
17. Not A, Ouaarab-Essadek H, Montoro M, Treviño B, Buti M, Morillas RM, et al. Hepatitis B and C Screening and Linkage to Care in Migrants From Endemic Countries in Barcelona Through a Community Action. Liver Int. 2025;45(6):e70126.
18. Badshah Y, Shabbir M, Khan K, Zafar S, Afsar T, Husain FM, et al. HCV and HBV genotypes: vital in the progression of HCV/HBV co-infection. BMC Gastroenterol. 2025;25(1):6.
19. Jamal S, Mansoor N, Ali A, Nadeem A, Aijaz J, Meraj F. Degree of blood safety of voluntary non-remunerated versus replacement blood donations: A multi-centre study of the large cohort of blood donors from two provinces of Pakistan. Vox Sang. 2023;118(12):1078-85.
20. Asghar MS, Rasheed U, Hassan M, Akram M, Yaseen R, Fayaz B. A CROSS-SECTIONAL SCREENING SURVEY ON THE SEROPREVALENCE OF HEPATITIS B AND HEPATITIS C AMONGST THE GENERAL POPULATION OF RURAL DISTRICTS OF SINDH, PAKISTAN. Arq Gastroenterol. 2021;58(2):150-6.
21. Alamneh TS, Walker JG, Lim AG, Alam E, Hamid S, Foster GR, et al. Changes in the prevalence of hepatitis B and C viral infections in Sindh province, Pakistan: Findings from two sero-surveys in 2007 and 2019. J Viral Hepat. 2024;31(11):645-56.
22. Kaewdech A, Charatcharoenwitthaya P, Piratvisuth T. Asian Perspective on Hepatitis B Virus and Hepatitis C Virus Elimination. Viruses. 2024;17(1).

