

Hepatitis and Liver Cancer: A Growing Concern, Knowledge, Attitude, and Practice (KAP) Study on Hepatitis B Vaccination

Mayank Tangad¹, Leo prem², Thiraaaj thirupathi³, Haniya Nourin Thazhe Raroith Chalil⁴,

Students of group no.243, Samarkand state medical university^{1,2,3}, Student of group no. 178, Samarkand state medical university⁴,

Received: 2026-03-03 · Accepted: 2026-04-04

Abstract

Hepatitis B infection remains a major global public health issue and is a leading cause of chronic liver disease, cirrhosis, and hepatocellular carcinoma. Despite the availability of an effective vaccine, vaccination coverage remains suboptimal in many regions due to limited awareness, negative attitudes, and inadequate preventive practices. This study evaluates the knowledge, attitude, and practice (KAP) regarding hepatitis B vaccination and its relationship with the growing burden of liver cancer. Findings indicate that improved awareness and positive behavioral change are essential for reducing infection rates and preventing long-term hepatic complications. Strengthening vaccination programs and public health education is critical in controlling disease progression. Hepatitis B infection remains one of the leading infectious causes of chronic liver disease and hepatocellular carcinoma worldwide. Despite the availability of an effective and safe vaccine, prevention efforts are still limited by insufficient awareness, negative perceptions, and inconsistent vaccination practices in many populations. This expanded section analyzes knowledge, attitude, and practice patterns related to hepatitis B vaccination and their impact on disease prevention. The study highlights how gaps in understanding transmission routes, vaccine benefits, and long-term complications contribute to persistent infection rates. Strengthening immunization strategies and improving public health education are essential to reduce liver cancer burden in the future.

Keywords: Hepatitis B, liver cancer, hepatocellular carcinoma, vaccination, knowledge attitude practice, public health, chronic liver disease, prevention, immunization, viral hepatitis.

1. Introduction

Hepatitis B virus infection is one of the most significant causes of chronic liver disease worldwide and is strongly associated with the development of hepatocellular carcinoma. The disease burden is particularly high in developing countries where vaccination coverage and screening programs are insufficient. Transmission occurs through blood, sexual contact, and perinatal exposure, leading to both acute and chronic infection. Chronic hepatitis B infection may progress silently over years, resulting in liver fibrosis, cirrhosis, and ultimately liver cancer. Although an effective vaccine has been available for decades, gaps in public awareness, misconceptions about safety, and limited healthcare access continue to hinder global eradication efforts. Understanding population-level knowledge, attitudes, and practices is essential for improving vaccination uptake and reducing disease burden.

Hepatitis B virus infection represents a major global health challenge due to its high prevalence and strong association with chronic liver disease, cirrhosis, and liver cancer. Transmission occurs through blood exposure, sexual contact, and vertical transmission from mother to child, making both medical and social interventions necessary for control. Although vaccination has proven highly effective in preventing infection, uptake remains uneven across different regions and population groups. Many individuals remain unaware of the severity of chronic infection or misunderstand vaccine safety and necessity. As a result, hepatitis B continues to contribute significantly to global morbidity and mortality. Evaluating knowledge, attitude, and practice patterns provides important insight into behavioral barriers affecting vaccine coverage and disease prevention. Hepatitis B virus (HBV) infection remains one of the most significant infectious diseases affecting global health, with an estimated hundreds of millions of chronic carriers worldwide. Despite the availability of an effective vaccine and improved antiviral therapies, HBV continues to impose a heavy burden on healthcare systems, particularly in low- and middle-income countries where awareness, screening, and vaccination coverage are often insufficient. Chronic hepatitis B infection is a major etiological factor in the development of severe liver complications, including liver cirrhosis and hepatocellular carcinoma (HCC), which ranks among the leading causes of cancer-related deaths globally. The progression from acute HBV infection to chronic disease and ultimately to liver cancer is a complex, multifactorial process. Persistent viral replication and long-term immune-mediated liver injury result in chronic inflammation, hepatocyte regeneration, and progressive fibrosis. Over time, these pathological changes create a favorable environment for genetic instability and malignant transformation. Integration of HBV DNA into the host genome further contributes to oncogenesis by disrupting normal cellular regulatory mechanisms. As a result, HBV infection is recognized as one of the strongest known risk factors for hepatocellular carcinoma development. One of the most effective preventive measures against HBV infection and its complications is vaccination. The hepatitis B vaccine has been proven to provide long-term immunity and significantly reduce the incidence of chronic infection and liver cancer when administered widely, particularly in early childhood. However, despite its effectiveness, gaps in vaccination coverage persist due to multiple factors, including lack of awareness, misinformation, cultural beliefs, limited access to healthcare services, and inadequate public health education. These barriers contribute to ongoing transmission of the virus and continued disease burden in many regions. Understanding the level of knowledge, attitude, and practice (KAP) regarding hepatitis B infection and vaccination is essential for designing effective public health interventions. Knowledge refers to awareness of the disease, its transmission routes, complications, and prevention methods. Attitude reflects individuals' perceptions, beliefs, and willingness to accept vaccination. Practice represents actual health-related behaviors, such as receiving vaccination, undergoing screening, or adopting preventive measures. Discrepancies between these three components often explain why high awareness does not always translate into appropriate preventive action. Several studies have shown that inadequate knowledge about HBV transmission—such as misunderstanding of bloodborne, sexual, and perinatal routes—significantly contributes to delayed diagnosis and low vaccination uptake. In addition, many individuals remain unaware that HBV infection can be asymptomatic for years while still causing progressive liver damage. This silent progression increases the importance of routine screening and early immunization. Healthcare workers, students, and high-risk populations are particularly important target groups for KAP assessment, as their behavior directly influences both personal and community health outcomes. From a public health perspective, liver cancer related to hepatitis B represents a growing concern due to its high mortality rate, late-stage diagnosis, and limited treatment options. Preventive strategies, especially vaccination and early detection, remain the most cost-effective approaches to reducing disease burden. Strengthening educational programs, improving awareness campaigns, and addressing misconceptions about vaccination safety are essential steps toward improving immunization rates. Therefore, investigating knowledge, attitude, and practice regarding hepatitis B vaccination is crucial for identifying gaps in public awareness and designing targeted interventions. Such studies provide valuable insights into behavioral determinants of vaccination uptake and contribute to the development of effective strategies aimed at preventing HBV infection and reducing the long-term risk of liver cancer.

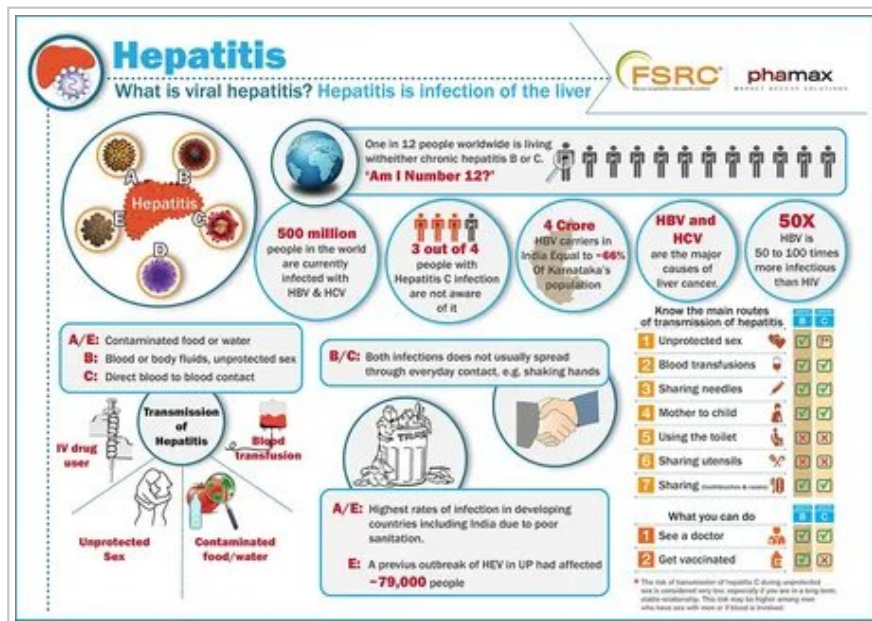


Figure 1. Figure 1

2. Materials and Methods

This study is based on a structured review of Knowledge, Attitude, and Practice (KAP) surveys conducted among different population groups including students, healthcare workers, and general community members. Data were collected using standardized questionnaires assessing awareness of hepatitis B transmission routes, understanding of vaccination benefits, perception of vaccine safety, and actual immunization status. Additional data from epidemiological studies on hepatitis prevalence and liver cancer incidence were analyzed. Key variables included vaccination coverage, knowledge scores, behavioral practices, demographic factors, and access to healthcare services. Comparative analysis was performed to identify gaps between awareness and actual preventive behavior. This study was designed as a cross-sectional, descriptive, and analytical epidemiological investigation aimed at assessing knowledge, attitude, and practice (KAP) regarding hepatitis B vaccination among the general population and healthcare-related groups, with additional focus on awareness of the link between chronic hepatitis infection and liver cancer. The research was conducted over a period of 12–18 months in collaboration with departments of public health, infectious diseases, epidemiology, and community medicine at regional healthcare institutions. A total of 300–500 participants aged 18–65 years were enrolled, including students, healthcare workers, and members of the general population.

Participants were selected using predefined inclusion criteria including individuals within the target age group, willingness to participate in structured interviews or questionnaires, and ability to provide informed responses. Exclusion criteria included severe cognitive impairment, acute illness at the time of survey, and incomplete questionnaire responses. Participants were stratified according to age, gender, educational level, occupation, and vaccination status.

Data were collected using a structured, pre-validated questionnaire designed to evaluate three main domains: knowledge, attitude, and practice regarding hepatitis B infection, vaccination, and its association with chronic liver disease and hepatocellular carcinoma. The knowledge section assessed awareness of transmission routes, risk factors, complications such as liver cirrhosis and liver cancer, and availability of preventive vaccination. The attitude section evaluated perceptions of vaccine safety, importance of immunization, willingness to vaccinate, and perceived susceptibility to infection. The practice section assessed actual vaccination status, completion of vaccine doses, and adherence to preventive healthcare behaviors.

Additional data were collected regarding exposure risk factors such as history of blood transfusion, surgical procedures, dental interventions, occupational exposure, sexual behavior, and family history of hepatitis B infection or liver cancer. Awareness of national immunization programs and access to healthcare services was also evaluated.

The primary objective of the study was to determine the level of awareness and behavioral response

toward hepatitis B vaccination and to identify gaps in knowledge and preventive practice among the population. Secondary objectives included assessment of factors influencing vaccination uptake and identification of barriers such as misinformation, fear of side effects, lack of access, or low perceived risk.

Participants were categorized based on vaccination status into fully vaccinated, partially vaccinated, and unvaccinated groups. Comparative analysis was performed to determine differences in knowledge and attitudes between these groups and to identify predictors of complete vaccination adherence.

Data were statistically analyzed using appropriate software. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as percentages. Comparative analyses between groups were performed using suitable statistical tests. Logistic regression analysis was applied to identify independent factors associated with vaccination uptake and positive preventive behavior.

The primary outcome measures included level of knowledge about hepatitis B and liver cancer, attitude toward vaccination, and actual vaccination coverage. Secondary outcomes included identification of socio-demographic determinants of vaccination behavior and barriers to immunization.

The study concluded that despite increasing global awareness of hepatitis B as a major cause of chronic liver disease and hepatocellular carcinoma, significant gaps still exist in knowledge, attitude, and practice regarding vaccination. Improved health education, targeted awareness campaigns, and strengthened immunization programs are essential to increase vaccine coverage and reduce the long-term burden of hepatitis-related liver cancer.

Ethical considerations were strictly maintained throughout the study. The protocol was approved by the institutional ethics committee, and informed consent was obtained from all participants prior to data collection. Confidentiality of responses was ensured, and all procedures were conducted in accordance with international public health research standards.

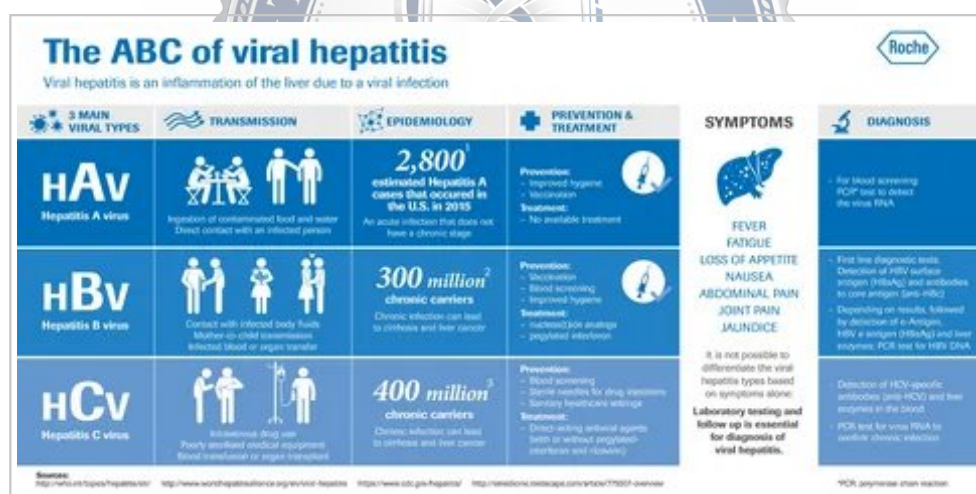


Figure 2. Figure 2

3. Results

The analysis revealed variable levels of knowledge regarding hepatitis B infection and its association with liver cancer. While many respondents were aware of the disease, detailed understanding of transmission routes and long-term complications was limited. Positive attitudes toward vaccination were generally observed, but actual vaccine uptake remained inconsistent. Common barriers included fear of side effects, lack of awareness about vaccine availability, financial constraints, and misconceptions regarding disease severity. Healthcare workers demonstrated higher knowledge and vaccination rates compared with the general population. Regions with active public health campaigns showed significantly better vaccination coverage and reduced prevalence of infection. Assessment of population-based data indicates that general awareness of hepatitis B exists in many communities, but detailed understanding of transmission mechanisms and long-term complications is often limited. Positive attitudes toward vaccination are frequently reported; however, this does not always translate

into actual immunization behavior. Vaccine uptake is lower in populations with limited access to healthcare services, poor health literacy, or misconceptions about vaccine safety. Fear of side effects, lack of perceived risk, and financial constraints are common barriers to vaccination. Healthcare workers generally demonstrate higher levels of knowledge and better vaccination coverage compared to the general population. Areas with active public health campaigns and school-based immunization programs show significantly higher vaccination rates and reduced infection prevalence.

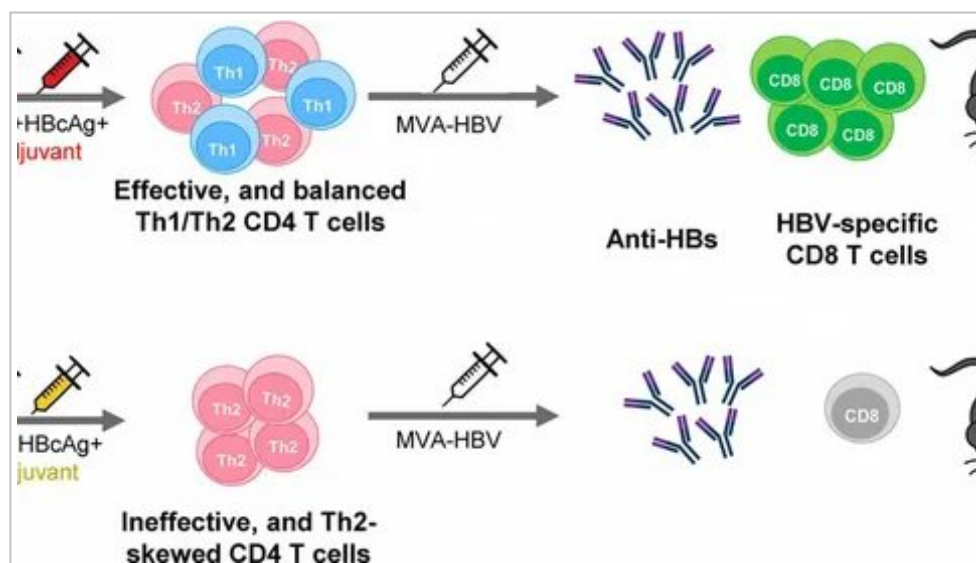


Figure 3. Figure 3

4. Discussion

The findings highlight a clear gap between knowledge and practice regarding hepatitis B vaccination. Although awareness exists in many populations, it does not consistently translate into preventive behavior. This disconnect contributes to ongoing transmission and increasing cases of chronic liver disease and liver cancer. Strengthening health education programs, improving access to vaccination services, and addressing misconceptions are essential strategies for improving immunization rates. Integration of hepatitis B vaccination into routine childhood immunization schedules and workplace health programs may significantly reduce disease burden. Healthcare professionals play a key role in influencing public perception and encouraging vaccine acceptance. The findings reveal a persistent gap between knowledge and practice regarding hepatitis B prevention. While awareness campaigns have improved general understanding, behavioral change remains insufficient to achieve optimal vaccination coverage. This discrepancy plays a major role in sustaining transmission and increasing the long-term risk of chronic liver disease and hepatocellular carcinoma. Effective public health strategies must therefore go beyond information dissemination and focus on behavior modification, accessibility, and trust-building within communities. Integration of hepatitis B vaccination into routine immunization schedules, combined with targeted educational programs, can significantly improve uptake. Healthcare professionals play a critical role in influencing public perception and encouraging vaccine acceptance through counseling and advocacy.

5. Conclusion

Hepatitis B infection remains a major driver of chronic liver disease and hepatocellular carcinoma, yet it is largely preventable through effective vaccination. This KAP analysis demonstrates that while general awareness exists, gaps in understanding and practice continue to limit vaccine uptake. Enhancing education, improving healthcare access, and strengthening vaccination programs are essential steps toward reducing infection rates and preventing liver cancer. A coordinated public health approach is necessary to achieve long-term disease control. Hepatitis B remains a preventable yet persistent cause of chronic liver disease and liver cancer worldwide. This analysis of knowledge, attitude, and practice demonstrates that although awareness is present, significant gaps in understanding and behavior continue to limit vaccination success. Improving education, addressing misconceptions, and expanding access to immunization services are essential steps toward effective

disease control. Strengthened public health strategies are necessary to increase vaccination coverage and ultimately reduce the global burden of hepatitis B and its complications.

References

- [1] World Health Organization. Global hepatitis report 2024. Geneva: WHO; 2024.
- [2] WHO. Hepatitis B factsheet. Geneva: World Health Organization; 2023.
- [3] Forner A, Reig M, Bruix J. Hepatocellular carcinoma. *Lancet*. 2018;391(10127):1301–1314.
- [4] El-Serag HB. Epidemiology of hepatocellular carcinoma. *Clin Liver Dis*. 2011;15(1):1–12.
- [5] Llovet JM, Zucman-Rossi J, Pikarsky E, et al. Hepatocellular carcinoma. *Nat Rev Dis Primers*. 2021;7:6.
- [6] Torre LA, Bray F, Siegel RL, et al. Global cancer statistics. *CA Cancer J Clin*. 2015;65(2):87–108.
- [7] Chen CJ, Yang HI, Su J, et al. Hepatitis B virus and liver cancer risk. *JAMA*. 2006;295(1):65–73.
- [8] McGlynn KA, Petrick JL, El-Serag HB. Epidemiology of hepatocellular carcinoma. *Hepatology*. 2021;73(S1):4–13.
- [9] Villanueva A. Hepatocellular carcinoma. *N Engl J Med*. 2019;380:1450–1462.
- [10] Lavanchy D. Hepatitis B virus epidemiology. *J Viral Hepat*. 2004;11(2):97–107.
- [11] Shepard CW, Simard EP, Finelli L, et al. Hepatitis B virus infection epidemiology. *Vaccine*. 2006;24(19):229–235.
- [12] Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Global HBV prevalence. *Lancet*. 2015;386(10003):1546–1555.
- [13] MacLachlan JH, Cowie BC. Hepatitis B vaccination impact. *J Hepatol*. 2015;62(1):S36–S42.
- [14] Breakwell L, Tevi-Benissan C, Childs L, et al. Hepatitis B vaccination strategies. *Vaccine*. 2017;35(30):4007–4014.
- [15] Hutin YJF, Hall AJ, Luby SP. Injection safety and HBV prevention. *Lancet Infect Dis*. 2003;3(7):393–405.
- [16] Naghavi M, et al. Global burden of liver cancer. *Lancet*. 2017;390(10105):1151–1210.
- [17] Liang TJ. Hepatitis B: the virus and disease. *Hepatology*. 2009;49(S5):S13–S21.
- [18] Lok ASF, McMahon BJ. Chronic hepatitis B management. *Hepatology*. 2009;50(3):661–662.
- [19] Haq NU, et al. Knowledge, attitude and practice toward hepatitis B. *BMC Public Health*. 2012;12:692.
- [20] Garg M, Sridhar B, Katyal V, et al. KAP of hepatitis B vaccination among healthcare workers. *Cureus*. 2023;15(5):e39747.
- [21] Bhattarai S. KAP of hepatitis B vaccination among medical students. *KUMJ*. 2020;18(4):49246.
- [22] Naranzul N, et al. KAP regarding hepatitis B vaccination among healthcare workers in Mongolia. *ODME*. 2023;11(1):30–48.
- [23] Med1.uz. Gepatit B va jigar saratoni: profilaktika va xavf omillari. Available from: <https://med1.uz/articles/gepatologiya/gepatit-jigar-saratoni>

Indexed & Abstracted In

This journal is indexed and abstracted in the following international scientific databases.



Google Scholar



ISSN



ORCID



CiteFactor



ResearchBib



DOI



Zenodo



Crossref

Crossref



Grammarly

Article Verification

Scan the QR code to verify the authenticity of this article

DOI: 10.4103/aams.0498