



# THE PREVALENCE AND RISK FACTOR OF HEPATITIS B VIRUS IN PROVINCE PUNJAB OF PAKISTAN: A REVIEW

Sabila Afzal<sup>1,2</sup>, Syed Shakeel Shah<sup>1,2</sup>, Nusrat Ahmed Ali<sup>1</sup>, Syeda Iqra Niaz<sup>1</sup>, Ariba Asghar<sup>1</sup>.

<sup>1</sup> Department of Zoology, University of Narowal, Pakistan.

<sup>2</sup> Department of Zoology, University of Punjab, Pakistan.

## ABSTRACT:

HBV is considered as the virus causing disease in the developing country as in Pakistan also. Now a day, viral hepatic infections (HBV) have become common and important cause of liver disease. The main causes of Hepatitis are poverty, ignorance of vaccination, reuse of syringes, exposure to not disinfected surgical instruments in hospitals, dental instruments in hospitals, acupuncture, unscreened blood transfusion, using of unsterilized equipment at barbers shops and also due to cultural and traditional activities. The present study represents the prevalence and risk factor of HBV infections in the general population of Punjab, province of Pakistan.

## Key Words:

Hepatitis B, Prevalence, Risk factor, life cycle, Punjab, Pakistan.

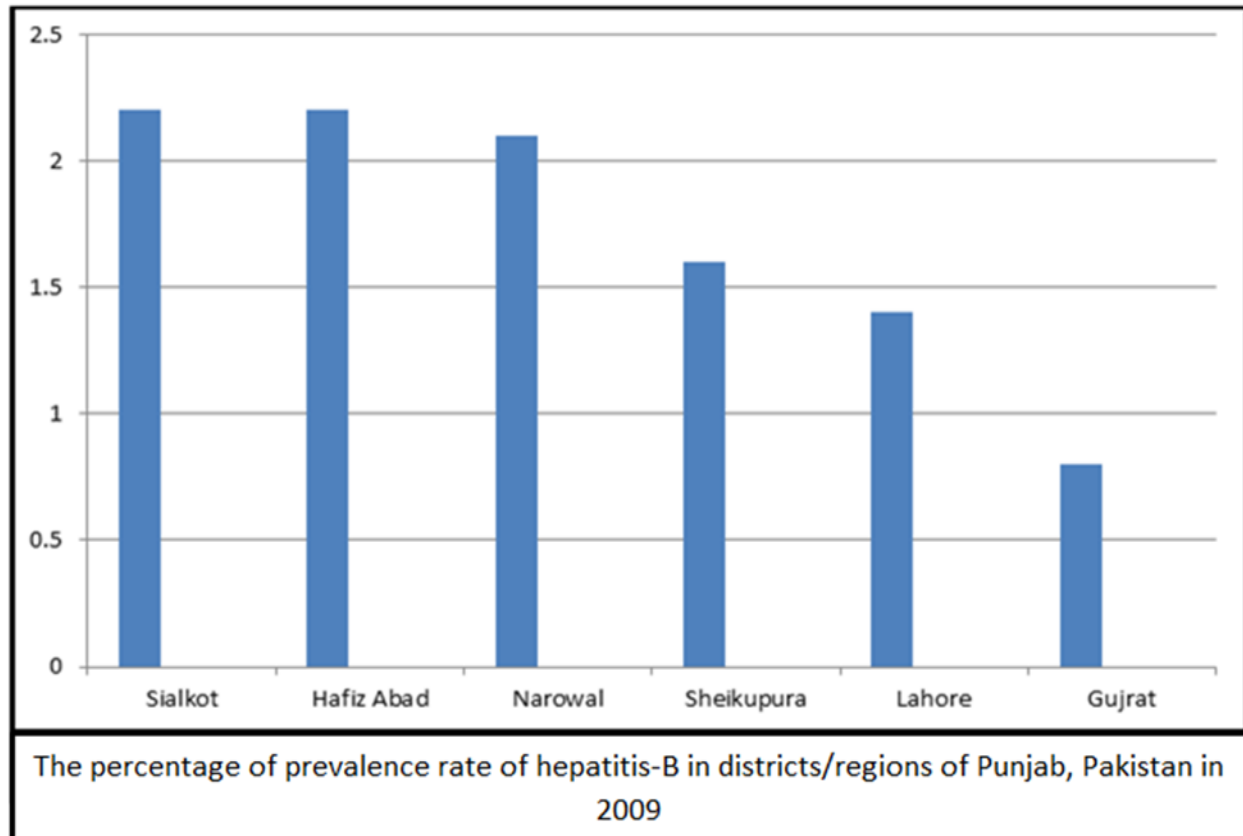
## Introduction:

Viral hepatitis is a severe global public health problem. Hepatitis B (HBV) was discovered in 1967. Hepatitis B Virus (HBV) is belonging to a (prototype) Hepadnaviridae family. Hepadnaviruses largely infect the liver cells, but in small numbers for hepadnaviral DNA which is found in kidney, pancreas and other mononuclear cells. HBV virions are double-shelled particles, having 40-42 nm diameters; an outer lipoprotein envelope that contains three related layers (envelope) glycoproteins, Inner envelope is the viral nucleocapsid, and a core. The core contains the viral genome, a relaxed-circular; aduplex DNA of 3.2kb, and a polymerase that is responsible for the synthesis of viral DNA in infected cells (Don Ganem, et al., 2004).

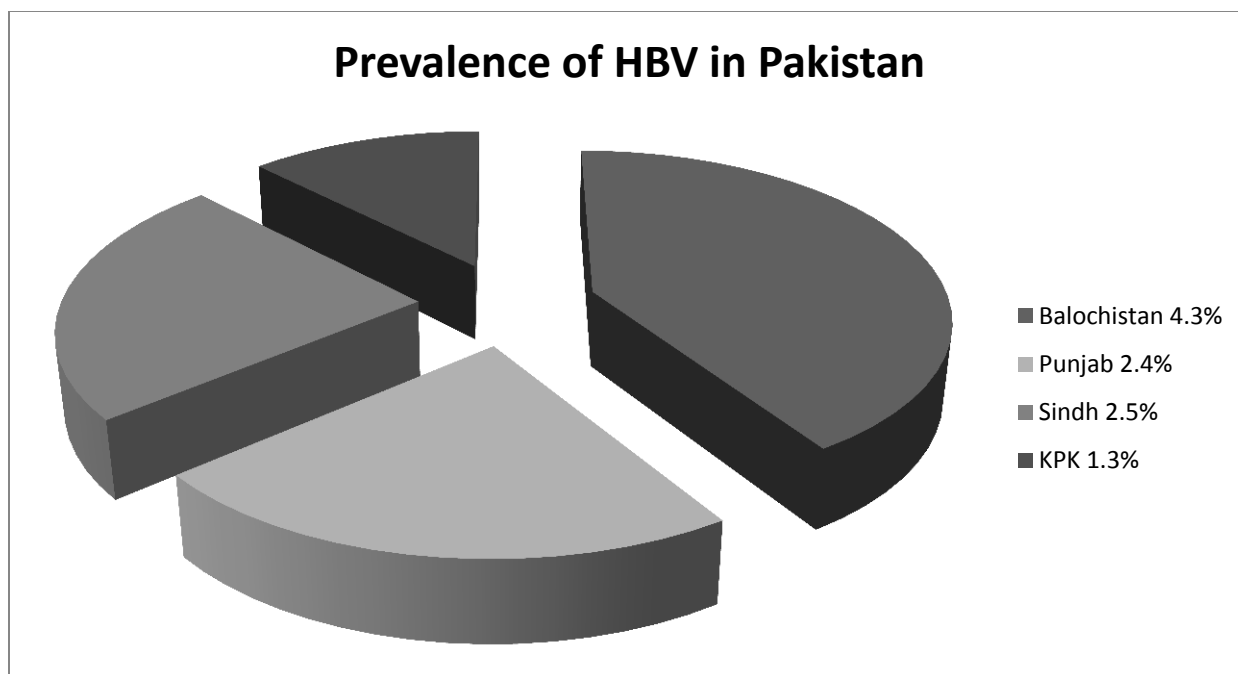
In the life cycle of Hepatitis B virus the liver cell membrane binds to an unknown receptor which is hepatocyte-specific preS1-receptor. Then, endocytosis of the viral envelope with the plasma membrane takes place. In the next step; uncoating into the cytoplasm and transport of the nucleocapsid to the nucleus takes place. The partially double-stranded viral relaxed circular DNA is repaired by both viral and cellular enzymes. cccDNA (covalently closed circular DNA) is formed by covalent ligation of both DNA strands. Viral covalently closed circular DNA serves as a template for RNA synthesis. The pgRNA is encapsidated together with the P protein. Inside the nucleocapsid, the pgRNA is reverse transcribed into negative-strand DNA (Balsano C. et al., 2008). rcDNA (relaxed circular DNA) is formed from the negative-strand DNA to the positive-strand synthesis. In the last step; the nucleocapsids are either imported to the nucleus for covalently closed circular DNA (cccDNA) amplification or released out through the endoplasmic reticulum. After the nuclear export, the pgRNA is sent (translated) into the core protein and the viral polymerase (Nassal M. et al., 2007). The DNA containing nucleocapsids perform two functions. First, they can be either imported into the nucleus to form additional cccDNA (covalently closed circular DNA). Second, they can be enveloped for secretion through the endoplasmic reticulum. After budding into the endoplasmic reticulum (ER) lumen, the envelope proteins are secreted by the cell either as small, non-infectious sub-viral spherical particles (of 22 nm diameter) or as infectious virions of 42 nm (Balsano C. et al., 2008).

### **Status of HBV in Punjab, Pakistan:**

According to World Health Organization (WHO) almost more than 2 billion people are infected with Hepatitis B (HBV) globally, including about 400 million people with chronic stage of infection during every year, approximately 0.6 million die due to HBV linked diseases all over the world (Goldstein et al., 2005; Alam et al., 2007). The prevalence of HBV in Gujranwala is higher (2.9%) as compared to districts (regions) like 2.2% in Sialkot, 2.2% in Hafiz Abad, 2.1% in Narowal, 1.6% in Sheikupura, 1.4% in Lahore. And prevalence of Hepatitis B in Gujrat is lower than other region 0.8% (PMRC, 2009).



HBV prevalence is highest 4.3% in Baluchistan, 2.4% in Punjab, 2.5% in Sindh, and lowest 1.3% in Khyber Pakhtunkhwa. HBV infected 2 billion people all over the world and about 400 million of them were chronically infected (Alam, et al., 2007; Zhu, et al., 2008; Li, et al., 2010; Ali et al., 2011). In Pakistan, 7 to 9 million people are living with HBV with an approximately spreading rate of 3 to 5% (Ali, et al., 2011).



(M. Ilyas, et al., 2012).

### **Risk Factors of HBV transmission**

HBV spread through interfamilial transmission, Needles in healthcare settings and Injection drug users (IDUs) (Alam, et al., 2007; Zhu, et al., 2008; Li, et al., 2010; Ali et al., 2011). The main factors in transmitting the HBV through blood is the reuse of syringes, exposure to not disinfected surgical instruments in hospitals, dental instruments in hospitals, acupuncture/unscreened blood transfusion, using of unsterilized equipment at barbers shops and also due to cultural and traditional activities (Enemuor, et al., 2012). HBV also spread due to ignorance of vaccination (M. Aman Ullah Khan et al., 2007). Poverty is a big issue in of spreading HBV (Qureshi H et al., 2010.)

#### **Transmission of HBV through Blood transfusion:**

The major source of HBV transmitting is through blood transfusion. Major causes of transmission of HBV through blood are due to lack of resources, weak framework, poor resources, untrained staff, inadequate policy implementation, frequent power breakdown and ineffective screening of blood donors (Aslam F, Syed JA et al., 2005).

#### **Transmission of HBV through using of unsterilized equipment at barbers shops:**

Transmission of Hepatitis B through using of infected equipment at barbers shops where instruments used on client are infected, not properly handled, used hygienically, sharp instruments like razors, clippers and scissors may become infected if they pierce the skin of injured person and it is be noted that blood and body fluids do not have to be visible on instruments or working surfaces for infection to be transmitted and both clients and operator are at risk (Ibrahim et al., 2007).

### **Transmission of HBV through ignorance of vaccination:**

Pakistan has adapted the method of expanded programmed on immunization (EPI). Although of this national strategy, all children not vaccinated against Hepatitis B. Mostly educated people although knowing the benefits of vaccination but ignore it. They simply are saying that we have many other important works to do instead of vaccination (M. AmanUllah Khan et al., 2007).

### **Transmission of HBV through poverty:**

Many poor people have no approach to achieved Hepatitis B vaccination due to its cost. It is not easily available by everyone due to its access in few selected areas and due to with very low number of trained vaccinators. Poverty is also curse when patient has to prefer cheaper hospitals or clinics and where unsterilized instruments are practiced (Qureshi H et al., 2010).

### **Transmission of HBV through Cultural and traditional activities:**

The main factors in transmitting the HBV through cultural and traditional activities are tattooing with not disinfected instruments, nose piercing, ear piercing and ritual circumcision (surgical removal of the foreskin of the penis) (Enemuor, et al., 2012).

### **Transmission of HBV through injection drug users (IDUs):**

Drug use injection in Pakistan supported the one of the major risk factor of prevalence of HBV. Numbers of drug users are increasing due to increased prevalence of psychological diseases and lack of law enforcement in country. This has also increased risk of many viral diseases with increased risk of Hepatitis B (Nelson PK et al., 2011).

### **Transmission of HBV through mother to child:**

The perinatal transmission is the most common pathway of transfusion of hepatitis B and leads to high rates of chronic HBV infection. And it ultimately causes the chronic liver disease. HBV infection predominantly spreads through unprotected sex and intravenous drug use. Hepatitis B causes viral infection in Pakistan. The most important theme of hepatitis B(HBV)immunizations the prevention of hepatitis B(HBV) infection, which can be achieved by routine infant vaccination, prevention of perinatal HBV transmission and catch up vaccination of older age group(H. Qureshi, N. Javaid, S. E. Alam, et al., 2014).

### **Transmission of HBV through unsterilized healthcare injection:**

Transmission of HBV is due to unsterilized healthcare injection that introduces a substance into the body through a cut (piercing) of the skin/ a mucosal membrane for the purposes of curative or preventive health care(Y J F Hutin et al., 2003).

### **Transmission of HBV through reuse of injection:**

It is spread due to the reuse of injection instruments in which an injection with a syringe or a needle that used previously on another person and reused in the other person in absence of sterilization(Y J F Hutin et al., (2003).

## Gender wise distribution of Hepatitis –B:

It is reported that prevalence of Hepatitis-B virus in males 6.03% is higher than in females 5.05% (Khan et al., 2006). In college students the prevalence of hepatitis-B was 1.76%. Hepatitis-B in male was 2.15% and in female 0.84%. The prevalence of Hepatitis in males is higher because in Pakistan males enjoy a lot of freedom and social mobility as compare to females. As a result they cause higher exposure to multiple risk factors and greater chances of contracting the Hepatitis-B infection (M. Ilay, et al., 2011).

## Conclusion:

Hepatitis B is considered as the big health problem in the developing countries such as Pakistan. Now a day, viral hepatic infections (HBV) have become common and important cause of liver disease. Hepatitis B in males is more than that of females. Prevalence of HBV infection varies with population residing in different regions of Pakistan. HBV spread by different method e.g. blood transfusion, Needles and Injection that are infected, use of infected surgical instruments, using of unsterilized equipment at barbers shops and also due to traditional activities. Therefore, the appropriate knowledge of all the HBV genotypes prevalent in a certain region is of immense importance for the proper management of Hepatitis B patients. The patients infected with more than one Hepatitis B genotypes, therefore, it is of worth important consideration for clinicians to adopt better and good strategies for appropriate prevention and cure of HBV infection. There is urgent need of mass vaccination and awareness programs for the prevention of HBV infection. In the absence of a vaccine, require an integrated strategy including screening of blood donations, safe injection practices and avoidance of unnecessary injections.

## References:

1. Alam, M.M., Zaidi, S.Z., Malik, S.A., Naeem, A., Shaukat, S. and Sharif S. (2007). Serology based disease status of Pakistani population infected with hepatitis B virus. *BMC Infect. Dis.*, 7: 64.
2. Ali, A., Nisar, M., Idrees, M., Ahmad, H., Hussain, A., Rafique, S., Sabri, S., Rehman, H., Ali, L., Wazir, S. and Khan, T. (2012). Prevalence of Hepatitis B Viral Infection in Punjab Province of Pakistan. *Infect. Genet. Evol.*, 12: 1865–1869.
3. Awan, Z.U.R., Shah, A.H., Khan, S., Rahman, S.U. and Rahman, H.M.U., 2012. *Int. J. Med. Med. Sci.*, 4: 123-127.
4. Nassal M. (2008). Hepatitis B viruses: reverse transcription a different way. *Virus Res*, 134(1–2), 235–249.
5. Balsano C, Alisi A. (2008). Viral hepatitis B: established and emerging therapies. *Curr Med Chem*, 15(9), 930–939.
6. Malik, I.A. and Tariq, W.U., 1993. *Pak. J. Pathol.*, 4: 15-18.

7. Noor ali, S., Hakim, S.T., Mclean, D., Kazmi, S.U. and Bagasra, O.(2008).Hepatitis B virus in Pakistan: A systematic review of prevalence, risk factors, awareness status and genotypes. *J. Infect. Develop. Count.*,2: 373-378.
8. Khan, M.A., Rehman, A., Ashraf, M., Ashraf, M., Ali, A. and Ditta, A., 2006. *Profess. Med. J.*, 13: 23-26.
9. World Health Organization.(2000). Hepatitis B. Fact Sheet WHO/204. *Geneva: WHO* 2000.
10. Mujeeb, S.A., Aamir, K. & Mehmood, K. (2000). Seroprevalence of HBV, HCV and HIV infections among college going first time voluntary blood donors. *J. Pak. Med. Assoc.*, 50(8): 269-70.
11. PMRC National Survey on Prevalence of Hepatitis B & C in General Population of Pakistan (2007-2009). Pakistan Medical Research Council, Shahrah-e Jamhuriat, Sector G-5/2, Islamabad.
12. Goldstein, S.T., Zhou, F., Hadler, S.C., Bell, B.P., Mast, E.E. and Margolis, H.S. (2005).A mathematical model to estimate global hepatitis B disease burden and vaccination impact. *Int. J. Epidemiol.*,34: 1329–1339.
13. Enemuor SC, Atabo AR, Oguntibeju OO (2012). Evaluation of microbiological hazards in barbershops in a university setting. *Scientific Research and Essays*, 7: 1100-1102. 29.
14. Lai CL, Ratziu V, Yuen MF & Poynard T (2003). Viral hepatitis B. *Lancet*, 362: 2089-2094.
15. Aslam F, Syed JA. (2005). Seeking a safer blood supply. *Lancet*.365:1464.
16. Ibrahim MT, Opara WE & Tanimowo T (2007). Knowledge of HIV/AIDS, infection prevention practices and accidental skin cuts in barbering saloons in Sokoto Nigeria. *Nig. Med. Pract.*, 51: 123-127.
17. Kazmi K& Khan MAU (2007). Phased introduction of hepatitis B vaccination in Pakistan. *Pakistan J Med Sci*, 23: 913.
18. Qureshi H (2010). Prevalence of hepatitis B and C viral infections in Pakistan: findings of a national survey appealing for effective prevention and control measures. *East Mediterr Health J*, 16: 15.
19. Yvan J F Hutin, Anja M Hauri& Gregory L Armstrong (2003) Use of injections in healthcare settings worldwide, 2000: literature review and regional estimates.*bmj.com*, 327:1075.
20. Ali SA, Suhail N& Ali S.A (2016). Role of Cultural and Social Barriers in Increased Burden of Hepatitis B in Pakistan: Literature Review. *J Infect Dis Diagn* 1: 105
21. Syed A Ali, Rafe M.J.Donahue, Huma Qureshi & Sten H. Vermunda (2008).Hepatitis B and hepatitis C in Pakistan: prevalence and risk factors. *Int J Infect Dis.*, 06.019.

22. Nelson PK, Mathers BM, Cowie B, Hagan H, Des Jarlais D. (2011). Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: results of systematic reviews. *Lancet*, 378: 571-583.
23. H. Qureshi, N. Javaid, S. E. Alam, (2014). The evidence of mother to child transmission of hepatitis B virus infection in Pakistan and the need for hepatitis B immunization policy change. *J Pak Med Assoc*, 64: 4.
24. Ilyas, M., Iftikhar, M. & Rasheed, U. (2011). Prevalence of hepatitis B and hepatitis C in populations of college students in Gujranwala, *Biologia Pakistan*, 57 (1&2), 89-95.
25. Don Ganem, M.D., & Alfred M. Prince, M.D. *N Engl J Med* 2004; 350:1118-1129.

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