

Prevalence of Hepatitis B (HBV) among the Health Care Workers in Bolan Medical Complex (BMC) of the Quetta City of Balochistan, Pakistan

¹Sabeena Rizwan, ¹Nelofer Jamil, ¹Musarat Riaz, ¹Ayesha Mandokhel, ²Zubia Masood, ¹Fazeela Mandokhel, ¹Huma Tareen, ³Farhat Iqbal and ³Wajeaha Razzaq

¹Department of Chemistry, SardarBahadur Khan Women University, Quetta, Balochistan, Pakistan.

²Department of Zoology, University of Karachi, Karachi-75270, Pakistan.

³Department of Zoology, SardarBahadur Khan Women University, Quetta, Balochistan, Pakistan.

Abstract: Hepatitis B (HBV) is one of the most important etiologic factors of acute and chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma. The rate of prevalence of Hepatitis B (HBV) varied among the different regions of Balochistan province of Pakistan. A present study was planned to see the prevalence of HBV among health care workers in Bolan Medical Complex (BMC) of Quetta city, Pakistan. The main purpose of this study was to assess the immunization rate against hepatitis B in medical health personal. The results of the present study revealed that among the 218 participants, the prevalence of HbsAg infection was 25.8%; while prevalence of life time exposure to hepatitis B virus infection was 45% for lab technicians, 16.6% for nurses and 12.5% for doctors, respectively. As Hepatitis B (HBV) is vaccine preventable, therefore, it is necessary to vaccinate all health care workers as a matter of strategy to reduce the risk of Hepatitis B (HBV) among them.

Key words: Hepatitis B (HBV) • Health Care Workers • Bolan Medical Complex (BMC)

INTRODUCTION

Hepatitis B (HBV) is a common viral infections agent of public health [1, 2]. About two million people alive today have been infected and among them, 360 million are suffering from chronic hepatitis B [3]. Over worldwide, about 600,000 deaths occur each year due to chronic sequelae of HBV infection [4-7]. The virus of hepatitis B is present in blood, blood products and body fluids (vaginal secretions, saliva of active carrier.), tears, sweat, urine and breast milk [8]. Hepatitis B virus (HBV) is a sexually transmitted and blood born virus, which is caused by partial DNA virus [9, 10]. Hepatitis B infects the liver and impairs its functions [11, 12]. The liver becomes damage and hepatitis occurs as a consequence of the immune response to the virus in the liver cell [13]. The major challenge for developing countries is the issue of unsafe blood [14]. To avoid non-curable infectious disease the demand for safe blood or blood products in life saving interventions is critical. The rate of infection is proportional to the frequency of transfusion it is called transfusion transmitted HBV (TTHBV). [15]. The persons who are dying from cirrhosis or liver cancer include

approximately 25% of person which become chronically infected during childhood stage and 15% are those who become infected after childhood [6]. The HBV is also transmitted from child to child which is called horizontal transmission. The countries that have low prevalence of this disease tend to affect young ones by transmission from drugs or sexual contacts [16]. The reduction in the risk of HBV infection in recipients resulted from voluntary blood donation, improving laboratory test, donor education and selection, donor screening and appropriate use of blood and blood components [19-23]. However, the risk of transmission of hepatitis B as compare to the transmission of hepatitis C or HIV is much higher in blood and blood products [24].

The HB is transmitted from mothers to their babies. The vaccine was integrated into routine immunization program the babies than became HBV carriers (16% - 30%) for mother who were HBsAg positive but HBsAg negative [25, 26]. The three possible routes of HBV transmission from infected mother to infants are (a) transplacental transmission in utero; (b) natal transmission during delivery; (c) postnatal transmission during infant care or through breast milk [27, 28].

Epidemiological data on HBV infection are important for program managers and health planners, to plan vaccination and other preventive strategies [29-33].

It is examined that HB is preventable disease and is necessary to establish its importance among the population for the need of implementing preventive action [34-35]. There is neither a national program of prevention nor national recommendations to limit the transmission of this disease [36]. The HBV infection patterns vary worldwide. Approximately 45% of the world's population live in region where most infections are acquired parentally or during childhood that are highly endemic for HBV infection [37, 38]. In the regions of intermediate endemicity another 43% live in this region, where multiple modes of transmission (i.e., perinatal, sexual, household, injection drug use associated and health care associated) are important. The world health organization in 1992 set a goal for all countries to include hepatitis B vaccine into their childhood vaccination programs by 1997. However a reduction of HBsAg prevalence which have reported from recent studies ranging from 0.29% to 2.6% in the general population with male sex, old age [39-43]. This reduction is due to the implementation of vaccination programmes and improvement of socioeconomic condition since 1998. For new born and for children entering puberty vaccination is now necessary [44].

This disease/infection is recognized as occupational hazard [45-47]. The workers as surgeons, dentists, lab technician etc. have been shown the higher prevalence of HB [48, 49]. The present study aims to bring out the causes of hepatitis B among the hospital workers.

Table Potential for exposure to hepatitis B virus infection.

Characteristic	Number %	Vaccination (yes) %	Injury (yes)%	Blood transfusion (yes)%	Recent or past infection (yes)%	Wearing gloves (yes)%	Result (positive)%
Age:							
16-29	43	69.56	34.78	39	43	69.5	21
30-39	30	60	60	60	60	80	40
40-49	18	50	100	50	0	0	50
Cadre:							
Doctor	20.64	100	37.5	37.5	37.5	75	12.5
Lab technician	32.56	36.36	54.54	63.63	9.09	63.63	45.45
Nurses	46.8	75	33.33	25	0.0	66.66	16.66

Vaccination among lab technician was 26/71 (36%), among nurses it was 76/102 (75%) and doctors were 45/45 (100%) vaccinated. The highest covered group of vaccination was doctor (100%) followed by nurses (75%) and lab technician (36%). The history of blood transmission of lab technician was 45/71 (63.6%), nurses 25/102(25%) and blood transmission in doctors was 17/45 (37.4%). The previous injuries in lab technicians were 38/71 (54%), in nurses it was 34/102 (33.33%) and in doctor

MATERIALS AND METHODS

About 218 blood sample were collected from the health care personnel in Bolan medical complex Quetta (BMC) visiting different labs and wards of BMC hospital and divide these samples into 3 groups

- Nurses
- doctors
- lab technicians

Brief history was taken from each individual. Blood samples were taken for HBV serology. The HBsAg test device (Serum/Plasma) package insert method is used for the detection of HBV. The blood was centrifuge to separate the serum of plasma from the blood at 15000 RMP for 10-15 minutes at room temperature. Different methods can be used for the detection of HBsAg.

- ELISA technique
- Hepatitis B surface antigen test device (serum/plasma) package insert.
- Chromatographic technique
- Electrochemiluminescence immune assay.

RESULTS AND DISCUSSION

Out of 218 participants, about 71 were lab technicians, 102 were working as nurses and only about 45 were doctors.

it was 17/45 (37.4%). About 32 (45%) out of 71 lab technicians were found positive. Out of these 32 positive subjects, 10 of them had previous history of blood transfusion and injuries during different procedure and both of them were vaccinated. One was vaccinated but has history of blood transfusion and injury. And other one has history of previous injury and last one vaccinated and has no history of blood transfusion and injury.

In nurses 16.6% were positive and they had history of blood transfusion and previous injuries and both were non-vaccinated.

Out of 45 doctors five (12.5%) were positive. they had previous history of injury. In this study the prevalence of hepatitis B infection is 25.8% and ratio was 5:2:1.

DISCUSSION

Hepatitis B is global health problem mostly in developing countries. The risk of occupational transmission is increased in health care worker by the excessive handling of contaminated needles and infected blood remains one of the major modes of infection of hepatitis B.

The knowledge of bio safety procedures and their application can play major role in prevention of highly infectious diseases like hepatitis B virus infection.

This study shows that hepatitis B virus is prevalent among health care workers in Bolan medical college (BMC) of Quetta. Findings from a similar study conducted among health care workers in BMC found a comparable prevalence of 25.8% current infection. The prevalence of HBsAg among lab technician, nurses and doctors was may be due to the previous history of blood transfusion and injuries. Lab technicians show high prevalence this was due to the frequent exposure to possible source of infection, such as needles, contaminated instruments show carelessness in their work and had previous history of blood transfusion and injuries.

CONCLUSION

The prevalence of current hepatitis B virus infection and life time exposure to hepatitis B virus infection among health care workers was high. Exposure to potentially infectious body fluids was also high and yet small percentage were vaccinated against hepatitis B. Considering the risk of liver cirrhosis and transmission of HBV to patients, there is need effort on mitigating transmission through improving the work place environment and making use of the available vaccine by vaccinating all health care workers who are susceptible and ensure a safer work environment. In addition education on infection control and other strategies for infection control need to be strengthened.

REFERENCES

1. Ott, J.J., G.A. Stevens, J. Groeger and S.T. Wiersma, 2012. Global Epidemiology of Hepatitis B Virus Infection: New Estimates of Age-Specific HbsAg Seroprevalence and Endemicity. *Vaccine*, 30: 2212-2219.
2. Salisbury, D., M.Ramsay and K.Noakes, 2006. *Immunization against Infectious Disease*, London. 6th edition. The Stationary Office. Public health England.
3. Lok, A.S., E.J. Heathcote and J.H. Hoofnagle, 2001. Management of hepatitis B, 2000. Summary of a workshop. *Gastroenterology*, 120: 1828-1853.
4. Edmunds, W.J., G.F. Medley, D.J. Nokes, A.J. Hall and H.C. Whittle, 1993. The influence of age on the development of the hepatitis B carrier state. *Proc. Biol. Sci.*, 253: 197-201.
5. McMahon, B.J., W.L. Alward and D.B. Hall, 1985. Acute hepatitis B virus infection: relation of age to the clinical expression of disease and subsequent development of the carrier state. *J. Infect. Dis.*, 151: 599-603.
6. Goldstein, S.T., F. Zhou, S.C. Hadler, B.P. Bell, E.E. Mast and H.S. Margolis, 2005. A mathematical model to estimate global hepatitis B disease burden and vaccination impact. *Int. J. Epidemiol.*, 34: 1329-1339.
7. Lok, A.S. and B.J. McMahon, 2007. AASLD practice guidelines for chronic hepatitis B. *Hepatology*, 45: 507-539.
8. Mast, E.E., C.M. Weinbaum, A.E. Fiore, M.J. Alter, B.P. Bell, L. Finelli, E.L. Rodewald, M. Douglas, R.S. Janssen and J. Ward, 2005. A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices (ACIP) Part I: Immunization of Infants, Children and Adolescents. *MMWR Recommendations and Reports*, 54: 1-31.
9. Tong, M.J., L. Hsu, P.W. Chang and L.M. Blatt, 2011. Evaluation of Current Treatment Recommendations for Chronic Hepatitis B: A 2011 Update. *Journal of Gastroenterology and Hepatology*, 26: 829-835.
10. Taylor, J.M., R.H. Purcell and P. Farci, 2013. Hepatitis D (Delta) Virus. In: (Knipe, D.M. and Howley, P.M., Eds), *Fields Virology*, 6th Edition, Lippincott Williams & Wilkins, Philadelphia.
11. Adams, D.H. and S.G. Hubscher, 2006. Systemic Viral Infections and Collateral Damage in the Liver. *American Journal of Pathology*, 168: 1057-1059.

12. Vinciguerra, M.G., C. Mazzoccoli, T. Piccol, A. Tataranni, A. Andriulli and V. Paziienza, 2013. Exploitation of Host Clock Gene Machinery by Hepatitis Viruses B and C. *World Journal of Gastroenterology*, 19: 8902-8909.
13. Rehermann, B. and M. Nascimbeni, 2005. Immunology of Hepatitis B Virus and Hepatitis C Virus Infection. *Nature Review. Immunology*, 5: 215-229.
14. MOH-G., 2006. National Blood Policy for the Health Sector, pp: 5-25.
15. William, W., S. Ahiaba, P. Hokey, V.K. Ezekiel, S.E.K. Acquah, Edmund Muonir Der and B.Z. Juventus, 2014. Sero-Prevalence of Hepatitis B Virus Infection among Blood Donors: A Retrospective Study in the Kintampo Municipal Hospital, Ghana. *British Microbiology Research Journal*, 4(12): 1491-1499.
16. Kim, B.K., P.A. Revill and S.H. Ahn, 2011. HBV genotypes: relevance to natural history, pathogenesis and treatment of chronic hepatitis B. *Antiviral Therapy*, 16: 1169-1186.
17. Alter, M.J., M.D. Kruszon-Moran, O.V. Nainan, G.M. McQuillan, F. Gao, L.A. Moyer, R.A. Kaslow and H.S. Margolis, 1999. The prevalence of hepatitis C virus infection in the United States, 1988 through 1994. *The New England Journal of Medicine*, 341: 556-562.
18. Glynn, S.A., S.H. Kleinman, G.B. Schreiber, M.P. Busch, D.J. Wright, J.W. Smith, C.C. Nass and A.E. Williams, 2000. Trends in incidence and prevalence of major transfusion-transmissible viral infections in US blood donors, 1991 to 1996. *JAMA*, 284: 229-235.
19. Soldan, K., J.A. Barbara, M.E. Ramsay and A.J. Hall, 2003. Estimation of the risk of hepatitis B virus, hepatitis C virus and human immunodeficiency virus infectious donations entering the blood supply in England, 1993-2001. *Vox Sanguinis*, 84: 274-286.
20. Nantachit, N., V. Robison, A. Wongthanee, N. Kamtorn, V. Suriyanon and K.E. Nelson, 2003. Temporal trends in the prevalence of HIV and other transfusion-transmissible infections among blood donors in northern Thailand, 1990 through 2001. *Transfusion*, 43: 730-735.
21. Matee, M.I.N., P.M. Magesa and E.F. Lyamuya, 2006. Seroprevalence of human immunodeficiency virus, hepatitis B and C viruses and syphilis infections among blood donors at the Muhimbili National Hospital in Dar Salaam, Tanzania. *BMC Public Health*, 6: 21.
22. Rosini, N., D. Mousse, C. Spada and A. Treitinger, 2003. Seroprevalence of HBsAg, anti-HBc and anti-HCV in southern Brazil, 1999-2001. *Brazilian Journal of Infectious Diseases*, 7: 262-267.
23. Sevens, C.E., R.A. Neurath, R.P. Beasley and W. Szmuness, 1979. HBeAg and anti-HBe detection by radioimmunoassay. Correlation with vertical transmission of hepatitis B virus in Taiwan. *J. Med. Virol.*, 3: 237-41.
24. Xu Z.Y., C.B. Liu, D.P. Francis *et al.*, XXXX. Prevention of perinatal acquisition of hepatitis B virus carriage using vaccine: preliminary report of a random double-blind placebo-controlled and comparative trial. *Pediatrics*, 76: 713-8.
25. Zhang, S.L., Y.F. Yue, G.Q. Bai, L. Shi and H. Jiang, 2004. Mechanism of intrauterine infection of hepatitis B virus. *World J. Gastroenterol.*, 10: 437-438.
26. Beasley, R.P. and L.Y. Hwang, 1983. Postnatal infectivity of hepatitis B surface antigen-carrier mothers. *J. Infect. Dis.*, 147: 185-90.
27. Laurent, C., D. Henzel, C. Mulanga-Kabeya, G. Maertens, B. Larouze and E. Delaporte, 2001. Seroepidemiological survey of hepatitis C virus among commercial sex workers and pregnant women in Kinshasa, Democratic Republic of Congo. *Int. J. Epidemiol.*, 30: 872-877.
28. Nacro, B., B. Dao, H. Dahourou, F. Hien, L. Charpentier-Gautier, N. Meda, P. Van de Perre, M. Cartoux, L. Mandelbrot and F. Dabis, 2000. HBs antigen carrier state in pregnant women in Bobo Dioulasso (Burkina Faso). *Dakar Méd.*, 45: 188-190.
29. Simporé, J., D. Ilboudo, A. Samandoulougou, P. Guardo, P. Castronovo and S. Musumeci, 2005. HCV and HIV co-infection in pregnant women attending St. Camille Medical Centre in Ouagadougou (Burkina Faso). *J. Med. Virol.*, 75: 209-12.
30. Simporé, J., A. Savadogo, D. Ilboudo, M.C. Nadambega, M. Esposito, J. Yara, S. Pignatelli, V. Pietra and S. Musumeci, 2006. Toxoplasma gondii, HCV and HBV seroprevalence and co-infection among HIV positive and -negative pregnant women in Burkina Faso. *J. Med. Virol.*, 78: 730-733.
31. Wurie, I.M., A.T. Wurie and S.M. Gevaio, 2005. Seroprevalence of hepatitis B virus among middle to high socio-economic antenatal population in Sierra Leone. *West Afr. J. Med.*, 24: 18-20.
32. Gjørup, I.E., P. Skinhoj, B. Böttiger and A.M. Plesner, 2003. Changing epidemiology of HBV infection in Danish children. *J. Infect.*, 47: 231-235.

33. Su, F.H., J.D. Chen, S.H. Cheng, C.H. Lin, Y.H. Liu and F.Y. Chu, 2007. Seroprevalence of hepatitis-B infection amongst Taiwanese University students 18 years following the commencement of a national hepatitis-B vaccination program. *J. Med. Virol.*, 79: 138-143.
34. Narciss, P.K., S. Bai-Sepou, A. Manirakiza, J. Léal, A. Béré and A. Le Faou, 2010. The prevalence of hepatitis B virus markers in a cohort of students in Bangui, Central African Republic. *Komas et al. BMC Infectious Diseases*, 10: 226.
35. Weinbaum, C., I. Williams and S. Neitzel, 2008. Recommendations for identification and public health management of persons with chronic hepatitis B virus infection. *MMWR Morb Mortal Wkly Rep.*, 57: 1-20.
37. Mast, E.E. and J.W. Ward, 2008. Hepatitis B vaccine. In: Plotkin SA, Orenstein WA, Offit PA, eds. *Vaccines*. 5th ed. Philadelphia, PA: Saunders.
38. Stamouli, M., V. Gizaris, G. Totos and G. Papaevangelou, 1999. Decline of hepatitis B in Greece. *Eur. J. Epidemiol.*, 15: 447-449.
39. Kyriakis, K.P., L.E. Foudoulaki, E.I. Papoulia and K.E. Sofroniadou, 2000. Seroprevalence of hepatitis B surface antigen (HBsAg) among first time and sporadic blood donors in Greece: 1991-1996. *Transfus. Med.*, 10: 175-180.
40. Sypsa, V., E. Hadjipaschali and A. Hatzakis, 2001. Prevalence, risk factors and evaluation of a screening strategy for chronic hepatitis C and B virus infections in healthy company employees. *Eur. J. Epidemiol.*, 17: 721-728.
42. Gogos, C.A., K.P. Fouka, G. Nikiforidis *et al.*, 2003. Prevalence of hepatitis B and C virus infection in the general population and selected groups in South-Western Greece. *Eur. J. Epidemiol.*, 18: 551-557.
43. Zervou, E.K., N.K. Gatselis, E. Xanthi, K. Ziciadis, S.P. Georgiadou and G.N. Dalekos, 2005. Intrafamilial spread of hepatitis B virus infection in Greece. *Eur. J. Gastroenterol Hepatol.*, 17: 911-915.
44. Elefsiniotis, I.S., I. Glynou, D. Pantazis, N.Y. Fotos, I. Magaziotou and H. Kada, 2005. Prevalence of chronic HBV infection among 13581 women at reproductive age in Greece. A prospective single centre study. *J. Clin. Virol.*, 32(2): 179-80.
45. West, D.J., 1984. The risk of hepatitis B infection among health professionals in the United States: a review. *Am. J. Med Sci.*, 287(2): 26-33.
46. Taylor, R., T. Sladden, S. Levy, I. Gust, P. Macaskill, L. Rushworth and G. Gaxibarich, 1991. A seroepidemiological study of hepatitis B amongst Fiji health careworkers. *Southeast Asian J. Trop. Med. Public Health*, 22(4): 567-576.
47. Pruss-Ustun, A., E. Rapiti and Y. Hutin, 2005. Estimation of the global burden of disease attributable to contaminated sharps injuries among health careworkers. *Am. J. Ind. Med.*, 48(6): 482-490.
48. Daw, M.A., I.M. Siala, M.M. Warfalli and M.I. Muftah, 2000. Seroepidemiology of hepatitis B virus markers among hospital health care workers. Analysis of certain potential risk factors. *Saudi Med. J.*, 21(12): 1157-1160.
49. Karpuch, J., E. Scapa, J. Eshchar, M. Waron, S. Bar-Shany and T. Shwartz, 1993. Vaccination against hepatitis B in a general hospital in Israel: antibody level before vaccination and immunogenicity of vaccine. *Isr. J. Med Sci.*, 29(8): 449-452.