

# Prevalence of Hepatitis 'B' Among Hospital Personnel in Combined Military Hospital (CMH) Muzaffarabad

SAIMA NAZ, MUSHTAQ AHMAD AND HUMAYUN ASGHAR†

Department of Zoology, University of Azad Jammu & Kashmir, Muzaffarabad

†Medical Virologist, National Institute of Health (NIH) Islamabad-Pakistan

## ABSTRACT

Medical and paramedical staff of Combined Military Hospital (CMH), Muzaffarabad, AJK, were tested for the presence of HBsAg. A total of 199 health care workers (HCWs) were included in the study. All the cases were tested by reverse passive hemagglutination. The positive cases were further confirmed by ELISA. The prevalence of HBsAg was 4.1% among the HCWs, which was highest among doctors (33.3%) following by the D.S.A (16.6%), Lab Techs (16.6%), Nurses (16.6%) and dispensers (16.6%). Mandatory vaccination against Hepatitis B Virus can help to prevent the infection among the HCWs.

**Key Words:** HBV; ELISA; Muzaffarabad; Vaccination

## INTRODUCTION

HBV infection is an important public health problem all over the globe affecting both developed and developing countries. Health-care personnel (surgeons, pathologists, and other physicians, dentists, nursing staff, laboratory technicians, and blood bank personnel) have a higher incidence of hepatitis and prevalence of HBsAg or anti-HBs than those who have no occupational exposure to patients or blood products (Schiff *et al.*, 1986; Gibas *et al.*, 1992; Doebbeling, 1996; Fox, 1996; Khuri-Bulos, 1997; Rosen *et al.*, 1999; Mahmood & Rehman, 1999; Mujeeb *et al.*, 1998; Stroffolini, 1998; Thompson & Norris, 1999).

The risk factors for hospital personnel include HBV prevalence in patient population, nature and frequency of blood contact, duration of employment in health care settings and their immunization status (Cardo & Bell, 1997). Invasive nursing procedures like phlebotomy and catheterization and working in operation theaters make the hospital personnel more susceptible to get exposed to the infected blood (Bouvet & Tarantola, 1998). While modes of transmission of HBV in patient population may be contamination with infected blood, reuse of disposal syringes, sharing needles with drugs addicts, sharing razors, toothbrushes, and nail cutters, ear piercing, manicures, acupuncture, tattooing and sexual and close contacts with infected persons (Bukhari, 1999). Detection of HbsAg indicates that the individual is infected / carrier of the virus (Mahmood & Rehman, 1999). This research was undertaken to study the prevalence of HBV infection among HCWs in CMH, Muzaffarabad, Azad Jammu and Kashmir.

## MATERIALS AND METHODS

### Inclusion criteria

1. Working in the hospital for the last six months
2. History of no vaccination against Hepatitis B virus

**Study population.** The Combined Military Hospital (CMH) in Muzaffarabad, AJK, is 262-bed hospital. This hospital provides health care to all ranks of defence services, civilian employees of Government of Azad Jammu & Kashmir, their families and civilian population. It was selected for collection of samples because of high turn out of patients. Between September 9<sup>th</sup>, 2000 and October 15<sup>th</sup>, 2000, 148 sera were collected from the subjects. The sera were collected from HCWs from the pediatrics, medicine, surgery, neuro surgery, cardiac unit, as well as other eligible staff members.

A self-assessment questionnaire was designed and filled to assess hepatitis history and potential exposure risks, for each subject. The questionnaire included demographic data, employment history, history of vaccination against HBV, history of clinical hepatitis and potential exposure i.e. blood transfusions or frequency of needle stick injuries etc. Total 199 questionnaires were distributed to employees who agreed to participate in the study. Out of 199 employees, 51 had the history of vaccination against HBV.

The consent was obtained from each participant of the study and he/she was briefed about the purpose of the study. About 5 mL of blood was collected under strict biosafety. The collected samples were transferred to the Microbiology Laboratory at the CMH, Muzaffarabad. The samples were allowed to clot at 4°C overnight. Sera were separated by centrifugation at 3000 rpm for 5 min, and stored at -20°C, till the time of testing.

**Laboratory methods.** Reverse Passive Hemagglutination (RPHA) was used for screening and sera positive for HBV by RPHA were confirmed by Enzyme-Linked Immunosorbent assays (ELISA; Tanwani & Abbas, 1996). The SERODIA HBsAg kits produced by FUJIREBIO INC., Tokyo, Japan, and Bioelisa HBsAg, produced BIKIT, S.A. 08186 Llissa' d' Amunt, Spain were used.

**Statistical analysis.** Epi Info Version 6.0b to c upgrade 1997, Y2K compatible programme, Centers for Disease

Control, Atlanta, USA was used for statistical analysis (Dean *et al.*, 1994).

**RESULTS AND DISCUSSION**

Out of 199 subjects, 136 (68.3%) were male and 63 (31.7%) were females. The median age was 30 years. History of blood transfusion was given by 14/197 (7.1%), visit to dentist by 83/193 (43%), intravenous injections 34/197 (17.3%), injuries during procedures 79/197 (41%), wearing of gloves during procedures 106/197 (53%).

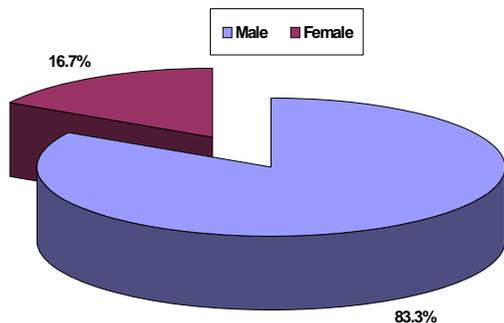
Six subjects (five males and one female) were found positive for HBsAg (Fig. 1). Median age distribution was 32 years (Fig 2). Out of these six positive subjects, there were two (33.3%) doctors, one (16.6%), dispenser, one (16.6%) D.S.A, one (16.6%) nurse and one (16.6%) lab technician. None of them had the previous history of blood transfusion, IV injection or recent or past infection. One of them gave the history of visit to dentist. Three of them (50%) gave the history of injuries during different procedures (Fig. 3). Two of them gave the history of wearing gloves during routine procedures (Fig. 4).

**Table I. Distribution of variables among the HBsAg positive cases**

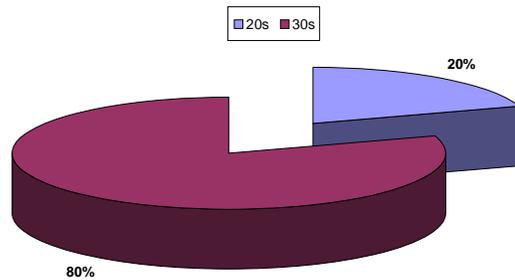
History	Male	Female
Injury	2	1
Blood transfusion	None	None
Visit to dentist	1	None
Recent or Past HBV Infection	None	None
Frequent IV Injections	None	None
Wearing Gloves	1	1

There are about 350 million HBsAg carriers worldwide, of which 75% reside in the Asian region. Pakistan is endemic for HBV infection. Almost 16% prevalence in Quetta made HBV a noticeable disease (Bukhari *et al.*, 1999). In Northern Pakistan, the prevalence of HBV is 37% (Manzoor *et al.*, 1997), in Southern Punjab the prevalence rate is 61 and 20% in another study carried

**Fig. 1. Sex-wise distribution of HBsAg positive cases**



**Fig. 2. Age-wise Distribution of HBsAg Positive Cases**



out in Shaikh Zayed Hospital, Lahore (Kausar *et al.*, 1998). The prevalence of HBsAg in healthy children is 3.6% in Pakistan (Abass & Tanwani, 1997), which is higher than 0.8–2.5% reported from both developed and developing countries. Malik and Wuz (1993) have reported prevalence rates of up to 10%.

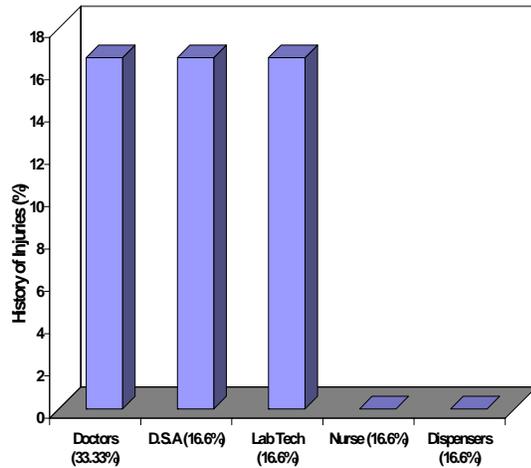
There is potential risk of exposure to HCWs in health care settings to infectious pathogens. This is because highest rates of Hepatitis B Virus (HBV) infection are found among HCWs (Fazli *et al.*, 1998). The high prevalence (Manzoor *et al.*, 1997; Bukhari *et al.*, 1999; Kausar *et al.*, 1998) of HBV in general population of Pakistan poses a great threat to the HCWs. The prevalence of past HBV infection among HCWs has been found three to five folds higher than the general population (Petrosillo *et al.*, 1995; Mahmood & Rehman, 1999). HBsAg prevalence rates ranging from 4.8% (Denes *et al.*, 1978) to 23.3% (Lanphear *et al.*, 1993) have been reported in HCWs. Unprotected handling of the biological specimens and different procedures in healthcare facilities are added risk factors.

Every year about 8700 healthcare workers contract hepatitis B from occupational exposure. Approximately 200 will die from this blood born infection. Some will become carriers passing the infection to others (U.S. Department of Labor Occupational Safety and Health Administration, 1994). The knowledge of bio-safety procedures and their application can play major role in prevention of highly infectious diseases like hepatitis B virus infection.

In this study, the prevalence of hepatitis B virus (HBV) infection was 4.1%, which is lower than the earlier reported 7.5% (Mujeeb *et al.*, 1998). In another study, Mujeeb and Mehmood (1996) have reported same prevalence rate (4.2%). A study conducted by Fazli *et al.* (1998) reported zero prevalence in dental clinics in Rawalpindi/Islamabad. A study from Karachi has reported HBsAg prevalence of 7% in doctors, 17% in dentists, and 20% in hospital sweepers (Mujeeb *et al.*, 1994).

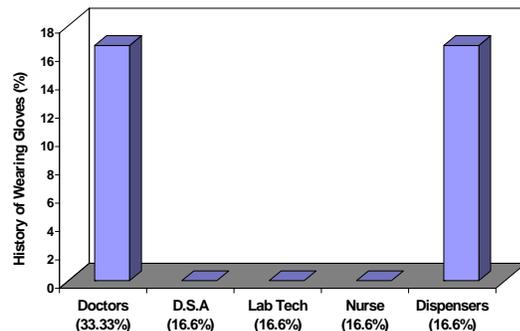
In this study, the male to female ratio was 5:1 (Fig. 1). The aforementioned observation has been poorly documented in the available literature. However, Hollinger (1985) reported 2:1 ratios. The median age of 32 shows that comparatively younger age group is prone to HBV infection

**Fig. 3. Distribution of HBsAg Positive Cases on the Basis of History of Injuries During Procedures**



(Fig. 2). Kammerlander and Zimmermann (1998) have reported 80% of acute HBV cases between 15-40 years while mean age of 38 years has been reported in a study conducted in Chile, Santiago by Brahm *et al.* (1990). The history of injury (50%) (Fig. 3) during routine procedure and no vaccination history/status can attribute the possibility of HBV by contact with positive cases. Mahmood and Rehman (1999) have similar claim that invasive nursing and surgical procedures are one of the major sources of percutaneous transmission of HBV infection. Blood transfusions are also major source of HBV infection (McQuillan *et al.*, 1999), but in our study none of the positive cases gave history of blood transfusions as well as recent or past HBV infection. Only one case (16.6%) had previous history of dental treatment. The contaminated dental instruments may cause HBV infection, because the presence of HBsAg in saliva in acute and chronic hepatitis B patients has been documented as possible sources of infection by Fox (1996). Only four (66.6%) of our six HBsAg positive cases gave a positive history of visiting

**Fig. 4. Distribution of HBsAg Positive Cases on the Basis of Wearing Gloves**



barbers for shaving purpose. Sharing razors may be a cause of infection as claimed by Bukhari *et al.* (1999).

Only two (33.3%) of our six HBsAg positive cases, gave a positive history of wearing gloves during routine procedures (Fig. 4). Four (66.6%) cases didn't wear gloves, so percutaneous transmission may cause the infection. In a study Fazli *et al.* (1998), the data indicates inadequacy of protective measures as 50% (32/60) used gloves and masks during dental procedures, 90% washed hands and 76% treated injuries like abrasion, cuts after dental procedures. Out of 50% who used gloves 49.45% were positive for anti-HBsAg 37.5% (12/32) are positive for anti-HBcIgG, 25% (8/32) are positive for both anti-HBsAg and anti-HBcIgG, creating doubts about strict use of gloves during every procedure. Fazli *et al.* (1998) concluded that the absence of clinical history of hepatitis in dental and para medical staff could not exclude the HBV infection. Only HBsAg test cannot rule out the HBV infection in the absence of anti-HBcIgG test, a marker of past infection.

As persistence of HBV infection has grave consequences and no satisfactory treatment is available so far, the HCWs should take all the preventive measures to save themselves of this menace. If possible, all the HCWs should be given vaccination for HBV preferably at the start of their career. But exposure prevention is still very important because of a risk of other blood borne pathogens. All the health care workers should be educated regarding universal precautions i.e. blood, body fluids and tissue of all the patients should be considered potentially infectious and appropriate barrier precautions should be taken while handling these (Committee for Science and Education, 1995). Use of certain safety devices e.g. blunt suture needles and needle sheathing devices that eliminate recapping are recently being introduced to reduce exposure (Mujeeb *et al.*, 1994).

Modification of work practices like avoiding holding tissues with bare hands during surgery and improving coordination between members of the surgical team can also help to reduce the chances of exposure (Billeit *et al.*, 1991). Protective equipment like gloves, masks, face shields and goggles can prevent exposure in situations where splashes of blood or body fluids are likely to occur (Cohn & Seifer, 1990). Last of all the post exposure prophylaxis with antiviral agents active against hepatitis B, such as lamivudine and immune globulin should be given to those exposed to the virus (Louther *et al.*, 1998).

**Acknowledgements.** The authors would like to acknowledge Dr. Khushhal (Operation Officer WHO) for sponsoring the (RPHA) kits, Major Altaf for the confirmation of results by ELISA technique, Dr. Waqar Haider, Dr. Shamailla Mufti, Dr. Shafique Mufti and whole medical and paramedical staff (CMH Muzaffarabad) for their cooperation.

## REFERENCES

- Abass, K.A. and A.K. Tanwani, 1997. Prevalence of HBsAg in healthy children. *J. Pakistan Med. Assoc.*, 47: 93–4.
- Billeit, L.S., C.R. Parker, P.C. Tanky, et al., 1991. Needlestick injury rates reduction during phlebotomy: A comparative study of two safety devices. *Lab-Med.*, 22: 120–23.
- Bouvet, E. and A. Tarantola, 1998. Protection of hospital personnel against risks of exposure to blood. *Rev. Part.*, 48:1558–62.
- Brahm, J., C. Hurtado, M. Velasco, 1990. Acute hepatitis by virus B in Chile: clinical and developmental characteristics. *Rev. Med. Chil.*, 118: 264–8.
- Bukhari, S.M., N. Khatoon, A. Iqbal, et al., 1999. Prevalence of hepatitis 'B' antigenaemia in Mayo Hospital Lahore. *Biomedica*, 15: 88–91.
- Cardo, D.M. and D.M. Bell, 1997. Blood borne pathogen transmission in health care workers. Risks and prevention strategies. *Infect. Dis. Clin. North America*, 11: 331–46.
- Cohn, G.M. and D.B. Seifer, 1990. Blood exposure in single versus double gloving during pelvic surgery. *American J. Obstet. Gynecol.*, 162: 715–7.
- Committee for Science and Education, Medical Associate of South Africa, 1995. Universal Precautions for the prevention of HIV and HBV infection in health care settings. *South Afr. Med. J.*, 85: 381–3.
- Dean, A.G., J.A. Dean, D. Coulombier, et al., 1994. *Epi Info, Version 6. A Word-Processing, Database, And Statistics Program For Public Health On Ibm-Compatible Microcomputers*. Center for Disease Control and Prevention, Atlanta, Georgia, USA.
- Denes, A.E., J.L. Smith, J.E. Maynard, I.L. Doto, I.C.R. Burquist and A.J. Finkel, 1978. Hepatitis B infection in physicians: Results of a nationwide sero-epidemiologic survey. *JAMA*, 239: 210–12.
- Doebbeling, B.N., K.J. Ferguson and F.J. Kohout, 1996. Predictors of hepatitis B vaccine acceptance in health care workers. *Med-Care.*, 34: 58–72.
- Fazli, Z., H. Asghar, N.U. Baig, et al., 1998. Prevalence of Hepatitis B virus in Dental Clinics in Rawalpindi/Islamabad. *J. Pakistan Med. Assoc.*, 48: 259.
- Fox, J.A., 1996. Hepatitis B and the theatre nurse. *British J. Theatre Nurs.*, 6: 26–9, 31.
- Gibas, A., Dr. Blewett, D.A. Schoenfeld and J.L. Dienstag, 1992. Prevalence and incidence of viral hepatitis in health workers in the pre-hepatitis B vaccination era. *American J. Epidemiol.*, 136: 603–10.
- Hollinger, F.B. and J.L. Dienstag, 1985. Hepatitis viruses. In: Lennette, E.H., A. Balows, W.J. Hausler Jr. and H.J. Shadomy (Eds.), *Manual of Clinical Microbiology*, 4<sup>th</sup> ed., pp: 813–35. American Society for Microbiology, Washington, DC.
- Kammerlander, R., H. Zimmermann, 1998. Epidemiology of hepatitis B in Switzerland. *Soz. Prevent. Med.*, 43(suppl) 1: 27–30, 101–4.
- Kausar, S., F. Shafiqat, F. Shafi and A.A. Khan, 1998. The association of hepatocellular carcinoma with HBV and HCV. *J. Gastroenterology*, 10: 3–6.
- Khuri-Bulos, N.A., A. Toukan, A. Mahafzah et al., 1997. Epidemiology of needlestick and sharp injuries at a university hospital in a developing country: a 3-year prospective study at the Jordan University Hospital, 1993 through 1995. *American J. Infect. Control*, 25: 322–9.
- Lanphear, B.P., C.C. Linnemann, C.G. Cannon and M.M. DeRonde, 1993. Decline of clinical hepatitis B in workers at a general hospital: relation to increasing vaccine-induced immunity. *Clin. Infect. Dis.*, 16: 10–14.
- Louther, J., J. Feldman, P. Rivera, N. Villa, J. DeHovitz and K.A. Sepkowitz, 1998. Hepatitis B vaccination program at a New York City Hospital: Seroprevalence, Seroconversion, and declination. *American J. Infect. Control*, 26: 423–7.
- Mahmood, A. and Z. Rehman, 1999. Prevalence of hepatitis B-Core antibodies amongst healthcare workers. *JCPSP*, 9: 529–31.
- Malik, I.A. and W. Tariq, 1993. Viral hepatitis in Pakistan. *Pakistan J. Path.*, 4: 1.
- Manzoor, S.A., I.A. Malik, Tarik Wuz et al., 1997. Hepatitis B related chronic liver disease in Rawalpindi Islamabad. *JCPSP*, 7: 43–6.
- McQuillan, G., J. Patrick, Coleman, Deanna Kruszon-Moran, et al., 1999. Prevalence of Hepatitis B Infection in the United States: The National Health and Nutrition Examination Surveys, 1976 through 1994. *American J. Public Health*, 89: 14–8.
- Mujeeb, S.A. and K. Mehmood, 1996. Prevalence of hepatitis B, C and HIV infections among family blood donors. *Ann. Saudi. Med.*, 16: 702–3.
- Mujeeb, S.A., Y. Khatri and R. Khanani, 1998. Frequency of parenteral exposure and seroprevalence of HBV, HCV and HIV among operation room personnel. *J. Hosp. Infect.*, 38: 133–7.
- Mujeeb, S.A., S.J. Zuberi, T.Z. Lodi and K. Mehmood, 1994. Prevalence of HBV infection in health care personnel. *J. Pakistan Med. Assoc.*, 44: 265.
- Petrosillo, N., V. Puro, G. Ippolito et al., 1995. Hepatitis B virus, hepatitis C virus and human immunodeficiency virus infection in health care workers: a multiple regression analysis of risk factors. *J. Hosp. Infect.*, 30: 273–81.
- Rosen, E., B. Rudensky, E. Paz et al., 1999. Ten-year follow-up study of hepatitis B virus infection and vaccination status in hospital employees. *J. Hosp. Infect.*, 41: 245–50.
- Schiff, E.R., M.O. de Medina, S.N. Kline, et al., 1986. Veterans Administration Cooperative Study on Hepatitis and Dentistry. *J. American Dent. Assoc.*, 113: 390–6.
- Stroffolini, T., N. Petrosillo, G. Ippolito, et al., 1998. Hepatitis B vaccination coverage among healthcare workers in Italy. *Infect. Control Hosp. Epidemiol.*, 19: 789–91.
- Tanwani, A.K. and K.A. Abbas, 1996. Comparative evaluation of serodia and ELISA techniques in the study of prevalence of HBsAg in healthy blood donors in Islamabad. *JCPSP*, 6: 187–8.
- Thompson, S.C. and M. Norris, 1999. Hepatitis B vaccination of personnel employed in Victorian Hospitals: are those at risk adequately protected? *Infect. Control Hosp. Epidemiol.*, 20: 51–4.
- U.S. Department of Labor Occupational Safety and Health Administration, 1994. Bloodborne facts: Reporting exposure incidents. OSHA Publications, Washington DC.

(Received 04 March 2002; Accepted 28 March 2002)