Punjab Univ. J. Zool., Vol. 29 (1), pp.11-15, 2014

ISSN 1016-1597 (Print)
ISSN 2313-8556 (online)

Original Article

Some studies on prevalence of hepatitis B surface antigen amongst healthcare workers of tertiary care hospitals of Multan city

Muhammad Zafar*

Department of Zoology, Govt. Emerson College, Bosan Road, Multan, Pakistan

(**Article history:** Received: February 04, 2014; Revised: April 06, 2014)

Abstract

This study was conducted to determine the prevalence of hepatitis B surface antigen among the health care workers (HCWs) from March 2013 to April 2014. The mean age of participants was found to be 32.78 ± 3.85 years; 63.03% of them were males and 36.97% were females. Out of the total 238 HCWs who returned questionnaires, there were 50 medical students, 44 nursing students, 38 doctors, 31 nurses, 19 administrative staff, 16 midwifery staff, 10 dispensers, 10 pharmacists, 10 laboratory assistants, 6 ward attendants and 4 sanitary workers. Non-vaccinated were 174 (73.11%) while 54 (22.69%) were vaccinated. Screening for hepatitis B surface antigen was done by ELISA technique. Hepatitis B surface antigen were detected in 10 (4.20%) subjects. The prevalence of hepatitis B surface antigen was equal in males 5 (2.10%) and females 5 (2.10%) out of detected hepatitis B surface antigen 6 (2.52%) were in chronic condition while 4 (1.68%) in acute condition. It is concluded that the present study reported a prevalence of hepatitis B surface antigen in health care workers (HCWs) as compared to other populations.

Key words: hepatitis B surface antigen, Vaccinated, Non-vaccinated, HCWs, ELISA.

To cite this article: ZAFAR, M., 2014. Some studies on prevalence of hepatitis B surface antigen amongst healthcare workers of tertiary care hospitals of Multan city. *Punjab Univ. J. Zool.,* **29**(1): 11-15.

INTRODUCTION

Hepatitis B infection is known as a public health problem causing near about 700,000 deaths annually in all over the world (WHO, 2004). This is also known as a major occupational hazard for health care workers (Yavuz *et. al.,* 2005). Hepatitis B virus (HBV) among the blood pathogens has gained the status of 10th major deaths causing disease in the world (Singhal *et. al.,* 2009).

The healthcare workers (HCWs) exposed to HBV infection were about 5.8% annually (WHO, 2004; Sharma *et. al.,* 2010). 42.62% of HBV infection in HCWs was attributed to professional hazard in developing countries while the attributed fraction was less than 10% due to vaccination covering in developed countries (WHO, 2004). The HCWs have an increased risk of hepatitis B infection as compared to the other population (WHO, 2002) and transmission from HCWs to patients has been documented (Gunson *et al.,* 2003; Reitsma *et. al.,* 2005). Occupational exposure to hepatitis B can result from needle stick or other sharp injury (percutaneous injury), splash of blood or other body fluids into the nose, eye, mouth and blood contact (mucocutaneous contact) with non-intact skin (Simonson *et al.,* 1999; Neusom and Kiwanuka, 2002; Gunson *et al.,* 2003).

In 94% of healthy recipients vaccination against hepatitis B induces immunity (WHO, 2004) and it is critical to protect the healthcare workers through immunization, use of protective equipment and post-exposure management (Thomas *et al.,* 2005; Gunson *et al.,* 2003).

In accordance to HBV prevalence Pakistan is in the intermediate area. For HBV infection the carrier rate is 3-5% with an estimated 4.6 million carriers. However, by some studies much higher prevalence rates have been reported ranging from 17% in Lahore to 24.9% in Gujranwala (Abbas *et al.,* 2003).

Hepatitis B is known as vaccine preventable disease though its implementations are still insufficient and a sizeable proportion of HWCs never get vaccinated. In an unvaccinated person the risk of HBV infection from a single HBV-infected needle stick injury ranges from 5-35% (Sharma *et al.,* 2010). A prevalence of 2.5% for HB and Ag in HCWs patients have been reported in some studies from Pakistan (Pyrsopoulos and Rajender, 2005). In Pakistan, studies regarding vaccination status of HCWs

0079-8045/14/0011-0015 $ 03.00/0

*Corresponding author: driqbalnaeem@hotmail.com

have reported vaccination rates ranging from 50% to 85% (Hamid *et al.,* 2007; Nasir *et al.,* 2000; Ali *et al.,* 2005; Akhter *et al.,* 2006; Memon *et al.,* 2007; Younis *et al.,* 2001; Imam *et al.,* 2000; Memon *et al.,* 2007).

In Multan, no study has so far been conducted. So, in southern Punjab, there was a need to establish the vaccination status of HCWs of biggest tertiary care hospitals. Therefore, this study was carried out to determine the hepatitis B vaccination status of HCWs which provide services to the general population in all over the city.

MATERIALS AND METHODS

This study was conducted from March 2013 to April 2014 for a period of one year. Randomly selected 238 HCWs were undertaken during this study in different departments of the hospitals. Ethical clearance for the study was obtained from the institutions. For all participants' information on demographics (such as residency, age, education, economic status and gender), sexual partners, vaccination status, occupation, duration of employment, parental exposures, medication and history of any suggestive illness were collected through a self-administered questionnaire.

For each participant, present and past history case was recorded in detail. In this study, participation was voluntary and strict confidentiality was ensured. 5 ml of blood sample was collected and serum separated was stored at -20^{o}C for further testing after an informed oral consent.

A total of 177 out of 238 non-vaccinated HCWs such as nursing students, ward attendants, laboratory technicians, sanitary workers, doctors, medical students, nurses, midwifery staff, pharmacists, dispensers and administrative staff were included. As hepatitis B surface antigen is the most reliable and universal marker of hepatitis B virus (HBV) infection. By using ELISA (3rd generation ELISA technique) serum was screened for HB and Ag. On a structured proforma, the data was collected and then statistically analyzed by using statistical package for social sciences software (SPSS; version 16) for MS Windows.

RESULTS

Out of total 238 study population 150 (63.03%) were male while 88 (36.97%) were female (Table I).

Table I: Gender wise distribution of the subjects (n=238).

Gender	Number	Percentage
Male	150	63.03%
Female	88	36.97%

Table II: Sero-positivity of hepatitis B surface antigen among healthcare workers according to occupations.

Occupation	Total		Non-vaccinated		Vaccinated`		HB and Ag positive	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Medical students	50	21.01	33	66.00	17	34.00	-	-
Nursing students	44	18.49	34	72.27	10	22.72	-	-
Doctors	38	15.97	35	92.11	3	7.89	-	-
Nurses	31	13.03	20	64.52	6	19.35	5	16.13
Administrative staff	19	7.98	18	94.74	1	5.26	-	-
Midwifery staff	16	6.72	10	62.50	6	37.50	-	-
Dispensers	10	4.20	6	60.00	4	40.00	-	-
Pharmacists	10	4.20	8	80.00	2	20.00	-	-
Laboratory technicians	10	4.20	6	60.00	2	20.00	2	20.00
Ward attendants	6	2.52	3	50.00	2	33.33	1	16.67
Sanitary workers	4	1.68	1	25.00	1	25.00	2	50.00
Total	238	100.00	174	73.11	54	22.69	10	4.20

The mean age of participants was found to be 32.78±3.85 years. None of them knew their previous viral hepatitis B status. Out of 238 participants, 50 (21.01%) medical students, 44 (18.49%) nursing students, 38 (15.97%) doctors, 31 (13.03%) nurses, 19 (7.98%) administrative staff, 16 (6.72%) midwifery staff, 10 (4.20%) dispensers, 10 (4.20%) pharmacists, 10 (4.20%) laboratory technicians, 6 (2.52%) ward attendants and 4 (1.68%) sanitary workers (Table II). Out of 238, vaccinated subjects 54 (22.69%) while non-vaccinated subjects were 174 (73.11%).

The overall positive rates of hepatitis B surface antigen were 10 (4.20%) out of 177 non-vaccinated. When the sexes were examined separately, the trend was found to be same, in males 5 (2.10%) and in females 5 (2.10%), but there was no significant difference in accordance to education, age, socio-economic status and other life style activities. However, the positive rates of hepatitis B surface antigen were the highest for HCWs with greater than 20 years in job according to duration of profession except students (Table II).

The highest positive rate of hepatitis B surface antigen was found to be in the nurses 5 (2.10%), laboratory technicians 2 (0.84%), sanitary staff 2 (0.84%) and ward attendants 1 (0.42%). Out of the 10 (4.20%) HCWs, screened 6 (2.52%) were in chronic and 4 (1.68%) were in acute conditions, while rest of them such as doctors, pharmacists, nursing students, midwifery staff, dispensers, administrative staff and medical students were not found to having hepatitis B surface antigen (Table II).

DISCUSSION

Hepatitis B is known as a major health problem in all over the world especially Latin America, Southern Europe, Africa and Asia. More than 350 million people has been found to infect with HBV globally (Previsani and Lavanchy, 2002). In general populations of Pakistan, it has been revealed that the overall prevalence of hepatitis B was 2.5% (PMRC, 2007-2009).

Healthcare workers (HCWs) are known as vital in controlling the epidemic of hepatitis B while dealing with patients by effective vaccination and taking protective measures. Our study showed 22.69% vaccination status among HCWs. In Pakistan, studies regarding vaccination status of healthcare workers (HCWs) have reported vaccination rates of 50.02% in National Institute of Child Health Karachi, 65% in Liaqat University Hospital Hyderabad, 77% in King Edward Medical University Lahore, 50% in Allama Iqbal Medical College Lahore, 72% in Sir Ganga Ram Hospital Lahore, 53% in Dow Medical College & Civil Hospital Karachi and 87% in Agha Khan University Hospital Karachi (Hamid *et. al.,* 2007; Nair *et. al.,* 2000; Ali *et. al.,* 2005; Akhter *et. al.,* 2006; Memon *et. al.,* 2007; Younis *et. al.,* 2001 and Imam *et. al.,* 2000). Among HCWs, all of these figures are far less than the ideal optimum coverage of 100%. In our study, the most commonly cited reason for non-vaccination were found the lack of awareness, negligence, laziness and forgetting dosages schedule respectively.

The present study indicates the prevalence of 10 (4.20%) of hepatitis B surface antigen among 174 non-vaccinated HCWs from all ages and both sexes. In some study a prevalence of 2.57%for HBV was found in health looking general population (Nasir *et. al.,* 2002). Hepatitis B was seen in 3.40% in blood donors (Khattak *et. al.,* 2002).

In the prevalence of hepatitis B surface antigen among HCWs different epidemiological and cross-sectional studies have reported marked variations (Mahoney and Stewart, 1997; Sepkowitz, 1996; Gerberding, 1994). In another study in CDC (USA) estimated the annual risk of hepatitis B infection 0.8% among nurses, 1.1% among physicians and 2.1% among laboratory technicians (Pattison *et al.,* 1975). In present study, the positive rates of hepatitis B surface antigen in the nurses group was 5 (2.10%) were highest followed by laboratory technicians group 2 (0.84%) while in sanitary staff 2 (0.84%) and in ward attendants 1 (0.42%) among the total participants (238). Whereas, among the occupational groups, the positive rates of hepatitis B surface antigen in sanitary workers was 2 (50.00%), laboratory technicians was 2 (20.00%), ward attendants 1 (16.67%) and nurses 5 (16.13%). Among all these groups, 2.52% were in chronic while 1.68% were in acute conditions. This suggested that these groups have more chances to be exposed infectious body fluid from patients or to the needle stick injury than did the other occupational groups. Furthermore, in

accordance with other recent studies it was observed that the positive rates of hepatitis B surface antigen were significantly related to the duration of profession among HCWs (Catalani *et al.,* 2004; Singhal, 2011).

Thus, to reduce risk, specific measures should be implemented. Being a potential risk, these may include considering any blood or other body fluids and strict policies on sharps (Hirschowitz *et al.,* 1980).

Conclusion

In healthcare setup, health care workers play an important role. To ensure control of hepatitis B infection, healthcare workers should be vaccinated and there is need for better training and education for them.

Acknowledgement

Author thanks all the healthcare workers who participated in this study.

REFERENCES

ABBAS, Z., JAFRI, W. AND SHAH, S.H.A., 2004. Members of consensus panel. PSG consensus statements on management of hepatitis B virus infections 2003. *J. Pak. Med. Assoc.*, **54**: 150-8.

AKHTAR, R., KAZI, Y. AND KHAN, K.M., 2006. Status of hepatitis B vaccination amongst healthcare workers and their knowledge about prevention strategies. *J. Surg. Pak.,* **11**(2): 62-66.

ALI, N.S., JAMAL, K. AND QURESHI, R. 2005. Hepatitis B vaccination status and identification of risk factors for hepatitis B in healthcare workers. *J. Coll. Physicians Surg. Pak.* **15**: 257-60.

CATALANIC, C., BIGGERI, A., GOTTARD, A., BENVENUTI, M., FRATI, E. AND CECCHINI, C., 2004. Prevalence of HCV infection among health care workers in a hospital in Central Italy. *Eur. J. Epidemiol.,* **19**(1): 73-7.

GERBERDING, J.L., 1994. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus and cytomegalo-virus among healthcare personnel at risk for blood exposure; final report from a longitudinal study. *J. Infect. Dis.,* **170**(6): 1410-7.

GUNSON, R.N., SHOUVAL, D. AND ROGGENDORF, M., 2003 Hepatitis B Virus (HBV) and hepatitis C virus (HCV) infections in healthcare workers (HCWs): guidelines for preventions of transmission of HBV and HCV from HCWs to patients. *J. Clin. Virol.* **27**: 213-30.

HAMID, S., FAISAL, W. AND ISMAIL, M., 2007. Hepatitis and the healthcare worker. A Pakistani perspective. *JCPSP,* **17**(4): 240-245.

HIRSCHOWITZ, B.L., DASHER, C.A. AND WHITT, F.J., 1980. Hepatitis B Ag and Ab tests of liver function: a prospective study of 310 hospital laboratory workers. *Ann. J. Clin. Pathol..* **73:** 63-75.

IMAM, S.F., HAROON, M. AND RIAZ, A., 2000. Status of immunization against Hepatitis B Virus infection among Health Care Workers. *Biomedica,* **16**: 25-7.

KHATTAK, M.F., SALEEM, N., BHATTI, F.A. AND QURESHI, T.Z., 2002. Seroprevalence of hepatitis B virus, C and HIV in blood donors in northern areas of Pakistan. *J. Pak. Med. Assoc.,* **52**: 398-402.

MAHONEY, F.J. AND STEWART, K., 1997. Progress toward the elimination of hepatitis B virus transmission among healthcare workers in the United States. *Arch. Intern. Med.,* **157**(22): 2601-2605.

MEMON, M.S., ANSARI, S. NIZAMANI, R. *ET. AL.,* 2007. Hepatitis B vaccination status in healthcare workers of two university hospitals. *J. Liaqat Uni. Med. Health Sci.,* **6**(2): 48-51.

MEMON, A.R., SHEIKH, M.A., AFSAR, S. *ET. AL*., 2007. Hepatitis B vaccination status and knowledge, attitude, practice of health care workers (HCWS) regarding Hepatitis B and C in a tertiary care setting of Karachi. *Ifect. Dis. J.,* **16**(4): 105-7.

NASIR, A., KHATTAK, J., ANWAR, M., TARIQ, W.Z., NADEEM, M., IRFAN, M., ASIF, M. AND HUSSAIN, A.B., 2002. Prevalence of hepatitis B surface antigen and hepatitis C antibodies in young health adults. *Pak. J. Pathol.,* **13**(4): 3-6.

NASIR, K., KHAN, K.A. AND KADRI, W.M. 2000. Hepatitis B vaccination among healthcare workers and students of a medical college. *J. Pak. Med. Assoc.*; **50**: 239-43.

NEWSON, D.H. AND KIWANUKA, J.P., 2002. Needle-stick injuries in an Uganda

teaching hospital. *Ann. Trop. Med. Parasitol.,* **96**(5): 517-22.

PATTISON, C.P., MAYNARD, J.E. AND BERQUIST, D.R., 1975. Epidemiology of hepatitis B in hospital personnel. *Ann. J. Epidemiol.,* **101:** 59.

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.

PREVISANI, N. AND LAVANCHY, D. 2002. WHO/CDS/CSR/LYO/2002.2:Hepatitis B, Geneva: World Health Organization.

PYRSOPOULOS, N. AND RAJENDAR, K., 2005. Hepatitis B. available from URL:http://www.emedicine.com/gastroenterology/hepatitisB.

REITSMA, A.M., CLOSEN, M.L. AND CUNNINGHAM, M., 2005. infected physicians and invasine procedures: *Infect. Dis*., **40**: 1665-72.

SEPKOWITZ, K.A., 1996. Occupationally acquired infections in healthcare workers. Part II. *Ann. Intern. Med.,* **125**(11): 917-928.

SHARMA, R., RASANIA, S.K., VARMA, A. AND SAUDAN, A., 2010. Study of prevalence and response to needle stick injuries among healthcare workers in a tertiary care hospital in Delhi, Indian. *Indian Journal of Community Medicine*, **35**(1): 74-77.

SIMONSON, L., KANE, A., LLYOED, J., ZAFFRAM, M. AND KANE, M., 1999. Unsafe injections in the developing world and transmission of blood borne pathogens: a review. *Bull World Health Organ,* **77**(10): 789-800.

SINGHAL, V., BORA, D. AND SINGH, S., 2009. Hepatitis B in healthcare workers; Indian Scenario. *J. Lab. Physicians,* **1**(2): 41-48.

SINGHAL, V., 2011. Prevalence of hepatitis B virus infection in healthcare workers of a tertiary care centre in India and their vaccination status. *J. Vaccines Vaccin.* **2:** 2-4.

THOMAS, D.L., FACTOR, S.H., KELENG, D., WASHINGTON, A.S., TAYLOR, JR. E. AND QUIM, T.C., 1993. Viral hepatitis in healthcare personnel at The Johns Hopkins Hospital. The seroprevalence of and risk factors for hepatitis B viris and hepatitis C virus infection. *Arch. Intern. Med.,* **153**(14): 1705-12.

WHO (World Health Organization). Department of Communicable Diseases Surveillance and Response. Hepatitis B. WHO/CDS/CSR/LYO/2002.

WHO (World Health Organization), 2004. Hepatitis B vaccines. WHO Position paper. WER 2004; **28**(79): 255-63.

YAVUZ, T., OZDENIR, I., SENEAN, I., ARBAK, P., BEHEET, M. AND SERT, E., 2005. Sero-prevalence of Varicella, Measles and Hepatitis B among female healthcare workers of childbearing age. *Jpn. J. Infect. Dis.,* **58**(6): 383-6.

YOUNIS, B. B., KHAN, G. M., AKHTAR, P., *ET. AL.,* 2001. Vaccination against Hepatitis B among doctors at a teaching hospital in Lahore. *Pak. J. Med. Sci.,* **17**(4): 229-32.