

Poor knowledge: a predictor to non-adherence to hepatitis B virus post-exposure prophylaxis in a tertiary hospital in Lagos, Nigeria.

C.C Egwuatu^{*1}, O.O. Oduyebo¹, C. Egwuatu², and G.I Ogban¹

ABSTRACT

Healthcare workers are at high risk of contracting Hepatitis B virus (HBV) infection through exposure to blood or body fluid among patients and health care workers. This study was conducted to determine the adherence to post-exposure prophylaxis (PEP) with hepatitis B following accidental and inoculation injuries among healthcare workers in the Lagos University Teaching Hospital (LUTH) and to examine the need for a post-exposure prophylaxis policy. The level of awareness and adherence to post-exposure prophylaxis (PEP) with hepatitis B in LUTH was low (44%) in spite of the healthcare workers high level of knowledge on Hepatitis B virus (HBV) infection and its route of transmission. This low level of awareness was due to several factors including; low level of observation of Universal Precaution guidelines, newly grooming infection control committee which many healthcare workers were not aware of, non-existence of post-exposure prophylaxis policy guidelines, not making Hepatitis B immunization and checking back the antibody titre compulsory to every healthcare worker, and lack of management commitment towards workers safety. We conclude that Hepatitis B virus post-exposure prophylaxis policy should be implemented in LUTH as this will reduce the high prevalence of such infections and ensure that in the event of an accident, specific guidelines are followed to protect the injured.

INTRODUCTION

The new rising wave of blood borne infections from various medical setting as well as other related environment has been of much concern in recent times. Therefore there is need to develop a policy on how the healthcare workers can be trained and equipped to better protect themselves from possible workplace accidents and injuries while improving the care they deliver. Because better workplace safety also means better customer and employee satisfaction, improved workplace retention and recruitment, and cost savings (Ramsey et al, 1996, Wison et al 2006). The risk of acquiring HBV following occupational exposure has been well documented, and shows that acquisition through needlestick injury ranges from 1% to 6% (source patient HBsAg-positive, HBeAg-negative) to 22% to 40% (source patient HBsAg-positive, HBeAg-positive (Michalsen et al. 1994, Gershon et al. 1995). However, health care workers who are occupationally exposed to HBV infection must have immediate access to post-exposure prophylaxis (PEP). The risk of HBV transmission through the route of injury sustained must be assessed and adequate management given (Averoff et al 1998, Lawoyin et al 2005). Hepatitis B virus (HBV) is very efficiently transmitted in the setting of a percutaneous injury that involves an instrument coated with or containing HBV-infected blood.

Acquisition of HBV virus can also occur via contact of mucous membranes or non-intact skin with infectious blood or body fluid (Nelsing et al 1997). The risk of non-percutaneous exposure has not been well quantified, but it may account for a significant proportion of HBV transmission in the healthcare setting (Uneke 2002, Sirisena et al. 2002). In the work environment, health care workers may be occupationally exposed to HBV infection. Health care workers include all paid and unpaid persons working in health care settings who have the potential for exposure to infectious material, for example blood, tissue, and specific body tissues and medical supplies, equipment, or environmental surfaces contaminated with these substances. Health care workers include doctors, nurses, pharmacists, nursing assistants, emergency medical service personnel, therapists, students and trainees, technicians and persons not directly involved in patient care but potentially exposed to blood and body fluids (e. g laboratory scientists and technologists, clerical, housekeeping, maintenance and volunteer personnel). The same principle of post-exposure management could be applied to other workers who have potential for occupational exposure to blood and body fluids in other settings (Olubuyide et al. 1997, Barkerlf and Sadler 1983). Indeed, many healthcare workers infected with HBV cannot recall an overt needlestick injury, but can remember caring for a patient with hepatitis B (Bamigboye and Adesanya 2006).

^{*}Corresponding author.

Manuscript received by the Editor April 15, 2009; revised manuscript accepted September 14, 2008.

¹ Department of Medical Microbiology and Parasitology, Lagos University Teaching Hospital, Lagos, Nigeria.

² Department of Biochemistry, Nnamdi Azikiwe University, Awka, Nigeria.

© 2009 International Journal of Natural and Applied Sciences (IJNAS). All rights reserved.

Hepatitis B virus is a hardy virus that can survive in dried blood for up to a week and thus may be transmitted via discarded needles or fomites, even days after initial contamination. Although some experts have suggested that occupational HBV transmission could occur via exposure to bloody body fluids, saliva, semen, or vaginal fluid, to the best of our knowledge, occupational transmission of HBV from these exposures has not yet been documented. Available data would suggest that transmission is unlikely to occur through contact with urine or feces (Maqbool 2002). Epidemiologic studies in the United States have demonstrated that healthcare workers (HCWs) had a seroprevalence rate of HBV infection that was 5 to 10 times higher than the general population (Beltrami *et al* 2000). Clinicians with direct patient contact, such as physicians, dentists, nurses, and dialysis workers, are at higher risk of acquiring HBV. Laboratory workers and cleaning staff also have higher than average rates of exposure to HBV (Pruss-Ustun *et al* 2005). Four factors are associated with increased risk of occupationally acquired HBV infection: (1) deep injury (2) visible blood on the device which caused the injury (3) injury with a needle which had been placed in a source patient's blood vessel (4) chronic HBV with high viral titre as the source patient. It has been shown that immediate administration of PEP drugs may prevent infection from occurring. Studies in health care workers who have had needle stick exposures have shown that post-exposure treatment with antiviral drugs can reduce the risk by 75% (Firrozi *et al* 2006).

METHODS

We conducted a cross-sectional survey of clinical and non-clinical health-care workers at Lagos University Teaching Hospital, (LUTH) Nigeria, during July through September 2008. A total of 340 health workers working in medical and surgical units as well as in the laboratory, hospital attendants (ward maids), and laundry departments were sampled. Exclusion criteria include healthcare workers in the administrative, accounting, and engineering departments. A questionnaire that is made up of both open ended and close ended questions that covered demographics, duration and job sites of the respondents, knowledge concerning hazards in their

environment, the types of personal protective equipment in use was administered.

The sample size which satisfied the study objectives was used. The level of confidence was specified as 95% and the tolerable error margin was 5%.

Data analysis was done using computer programme Epi info 6.0.

RESULTS

We were able to interview 340 Healthcare workers. Of these, 260 (76.47%) were from clinical areas. Eighty (23.53%) were from the laboratory. These include theatre/ICU 14 (5.38), surgical 50 (19.23), O & G /Labour 79 (30.38%), medical 82 (31.54%), paediatrics 23 (8.5%) and 12 for radiology unit.

However, of the 138 (40.59%) of the HCWs who have had inoculation injury while 24 (17.39%) always report, 10 (7.25%) usually report and 41 (29.71%) sometimes report (Table 1). Out of those that report their injuries, only about 5% received PEP prophylaxis.

On the issue of awareness on Hepatitis B virus post-exposure prophylaxis (HBV-PEP), 235 (69.12%) of HCWs were aware of HBV-PEP, 78 (22.94%) were not aware while 53 (15.59%) did not know whether PEP policy exists or not (Table 2).

On questioning about hepatitis B immunization, 190 (55.88%) of the HCWs had received it, while 150 (44.12%) have not (Table 3). About 109 (32.06%) received the full doses while 11 (5.79%) of the 190 HCWs who received hepatitis B immunization checked their antibody titre later.

On the improvement in adherence to Hepatitis B virus post-exposure prophylaxis, 319 (93.82%) suggested that setting up an effective infection control committee that will monitor, implement and evaluate the use of Hepatitis B virus post-exposure prophylaxis, 324 (95.29%) felt that pasting posters or written down standard operative procedures at every strategic points in the hospital, 329 (96.77%) said that an increased political will on the part of the management towards workers safety at work while 332 (97.65%) said that regular training and re-training of HCWs on Hepatitis B virus post-exposure prophylaxis compliance will go a long way in improving the use of Hepatitis B virus post-exposure prophylaxis in the hospital.

Table 1. Distribution of health workers and the type of inoculation injury and report of these injuries

Occupation	Inoculation of injury		Report			
	Yes	No	Always	Usually	Sometimes	Never
Doctors	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %
Consultants	20 (14.5)	13 (6.4)	8 (33.3)	0 (0.0)	5 (12.2)	8 (11.3)
Residents	56 (40.6)	58 (28.7)	10 (41.7)	6 (60.0)	12 (29.3)	29 (40.8)
HOs	12 (8.7)	24 (11.9)	2 (8.3)	1 (10.0)	5 (12.5)	3 (4.2)
Nurses	24 (17.4)	77 (38.1)	1 (4.2)	1 (10.0)	14 (34.1)	16 (22.5)
Lab Scientists	14 (10.1)	19 (9.4)	1 (4.2)	1 (10.0)	2 (4.1)	9 (12.7)
Lab Attendants	4 (2.9)	10 (5.0)	2 (8.3)	1 (10.0)	0 (0.0)	1 (1.4)
Ward Maids	8 (5.8)	1 (0.5)	0 (0.0)	0 (0.0)	3 (7.3)	5 (7.0)
Total	138(100.0)	202 (100.0)	24 (100.0)	10 (100.0)	41 (100.0)	71 (100.0)

Table 2. Distribution of HCWs on awareness on policy on PEP and receiving PEP following injury

Occupation	Awareness on PEP Policy			Received PEP	
	Yes	No	Don't know	Yes	No
Doctors	Freq %	Freq %	Freq %	Freq %	Freq %
Consultants	31 (13.2)	2 (2.6)	0 (0.0)	10 (18.9)	21 (11.5)
Residents	79 (33.6)	23 (29.5)	10 (58.8)	12 (22.6)	68 (37.4)
HOs	22 (9.4)	12 (15.4)	2 (11.8)	5 (9.4)	15 (8.2)
Nurses	75 (31.9)	20 (25.6)	1 (5.9)	18 (34.0)	55 (30.2)
Lab Scientists	14 (6.0)	16 (20.5)	2 (11.8)	3 (5.7)	12 (6.6)
Lab Attendants	7 (3.0)	4 (5.1)	1 (5.9)	4 (7.5)	4 (2.2)
Ward Maids	7 (3.0)	1 (1.3)	1 (5.9)	1 (1.9)	7 (3.8)
Total	235 (100.0)	78 (100.0)	17 (100.0)	53 (100.0)	182 (100.0)

Table 3. Distribution of HCWs on hepatitis B immunization, how many doses they received and the checking antibody titre later

Occupation	Hepatitis B Immunization		Doses received			Checking of antibody titre	
	Yes	No	Once	Twice	Thrice	Yes	No
Doctors	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %
Consultants	21 (11.1)	12 (8.0)	0 (0.0)	10 (19.2)	11 (10.1)	1 (9.1)	17 (9.5)
Residents	69 (36.3)	45 (30.0)	5 (17.2)	11 (24.2)	41 (37.6)	2 (18.2)	71 (39.7)
HOs	20 (10.5)	16 (10.7)	1 (3.4)	4 (7.7)	17 (15.6)	0 (0.0)	21 (11.7)
Nurses	59 (31.1)	42 (28.0)	18 (62.1)	7 (13.5)	31 (28.4)	5 (45.5)	52 (29.1)
Lab Scientists	12 (6.3)	21 (14.0)	1 (3.4)	3 (5.8)	7 (6.4)	2 (18.2)	8 (4.5)
Lab Attendants	4 (2.1)	10 (6.7)	4 (13.8)	0 (0.0)	2 (1.8)	1 (9.1)	5 (2.8)
Ward Maids	5 (2.6)	4 (2.7)	0 (0.0)	5 (9.6)	0 (0.0)	0 (0.0)	5 (2.8)
Total	190 (100.0)	150(100.0)	29 (100.0)	52 (100.0)	109	11 (100.0)	179 (100.0)

DISCUSSION

Our results indicate that adherence to Hepatitis B virus post-exposure prophylaxis was low across all categories of Healthcare workers despite their knowledge on the mode of transmission of the infection. The healthcare workers at clinical areas, however, were better informed as compared to those at laboratory.

This study also showed that different categories of HCWs had high incidence of needle stick injuries, which were not reported. These injuries which are mostly because of recapping of needles and manipulation during sterilization are more among the nurses 67% and this was similar to the study done by Maqbool(2002), on needle stick injuries among HCWs in Saudi Arabia. He reported that about 68% of nurses had needle stick injuries followed by doctors (Maqbool 2002).. Also in another study by Bamigboye and Adesanya(2006), about 65% of nurses were exposed to needle-stick injuries and most of these injuries are not reported¹². In another study of injection practices at First level care facilities in urban and rural North India that assessed the knowledge of HBV and HCV of HCWs reported that 87.5% of the prescribers and 52.5 % of providers (dispensers) knew the association of unsafe injection with HBV. However, association between HBV and unsafe injections was known only to 30 % of prescribers and 5 % of providers (Naveed et al 2007).

Our study also reported that about 69% of the healthcare workers had the knowledge of HBV post exposure prophylaxis, 32% had received full HBV vaccine. This is in contrast to a study directed at assessing the knowledge of blood-borne pathogens among medical students in a tertiary care hospital in Karachi, Pakistan among medical students in a tertiary care hospital showed that 100% of the students were aware of HBV and Needle-stick injury (NSI) association, 92% knew about HBV post exposure prophylaxis and 74% of the subjects had been vaccinated (Anjum et al,2005).

Despite the long existence of policy on exposure prophylaxis in the hospital, there was low compliance rate and some of the factors that attributed to this includes some of the HCWs did not know where to get these services, there were no posters concerning post exposure prophylaxis pasted at strategic points to enable these workers to be aware of the services and even some that knew about the PEP policy found it difficult (because of distance) to reach the place where services can be provided. These factors also contributed to incomplete dose of hepatitis B received by these HCWs and lack of knowledge concerning checking the antibody titre was found to be the culprit to low rate of checking the antibody titre among the HCWs in the hospital (Linnemann et al 1991).

Hepatitis B virus post-exposure prophylaxis

CONCLUSION

Adherence to Hepatitis B virus post-exposure prophylaxis was low across all categories of Healthcare workers. The healthcare workers at clinical areas, however, were better informed as compared to those at laboratory. Very few HCWs adhered to Hepatitis B virus post-exposure prophylaxis to lower the risk of HBV infection at their workplace. Our findings suggest that training of HCWs to increase their knowledge about PEP policies and guidelines could improve their use of Hepatitis B virus post-exposure prophylaxis. Our discussions with healthcare workers during this study and in a separate training of master trainers from various health care facilities suggest that HCWs are eager to improve their adherence to Hepatitis B virus post-exposure prophylaxis to protect their health.

RECOMENDATION

Hepatitis B vaccination and assessment should be made a pre-requisite for admission into medical and employment into hospitals. The hospital should establish a post exposure prophylaxis program / management for the protection of HCWs who experience needle stick injuries. The recommendations for HBV post-exposure management should include initiation of the hepatitis B vaccine series within 24 hours to any susceptible, unvaccinated person who sustains an occupational blood or body fluid exposure. Post-exposure prophylaxis (PEP) with hepatitis B immune globulin (HBIG) and/or hepatitis B vaccine series should be considered for occupational exposures after evaluation of the hepatitis B surface antigen status of the source and the vaccination and vaccine-response status of the exposed person. A responder to the HBV PEP is a person with adequate levels of serum antibody to HbsAg (i.e. anti-HBs ≥ 10 mIU/mL) while non-responder is a person with inadequate response to vaccination (i.e. serum anti-HBs < 10 mIU/mL)

REFERENCES

- Anjum .Q, Siddiqui .H, Ahmed .Y, Rizvi S.R and Usman.Y(2005).Knowledge of students regarding hepatitis and HIV/AIDS of a private medical university in Karachi. *J Pak Med Assoc*, 55(7):285-288.
- Averoff F, Mahoney F and Coleman P. (1998). Immunogenicity of hepatitis B vaccines www.sciencedirect.com/science-amj *Prev Med* (Dec).
- Bamigboye A.P and Adesanya A.T. (2006) Knowledge and Practice of Universal Precautions among Qualifying Medical and Nursing Students: A Case of Obafemi Awolowo University Teaching Hospitals Complex, ILE-IFE. *J. Medicine & Med. Sci*:: 1(3): 112-116.
- Barkerlf .D and Sadler S.G. (1983). Epidemiology of Hepatitis B and post – transfusion and nosocomial hepatitis In: Deinhardt J. Eds. *Viral hepatitis: laboratory and clinical science*. Marcel dekker, Inc, New York:215-30.
- Beltrami E.M, Williams I.T, Shapiro C.N and Chamberland M.E (2000).Risk and management of blood-borne infections in health care workers. *Clin Microbiol Rev*, 13(3):385-407.
- Firrozi M.S, Gholamzadeh .S and Serati .A (2006).The long term immunity among health care workers vaccinated against hepatitis B virus in a large referral hospital in Southern Iran. www.ams.ac.ir/aim/0693/006.htm. *Archives of Iranian Medicine*, 9(3):204-207.
- Gershon R.R.M, Vlahov D, Felknor S.A, Vesley D, Johnson P.C, Delcios G.L and Murphy L.R (1995).Compliance with universal precautions among health care workers at three regional hospitals. *American Journal of Infection Control*, 23(4):225-236.
- Lawoyin T, Stringer B, Taines T and Oluwatosin A. (2005).Assessing the risk of the healthcare workers for occupational transmission of HIV, hepatitis B and C in Ibadan, Nigeria. 145 Conf. HIV pathog Treat. 24-27: 3rd Abstract no. 10.5 pp. 07.
- Linnemann C.C Jr., Cannon .C, DeRonde .M and Lanphear .B(1991). Effect of educational programs, rigid sharps containers, and universal precautions on reported needlestick injuries in healthcare workers. *Infect Control Hosp Epidemiol*, 12(4):214-219.
- Maqbool .A (2002).Knowledge, attitude and practices among healthcare workers on needle-stick injuries. *Annals of Saudi Medicine*; 22 : 5-6.
- Michalsen A, Delclos G.L, Felknor S.A, Davidson A.L, Johnson P.C, Vesley D, Murphy L.R, Kelen G.D and Gershon R.R (1994).Compliance with universal precautions among physicians. *Am J Infect Control*, 22(3):129-137.

- Naveed Z.J, Mahreen .R, Subhash .C, Shafquet .R and Bushra .M (2007). Poor knowledge-predictor of nonadherence to universal precautions for blood borne pathogens at first level care facilities, 7(8):1-7
- Nelsing S, Nielsen T.L, Nielsen J.O. (1997). Noncompliance with universal precautions and the associated risk of mucocutaneous blood exposure among Danish physicians. *Infect Control Hosp Epidemiol*, 18(10):692-698.
- Olubuyide I, Ola S.O, Aliyu B, Dosunmu O.O, Arotiba J.T, Olaleye O.A and Odaibo G.N. (1997). Hepatitis B and C in Doctor and Dentists in Nigeria. *QJM*, Vol. 90, Issue 417-422.
- Pruss-Ustun .A, Rapiti .E and Hutin .Y (2005). Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med*, 48(6):482-490.
- Ramsey P.W, McConnell P, Palmer B.H and Glenn L.L. (1996). Nurses' compliance with universal precautions before and after implementation of OSHA regulations. *Clin Nurse Spec*, 10(5):234-239.
- Sirisena N.D, Njoku M.O, Idokoja I .E, Jepe D and Otowo S. (2002). Carriage rate of Hepatitis B surface antigen HBsAg in Urban Community in Jos Plateau state, Nigeria. *N. G. post grad med J* 9:7-10.
- Uneke C.J, Ogbu O, Inyana P.U, anyanwu G.I, Njoku M.D and Ijoko J.H (2002). Prevalence of hepatitis B surface antigen among blood donors and human immunodeficiency virus-infected patients in Jos, Nigeria. <http://www.scielo.br/scielo.php>
- Wison ES, Fawole AO, Atoyebo E, Sedoh S and Oladimeji O. (2006). Practice of universal precautions among health care workers in Nigeria. *J. Nat. med. Assoc.* Vol. 98, No. 5.