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Knowledge, risk perception and hepatitis B vaccination status of health workers in Sokoto, Nigeria

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Hepatitis B virus (HBV) infection threatens the health of populations across the globe. It is an important occupational risk for health care workers (HCWs); they are known to be at high risk of the infection following needle stick injuries and accidental exposure to infected blood and other body fluids. This study was conducted to assess the knowledge, risk perception and hepatitis B vaccination status of HCWs in Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, Nigeria. A descriptive cross-sectional study among 124 HCWs selected by multistage sampling technique was conducted in the months of February to April 2013. Informed consent was taken and information was collected by a pre-designed questionnaire, data analysis was done using computer software, SPSS version 20. Majority of respondents (86.3%) demonstrated good knowledge of HBV infection. Most of the respondents (92.7%) perceived themselves to be more at risk of HBV infection as compared to the general population by virtue of their profession. Only 50 (40.3%) of the 124 respondents have been vaccinated against HBV infection. In addition, only 28 (56.0%) of the 50 respondents that have been vaccinated against HBV infection had the recommended three doses of the vaccine. This study demonstrated poor uptake of hepatitis B vaccination among HCWs in UDUTH, Sokoto, Nigeria, despite good knowledge and high risk perception. Periodic education of staff on prevention of transmission of blood and other body fluids borne pathogens in the hospital setting, and promotion of accessibility to vaccines against relevant vaccine preventable diseases in the healthcare facilities are hereby suggested.

Key words: Knowledge, risk perception, hepatitis B, vaccination status, healthcare workers.

INTRODUCTION

Hepatitis B virus (HBV) infection threatens the health of populations across the globe. An estimated 240 million

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people are chronically infected and more than 780,000 people die every year due to complications of hepatitis B including cirrhosis and liver cancer (WHO, 2015). Approximately one third of all cases of cirrhosis and half of all cases of hepatocellular carcinoma can be attributed to chronic HBV infection, and the disease is estimated to be responsible for 50,000-700,000 deaths each year (Shepard et al., 2006; WHO, 2004).

Liver diseases are common in Africa and account for high morbidity and mortality. Reports from hospital based studies show that about 12% of medical admissions and more than 20% of hospital mortality in many parts of Africa were due to acute viral hepatitis, chronic hepatitis, cirrhosis and hepatocellular carcinoma. Chronic carrier rates among the general population in Nigeria ranged from about 12 to 48.7% in different states and cities (Olokoba et al., 2010).

Primary liver cell carcinoma (PLCC) arising from a chronic liver disease is the commonest cancer of males in Nigeria, the frequency of which can only be compared to that of prostatic cancer. Reports from the University College Hospital, Ibadan, Nigeria, showed that PLCC accounted for 491 out of 100,000 hospital admissions; it was the commonest malignancy among patients in the medical wards of the hospital and the commonest cause of death from cancer in the middle-aged as well as elderly Nigerians (Braunwald et al., 2001).

Hepatitis B virus infection is an important occupational risk for health care workers (WHO, 2015). They are known to be at high risk of the infection following needle stick injuries and accidental exposure to infected blood and other body fluids (Kesieme et al., 2011; Hussein et al., 2010). Health care workers in Nigeria are particularly at increased risk of contracting HBV infection in their work place, because the country is holoendemic for the disease (Olokoba et al., 2010). Hepatitis B virus is by far the most dreaded and more infectious than the other blood-borne pathogens. Estimates of the risk of a single needle stick injury indicated 30% risk of hepatitis B virus infection, 3% risk of hepatitis C virus infection and 0.3% risk of HIV infection (Ibekwe and Ibeziako, 2006; Lavanchy, 2005; Smith et al., 2001).

The risk of transmission of HBV from patients to HCWs is higher than the risk of transmission of the virus from HCWs to patients. It has been reported that the risk of transmission varies greatly amongst different disciplines, with surgery, gynaecology and orthopaedic services having the greatest risk (Moghimi et al., 2009). Needle-stick injuries, especially those involving hollow needles have been reported as the most common route of transmission (De Villiers et al., 2007; Alam, 2002; Smith et al., 2001).

The risks and preventive measures against occupational exposure of HCWs to blood borne pathogens are well documented. Although, universal precautions were established many years ago to address this problem, their application is difficult in developing countries, owing to organizational problems and lack of necessary materials such as gloves and proper needle-disposal facilities (Le Pont et al., 2003).

Reports from studies conducted in health facilities across Nigeria show high prevalence of injury from sharps and accidental exposure to potentially infected blood and body fluids, while use of personal protective equipment was found to be low due to unavailability, inadequate or irregular supply of materials and equipment needed for protective and hygienic practices in most of the health facilities (Adesunkanmi et al., 2003; Ansa et al., 2002).

Although, evidence has shown that HBV infection is preventable by vaccination (Pungpapong et al., 2007), and several vaccines have been developed for this purpose, wide variations exist in uptake of HBV vaccination across the globe even among healthcare workers. Complete vaccination against hepatitis B is achieved by administration of a three-dose regimen, with the second and third doses being given one and six months after the initial dose. In addition to the fact that a high proportion (75%) of health workers in the United States have been vaccinated against HBV infections, plans already exist to achieve 98% hepatitis B vaccination coverage among HCWs thus providing a bench mark for the elimination of occupational acquired HBV infection (Dannetun et al., 2006). While 79% of HCWs in Sweden had received at least one dose of vaccine, only 40% were reported to be fully vaccinated; and vaccination coverage was found to be 48.2% among dental workers in Japan (Kawaguchi et al., 2005).

Findings from studies in Nigeria indicated very low uptake of hepatitis B vaccination among healthcare workers in the country despite good knowledge of HBV transmission, its prevention and risk perception of occupational exposure to the virus (Kesieme et al., 2011; Samuel et al., 2009).

The dearth of literature on knowledge, risk perception and hepatitis B vaccination status of health workers in Sokoto constitutes a major challenge to the prevention and control of the disease among this high risk group in this part of the country. This study was therefore conducted to address this challenge.

MATERIALS AND METHODS

The study was conducted at the Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria, in the months of February to April, 2013. The hospital serves the inhabitants of Sokoto State, neighboring Kebbi and Zamfara states, as well as people from neighboring Niger Republic. It has a bed capacity of 650, staff strength of 2093, and consists of 42 departments out of which 24 offer clinical services in the form of preventive, curative and rehabilitative services apart from the laboratory units that only carry out investigations.

The study populations included doctors, nurses, laboratory personnel and ward attendants/porters. The sample size was estimated at 124 using the statistical formula for estimating the sample size for descriptive studies (Araoye , 2004), 8.4%

Table 1. Socio-demographic profile of respondents.

Variables	Frequency (%) n=124
Age groups (in years)	
20-29	37(29.8)
30-39	36(29.0)
40-49	23(18.5)
50-59	8(6.5)
60-69	1(0.8)
No response	19(15.3)
Sex	
Male	54(43.5)
Female	70(56.5)
Marital status	
Single	21(16.8)
Married	99(79.2)
Divorced	4(3.2)
Religion	
Islam	86(69.4)
Christianity	37(29.8)
Others	1(0.8)
Cadre	
Doctor	12 (9.7)
Nurse	69(55.6)
Laboratory personnel	20(16.1)
Ward attendant/porter	23(18.5)
Duration of service (in years)	
1 and below	30(24.2)
2 - 11	58(45.2)
12 - 21	18(14.5)
22 and above	16(11.9)
No response	4(3.2)

prevalence of hepatitis B vaccination among health workers from a previous study (Izegbu et al, 2006), adjustment for a finite population of 2093 health workers in UDUTH (obtained from institutional records), precision level of 5% and an anticipated response rate of 90%. A two-stage sampling technique was employed in selecting the study subjects; five of the 24 departments involved in clinical services were randomly selected by balloting, and in the selected departments, the study subjects were selected (in direct proportion to the staff strength) by systematic sampling technique using the staff list in the respective departments to constitute the sampling frame.

A set of pretested, semi-structured, interviewer administered questionnaire was used to obtain information on respondent's socio-demographic characteristics, knowledge of HVB infection, risk perception and hepatitis B vaccination status. The questionnaire was adapted from the instrument used in previous studies with slight modifications (Habiba et al., 2012; Kesieme et al., 2011; Samuel et al., 2009). It was reviewed by senior colleagues in the Department of Community Health, Usmanu Danfodiyo University, Sokoto, to ascertain content validity. Pretesting of the questionnaire was done among 20 healthcare workers in two other clinical departments not selected for the study; the instrument demonstrated good internal consistency (Cronbach's alpha = 0.80), and appropriate modification was also made based on the observations made during the pretest. Four resident doctors assisted in questionnaire administration after pre-training on conduct of survey research, the objectives of the study, selection of study subjects and questionnaire administration. Institutional ethical clearance was sought from the Ethical committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. Permission to conduct the study was obtained from the management of the hospital and the heads of the selected departments; informed written consent was also obtained from the participants before data collection.

Data was analyzed using SPSS version 20 computer statistical software package. Study subjects' responses to the knowledge questions were scored and graded. One mark was awarded for correct response, while wrong response or non-response attracts no mark. Respondents that scored 60% or more of expected knowledge were graded as having good knowledge, while those with scores less than 60% of expected knowledge were graded as having poor knowledge. The Chi-square test was used for bivariate analysis involving categorical variables. Logistic regression analysis was used to determine the variables that predict good knowledge of HPV infection, risk perception and hepatitis B vaccination status. All levels of significance were set at $p < 0.05$.

RESULTS

All the 124 questionnaires administered were useable for analysis; the respondents were predominantly females (56.5%) and nurses by profession (55.6%). Their age ranged from 22 to 60 years (mean = 35.19 ± 9.08) with majority (58.8%) in the second and third decades of life. Most of the respondents were married (79.2%) and Moslem by religion (69.4%). Their duration of service ranged from 0.3 to 37 years (median = 5.0), but majority (69.4%) have worked for 11 years and below (Table 1).

Respondents' knowledge of hepatitis B virus infection

Majority of respondents (78.2%) demonstrated good knowledge of hepatitis B virus infection (which comprised of cause, symptoms and signs, transmission, associated risks and prevention). There was no association between good knowledge of hepatitis B virus (HBV) infection and any of the socio-demographic variables ($p > 0.05$). Although majority of respondents (86.3%) knew HBV infection to be caused by a virus, some of them misperceived it to be caused by bacteria (7.3%), parasite (6.5%) and attack by evil spirit (5.6%). While majority of respondents knew the various symptoms/signs of HBV infection such as yellowness of the eyes (88.7%), weakness of the body (82.3%), and passage of dark urine (73.4%), only about half of respondents (52.4%) knew itchy skin as one of its symptoms (Table 2).

Table 2. Knowledge of cause and symptoms/signs of hepatitis B virus infection.

Variables	Response		
	Yes No (%)	No No (%)	I do not know No (%)
Cause of HBV infection			
Bacteria	9 (7.3)	99 (80.0)	15 (12.1)
Virus	108 (86.3)	2 (1.6)	15 (12.1)
Parasite	8 (6.5)	94 (75.8)	21 (16.9)
Evil spirit	7 (5.6)	100 (80.6)	16 (12.9)
Symptoms/signs of HBV infection			
Yellowness of the eyes	110 (88.7)	4(3.2)	9 (7.3)
Weakness of the body	102 (82.3)	7 (5.6)	12 (12.1)
Dark urine	91 (73.4)	13 (10.5)	20 (16.1)
Itchy skin	65 (52.4)	29 (23.4)	29 (23.4)

Similarly, majority of respondents knew the various mode of transmission of HBV infection, the risks associated with the virus and its prevention. Whereas most respondents knew the virus to be transmissible through needle pricks (95.0%) percutaneous injury (73.4%), and from mother to child (82.3%), less than two-thirds of respondents (58.9%) knew the virus to be transmissible through mucus membranes. Also, most respondents considered the virus to be more deadly than HIV (82.3%), a risk factor for liver cancer (71.8%) and transmissible between healthcare workers and patients (93.5%).

While most respondents believed that HBV infection is preventable (92.7%), and that complete immunization with 3 doses of vaccines protects from hepatitis due to the infection (68.5%), a large proportion of respondents believed that the disease is curable (62.1%) as shown in Table 3.

Risk perception of hepatitis B virus infection among respondents

Most, 116 (93.5%) of the 124 respondents perceived themselves to be more at risk of hepatitis B virus infection as compared to the general population by virtue of their profession. While all the doctors (100.0%) and almost all the nurses (98.6%) and laboratory personnel (95.0%) perceived themselves to be at increased risk of the infection, a statistically significantly lower proportion of the ward attendants and porters (73.9%) perceived themselves to be at increased risk of the infection (Fisher's Exact χ^2 = 12.829, p = 0.002) as shown in Table 4.

The doctors, nurses and laboratory personnel were seventeen times more likely to perceive themselves to be at risk of the infection as compared to ward attendants and porters (Odds ratio (OR) = 17.471, 95% Confidence Interval (CI) = 3.253 – 93.833, p = 0.001).

Respondents' hepatitis B vaccination status

Uptake of HBV vaccine was poor among the respondents, only 50 (40.3%) of the 124 respondents have ever been vaccinated against HBV infection. In addition, only 28 (56.0%) of the 50 respondents that have been vaccinated against the infection had the recommended three doses of the vaccine. The commonest reasons given for lack of vaccination by most of the respondents were lack of awareness of where to obtain the vaccine (57.1%), the vaccine not being recommended for them (17.1%) and fear of vaccine side effects (14.3%) as shown in Table 5. A statistically significantly lower proportion of ward attendants and porters (13.0%) were vaccinated against HBV infection as compared to laboratory personnel (30.0%), doctors (41.7%) and nurses (52.2%), χ^2 = 12.025, p = 0.007.

The doctors, nurses and laboratory personnel were about six times more likely to have been vaccinated against HBV infection as compared to ward attendants and porters (Odds ratio (OR) = 5.802, 95% confidence interval (CI) = 1.622 – 20.764, p = 0.007).

DISCUSSION

Majority (78.2%) of the respondents in this study demonstrated good knowledge of hepatitis B virus (HBV) infection. This finding is encouraging considering the fact that knowledge is an important factor for behavioral modification. This finding is in concordance with the 80% prevalence of good knowledge of HBV infection among health care workers reported in a study by Kesieme et al.

Table 3. Knowledge of transmission, risks and prevention of hepatitis B virus infection.

Variables	Response		
	Yes No (%)	No No (%)	I don't know No (%)
Transmission of HBV infection			
Can occur through mucus membranes	73 (58.9)	30 (24.2)	21(17.0)
Can occur through percutaneous injury	91 (73.4)	8 (6.5)	25(20.0)
Can be through needle pricks	118 (95.0)	3 (2.4)	3(2.4)
Mother to child transmission can occur	102 (82.3)	3 (2.4)	3(2.4)
Risks associated with hepatitis B virus			
It is present in high concentration in body fluids	96 (77.4)	3 (2.4)	25(20.2)
It is more deadly than HIV	102 (82.3)	13 (10.5)	8(6.5)
It can cause liver cancer	89 (71.8)	7 (5.6)	27(21.8)
Cross infection can occur between health care workers and patients	107 (93.5)	3 (2.4)	13(10.5)
Prevention of hepatitis due to HBV infection			
Hepatitis can be prevented	115 (92.7)	3(2.4)	6(4.8)
Complete immunization with 3 doses of vaccines prevents the disease	85 (68.5)	2 (1.6)	34(27.4)
Hepatitis can be cured	77 (62.1)	27 (21.8)	19(15.3)

Table 4. Risk perception of hepatitis B virus infection among respondents.

Cadre	Risk perception		Test of significance
	Yes Frequency (%)	No Frequency (%)	
Doctor	12 (100.0)	0 (0)	
Nurse	68 (98.6)	1 (1.4)	$FE\chi^2 = 12.829$
Laboratory personnel	19 (95.0)	1 (5.0)	p = 0.002
Ward attendant/porter	17 (73.9)	6 (26.1)	

(2011), and the 81% prevalence of good knowledge of transmission and prevention of HBV infection obtained in another study among health care workers in Southern Nigeria (Samuel, 2009).

Findings from studies outside Nigeria also reported good knowledge of hepatitis as documented from Kuwait (Habiba et al., 2012) which showed that health workers in Kuwait have good knowledge of hepatitis (76.2%). Similarly, Koria and Lala (2012) in Pakistan and Foster et al. (2010) in Jamaika had the same results. However, the finding from this study is at variance with that reported in a study in Karachi by Habib et al. (2011) who found that the overall knowledge of the health workers studied was inadequate.

Risk perception is the subjective judgment that people make about the characteristic and severity of a risk. In this study, it was noted that majority, 116 (93.5%) of the health workers perceived themselves to be more at risk of HBV infection than the general population. This finding is comparable to that of Habiba et al. (2013) where it was observed that 62.5% of the health workers perceived themselves to be more at risk of contracting HBV infection. This is slightly higher than the findings of Okeke et al. (2008) who noted that 88.7% of the health workers had high risk perception of contracting the infection. It was also higher than that of Ibekwe and Ibeziako (2006) in which 50.4% of the health workers felt that their job exposes them to increased risk of contact with materials potentially contaminated with hepatitis B virus. Bakry and his colleagues (2012) found lower figures in their study as compared to the figure obtained in this study; they observed that less than 50% of the health workers they studied did not fully appreciate their risk of occupational exposure to the infection, in addition to poor knowledge of standard universal precautions.

Despite the fact that ward attendants and porters are known to be frequently exposed to healthcare wastes that could contain infected blood and body fluids, the ward attendants and porters in this study demonstrated very low risk perception of HBV infection, as they were found

Table 5. Respondents' hepatitis B vaccination status.

Variables	Frequency (%)
Vaccination status (n = 124)	
Vaccinated	50(40.3)
Not vaccinated	74(59.7)
Received recommended 3 doses (n = 50)	
Yes	28(56.0)
No	22(44.0)
Reason for lack of vaccination (n = 70)	
Not at risk of the infection	5(7.1)
Vaccine not being recommended for them	12(17.1)
Fear of side effects of vaccine	10(14.3)
Don't know where to obtain the vaccine	40(57.1)
Vaccine not offered by the hospital routinely	2(2.9)
Too busy at work	1(1.4)

to be seventeen times less likely to perceive themselves to be at risk of the infection as compared to doctors, nurses and laboratory personnel. Addressing this is of public health importance because it could negatively influence their compliance with safe healthcare waste disposal practices and other preventive measures against the disease.

Despite the fact that majority of respondents (86.3%) had good knowledge of hepatitis B viral infection, and most of them (92.7%) perceived themselves to be at increased risk of the infection as compared to the general population, only 50 (40.0%) of the 124 respondents were vaccinated against the infection, and only 28 (56.0%) of the 50 respondents that were vaccinated had the recommended three doses of the vaccine. This finding is a cause for concern because of the inevitable risk of majority of the respondents contracting hepatitis B viral infection following accidental exposure to infectious healthcare wastes. Worst of all, uptake of hepatitis B vaccination was abysmally low among wards attendants and porters (13.0%), and they were about six times less likely to have had HBV vaccination as compared to doctors, nurses and laboratory personnel. This could be related to their low risk perception of HBV infection and it underscores the need for a concerted effort in promoting preventive practices against the infection among them. Reports from other studies generally showed poor uptake of hepatitis B vaccine. Findings of studies by Kesieme et al. (2011) and Koria and Lala (2012) showed even lower uptake of hepatitis B vaccine among health care workers of 35.5 and 35.0% respectively. Lower values of 22.4 and 20% were observed by Ibekwe and Ibeziako (2006) and Azado et al. (2012), respectively. Izegbo et al. (2006) and Ziraba et al. (2010) noted that only 8.4 and 6.2% of their respondents were vaccinated, respectively. However, an encouraging higher value was noted in the study by Al-Hussami (2004) where 85% of the health workers were immunized against the disease. Other researchers that recorded values higher than that observed in this study include estimates of 59% by Samuel et al. (2009) in southern Nigeria, 57% by Chandhari et al. (2009) in India and 84.0% by Habiba et al. (2012) in Kuwait.

Conclusion

This study demonstrated poor uptake of hepatitis B vaccination among HCWs in UDUTH, Sokoto, Nigeria, despite good knowledge and high risk perception. Periodic education of staff on prevention of transmission of blood and other body fluids borne pathogens in the hospital setting, and promotion of accessibility to vaccines against relevant vaccine preventable diseases in the healthcare facilities are hereby suggested.

Conflict of interests

The authors have not declared any conflict of interests.

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