



Prevalence of Hepatitis B Vaccination among Health Care Workers in Nigeria in 2011–12

D Ogoina¹, K Pondei², B Adetunji³,
G Chima⁴, C Isichei⁵, S Gidado⁶

Abstract

Background: Hepatitis B virus (HBV) infection is an endemic infection in Nigeria. Health care workers (HCWs) are at risk of occupational exposures to HBV-infected blood and body fluids.

Objective: To determine the prevalence and determinants of HBV vaccine coverage among HCWs in two teaching hospitals in Nigeria.

Methods: This cross-sectional study was undertaken in 2011 and 2012 in two teaching hospitals in Jos, North-Central Nigeria, and Yenagoa, South-South Nigeria. A self-administered structured questionnaire was administered to HCWs to obtain socio-demographic data and history of HBV vaccination.

Results: Out of 290 HCWs who participated in the study, 185 (64.5%) had received at least one dose of HBV vaccine; 105 (36.2%) had full coverage of three doses. Professional category and previous training in infection control were independently associated with HBV vaccination. House officers and laboratory scientists were more likely to be unvaccinated than resident doctors, consultant doctors and nurses. Full vaccine coverage was associated with younger age and shorter years of professional experience.

Conclusion: We observed a generally low rate of HBV vaccine coverage among HCWs in Nigeria. Establishment of policies on compulsory HBV vaccination of all HCWs in Nigeria is recommended.

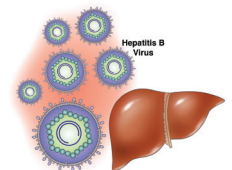
Keywords: Hepatitis B; Hepatitis B vaccine; Vaccine coverage; Health personnels; Prevalence; Nigeria

Introduction

With almost 350 million people chronically infected with hepatitis B virus (HBV) worldwide, HBV infection is a major public health challenge. The majority of the infected cases are living in developing countries

of sub-Saharan Africa.¹ The World Health Organization (WHO) estimates that about two million health care workers (HCWs) face occupational exposure to HBV each year and that 90% of the infections that result from these exposures are in low-income countries, especially those in sub-Saharan Africa.^{2,3}

Departments of ¹Medicine, and ²Microbiology, Niger Delta University, Wilberforce Island, Amassoma, Bayelsa State, Nigeria
Departments of ³Medicine, ⁴Family Medicine, ⁵Chemical Pathology, and ⁶Surgery, Bingham University Teaching Hospital, Jos Plateau State, Nigeria



Correspondence to Dimie Ogoina, MD, Department of Medicine, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria
Tel: +234-802-855-4566
E-mail: dimostic@yahoo.co.uk
Received: Oct 11, 2013
Accepted: Dec 17, 2013

Cite this article as: Ogoina D, Pondei K, Adetunji B. Prevalence of hepatitis B vaccination among health care workers in Nigeria in 2011–12. *Int J Occup Environ Med* 2014;5:51-56.

Table 1: Demographic and occupational characteristics of study participants

Variables	Institution*		Total population
	NDUTH	BHUTH	
Median (IQR) age (yrs)	34 (29–45)	39 (33–48)	37 (30–46)
Male gender (%)	86 (51.8)	47(37.9)	133 (45.9)
Median (IQR) work experience (yrs)	6 (3–20)	10 (4–22)	8 (3–21)
Having training in infection control	78 (57.4)	58 (42.6)	136 (48.6)
Professional group† (%)			
House officers	23 (13.9)	—	23 (7.9)
Medical officers/ Resident	30 (18.1)	20 (16.1)	50 (17.2)
Doctors	27 (16.3)	11 (8.9)	38 (13.1)
Consultant doctors	44 (26.5)	55 (44.4)	99 (34.1)
Staff nurse/SNO	31 (18.7)	17 (13.7)	48 (16.6)
PNO/ACNO/ CNO	11 (6.6)	21 (16.9)	32 (11)
Laboratory scientists	166 (57.2)	124 (42.8)	290 (100)

*NDUTH: Niger Delta University Teaching Hospital; BHUTH: Bingham University Teaching Hospital
 †SNO-Senior Nursing Officer; PNO: Principal Nursing Officer; ACNO: Assistant Chief Nursing Officer; CNO-Chief Nursing Officer

HBV infection is highly endemic in Nigeria based on studies undertaken in blood donors, pregnant women and HIV-infected patients, which revealed an HBsAg carrier rate of 9% to 39%.^{4,5} Consequently, the risk of occupational exposure to HBV among HCWs in Nigeria remains high. A few studies conducted on selected HCWs in Nigeria revealed low rates of HBV vaccination coverage of 20%–50%.^{6–8}

To the best of our knowledge, the dif-

ferences in the rate of HBV vaccine coverage among the three major health professional groups and the determinants of vaccine coverage have not been previously described in Nigeria. The objective of our study was to evaluate the prevalence and determinants of HBV vaccination coverage among various cadres of doctors, nurses and laboratory scientists working in two tertiary hospitals in North-Central and South-South Nigeria.

Materials and Methods

This cross-sectional study was undertaken in two tertiary hospitals in Nigeria—Bingham University Teaching Hospital (BHUTH), Jos Plateau state, and Niger Delta University Teaching Hospital (NDUTH), Bayelsa state. The BHUTH is a 150-bed hospital located in Jos, an urban city in North-Central Nigeria. NDUTH is a 200-bed hospital located in Okolobiri, a semi-urban city in Bayelsa state, South-South Nigeria. Both hospitals provide tertiary level patient care covering major medical and surgical disciplines.

The study was conducted over two months—between March and April 2011 in BHUTH and between February and March 2012 in NDUTH. Ethical approval for the study was obtained from the Ethical Review Committee and all study participants.

We studied 381 HCWs including all doctors (n=128), nurses (n=220), and laboratory scientists (n=33) of both hospitals—165 (43.3%) were working in BHUTH and 216 (56.7%) in NDUTH.

Data were collected using a self-administered structured questionnaire, which comprised of four categories of questions including demographic and occupational data, history of training in infection control, knowledge of recommended HBV vaccination coverage for HCWs, and number of doses of HBV vaccine received.

Data was analyzed by SPSS® for Win-

Table 2: Demographic and occupational variables in relation to HBV vaccination status

Variables	Hepatitis B vaccination		p value
	Yes	No	
Median (IQR) age (yrs)	39 (30–70)	34 (29–46)	NS
Median (IQR) work experience (yrs)	10 (3–21)	6 (3–20)	0.037
Gender (%)			
Male	84 (63.6)	48 (36.4)	NS
Female	101 (65.2)	54 (34.8)	
Hospital* (%)			
BHUTH	106 (66.5)	55 (33.5)	NS
NDUTH	76 (61.8)	47 (38.2)	
History of training in infection control	99 (73.9)	35 (26.1)	0.003
Professional group† (%)			
House officer	8 (34.8)	15 (65.2)	0.003
Medical officer/Resident doctor	38 (76)	12 (24)	
Consultant doctors	28 (75.7)	9 (24.3)	
Staff nurse/SNO	65 (67)	32 (33)	
PNO/ACNO/CNO	31 (64.6)	17 (35.4)	
Laboratory scientists	15 (46.9)	17 (53.1)	
Total	185 (64.5)	102 (35.5)	

*NDUTH: Niger Delta University Teaching Hospital; BHUTH-Bingham University Teaching Hospital

†SNO: Senior Nursing Officer; PNO: Principal Nursing Officer; ACNO: Assistant Chief Nursing Officer; CNO: Chief Nursing Officer

dows® ver 17. A p value <0.05 was considered statistically significant.

Results

A total of 290 HCWs—124 (response rate of 75.2%) from BHUTH, and 166 (response rate of 76.9%) from NDUTH—participated in the study, giving an overall response rate of 76%.

The demographic and occupational characteristics of the study participants are shown in Table 1.

The median work experience of HCWs

was 8 (IQR: 3–21) years. Although at the time of study, both hospitals had policies requiring staff to be vaccinated against HBV, free HBV vaccination was not routinely offered to staff in both hospitals.

Out of 287 respondents, 185 (64.5%) had received at least one dose of HBV vaccine; 102 (35.5%) had never received any dose of HBV vaccine. The prevalence of HBV vaccination in relation to the study variables is shown in Tables 1 and 2. HBV vaccination was significantly associated with years of professional practice, previous training in infection control and pro-

Table 3: Crude and adjusted ORs showing variable associated with HBV vaccination

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)
Age (yrs)	1.0 (0.99–1.04)	0.97 (0.91–1.02)
Years in profession	1.0 (0.98–1.03)	1.1 (0.99–1.12)
Gender		
Male	0.9 (0.6–1.5)	1.1 (0.6–2.0)
Female	1	
Training in infection control		
Yes	2.14 (1.3–3.6)	2.04 (1.2–3.5)
No	1	1
Professional group*		
House officers	1	1
MO/Residents	5.9 (2.0–17.4)	6.1 (2.2–22.2)
Consultants	5.8 (1.9–18.2)	3.9 (1.1–15.7)
Staff nurse/SNO	3.8 (1.5–9.9)	2.5 (1.0–9.2)
PNO/ACNO/CNO	3.4 (1.2–9.7)	1.9 (0.5–8.3)
Laboratory scientists	1.7 (0.6–4.9)	1.2 (0.5–5.2)

*SNO: Senior Nursing Officer; PNO: Principal Nursing Officer; ACNO: Assistant Chief Nursing Officer; CNO: Chief Nursing Officer

fessional group, but not associated with age, gender and hospital location.

In an unconditional logistic regression analysis of variables including age, gender, years of professional practice, training in infection control, professional group and practice area, only previous training in infection control and professional group were found to be independent predictors of HBV vaccination (Table 3). Resident doctors (OR: 6.9; 95% CI: 2.2–22.2), consultant doctors (OR: 4.1; 95% CI: 1.1–15.7) and staff nurse/SNO (OR: 3.1; 95% CI: 1.0–9.2) were more likely to be vaccinated than house officers. Study participants with a prior training in infection control were also more likely to be vaccinated (OR: 2.0; 95% CI: 1.2–3.5).

The consultant doctors and the senior cadres of nurses had significantly ($p=0.025$) lower rates of a complete HBV vaccination than other HCWs. The fully vaccinated HCWs were significantly ($p=0.005$) younger (median of 34 [IQR: 29–45] yrs) than those not fully vaccinated ((median of 41.5 [IQR: 33–47.5] yrs) and had a significantly ($p=0.004$) lower years of professional experience (median of 6 [IQR: 3–20] yrs) than those not fully vaccinated (median of 14 [IQR: 5–24] yrs). Full vaccination coverage was not related to gender, knowledge of HBV vaccine coverage, and prior history of infection control.

Discussion

The results of our study reveal that 65% of the studied HCWs received at least one dose of HBV vaccine and only 36.2% received full vaccine coverage of three doses. The HBV vaccination coverage rate reported in our study is higher than the rates of 22.4% and 40.3% reported among selected HCWs in other Nigerian tertiary hospitals in Enugu⁹ and Lagos,¹⁰ respectively, but it was lower than the rate of 91.9% reported

TAKE-HOME MESSAGE

- We found low rates of hepatitis B vaccine coverage among health care workers in two teaching hospitals in Nigeria.
- Among 290 health care workers studied, 64.5% received at least one dose of hepatitis B vaccine; only 36.2% had full coverage of three doses of the vaccine.
- Receiving hepatitis B vaccine was independently associated with professional group and prior training in infection control. House officers and laboratory scientists had significantly lower vaccine uptake rates compared to resident doctors, consultant doctors and nurses.

among HCWs in Ife, South-West Nigeria.¹ Among HCWs in Burkina Faso, 47.7% had received at least one dose of HBV vaccine and the full immunization coverage against HBV was estimated at 10.9%.¹¹ In another study from South Africa, 67.9% of HCWs had received at least one dose of HBV vaccine while only 19.9% had full coverage of vaccination.¹² In contrast to these observed low rates of full immunization coverage in Africa, higher rates of 75% and 93% were reported among HCWs in the USA¹³ and France,¹⁴ respectively.

It is noteworthy that senior cadres of doctors, those with longer work experience, and those with prior training were more likely to be vaccinated than other HCWs. Our results are in agreement with the findings of another study from Egypt¹⁵ where vaccination uptake among HCWs was associated with longer years of working experience. Since routine HBV vaccine was not offered to HCWs in study sites, it is plausible that younger HCWs had poorer vaccine uptake probably due to their lower access to HBV vaccine or poorer knowledge of the need for HBV vaccination.

Our results also indicated that the senior cadres of HCWs with more years of professional experience were less likely to complete HBV vaccination. A similar finding was also reported in Greece¹⁶ where younger HCWs were shown to be more likely to complete HBV vaccination. Motivation, access to vaccines, cost implications, and risk perception are some variables proposed to determine vaccine completion rates.¹⁷

Acknowledgements

We are grateful to all clinical staff of Niger Delta University Teaching Hospital, Okolobiri Bayelsa State and Bingham University Teaching Hospital, Jos Plateau State, Nigeria for participating in this study.

Conflicts of Interest: None declared.

References

1. Fatusi AO, Fatusi OA, Esimai AO, *et al*. Acceptance of hepatitis B vaccine by workers in a Nigerian teaching hospital. *East Afr Med J* 2000;**77**:608-12.
2. WHO. *The world health report: reducing risks, promoting healthy life*. 2012.
3. Prüss-Ustün A, Rapiti E HY. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med* 2005;**48**:482-90.
4. Agbaji O, Ladep N, Agaba P, *et al*. Prevalence and characteristics of hepatitis B surface antigenaemia among HIV infected patients in Jos, Nigeria. *Hungarian Med J* 2008;**2**:77-82.
5. Emechebe G, Emodi I, Ikenuna A, *et al*. Hepatitis B virus infection in Nigeria-A review. *Niger Med J* 2009;**50**:18-22.
6. Ibekwe RC, Ibeziako N. Hepatitis B vaccination status among health workers in Enugu, Nigeria. *Niger J Clin Pract* 2006;**9**:7-10.
7. Fatusi AO, Fatusi OA, Esimai AO, *et al*. Acceptance of hepatitis B vaccine by workers in a Nigerian teaching hospital. *East Afr Med J* 2000;**77**:608-12.
8. Omokhodion FO. Health and safety in clinical laboratory practice in Ibadan, Nigeria. *Afr J Med Med Sci* 1998;**27**:201-4.
9. Ibekwe RC, Ibeziako N. Hepatitis B vaccination status among health workers in Enugu, Nigeria. *Niger J Clin Pract* 2006;**9**:7-10.
10. Sofola OO, Uti OG. Hepatitis B virus infection and prevention in the dental clinic: knowledge and factors determining vaccine uptake in a Nigerian dental teaching hospital. *Nig Q J Hosp Med* 2008;**18**:145-8.
11. Ouédraogo HG, Kouanda S, Tiendrébeogo S, *et al*. [Hepatitis B vaccination status and associated factors among health care workers in Burkina Faso]. *Med Sante Trop* 2013;**23**:72-7. [in French]
12. Burnett RJ, François G, Mphahlele MJ, *et al*. Hepatitis B vaccination coverage in healthcare workers in Gauteng Province, South Africa. *Vaccine* 2011;**29**:4293-7.
13. Simard EP, Miller JT, George PA, *et al*. Hepatitis B vaccination coverage levels among healthcare workers in the United States, 2002-2003. *Infect*

- Control Hosp Epidemiol* 2007;**28**:783-90.
14. Loulergue P, Moulin F, Vidal-Trecan G, *et al.* Knowledge, attitudes and vaccination coverage of health-care workers regarding occupational vaccinations. *Vaccine* 2009;**27**:4240-3.
 15. El-Awady MY. Hepatitis B vaccination rates among medical personnel at Ain Shams University Hospital and obstacles to vaccine uptake. *J Egypt Public Health Assoc* 1998;**73**:519-37.
 16. Maltezou HC, Gargalianos P, Nikolaidis P, *et al.* Attitudes towards mandatory vaccination and vaccination coverage against vaccine-preventable diseases among health-care workers in tertiary-care hospitals. *J Infect* 2012;**64**:319-24.
 17. Sheikh NH, Hasnain S, Majrooh A, *et al.* Status of Hepatitis B Vaccination Among The Health Care Workers of A Tertiary Hospital , Lahore. *Biomedica* 2007;**23**:17-20.

Guidelines for Filing a Competing Interest Statement

Definition: Conflict of interest (COI) exists when there is a divergence between an individual's private interests (competing interests) and his or her responsibilities to scientific and publishing activities such that a reasonable observer might wonder if the individual's behavior or judgment was motivated by considerations of his or her competing interests. COI in medical publishing affects everyone with a stake in research integrity including journals, research/academic institutions, funding agencies, the popular media, and the public.

COI may exist in numerous forms including financial ties, academic commitments, personal relationships, political or religious beliefs, and institutional affiliations. In managing COI, *The IJOEM* abides to the policy statement of the *World Association of Medical Editors (WAME)*. All authors should declare their COI, if any, during the manuscript submission. Reviewers are asked to declare their COI after they accept to review a manuscript. Editors should also declare their COI during handling of a manuscript.

Managing COI depends on disclosure because it is not possible to routinely monitor or investigate whether competing interests are present. COI disclosed by authors will be presented in the Editorial Board and an appropriate action will be taken. Those reviewers and Editors with COI will be excluded from the manuscript process. If competing interests surface from other sources after a manuscript is submitted or published, *The IJOEM* investigates allegations of COI and depending on their nature, appropriate actions will be taken if the allegations were found to be true. If a manuscript has been published and COI surfaces later, the journal will publish the results of the investigation as a correction to the article and ask the author to explain, in a published letter, why the COI was not revealed earlier.