Egyptian Journal of Community Medicine, 2022;40(2): 143-147

Egyptian Journal of Community Medicine

Uptake of Hepatitis B vaccine and its predictors among healthcare workers in south-south Nigeria: a cross-sectional survey

Patrick Gold Oyibo[1]; Callistus Adewale Akinleye[2]; Yovwin Daferiogho Godwin[1]; Eddy Awire[3]

[1]Department of Community Medicine, Faculty of Clinical Sciences, College of Health Sciences, Delta State University, Abraka, Nigeria
[2]Department of Community Medicine, Osun State University, Nigeria
[3]School of Health and Life Sciences, University of the West of Scotland, United Kingdom

Submission Date: 2021-07-07

Revision Date: 2021-07-27

Acceptance Date: 2021-08-16

Key Words: Hepatitis B vaccination, uptake, predictors, healthcare workers, south-south Nigeria

A B S T R A C T

Background: Hepatitis B vaccination rates among healthcare workers in many developing countries including Nigeria continue to be low. **Objective**: This study assessed the uptake of hepatitis B vaccine and its predictors among HCWs in south-south Nigeria. **Methods**: This was a cross-sectional study conducted to assess the uptake of hepatitis B vaccine and its predictors among 565 healthcare workers. Data was collected using a semi-structured questionnaire which was self-administered. Descriptive and inferential analysis of data collected was carried out using the IBM SPSS version 22 software. **Results**: Over half of the study participants had blood and body fluids exposure (58.6%) in the preceding year and were unvaccinated (53.4 %) respectively. About a tenth (9.6%), 12.0% and 25.0% of the study participants reported receipt of one, two and three doses of hepatitis B vaccine respectively. The study participants who had been trained on infection prevention and control (OR=1.25; 95% CI: 1.06-1.49), who were married (OR=1.28; 95% CI: 1.07-1.54), and who had good perception of the risk of blood-borne infections (OR=1.93; 95% CI: 1.65-2.25) had 25.0%, 28.0% and 93% increased odds respectively of receiving at least one dose of hepatitis B vaccine. **Conclusion**: The study brings to the fore a low hepatitis B vaccination coverage and a high rate of blood and body fluid exposure among the study participants. There is a need to stimulate and motivate healthcare workers in the study locations to improve their uptake of hepatitis B vaccine.

INTRODUCTION

Hepatitis B virus (HBV) infection affects about one-third of the world's population, with over 350 million persons estimated to be chronic carriers.[1] Sub-Saharan Africa and South-east Asia bear 10–20% of the disease burden due to chronic HBV.[2] Most adult onset HBV infections resolve spontaneously, with only 5-10% resulting in chronic carriership.[2,3] Among the transmissible blood-borne viruses such as Human immunodeficiency virus (HIV) and Hepatitis C virus (HCV), HBV is the most transmissible and also the only blood-borne viral infection that is preventable by vaccination.[2,3] Hepatitis B vaccination is an important infection control measure as it reduces the risk of a person becoming infected with the pathogen as well as transmitting them to another person.[4-6] In healthcare settings, prevention of HBV transmission requires the vaccination of HCWs.[7] About a quarter (24%) of the global population of healthcare workers (HCWs) are unvaccinated against HBV;[7] and remain at risk of

Corresponding Author: Patrick Gold Oyibo MBBS, MSc, PhD, FWACP. Department of Community Medicine, Faculty of Clinical Sciences, College of Health Sciences, Delta State University, Abraka, Nigeria. E-mail: oyibopatrick@yahoo.com; pgoyibo@delsu.edu.ng

acquiring HBV predominantly through blood and body fluids exposure (BBFE) of infected patients.[1,7]

Despite the recognized risk for acquiring HBV among HCWs, hepatitis B vaccination rates among them in many developing countries including Nigeria continue to be low. [4,5] This has been linked to poor awareness, non-existence of risk assessment and low priority given by the management of health facilities.[4,5] Hepatitis B vaccination was introduced into the Nigerian routine childhood immunization programme in 2004.[8] This has resulted in the overall reduction in the rate of HBV infection among children in Nigeria, while the infection rates among the adult population continue to rise.[8,9]

Evidence has shown that in high risk population, immunological memory persist for as much as 12 years after primary hepatitis B vaccination.[10] This underscores the need for vaccination of HCWs especially in high risk populations in which the prevalence of HBV infection among HCWs is estimated to be five times higher than what obtains in the community in some healthcare settings.[2] Therefore, it is important for healthcare authorities to plan for the vaccination of their health workforce by ensuring they get vaccinated preferably early in their careers. There is paucity of evidence regarding the uptake of hepatitis B vaccine and its predictors among HCWs in Nigeria. It is against this backdrop that this study was conducted to assess the uptake of hepatitis B vaccine and its predictors among HCWs in south-south Nigeria.

METHODS

This study was conducted from June 2015 to January 2016 at three randomly selected public hospitals (Central hospital, Warri; Central Hospital, Sapele; and Delta State University Teaching Hospital, Oghara) in Delta State, south-south Nigeria. These hospitals render specialist health care to patients.

This was a cross-sectional study conducted to assess the hepatitis B vaccination status and predictors of its uptake among HCWs.

The study population comprised of HCWs (doctors, nurses/midwives, health assistants and final year medical and nursing students) working in three randomly selected public hospitals rendering specialist care to patients in Delta State, south-south Nigeria.

The minimum sample size was determined based on the hepatitis B vaccine uptake rate among HCWs of 26.8% reported from a previous study,[5] an error margin of 5 % and standard normal variate at 95% confidence level. The determined minimum sample size was 323; however, 565 participants were selected for the study to increase the validity of findings.

A multi-stage sampling technique (three stages) was employed in this study. In the first stage, three public hospitals (Central hospital, Warri and Sapele respectively; and Delta State University Teaching Hospital, Oghara) were randomly selected by ballot from a sample frame of six public health facilities (two tertiary and four secondary) providing specialist health care in Delta State. In the second stage, health care providers in the three selected public health facilities were proportionately allocated into different strata by professional category and in the third stage a simple random sampling technique using was used to select study participants were randomly selected (table of random numbers) from a list of healthcare providers in each stratum.

Data was collected using a pre-tested semi-structured questionnaire which was self-administered. The questionnaire was tested for its reliability and was validated with a reliability coefficient of 0.8. The questionnaire elicited information on the socio-demographic characteristics, hepatitis B vaccination status, infection prevention and control (IPC) training status, perception of the risk of acquiring blood-borne infections (BBIs), and 12-month history of BBFE among the study participants in the three randomly selected public health facilities.

Statistical analyses

Data generated was analysed using the IBM SPSS version 22 software. Frequency tables were generated. Bivariate analysis using chi-square was carried out and statistical significance set at $p < 0.05$. To measure the independent effect of different factors on the uptake of hepatitis B vaccine, factors that were significant at p-value < 0.2 during the bivariate analysis (Chi-Square analysis) were selected and entered stepwise into the binary logistic regression model. The model fitness was measured by the Hosmer-Lemeshow test. The statistical significance of the model ($p=0.792$) revealed that the binary logistic regression model (with independent variables included) was a good fit to the data. Binary logistic regression analysis was used to estimate the odds ratio

Table 1: Socio-demographic characteristics of the study participants

Variables	Categories	Frequency (%) N=565
Age (years)	21-30	231 (40.9)
	31-40	219 (38.8)
	41-50	89 (15.7)
	51-60	26 (4.6)
Sex	Male	208 (36.8)
	Female	357 (63.2)
Marital status	Married	305(54.0)
	Not married	260 (46.0)
Profession	Doctors	211 (37.3)
	Nurses/Midwives	165 (29.2)
	Others	189 (33.5)
Department	Surgical	225 (39.8)
	Non-surgical	340 (60.2)
Years of experience	< 6	314 (55.5)
	6-10	251 (45.5)

*Mean age = 33.0 ± 7.7; Median years of experience = 6 (IQR: 3-11); *Others (health assistants, and final year medical and nursing students). (OR) and 95% Confidence Interval of the odds ratio (95% C.I).*

RESULTS

The study included 208 males (36.8 %) and 357 females (63.2 %). The mean age and years of experience among the study participants were 33.0 ± 7.7 years and 7.5 ± 5.7 years respectively (Table 1).
Over half (58.6%) of the study participants reported at least one BBFE in the preceding year before the study. Less than half (46.6 %) of the study participants had received at least one dose of hepatitis B vaccine. Overall, 25.0 % of the study participants self-reported receiving three doses of hepatitis B vaccine, while 12.0 % and 9.6 % of them self-reported receiving two doses and one dose respectively (Table 2).

Table 2: Number of dose(s) of Hepatitis B vaccine received among the study participants by their exposure status

Variables	Categories	BBFE		
		Yes n=331(58.6)	No n=234 (41.4)	Total (N=565)
Number of dose(s) of vaccine received	None	170 (51.3)	132 (56.4)	302 (53.4)
	1	34 (10.3)	20 (8.5)	54 (9.6)
	2	40 (12.1)	28 (12.0)	68 (12.0)
	3	87 (26.3)	54 (23.1)	141 (25.0)

The bivariate analysis revealed that the association of the study participants' age (X^2=10.6; df=3; p=0.01), marital status (X^2=7.36; df=1; p=0.01), years of experience (X^2=7.52; df=1; p=0.01), IPC training status (X^2=5.62; df=1; p=0.02) and perception of the risk of BBIs (X^2=42.53; df=1; p < 0.001) with hepatitis B vaccination status were significant (p < 0.05). The association of the study participants' sex (X^2=0.05; df=1; p=0.82), profession (X^2=0.87; df=1; p=0.65), department of work (X^2=0.31; df=1; p=0.58) with hepatitis B vaccination status were not significant (p > 0.05) (Table 3).
The multivariable analysis revealed that the study participants who had been trained on IPC (OR=1.25; 95% CI: 1.06-1.49), who were married (OR=1.28; 95% CI: 1.07-1.54), and who had good perception of the risk of blood-borne infections (OR=1.93; 95% CI: 1.65-2.25) had 25.0%, 28.0% and 93% increased odds respectively of receiving at least one-dose of hepatitis B vaccine (Table 3). The study participants who had less than 6 years of experience (OR=0.78; 85% CI: 0.66 - 0.93) had 22% decreased odds of receiving at least one dose of hepatitis B vaccine (Table 3).

DISCUSSION

The prevention of HBV transmission in healthcare settings requires the vaccination of healthcare workers. The hepatitis B vaccination rate observed among the participants in this study was unacceptably low. Less than half of the study participants had received at least one dose of hepatitis B vaccine. The one-dose hepatitis B vaccination rate observed in this study was comparatively higher than the rate of 12.8% reported from a previous study conducted among healthcare workers in Kenya,[11] but lower than the vaccination rates of 54.8% and 70.2% reported from previous studies conducted among HCWs in Benin and Ilorin, Nigeria respectively.[12,13] Overall, a quarter of the study participants reported receiving three doses of hepatitis B vaccine. The complete (three doses)

Table 3: Predictors of uptake of at least one dose hepatitis B vaccine among the study participants

Variables	Categories	Vaccination status (N=565) Yes (%) n=263 (44.6)	No (%) n=302 (53.4)	Bivariate Analysis χ2 (p value)	Regression Analysis AOR (95% C.I.)
Age (years)	21-30	89 (38.5)	142 (61.5)	10.59 (0.01)	1.37 (0.61 - 3.09)
	31-40	114 (52.1)	105 (47.9)		0.79 (0.35 - 1.78)
	41-50	48 (53.9)	41 (46.1)		0.73 (0.31 - 1.76)
	51-60	12 (46.2)	14 (53.8)		1
Sex	Male	95 (45.7)	113 (54.3)	0.05 (0.82)	-
	Female	168(47.1)	189 (52.9)		
Marital status	Married	158 (51.8)	147 (48.2)	7.36 (0.01)	1.28 (1.07 - 1.54)
	Not married	105 (40.4)	155 (59.6)		1
Profession	Doctors	103 (48.8)	108 (51.2)	0.87 (0.65)	-
	Nurses/Midwives	77 (46.7)	88 (53.3)		
	*Others	83 (43.9)	106 (56.1)		
Department	Surgical	101 (44.9)	124 (55.1)	0.31 (0.58)	-
	Non-surgical	162 (47.6)	178 (52.4)		
Years of experience	< 6	130 (41.4)	184 (58.6)	7.52 (0.01)	0.78 (0.66 - 0.93)
	≥6	133 (53.0)	118 (47.0)		1
Training on IPC	Yes	108 (53.5)	94 (46.5)	5.62 (0.02)	1.25 (1.06 - 1.49)
	No	155 (42.7)	208 (57.3)		1
***Perception of risk BBIs**	Good	69 (78.4)	19(21.6)	42.53 (<0.001)	1.93 (1.65 - 2.25)
	Poor	194 (55.6)	283(44.6)		1

**Others (health assistants, and final year medical and nursing students) *Composite perception*

hepatitis B vaccination rate observed in this study was comparatively lower than the complete (three doses) vaccination rate of 59.4% reported in Ilorin, Nigeria[13] but higher than vaccination rate of 15.8% reported in Egypt[14] among HCWs.

High rate of BBFE, poor perception of the risk of acquiring BBIs and poor status of training on IPC were respectively observed among the study participants. This calls for concern among all stakeholders seeing that HCWs have a high risk of being infected with HBV because of their high frequency of BBFE coupled with the high contagiousness of HBV. Over half of the study participants who reported a history of BBFE had not been vaccinated against HBV infection. The hepatitis B non-vaccination rate observed among the study participants was higher that the non-vaccination rate of 14.8 % reported among HCWs who reported a history of BBFE in Tehran.[11] The high BBFE rate combined with low level of hepatitis B vaccination coverage observed in this study implies that many of the HCWs in the study settings remain at risk of HBV infection. High rates BBFE and low hepatitis B vaccination coverage has been identified as factors that contribute to high rates of viral hepatitis B infection among HCWs.[10] Good perception of the risk of acquiring HBV infection and the identification of hepatitis B vaccination as an effective preventive measure have been linked to the uptake of hepatitis B vaccine among HCWs.[13,15,16] Analysis of the study variables revealed that good perception of the risk of acquiring BBIs and training on IPC were the predictors of the uptake of hepatitis B vaccine among the study participants.

The limitations of this study need to be taken into consideration. The self-report nature of the study leaves room for reporter bias. In addition, the data analyzed in this study were collected 5 years ago and may not reflect present situation.

CONCLUSION AND RECOMMENDATION

This study brings to the fore a low hepatitis B vaccination coverage and high rate of BBFE among the HCWs in the study settings. The prevention of BBFE and hepatitis B vaccination among HCWs should be given priority in the study settings. The management of the selected hospitals should pay enough attention to the vaccination of their health workforce against hepatitis B virus. This could be achieved via IPC training campaign targeted at stimulating and motivating HCWs to improve their uptake of hepatitis

B vaccine. In addition, the management of the selected hospitals should endeavor to implement hepatitis B vaccination program for their health workforce at pre-employment and on the job with records of vaccination kept.

Ethical considerations

Ethical clearance was obtained from the research ethics committee of the Delta State University Teaching Hospital, Oghara. Institutional consent was also obtained from the management of the three selected public hospitals where the study was conducted. Informed consent was obtained from the participants before inclusion in this study. The participants were informed of the purpose of the research as well as their right to participate or refuse to participate in the study.

Acknowledgements

The authors acknowledge all the healthcare providers that participated in the study and the head of all the health facilities for their co-operation.

Conflict of interest

The authors declare that there is no conflict of interest.

Funding

No grant or funding was received for the study from the public, commercial or not for profit sectors.

Authors' contributions

The conception, design, drafting of the research work, analysis and interpretation of the data were done by PGO; while CAA, YDA and EA were involved in the training of data collectors, data collection and analysis. PGO wrote the initial draft of the manuscript and all the authors participated in its finalization. All authors read and approved the final manuscript.

REFERENCES

1. World Health Organization. Hepatitis B Factsheet: WHO, Geneva, 2015. Available at: http://www.who.int/mediacentre/factsheets/fs204/en/. Accessed April 16, 2018
2. Lemoine M, Eholié S, Lacombe K. Reducing the neglected burden of viral hepatitis in Africa: strategies for a global approach. J Hepatol 2015; 62:469 - 476
3. Meireles LC, Marinho RT, Van Damme P. Three decades of hepatitis B control with vaccination. World J Hepatol 2015; 7: 2127–2332
4. Abeje GAzage M. Hepatitis B vaccine knowledge and vaccination status among health care workers of Bahir Dar City Administration, Northwest Ethiopia: a cross-sectional study. BMC Infect Dis. 2015; 15 (1): 10.1186/s12879-015-0756-8
5. Kesieme, EB, Uwakwe, K, Irekpita, E, et al. Knowledge of hepatitis B vaccine among operating room personnel in Nigeria and their vaccination status. Hepat Res Treat 2011; 2011: 157089.
6. Centers for Disease Control and Prevention. Immunization of health-care personnel: recommendations of the Advisory Committee on Immunization Practices (ACIP). Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm. Accessed 12 July 2020
7. Askarian M, Yadollahi M, Kuochak F, Danaei M, Vakili V, Momeni M. Precautions for health care workers to avoid hepatitis B and C virus infection. Int J Occup Environ Med, 2 (4) (2011), pp. 191-198
8. Nwokediuko S. Chronic Hepatitis B: Management Challenges in Resource-Poor Countries. Hepatitis Monthly, 2011;11 (10):786-793.
9. The journey to hepatitis elimination in Nigeria: Hepatitis B foundation, 2020. Available at: https://www.hepb.org/blog/journey-hepatitis-elimination-nigeria/. Accessed April 16, 2021
10. Mahmood S, Shah KU, Khan TM. Immune persistence after infant hepatitis B vaccination: A systematic review and meta-analysis. Sci Rep, 2018; 8:12550.
11. Suckling RM, Taegtmeyer M, Nguku PM, Al-Abri SS, Kibaru J, Chakaya JM, Tukei PM, Gilks CF. Susceptibility of healthcare workers in Kenya to hepatitis B: new strategies for facilitating vaccination uptake. J Hosp Infect. 2006; 64(3): 271-277
12. Azodo CC, Ehigiator O, Ojo MA: Occupational risks and hepatitis B vaccination status of dental auxiliaries in Nigeria. Med Princ Pract 2010; 19: 364–366
13. Samuel SO, Aderibigbe SA, Salami TAT, Babatunde OA. Health workers' knowledge, attitude and behaviour towards hepatitis B infection in Southern Nigeria. International Journal of Medicine and Medical Sciences, 2009; 1: 421
14. Talaat M, Kandeel A, El-Shoubary W, Bodenschatz C, Khairy I, Oun S. Occupational exposure to needlestick injuries and hepatitis B vaccination coverage among health care workers in Egypt. Am J Infect Control, 2003; 31(8):469–474.
15. Davood F, Mohammad AZ, Sayed AH, Saeed A, Afsoon E, Peyman H, Mahdi R. Prevalence of occupational exposure to blood and body secretions and ts related effective factors among health care workers of three Emergency Departments in Tehran. J Res Med Sci. 2012; 17(7): 656–661
16. Abiola AO, Omoyeni OE, Akodu BA. Knowledge, attitude and practice of Hepatitis B vaccination among health-care workers at the Lagos State Accident and Emergency centre, Toll-gate, Alausa, Lagos State. WAJM, 2013; 32: 257-262

Cite this article as: Patrick Gold Oyibo, Callistus Adewale Akinleye, et al. Uptake of Hepatitis B vaccine and its predictors among healthcare workers in south-south Nigeria: a cross-sectional survey. *Egyptian Journal of Community Medicine*, 2022;40(2):143-147.
DOI: 10.21608/ejcm.2021.84650.1181