Global Journal of Medicine & Public Health

knowledge and risk perception of hepatitis b infection among primary healthcare workers in the federal capital territory, Abuja, Nigeria

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ABSTRACT

Introduction

Hepatitis B Virus has been an increasing global hazard, particularly to healthcare personnel who are continuously exposed to bodily fluids, and despite the availability of a very effective vaccination, it is still widespread. HBV studies previously done have shown that many healthcare workers consistently demonstrate low vaccination uptake, particularly in low- and middle-income countries such as Nigeria. This study aims to assess the knowledge and perception of risk about HBV among primary healthcare workers in the Federal Capital Territory (FCT), Abuja, Nigeria.

Methods

The study used a cross-sectional survey design in which data was collected using structured questionnaires administered to healthcare workers in various primary healthcare facilities in the FCT. Data were collected through structured questionnaires, and the analysis focused on assessing the knowledge of HBV and the perception of risk.

Result

The mean knowledge score was 87.3%. Most participants, 72.3%, believe hepatitis B is a serious public health problem, while 27.7% do not share this view, and the mean score for risk perception was 74.94%. About half of the respondents are aware of the existence of an effective vaccine for hepatitis B.

Conclusion

This study demonstrated the need for continuing awareness creation and training of healthcare workers on HBV to address the existing gaps in knowledge and risk perception.

Keywords: Hepatitis B, Healthcare workers, Risk perception, FCT, Nigeria

GJMEDPH 2025; Vol. 14, issue 2 | OPEN ACCESS

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Conflict of Interest—none | Funding—none

INTRODUCTION

The primary and most significant occupational health risk encountered by healthcare professionals globally is the potential exposure to blood-borne pathogens, predominantly infections such as Hepatitis B, Hepatitis C, and Human Immunodeficiency Virus (HIV). An estimated 30% of the global population, roughly 2 billion people, have been infected with the blood pathogen hepatitis B virus. About 350 million people are reported to have chronic hepatitis B infection. (Te & Jensen 2010, Mossburg et al 2019) The Hepatitis B virus is believed to be one of the most significant blood-borne pathogens due to its high potential for transmission through blood and bodily fluids. The estimates of the risk of a single needle-stick injury indicate a risk of 300 hepatitis B virus infections (30% risk), 30 hepatitis C virus infections (3% risk) and 3 HIV infections (0.3% risk), per 1,000 respective exposures. (Sarrazin et al 2004, Mengistu et al 2020)

According to WHO 2015, The burden of HBV infectivity is notably higher in sub-Saharan Africa, East Asia, and the Amazon basin of South America. (WHO 2015) Over half a million people in the world die annually from complications arising from chronic HBV infection which causes death associated with cirrhosis, liver failure, and hepatocellular carcinoma. (WHO 2015, Wilkins et al 2010) HBV primarily spreads through bodily fluids such as blood, semen, and vaginal secretions similar to HIV; however, it is 50-100 times more infectious than HIV.(WHO 2014) Even minimal exposure to blood or fluids during medical procedures can lead to virus transmission. Hepatitis B virus may also be accidentally transmitted through the introduction of small quantities of contaminated blood or fluid during medical, surgical, and dental procedures, or via sharp objects like razor blades, and because the virus remains infectious on surfaces for up to seven days, it poses an increased risk for healthcare workers due to their regular exposure to patients and bodily fluids. HBV is a major infectious occupational hazard for health workers. (Noubiap et al 2014, Eustace 2019) Primary healthcare (PHC) physicians interact with patients and encounter bodily fluids while collecting blood samples, obtaining microbiological specimens, and conducting minor surgical procedures. (Causse 2009)

The ongoing concern of healthcare workers (HCWs) in Nigeria facing occupational exposure to HBV remains particularly high due to the elevated seroprevalence rate in the country. Research conducted among specific HCWs in Nigeria indicated insufficient HBV vaccination coverage, varying between 20% and 50%. (Ogoina et al 2014) It is crucial to make efforts to eliminate healthcare-acquired infections for patient safety and infection control, it will also reduce the spread of nosocomial infection. Previous studies have shown that the immunization of healthcare workers (HCWs) is a highly successful preventive measure in controlling Vaccine Preventable Diseases (VPDs) (Sarrazin et al 2004) Recent evidence from European measles epidemics and other VPD outbreaks in hospitals highlights the role of non-immune HCWs in disease spread, sometimes serving as the primary source of infection. (Georgakopoulou et al 2018, Genovese 2019)

In Nigeria, approximately 75% of the adult population is at risk of contracting Hepatitis B, with prevalence rates of HBsAg ranging from 10% to 15% in the general population. Specific groups, such as surgeons and voluntary blood donors, report higher rates of 25.7% and 23.4%, respectively.(Abiodun et al 2019) Healthcare workers (HCWs) are particularly vulnerable to occupational exposures and should undergo serologic testing for antibodies 1-2 months after completing the vaccination series. Those with anti-HBsAb levels below 10 mIU/ml should receive additional vaccine doses to ensure protection.

Hepatitis B is a significant contributor to chronic liver diseases in Nigeria, with 58.1% of chronic liver disease patients testing positive for HBsAg. (Abiodun et al 2019) Prevention strategies include maintaining personal hygiene, using protective equipment, and proper disposal of medical waste. However, vaccination remains the most effective measure. Medical, dental, and nursing students face higher infection risks due to contact with bodily fluids. Overall, healthcare workers are four times more likely to experience needle stick injuries

compared to the general population, emphasizing the need for universal precautions and vaccination to protect them from HBV.(Hosseinipalangi et al 2022)

The findings of the study are expected to provide valuable support to local and global health initiatives aimed at mitigating the impact of hepatitis B. The insights gained will inform targeted interventions, contribute to policy development, and enhance the overall safety culture within healthcare facilities. This study aims to determine the knowledge and risk perception among health workers in primary healthcare facilities in the Federal Capital Territory (FCT) regarding the Hepatitis B virus and Hepatitis B vaccine.

Methodology

This research was conducted in Abuja, Nigeria's capital, specifically within the Abuja Municipal Area Council (AMAC). The FCT spans about 8,000 square kilometers and includes six area councils, with a total of 656 health facilities: 559 Primary Health Care (PHC) centers, 90 Secondary Health Care facilities, and seven Tertiary Health Care institutions. AMAC has 58 operational primary health centers staffed by 243 healthcare workers. These primary health centers serve as the entry point into the healthcare system, providing essential services and referrals to higher-level care as needed.

Study design: A Descriptive cross-sectional study design was used in our study/this study.

Inclusion and Exclusion Criteria: This study included all healthcare workers within the FCT working in PHC facilities who are in regular contact with patients and their body fluid samples, encompassing doctors, nurses, Laboratory scientists/laboratory technicians, CHEW (community health extension workers) and CHO (Community health officers). Pharmacists, health record and admin officers were excluded because of their reduced risk of exposure to body fluids.

Sample size: The minimum sample size was determined using a modified leslie-kish, Fisher's et.al statistical formula for calculating sample size;

$$n = \frac{Z^2.P.(1-P)}{E^2}$$

Z= 1.96 i.e., the value of the standard distribution corresponding to a significance level of a (1.96 for a 2-sided test at the 0.05 level),

P= proportion 86.6% of HCWs knowledge in previous study. (Liu et al 2011)

E = tolerable error of margin set at 0.05.

$$\frac{1.96^2 \times 0.866 \times (1-0.866)}{0.05^2} = 178.33$$

Our parameters included an estimated proportion of 86.6% who were aware of the hepatitis vaccine among HCWs, a confidence level of 95%, and a precision of 5%.

Final sample size= Effective sample size/ (1- non-response rate anticipated)

$$\frac{178}{1-0.10} = 197.78$$

adjusted = **198**

Sample Technique

In this study, a multi-stage sampling technique was employed:

Stage 1: Selection of Area Council: The six Area Councils in Abuja—Abaji, Bwari, Gwagwalada, Kuje, Kwali, and AMAC—were enumerated. A simple random draw (balloting) was performed, resulting in AMAC being selected for the study.

Stage 2: All the wards in AMAC were included to reflect the diversity of healthcare settings, ensuring representation of healthcare workers from different geographic areas.

Stage 3: A list of all available PHCs in each ward was compiled. To ensure adequate representation, at least two to three PHCs were randomly selected by balloting from each ward. In cases where a ward had fewer than three PHCs, all facilities were included.

Stage 4: Eligible healthcare workers—those who regularly encounter patients' blood were identified in each selected PHC. These workers were stratified into professional categories, such as doctors, nurses, and lab technicians. A proportional random sampling method was then employed within each category to select the final sample of participants.

Collection Process: The research team engaged two health worker research assistants fluent in the local dialect. After receiving training on the study's objectives and data collection techniques, the assistants ensured the completion and return of questionnaires. The researchers supervised their work to guarantee accurate data collection.

Data Analysis: Statistical analysis was performed using Statistical Package for the Social Sciences software (SPSS) Version 21. Descriptive statistics were employed to summarize demographic

characteristics, knowledge levels, and risk perception. Frequency tables and charts were used to summarize the sociodemographic characteristics and doses of hepatitis B vaccines received. The knowledge of the health care workers on hepatitis was this study's first objective, and this was assessed using 23 stems of yes-or-no knowledge-based questions focusing on the causes of hepatitis B, its knowledge, treatment, and prevention of the hepatitis virus. Risk perception was gauged using a yes-or-no-based question. For all tests, a p-value of less than 0.05 was considered significant.

Ethical approval was obtained from the FCTA ethical review committee. Participants were given comprehensive information regarding the study's goal, methods, risks, and benefits, with an emphasis on voluntary participation. Confidentiality was preserved, and all obtained data were anonymized and securely kept. Written consent was obtained before the administration of the questionnaire.

Results

Over a third of respondents are within the 22-32 years range (44.5%), mean age is 36.55 years, with a standard deviation of ±10.36 years. Most respondents (64.4%) have between 1-8 years of experience. Majority are female (63.9%) and (53.4%) married. A significant majority, 97.9%, have heard of HBV. When identifying the nature of HBV, 93.7% correctly identified it as a virus. A substantial number of respondents (89.0%) were aware that HBV is blood-borne and can be transmitted from mother to child (80.1%) and through sexual contact (91.1%). Majority 87.4% of the health workers know that HBV is preventable, and 76.4% believe it is treatable. A high percentage (93.7%) are familiar with the HBV vaccine, and 95.8% have been vaccinated.

Table 1: Overall knowledge score of health workers regarding Hepatitis B Virus

Knowledge	Frequency (n = 191)	Percentage (%)
Overall knowledge score		
≥50	178	93.2
<50	13	6.8
Mean ± SD	87.3±37.12	

Key: Good knowledge ≥50%; Poor knowledge <50%

From Table 1 above: A large majority have good knowledge, indicated by scores of 50% or higher. In contrast, 6.8% (13 individuals) have poor knowledge, with scores below 50%. The average knowledge score among the participants is 87.3, with a standard deviation of 37.12. This indicates that most health workers possess a relatively high level of knowledge about HBV.

Table 2: Risk Perception of Participants on Hepatitis B Virus and Vaccine

Risk Perception	Frequency (n = 191)
Hepatitis B is a serious Public Health problem.	
Yes	138(72.3)
No	53(27.7)
Primary healthcare (PHC) workers are at risk of contracting and spreading the Hepatitis B virus	
Yes	139(72.8)
No	52(27.2)
Patients should be tested for the Hepatitis B virus before they receive healthcare	
Yes	104(54.5)
No	87(45.5)
Are you exposed to blood products and body fluid in the hospital	
Yes	169(88.5)
No	22(11.5)
Apply standard precautions while attending to patients and handling body fluids	
Yes	160(83.8)
No	31(16.2)
Take measures after exposure	
Yes	172(90.1)
No	19(9.9)
Can Hepatitis B vaccine be given as post-exposure prophylaxis	
Yes	141(73.8)
No	50(26.2)
Do you believe despite the availability of a highly effective vaccine against Hepatitis B virus, approximately 2 billion people worldwide (1/3rd of the world) are infected	
Yes	114(50.7)
No	77(40.3)

From table 2 above: Most of the participants, 72.3%, believe that hepatitis B is a serious public health problem. Similarly, 72.8% recognize that primary healthcare workers are at risk of contracting and spreading HBV. About half of the respondents (54.5%) believe it is necessary to test patients before receiving healthcare. The majority (88.5%) report being exposed to blood products and body fluids in the hospital setting. 83.8% of respondents apply standard precautions when handling patients and body fluids. After potential exposure to HBV, 90.1% take appropriate. 73.8% believe that the hepatitis B vaccine can be used for post-exposure prophylaxis. Lastly, 50.7% of participants believe that despite the availability of a highly effective vaccine, approximately 2 billion people worldwide are still infected with HBV.

Table 3: Overall risk perception score of participants on Hepatitis B Virus and Vaccine

Risk Perception	Frequency (%)
Overall risk perception score	
≥50	139 (72.8)
<50	52 (27.2)
Mean ± SD	74.94±25.70

Key: High perception ≥50%; Low perception <50% n=191

From table 3 above: The majority (72.8%) of the respondents have high risk perception, with scores above 50%. The average risk perception score among the participants is 74.94, with a standard deviation of ±25.70. This indicates that most participants have a high level of awareness and concern about the risks associated with HBV and its vaccine.

Table 4: Association between sociodemographic characteristics and knowledge of health workers regarding Hepatitis B Virus.

Variables	Knowledge of Health Workers			χ^2	df	p-value
	Good n=178	Poor n=13	Total n=191			
Occupation						
CHEW	102 (88.7)	13 (11.3)	115	9.219	4	0.056
CHO	24 (100)	0 (0.0)	24			
Doctor	1 (100)	0 (0.0)	1			
Laboratory Scientist	20 (100)	0 (0.0)	20			
Nurse	31 (100)	0 (0.0)	31			
Age range (years)						
22 - 32	83 (97.6)	2 (2.4)	85	18.586	3	0.001*
33 - 43	49 (81.7)	11 (18.3)	60			
44 - 54	32 (100)	0 (0.0)	32			
55 - 65	14 (100)	0 (0.0)	14			
Years of experience						
1 - 8	114 (92.7)	9 (7.3)	123	3.640	3	0.303
9 -16	31 (88.6)	4 (11.4)	35			
17 - 24	23 (100)	0 (0.0)	23			
25 - 32	10 (100)	0 (0.0)	10			
Gender						
Female	114 (93.4)	8 (6.6)	122	0.033	1	0.856
Male	64 (92.8)	5 (7.2)	69			
Marital status						
Single	84 (94.4)	5 (5.6)	89	0.371	1	0.542
Married	94 (92.2)	8 (7.8)	102			
Religion						
Christian	111 (100)	0 (0.0)	111	19.355	1	0.001*
Muslim	67 (83.8)	13 (16.2)	80			

*Statistically significant ($p<0.05$) n = 191

From table 4 above: All CHOs, doctors, laboratory scientists, and nurses had good knowledge (χ^2 = 9.219, p = 0.056), indicating no significant association between occupation and knowledge. Age significantly affects knowledge (χ^2 = 18.586, p = 0.001), with younger workers (22-32 years) showing better knowledge. Experience does not significantly impact knowledge (χ^2 = 3.640, p = 0.303), though most workers across all experience levels had good knowledge. Gender shows no significant association (χ^2 = 0.033, p = 0.856). Marital status also shows no significant impact (χ^2 = 0.371, p = 0.542). Religion significantly influences knowledge (χ^2 = 19.355, p = 0.001), with all Christians showing good knowledge.

Table 5: Association between sociodemographic characteristics and risk perception of participants on Hepatitis B Virus and vaccine

Variables	Risk perception			χ^2	Df	p-value
	Negative (n=52)	Positive (n=139)	Total (n=191)			
Occupation						
CHEW	50 (43.5)	65 (56.5)	115	39.109	4	0.001*
CHO	2 (8.3)	22 (91.7)	24			
Doctor	0 (0.0)	1 (100)	1			
Laboratory Scientist	0 (0.0)	20 (100)	20			
Nurse	0 (0.0)	31 (100)	31			
Age range (years)						
22 – 32	23 (27.1)	62 (72.9)	85	1.771	3	0.621
33 – 43	19 (31.7)	41 (68.3)	60			
44 – 54	6 (18.8)	26 (81.2)	32			
55 – 65	4 (28.6)	10 (71.4)	14			
Years of experience						
1 - 8	38 (30.9)	85 (69)	123	4.249	3	0.236
9 -16	6 (17.1)	29 (82.9)	35			
17 - 24	7 (30.4)	16 (69.6)	23			
25 - 32	1 (10.0)	9 (90.0)	10			
Gender						
Female	19 (15.6)	103 (84.4)	122	23.139	1	0.001*
Male	33 (47.8)	36 (52.2)	69			
Marital status						
Single	24 (27.0)	65 (73.0)	89	0.006	1	0.940
Married	28 (27.5)	74 (72.5)	102			
Religion						
Christian	13 (11.7)	98 (88.3)	111	32.191	1	0.001*
Muslim	39 (48.8)	41 (51.2)	80			

Table 5 above shows: There are significant associations between various factors and the risk perception of HBV among health workers. Occupation is significantly associated (χ^2 = 39.109, p = 0.001); most CHEWs (56.5%) had a positive risk perception, while nearly all CHOs (91.7%), laboratory scientists, and nurses had a positive risk perception. Age is not significantly associated (χ^2 = 1.771, p = 0.621), although younger workers had higher positive risk perceptions. Experience also shows no significant association (χ^2 = 4.249, p = 0.236), despite more experienced workers generally having negative risk perceptions. Gender is significantly associated (χ^2 = 23.139, p = 0.001), with males having higher positive risk perceptions compared to females. Marital status shows no significant association (χ^2 = 0.006, p = 0.940). Religion is significantly associated (χ^2 = 32.191, p =

0.001), with Muslims having higher negative risk perceptions compared to Christians.

Discussion

This study explored the knowledge and risk perception of hepatitis B virus (HBV) and the HBV vaccine among healthcare workers (HCWs). The mean age of participants was 36.55 ± 10.3 years, aligning with findings from similar local studies in Nigeria and likely reflecting the predominance of middle-aged personnel in active service (Abubakar et al., 2018). In contrast to previous studies where nurses and doctors formed the majority of respondents (Abubakar et al., 2018; Babalola et al., 2015), this study recorded a higher number of Community Health Extension Workers (CHEWs). This is attributable to the study's focus on primary healthcare facilities, which typically employ more CHEWs compared to the secondary and tertiary levels where nurses, doctors, and laboratory scientists are more prevalent. Additionally, the underemployment of higher-level professionals in primary healthcare centers in the FCT may explain this difference.

The study revealed that the majority (93.2%) of HCWs demonstrated good knowledge of HBV, with 93.7% correctly identifying transmission routes such as exposure to infected blood and body fluids. These figures are significantly better than those reported in studies from Southern Nigeria (Adekanle et al., 2015; Oni et al., 2022; Kesieme et al., 2011), where notable knowledge gaps among HCWs were documented. However, some misconceptions persist—2.6% believed HBV could be transmitted through mosquito bites, 4.7% through handshakes, and 19.4% through contaminated food or water. These misconceptions underscore the urgent need for ongoing education to dispel myths and enhance prevention strategies. Factors significantly associated with knowledge levels included cadre (particularly being a CHEW), younger age, and religion. CHEWs were more likely to demonstrate poor knowledge, possibly due to their classification as lower-level health workers despite their wide range of responsibilities, including immunizations, antenatal care, and delivery services. Similarly, younger HCWs may still be in the process of acquiring practical experience. These findings highlight the need for targeted and continuous training across all healthcare cadres.

Risk Perception: The study also showed a high level of positive risk perception, with 72.3% recognizing HBV as a serious public health threat. Additionally, 88.5% reported regular exposure to blood products and body fluids, indicating awareness of their occupational vulnerability. These findings align with a study by Isah et al. (2023), where 82.1% of HCWs acknowledged their elevated risk of HBV infection. A similar study in Ghana reported even higher levels of risk perception, ranging from 87.8% to 95.3%, suggesting robust awareness among healthcare providers in that setting. Nevertheless, about a quarter of respondents in our study demonstrated negative risk perception, indicating a considerable gap. This is further emphasized by the study by Daboer et al. (2013), in which only 57.6% of HCWs acknowledged their vulnerability to HBV. These regional disparities underscore the need for a comprehensive national policy on HBV education and prevention targeting all levels of the healthcare system.

Conclusion

This study provides valuable insights into the knowledge and risk perception of HBV among primary healthcare workers in Nigeria. Overall, a high level of knowledge and positive risk perception was observed, although notable misconceptions and differences across cadres persist. Occupation and age emerged as significant determinants of HBV awareness and perception. In light of these findings, we recommend the development of national HBV prevention policies and training guidelines tailored to each healthcare worker cadre. Structured and regular educational programs should be integrated into ongoing professional development to bridge knowledge gaps. Furthermore, future research should investigate the uptake of the HBV vaccine and how it is influenced by healthcare workers' knowledge and risk perception.

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