Original Article

Sero-Prevalence And Knowledge Of Hepatitis B Viral Infection Among Intending Kogi State Hajj Pilgrims For The Year 2025

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ABSTRACT

Hepatitis B viral infection is a major global public health threat, as the second deadliest communicable disease after tuberculosis, with about 254 million people living with the virus, 6,000 people infected each day and 2900 deaths per day. Nigeria is classified as a hyper endemic area and holds the third-highest hepatitis burden globally. Poor resource allocation has led to a poor surveillance system and limited data which has constrained a comprehensive understanding of the burden of HBV and impeded the implementation of effective prevention and treatment strategies geared towards the elimination of HBV infection in Nigeria. This study was a retrospective analysis of the records of 535 intending 2025 Hajj pilgrims from Kogi state, who were subjected to HBV serological screening test as part of their pre-Hajj medical screening exercise. Their biodata, socio-demographic data, knowledge of HBV, viral hepatitis, vaccination and HBSAg results were analyzed. Result showed participants means age of 40.5 years, 312 (58.3%) were males, while 223 (41.7%) were females. Prevalence of HBV infection was 15 (2.8%), 13 (86.7%) male and 2 (13.3%) female, 489 (91.4%) of the subjects reported no previous knowledge of HBV and viral hepatitis, 13(86.7%) of those who tested positive to HBsAg had no previous knowledge of HBV infection and only 8 (1.5%) participants were vaccinated. The study shows low prevalence of HBV infection, low level of knowledge and awareness of hepatitis viral infection and low rate of adult HBV vaccination.

Keywords: HBV infection knowledge, Hepatitis B prevalence, Kogi, Nigeria

INTRODUCTION

Hepatitis B virus (HBV) is a member of the Hepadnaviridae family of viruses and an established oncogenic virus more infectious than HIV and HCV, known for causing chronic liver infection, liver cirrhosis and hepatocellular carcinoma with its consequent severe debilitating ill health and high cost of treatment that is out of reach of the common man globally. Hepatitis B viral infection is a major global public health threat, as the second deadliest communicable disease after tuberculosis, with about 254 million people living with the virus, 6,000 people infected each day and 2900 deaths per day.[1] Nigeria holds the third-highest hepatitis burden globally and is classified as a hyper endemic area with a prevalence of 5.4% - 13.6% and one of the focus countries of World health organization (WHO) on the elimination of hepatitis.[1,2,3,4]

The inadequate resource allocation to the Nigeria health sector has led to a poor surveillance system and limited data which have constrained a comprehensive understanding of the burden of HBV and impeded the implementation of effective prevention and treatment strategies geared towards the elimination of HBV infection, [2] in line with the WHO goal of global elimination of HBV infection in 2030.[1]

Despite recent data indicating the declining trends in the prevalence of HBV infection in Nigeria, 325,000 new infections were recorded in 2022, [5] and a high mortality of about 46,000 deaths were attributed to HBV infection equating to 21 deaths per 100,000 population. [2]

Although guidelines and strategic directions have been developed to guide Nigeria's response to viral hepatitis, important barriers remain in place, which must be surmounted to reach elimination targets.[6] These barriers include geographical and financial barriers to accessing testing and treatment and the availability of alternative tests and treatment providers that lack connection with the health system and efficacy for treatment outcomes and unless something drastic is done, Nigeria and most of Africa stands the risk of missing the SDGs Goal 3.3 and the WHO "Global Health Sector Strategy on Viral Hepatitis Elimination" target for 2030.[6,7]

In order to achieve the goal of eliminating HBV in Nigeria, there is a need for adequate funding for both national and state level programmes on hepatitis so as to improve; advocacy and level of awareness, diagnostic and treatment

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services and accessibility to vaccines.

There is inadequate data especially in the rural areas on the burden of the disease, public awareness level and HBV vaccination in adults. The incidence and knowledge of HBV in our study population is not known.

The aim of this study was therefore to determine the sero-prevalence, knowledge and awareness of hepatitis B viral infection among intending Kogi state hajj pilgrims for the year 2025.

MATERIALS AND METHODS

This study was a retrospective analysis of the record of biodata, sociodemographic data, HBV serological data, HBV knowledge and vaccination status of 535 intending 2025 Hajj pilgrims from Kogi state who consented and were subjected to Hepatitis B viral serological screening test as part of their pre-Hajj medical screening exercise over a 4-day period (9^{th} – 12^{th} May 2025), a month prior to their departure for the Kingdom of Saudi Arabia to perform the 2025 Hajj exercise. Their biodata, socio-demographic data, knowledge of HBV and viral hepatitis, vaccination status along with the results of their HBV screening test were obtained, collated and analyzed using Excel.

Five (5) milliliters of blood samples were aseptically drawn from the antecubital vein of each consenting participant into a well-labeled EDTA bottle. The blood samples were left to stand for 25 min in order for the red blood cells to sediment, leaving the supernatant serum above the sediments. The supernatant serum was extracted and assayed for the presence of HBsAg using the LabACON^{R} (Hangzhou Biotest Biotech Co., Ltd., China) test kit in line with the instructions of the manufacturer. The kit has sensitivity and specificity of 99.9 and 99.0% respectively which are similar to other commercial figures

The test is a rapid chromatographic immunoassay for the qualitative detection of HBsAg in serum. It is a qualitative membrane strip based immunoassay for the detection of HBsAg. In this test procedure, HBsAg antibody is immobilized in the test line region of the strip. On adding 2 drops of serum specimen in the specimen area, it reacts with HBsAg coated antibody particles that have been applied to the specimen pad. This mixture migrates chromatographically along the length of the test strip and interact with the immobilized HBsAg antibody. Presence of HBsAg in the specimen will lead to an appearance of a colored line in the test region that is read and interpreted as positive result after 15 minutes. Absence of HBsAg in the specimen will show no colored line in this region, indicating a negative result after 15 minutes. For every test, a colored line, serving as procedural control, will always appear at the control line region indicating that proper volume has been added and membrane wicking has occurred. Control line fails to appear: insufficient specimen volume or incorrect procedural techniques.

Inclusion criteria

Data of all intending 2025 Hajj pilgrims from Kogi state

Exclusion criteria

Participants who were not intending 2025 Hajj pilgrims from Kogi state

Data analysis

Data was analyzed using Excel Sheet 2013. Descriptive statistics (frequency, percentage) was used to summarize prevalence and other statistical distributions

Ethical Considerations

Ethical approval was obtained, data was anonymized and handled with confidentiality in compliance with ethical standards for secondary data use.

RESULTS

A total of 535 subjects were screened for HBsAg in this study. Three-hundred and twelve 312 (58.3%) of the subjects were males, while 223 (41.7%) were females. Five 5 (1.0%) of the subjects belonged to Age group 15 – 25 years, 34 (6.3%) to Age group 26 – 35 years, 227 (42.4%) to Age group 36 – 45 years, 161 (30.1%) to Age group 46 – 55 years, 66 (12.3%) to Age group 56 – 65 years, 24 (4.5%) to Age group 65 years and above, and 18 (3.4%) had no specified age. 81 (15.1%) of the subjects were from Kogi Central Senatorial District, 95 (17.8%) from Kogi East, and 359 (67.1%) from Kogi West. 243 (45.4%) of the subjects were Fulani by tribe, 87 (16.3%) Igala, 58 (10.8%) Ebira, 54 (10.1%) Kupa, 47 (8.8%) Kakanda, 15 (2.8%) Nupe, 14 (2.6%) Hausa, 8 (1.5%) Yoruba, 3(0.6%) Ganagana, 2(0.4%) Bassa, 2(0.4%) Ogori, 2(0.4%) Gwari and 9(1.7%) others. Four hundred and thirteen 413 (77.2%) had no formal education, 10 ((1.9%) had primary education, 35 (6.5%) had secondary education, and 77 ((14.4%) had tertiary education (P value = 0.40133). Four hundred and eighty-nine (91.4%) of the subjects reported no previous knowledge of HBV and viral hepatitis, while 46 (8.6%) had previous knowledge of HBV and the infection. Five hundred and twenty-seven had not previously received HBV vaccination, while 8 had received complete doses of HBV vaccine

A total of 15 subjects tested positive for HBsAg, giving a prevalence of 2.8%. 13 (86.7%) of those who were positive for HBsAg were males, while 2 (13.3%) were females (P = 0.023895), 5 (33.3%) of the subjects who tested positive were from Kogi Central, 2 (13.4%) from Kogi East, and 8 (53.3%) from Kogi West. One (6.7%) of the subjects who tested positive for HBsAg belonged to age range 15 – 25 years, 10 (66.6%) to age range 36 – 45 years, 3 (20%) to age range 46 – 55 years, 1 (6.7%) to 56 – 65 years

Of the 15 who tested positive for HBsAg, 11 (73.3%) were Fulani by tribe, 2 (13.3%) were Hausa, 1 (6.7%) was Ebira, and 1 (6.7%) was Kupa.

Twelve (80%) of the 15 subjects that tested positive for HBsAg had no formal education, 1 (6.7%) primary education, and 2 (13.3%) had tertiary education.

13 (86.7%) of those who tested positive to HBsAg had no previous knowledge of HBV and its infection, while 2 (13.3%) had previous knowledge.

None of those who tested positive to HBsAg had received any previous dose of HBV vaccination.

Table 1. Bio and sociodemographic data distribution of the subjects

Variables	Distribution
Age	
15 - 25	5 (1.0)
26 - 35	34 (6.3)
36 - 45	227 (42.4)
46 - 55	161 (30.1)
56 - 65	66 (12.3)
>65	24 (4.5)
Unspecified	18 (3.4)
Total	535 (100)
Gender	
Male	312 (58.3)
Female	223 (41.7)
Total	535 (100)
Senatorial Districts	
Kogi Central	81 (15.1)
Kogi East	95 (17.8)
Kogi West	359 (67.1)
Total	535 (100)

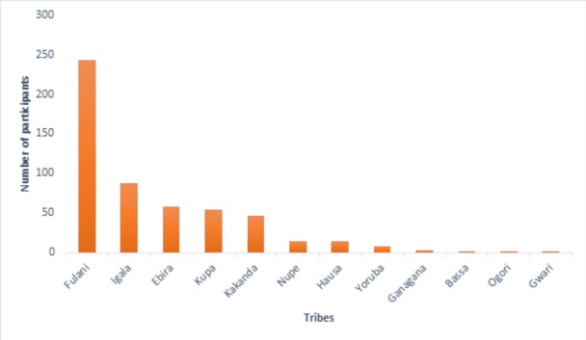

Fig 1: Distribution of participants by Tribe

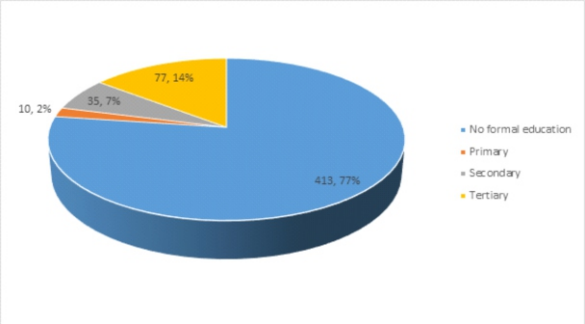

Fig 2: Educational Status of Participants

Table 2. Prevalence of HBsAg among the subjects' variables

Variables	Positive n (%)	Negative n (%)	Total n (%)	
Age				
15 - 25	1 (20)	4 (80)	5 (100)	$X^2 = 10.6791$
26 - 35	0 (0)	34 (100)	34 (100)	df = 6
36 - 45	10 (4.4)	217 (95.6)	227 (100)	P = 0.0988
46 - 55	3 (1.9)	158 (98.1)	161(100)	
56 - 65	1 (1.5)	65 (98.5)	66 (100)	
. . .	0 (0)	24 (100)	24 (100)	
Unspecified	0 (0)	18 (100)	18 (100)	
Total	15 (2.8)	520 (97.2)	535 (100)	
Senatorial Districts				
Kogi Central	5 (6.2)	76 (93.8)	81 (100)	$X^2 = 3.9800$
Kogi East	2 (2.1)	93 (97.9)	95 (100)	df = 2
Kogi West	8 (2.2)	351 (97.8)	359 (100)	P value = 0.1367
Total	15 (2.8)	520 (97.2)	535 (100)	
Tribe				
Fulani	11 (4.5)	232 (95.5)	243 (100)	
Igala	0 (0)	87 (100)	87 (100)	$X^2 = 14.6362$
Ebira	1 (1.7)	57 (98.3)	58 (100)	Df = 11
Kupa	1 (1.9)	53 (98.1)	54 (100)	P value = 0.19980
Kakanda	0 (0)	47 (100)	47 (100)	
Nupe	0 (0)	15 (100)	15 (100)	
Hausa	2 (14.3)	12 (85.7)	14 (100)	
Yoruba	0 (0)	8 (100)	8 (100)	
Ganagana	0 (0)	3 (100)	3 (100)	
Bassa	0 (0)	2 (100)	2 (100)	
Ogori	0 (0)	2 (100)	2 (100)	
Gwari	0 (0)	2 (100)	2 (100)	
Total	15 (2.8)	520 (97.2)	535 (100)	

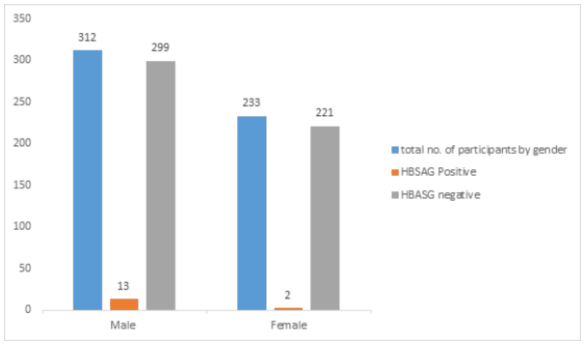

Fig 3: Prevalence of HBsAg According to Gender

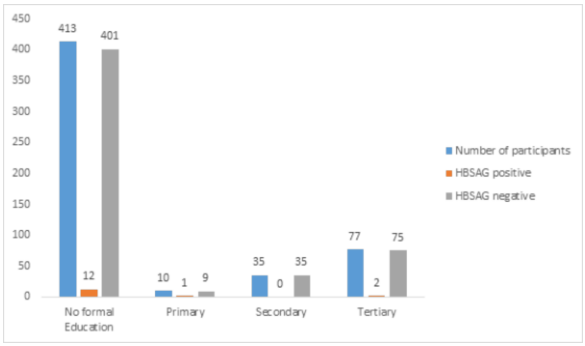

Fig 4: Prevalence of HBsAg According to Educational Status

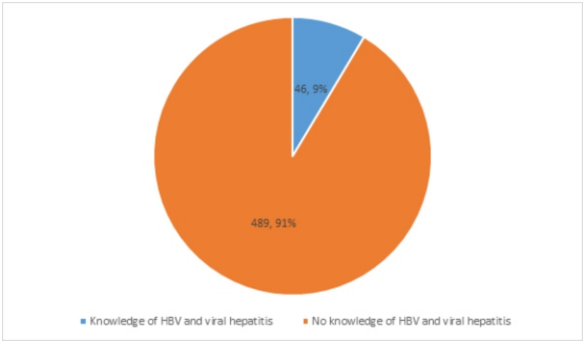

Fig 5: Knowledge of hepatitis B virus and viral hepatitis infection

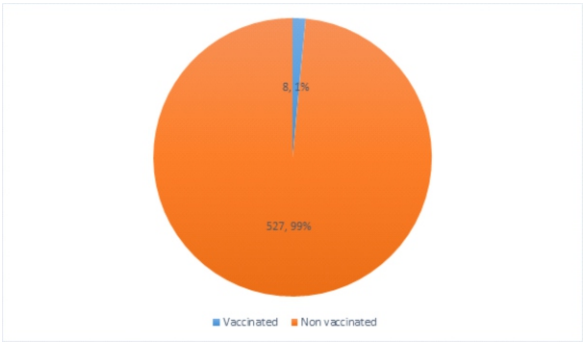

Fig 6: Hepatitis B virus vaccination status

DISCUSSION

Our study reported a prevalence of 2.8%, this supports the declining trends in the prevalence of HBV infection in Nigeria. Enitan et al, in Ogun state and Odukoya et al., in

Lagos State also reported similar low prevalence of 1.5% and 2.1% respectively. [9, 10] Several studies reported on the prevalence of HBV among sub-populations in Nigeria with estimates ranging from 5.4% to13.6% depending on the population studied and method used.[2,3,4,7,8] High prevalence have been observed in vulnerable and high risk populations such as children prison inmates, commercial sex workers and healthcare workers, [11, 12, 13, 14] while some studies have also observed low prevalence among healthcare workers. [15,16,17] The age group 36-45 years in our study had the highest prevalence (66.7%) of HBV infection, this is similar to several studies as well as the NAIIS report of the highest prevalence in adults among persons 35–39years. [2,7,18,19]

Our study reported a higher prevalence rate in men 86.7% than in women 13.7%. Studies have shown a gender disparity in the prevalence of HBV in Nigeria. Onyekwere et al., reported a prevalence of 8.1% in men, which was more than twice that of women (3.2%). [2,20] This pattern was corroborated by a national study conducted by Olayinka et al., which found a prevalence of 14.5% in men compared with 8.5% in women[2, 21]. Similar disparity was also observed in the Nigeria HIV/AIDS Indicator and Impact Survey (NAIIS) report, with a prevalence of 10.3% in men and 5.8% in women .[18,19]

Our study population had a very low formal education level, 77.2% had no formal education, while this may not be a measure of literacy which is the ability to read and write,[22] educational level and literacy are strongly correlated. Majority of the study participants (91.4%) reported no previous knowledge of HBV and viral hepatitis. Some studies have also shown similar high rate of lack of knowledge of hepatitis B viral infection. [10] Likewise 80% of our study participants who tested positive for HBsAg had no formal education. Reports on the prevalence of HBV by educational attainment are mixed while some studies have reported a slightly higher prevalence among more educated people, others reported a higher prevalence among the populace with no formal education. Olayinka et al., found a higher prevalence of HBV among individuals with no formal education (13.1%) compared with those with tertiary education (12.1%) [10, 21] in the NAIIS report, the prevalence of HBV among people with tertiary education (8.6%) was slightly higher than those with primary education (7.7%) and no formal education (7.2%).[18]

Alarmingly, only 1.0% of our study participants were vaccinated against HBV, this is similar to studies in Lagos state and in Nasarawa state were the HBV vaccination rate in adults was 2.5%. and 1.0% respectively.[10, 23] This is not surprising, as highlighted by several factors; low level of awareness, general misinformation, religious and socio-cultural beliefs regarding vaccines,[24,25] high out of pocket cost of testing and vaccination and the tedious multi-dose schedule for HBV vaccine which requires three clinic visits weeks apart. High adult HBV vaccine uptake have mostly been observed among health care workers in Nigeria.[17]

Conclusion: Although, the outcome of our study showed a low prevalence of hepatitis B infection, there was a low level of knowledge and awareness of HBV and hepatitis viral infection and a very low literacy rate among the study population. The rate of adult HBV vaccination was also abysmally low among the study population.

RECOMMENDATIONS

A targeted approach to eliminate hepatitis B viral infection through mass advocacy, mass testing and screening, and vaccination of sero-negative individuals in the community is required. The focus should be on the socially disadvantaged populations such as, persons with disabilities, internally displaced people/ migrants, rural populations and those at high risk should be prioritized. A periodic national household survey to monitor the prevalence of HBV in Nigeria is necessary. The integration of hepatitis component into the already existing platform "National AIDS indicator and impact survey" (NAIIS), [7] will provide accurate and comprehensive data for stakeholders to facilitate efficient use of health care resources, to strengthen the weak federal and state level programs on hepatitis among which is the hepatitis awareness advocacy, mass testing and vaccination, diagnosis and treatment. Currently the Nigerian expanded program on immunization is limited to children only. Free HBV screening and vaccination should be made accessible to the adult population, thereby reducing the high out of pocket cost for screening, vaccination, diagnosis and treatment. Further research is needed to highlight the relationship between HBV burden and socio economic indicators such as income, educational status, religious and cultural beliefs that may hinder testing and vaccination. There is also need for more systematic reviews and meta-analysis on the current decreasing trend in the prevalence of HBV infection in Nigeria.

Study limitations

Although our study participants were from all the local government areas of Kogi state, they were all adult Muslim pilgrims, therefore this may not be a true representation of the state population in terms of religion and tribe.

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Conflicts of interest

There are no conflicts of interest among the authors.

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