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PASSIVE SURVEILLANCE OF HEPATITIS B AMONG INDIVIDUALS ATTENDING SABON TASHA AND IDON GENERAL HOSPITALS, KADUNA STATE, NIGERIA

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ABSTRACT

Hepatitis B virus (HBV) infection is responsible for approximately one million deaths globally each year. Hepatitis refers to inflammation of the liver, with the most common causative agents being one of the five hepatitis viruses: A, B, C, D and E. Among these, the Hepatitis B virus is the most prevalent and severe liver infection worldwide. HBV is highly contagious-50 to 100 times more infectious than HIV. This study aimed to determine the seroprevalence of HBV infection in the study area, assess its association with socio-demographic factors and identify existing control measures among an apparently healthy population attending two General Hospitals in Kaduna State, Nigeria. A descriptive cross-sectional study was conducted over six months from January to June 2021. A total of 475 participants, including healthcare workers, were randomly selected from Sabon Tasha and Idon General Hospitals. Data were collected using semi-structured, interviewer-administered questionnaires alongside serological testing. Participants ranged in age from 15 to 44 years, with a higher proportion of females than males. The overall HBV seroprevalence was 18.8% in Sabon Tasha and 22% in Idon. A statistically significant association was observed between HBV prevalence and age in both hospitals (p-values: 0.006 and 0.018, respectively; 95% CI = 0.05). The study also revealed poor adherence to infection control practices, including low use of retractable syringes and incomplete HBV vaccination among healthcare workers. These lapses are particularly concerning, as healthcare workers are pivotal in disease prevention and public education. The findings underscore the urgent need for a universal HBV vaccination policy targeting all healthcare workers. Additionally, further studies are recommended to assess the knowledge, attitude and practices related to HBV among both health professionals and the general population across healthcare facilities in Kaduna State.

KEYWORDS

Hepatitis B. Virus, Seroprevalence, Passive surveillance, Kaduna state, General hospitals and Vaccination.

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INTRODUCTION

Hepatitis refers to inflammation of the liver. The liver is a vital organ responsible for processing nutrients, filtering blood and combating infections. When the liver becomes inflamed or damaged, its normal functions can be impaired. Hepatitis can

result from excessive alcohol consumption, toxins, certain medications, autoimmune disorders and infectious agents, most commonly viruses. Among these, viral hepatitis caused by one of the five hepatitis viruses (A, B, C, D and E) is the most prevalent. Hepatitis B virus (HBV), in particular, poses a major global public health concern (Centers for Disease Control and Prevention, 2021)[1].

In Nigeria, hepatitis B is often referred to as a "silent epidemic" due to the limited attention it receives from both the public and government despite its serious health consequences. According to the World Health Organization (WHO)[2], HBV is 50 to 100 times more infectious than the Human Immunodeficiency Virus (HIV), with an estimated 600,000 global deaths annually resulting from hepatitis B complications such as liver cirrhosis and hepatocellular carcinoma.

HBV is a potentially life-threatening liver infection and a significant global health challenge. Although it causes chronic liver disease, awareness and prevention efforts in Nigeria remain insufficient (Maryam *et al*, 2014)[3]. Recent statistics indicate that approximately 23 million Nigerians are infected with HBV, making Nigeria one of the countries with the highest burden of HBV infection globally. About 5% of the world population are asymptomatic carriers, and over 350 million people worldwide are chronic HBV carriers. Chronic hepatitis B is a major risk factor for liver-related deaths, especially from cirrhosis and liver cancer. The infection has reached hyperendemic levels in Nigeria, with hepatitis B surface antigen (HBsAg) seroprevalence rates estimated to range between 10% and 40%.

This study aims to assess the prevalence and awareness of HBV infection among individuals attending selected healthcare facilities in Kaduna State, Nigeria and to evaluate the public health implications.

The Nigerian Hepatitis Survey Project also reports that HBV is a blood-borne and sexually transmitted virus spread through contact with infected blood or body fluids such as saliva, sweat, semen, vaginal secretions, breast milk, urine, and feces. Transmission may occur through sharing needles, unscreened blood transfusions (especially before 1975), tattooing, body piercing, mother-to-child transmission during childbirth, surgical procedures, occupational exposure, or sexual contact. HBV shares several transmission routes with HIV.

Currently, four main modes of HBV transmission are recognized (Viral Hepatitis Prevention Board, 1996):

Mother-to-child transmission (perinatal),

Horizontal transmission through close contact with infected individuals,

Sexual transmission, and

Parenteral exposure through contact with contaminated blood or body fluids.

HBV can survive outside the human body for at least seven days and remains capable of causing infection during that time. Thus, indirect transmission through contaminated surfaces or personal items-such as toothbrushes, baby bottles, razors, eating utensils, or hospital instruments—is also possible.

Hepatitis B affects individuals of all age groups, but infections are more common among young adults, often acquired perinatally or through risky behaviors such as intravenous drug use. Most individuals infected with HBV clear the virus naturally within six months and develop immunity. However, individuals who fail to clear the virus after this period are considered chronically infected. The risk of death from HBV-related liver disease or cirrhosis is approximately 25% among those infected during childhood. In developing countries, 8-10% of the general population is chronically infected, with most acquiring the virus in infancy (WHO, 2016)[2].

In Africa, an estimated 60 million people are chronically infected with HBV, with a prevalence rate of approximately 6.2%. New infections are most common among children, with transmission mainly occurring perinatally. Globally, the prevalence of chronic HBV infection among children under five years of age declined from 5% in the pre-vaccine era (1980s-early 2000s) to less than 1% in 2019, owing to widespread immunization. The HBV vaccine is now part of the WHO Expanded Programme on Immunization (EPI) and has been progressively implemented across Africa since 1995, alongside measures to prevent mother-to-child transmission.

This study was aimed at understanding how widespread Hepatitis B virus (HBV) infection is among people visiting Sabon Tasha and Idon General Hospitals in Kaduna State, Nigeria. We aim to explore how various social factors-like age, gender, and occupation-affect the likelihood of HBV infection. Additionally, we want to gauge how much patients and healthcare workers know about HBV, what preventive measures are currently in place, and the vaccination status of healthcare workers, who play a vital role in preventing the disease and educating patients.

The importance of this research is that it can provide valuable insights into the spread of HBV in areas that are often overlooked. In Nigeria, where the prevalence of HBV is high and awareness is low, this information is crucial for making informed public health decisions. The results of this study could help shape targeted awareness campaigns, strengthen infection control practices, and promote policies for universal HBV vaccination specifically for healthcare workers. In doing so, we hope to contribute to broader national and global efforts to reduce the transmission of HBV and improve liver health outcomes for those affected.

MATERIAL AND METHODS

Study Area

The study was conducted in two communities located in southern Kaduna State, Nigeria: Sabon Tasha and Idon General Hospitals. Sabon Tasha General Hospital is situated at latitude 10.463°N and longitude 7.4138°E, with a tropical climate characterized by a distinct wet and dry season. The area records an average annual temperature of 25.2°C (77.4°F) and approximately 998 mm (39.3 inches) of rainfall per year.

Idon General Hospital is also located in southern Kaduna State at approximately latitude 10°06′10.5″N and longitude 7°54′19.9″E. Idon lies 43 miles from Kaduna city and 77 miles from the Federal Capital Territory (FCT), Abuja.

Study Design

This was a descriptive, cross-sectional study conducted simultaneously at Sabon Tasha and Idon General Hospitals over six months from January to June 2021, following the model of Ndams *et al*, (2008)[4].

Study Population

The study population included individuals attending the Outpatient Departments (OPD) of the two hospitals, comprising both patients and healthcare workers. All participants were approached during their hospital visits and were asymptomatic at the time of enrollment.

Sample Size

A total of 475 participants were randomly selected: 240 from Sabon Tasha and 235 from Idon General Hospitals, including healthcare workers. The sample size was determined based on the formula:

$$n = \frac{Z^2.p(1-p)}{d^2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (i)$$

Where: n = required sample size, Z = standard normal deviate at 95% confidence level (1.96), p = estimated prevalence (assumed 50% for maximum variability) and d = margin of error (0.05).

Inclusion Criteria

Participants included adults and asymptomatic patients attending the hospitals for other conditions but who consented to HBV screening and participation in the study. Only individuals who gave informed consent were enrolled.

Blood Sample Collection and Preparation

Venous blood (5mL) was collected aseptically using sterile disposable syringes on scheduled collection days (Mondays and Tuesdays). The blood was transferred into properly labeled sample bottles and transported to the hospital's immunology laboratory. Samples were allowed to clot and then centrifuged at 3,000rpm for 5 minutes to separate the serum. The extracted sera were stored in 1.25mL screw-cap tubes at -20°C until tested.

Detection of Hepatitis B Surface Antigen (HBsAg)

Detection of HBsAg was performed using a rapid immunochromatographic test kit (commonly referred to as a rapid diagnostic test or RDT). Each test strip was loaded with the participant's serum sample according to manufacturer's protocol.

Interpretation of Results

Positive

Appearance of two distinct pink bands at both the test (T) and control (C) regions indicated the presence of HBsAg.

Negative

A single band appearing only at the control region (C) indicated absence of HBsAg.

Invalid

No band at the control region (C), regardless of the presence or absence of a band at the test region (T), indicated a failed test and required repetition.

Data Analysis

Data collected from both the serological testing and the semi-structured questionnaires were analyzed using SPSS version 23.0. Descriptive statistics were used to summarize demographic variables and prevalence. The Chi-square (χ^2) test was applied to assess significant associations between categorical variables, while odds ratios (ORs) were calculated to estimate the strength of associations. Statistical significance was set at $p < 0.05$ with a 95% confidence interval (CI).

Ethical Considerations

Ethical approval for the study was obtained from the Kaduna State Ministry of Health and the Ethics Review Committee of Kaduna State University (KASU). Further permissions were granted by the management of both Sabon Tasha and Idon General Hospitals. Participation was voluntary and informed consent was obtained from all respondents. Confidentiality and privacy were strictly maintained throughout the study.

RESULTS AND DISCUSSION

Segment Qualities of Respondents

The demographic distribution of respondents revealed that the majority were within the age group of 15-19 years, with females representing a larger proportion in both study sites (64.5% in Idon and 69.6% in Sabon Tasha) (Table No.1). Most participants had secondary-level education and were predominantly housewives or students.

In Table No.2, the highest HBV prevalence at Idon General Hospital was observed among individuals aged 15–19 years (14%), followed by those aged 20-24 years (5.5%). Educationally, the highest prevalence occurred among those with secondary education (11.5%) and by occupation, housewives (9%) and students (6.5%) recorded the most cases. The infection was more prevalent among females (14%) than males (8%).

At Sabon Tasha General Hospital (Table No.3), the overall HBV seroprevalence was 18.8%, with a higher prevalence observed among females (12.0%) compared to males (6.8%). The highest infection rate was found in the 15-19-year age group (11.0%), followed by the 20-24 age group (3.0%). Participants with secondary education had the highest prevalence (10.0%) among educational groups, while those with primary and tertiary education had rates of 5.2% and 3.2%, respectively. By occupation, housewives (7.6%) and students (6.0%) had the highest HBV positivity rates. These findings highlight a higher burden of HBV among younger age groups, females and individuals with lower to mid-level education.

Serological Test: Outcome in Idon General Hospital

The serological assessment at Idon General Hospital revealed a statistically significant association between age and HBV infection status ($p = 0.018$), with the highest seroprevalence observed among individuals aged 15-19 years (11.2%) and 20-24 years (4.4%) (Table No.4). No statistically significant associations were found between HBV positivity and educational status ($p = 0.619$), occupation ($p = 0.979$), or gender ($p = 0.892$). Females constituted the majority of HBV-positive cases (22%) compared to males (6.4%), though the gender-based difference was not statistically significant. These findings suggest that younger age groups are more vulnerable to HBV infection in this setting, underscoring the need for targeted interventions among adolescents and young adults.

Serological Test: Outcome in Sabon Tasha General Hospital

The seroprevalence of HBV among respondents at Sabon Tasha General Hospital was 18.8%, with a statistically significant association between HBV status and age group ($p = 0.006$) (Table No.5). The highest proportion of positive cases was observed among individuals aged 15-19 years (10.8%), followed by those aged 20-24 years (3.2%). No significant associations were found between HBV prevalence and level of education ($p = 0.614$), occupation ($p = 0.652$), or gender ($p = 0.829$). Females accounted for a larger share of both the total respondents and positive cases (12% vs. 6.8% in males), though the gender difference was not

statistically significant. These findings highlight the need for intensified HBV prevention efforts among adolescents and young adults, particularly through routine screening and vaccination programs.

Awareness of Control Measures of HB among Health Personnel

The awareness and practice of hepatitis B virus (HBV) control measures among healthcare personnel were generally higher at Sabon Tasha General Hospital compared to Idon General Hospital (Table 6). Most respondents in both facilities reported using PPE (72% in Idon; 80% in Sabon Tasha) and had access to biohazard containers (80% and 88%, respectively). However, Sabon Tasha demonstrated slightly higher compliance across most indicators, including awareness of hepatitis B vaccination stages (88% vs. 72%) and the use of sharp boxes (76% vs. 60%). Knowledge of the HBV booster dose was relatively lower, particularly in Idon (52%), compared to Sabon Tasha (72%). These findings underscore the need for improved and standardized infection prevention training and resources, especially in under-resourced healthcare settings.

Discussion

In total, 450 patients and 50 healthcare professionals were included in the study, drawn from weekly surveys of apparently healthy individuals attending the outpatient departments (OPD) of the two selected hospitals. The mean age of the patient population was 24.32 ± 0.49 years. The overall seroprevalence of Hepatitis B virus (HBV) recorded in this study was 18.8% and 22% for Sabon Tasha and Idon General Hospitals, respectively. These figures are notably higher than the national prevalence of 12.2% as reported by Olayinka *et al*, (2016)[5], indicating that HBV remains a significant public health concern and potentially endemic within the region, similar to other infectious diseases commonly found in Nigeria. Although HBV infection is often asymptomatic and may go unnoticed, infected adults are at risk of developing severe complications, including liver cirrhosis, hepatocellular carcinoma, and chronic hepatitis B infection.

This study also observed a statistically significant inverse relationship between age and HBV seropositivity ($p<0.018$ and $p<0.006$ for the two hospitals). Younger individuals were more likely to test positive for HBV, suggesting increased susceptibility or recent transmission events within this age group. This trend contrasts with findings from previous studies, which reported a gradual increase in HBV seropositivity with age, attributing it to cumulative exposure over time (Vilibic-Cavlek *et al*, 2014[6], Yamada *et al*[7], 2014, Dark *et al*, 2014[8]). The higher prevalence among younger participants in this study may reflect gaps in early childhood vaccination, risky behaviors in adolescence, or limited awareness and preventive practices among youth.

The majority of respondents who participated in the study were female; however, no statistically significant association was found between gender and the risk of HBV infection. Previous studies, such as that by Olayinka *et al*, (2016)[5], have identified key risk factors for HBV transmission in Nigeria, including uvulectomy, the presence of tribal marks, sharing of sharp objects, and circumcision. Circumcision is commonly performed on nearly all Nigerian males and remains one of the oldest traditional surgical procedures conducted by local practitioners, often in non-clinical settings. In some regions, group circumcision is still practiced (Osifo *et al*, 2009[9], Abdur-Rahman *et al*, 2012[10]). While HBV prevalence was slightly higher among males in this study, the difference was not statistically significant. Nevertheless, similar trends have been reported in Uganda and other sub-Saharan African countries, where chronic HBV infections appear to be more prevalent among males (Bwogi *et al*, 2009[11], Kiire, 1999[12], Martinson *et al*, 1998[13], Burnett, 2005[14]).

Although not statistically significant, the findings also suggest that many of the female respondents showed evidence of prior HBV exposure, as indicated by the presence of anti-HBV markers. Unprotected sexual intercourse remains a well-documented route of HBV transmission, and marriage may increase the likelihood of such exposure due to frequent sexual contact. Supporting this, a study by Bhattarai *et al*, (2014)[15] found that married students had a higher prevalence of HBsAg compared to their single counterparts, possibly indicating the role of sexual transmission in HBV

spread. However, this is not always consistent, as evidenced by the low HBV prevalence (2.9%) among healthcare workers in Rwanda, despite high exposure to blood and body fluids (Kateera *et al*, 2015)[16]. By contrast, higher HBsAg positivity rates have been reported in Uganda (8.1%, Nguyen *et al*, 2010[17]), Tanzania (7.0%, Ogoina *et al*, 2014[18]), and Saudi Arabia (8.7%, Adebamowo *et al*, 1998[19]), indicating regional variations influenced by different transmission dynamics and public health measures.

Healthcare workers are at significantly higher risk of contracting blood-borne infections due to their frequent exposure to blood, body fluids, and contaminated instruments. In this study, the level of awareness regarding HBV among both healthcare workers and the general respondent group was found to be satisfactory. A majority of participants reported the use of personal protective equipment (PPE), such as gloves, as a means of preventing hepatitis B virus (HBV) transmission. This finding contrasts with the study by Afihene *et al*, (2017)[20], which reported low usage of protective gear among healthcare workers, largely due to the unavailability of such materials.

Preventive strategies remain crucial in controlling the spread of hepatitis B, particularly since the infection can be asymptomatic and unknowingly transmitted. Our findings revealed that a significant proportion of healthcare workers had completed the third dose of the HBV vaccination, which is essential for full protection. This contrasts with the report by Bakry *et al*, (2015)[21], where most healthcare workers in Uganda had received only the first dose of the vaccine. However, it is concerning that some healthcare workers in this study had only taken the initial dose and failed to complete the full vaccination series. This observation aligns with earlier reports indicating that many healthcare workers either had not completed or had only recently begun the HBV immunization process. Such trends reflect a persistent gap in HBV vaccine uptake among healthcare workers in sub-Saharan Africa, as noted by Kao and Chen (2002)[22] and emphasize the urgent need for improved vaccination programs and follow-up.

Table No.1: Demographic characteristics of passive (HBsAg) respondents attending OPD clinics at study areas

S.No	Variables	Idon (n = 200)	Sabon Tasha (n = 250)
Age group (years)			
1	15–19	103 (51.5%)	103 (41.2%)
2	20–24	45 (22.5%)	45 (18.0%)
3	25–29	20 (10.0%)	44 (17.6%)
4	30–34	14 (7.0%)	26 (10.4%)
5	35–39	13 (6.5%)	16 (6.4%)
6	40+	5 (2.5%)	16 (6.4%)
Education Level			
7	Illiterate	17 (8.5%)	8 (3.2%)
8	Primary	52 (26.0%)	63 (25.2%)
9	Secondary	117 (58.5%)	134 (53.6%)
10	Tertiary	14 (7.0%)	45 (18.0%)
Occupation			
11	Applicant	11 (5.5%)	11 (4.4%)
12	Business	20 (10.0%)	29 (11.6%)
13	Civil Servant	33 (16.5%)	42 (16.8%)
14	Housewife	84 (42.0%)	111 (44.4%)
15	Student	52 (26.0%)	57 (22.8%)
Gender			
16	Female	129 (64.5%)	174 (69.6%)
17	Male	71 (35.5%)	76 (30.4%)

Table No.2: Distribution of passive HBsAg respondents based on demographics at Idon general Hospital, Kaduna State

S.No	Variables	HBV Negative (n = 156)	HBV Positive (n = 44)	Prevalence (%)
Age (years)/Variables				
1	15–19	74	28	14.0
2	20–24	34	11	5.5
3	25–29	18	2	1.0
4	30–34	12	2	1.0
5	35–39	12	1	0.5
6	40+	6	0	0.0
Education Level				
7	Illiterate	7	1	0.5
8	Primary	45	16	8.0
9	Secondary	94	23	11.5
10	Tertiary	10	4	2.0
Occupation				
11	Applicant	9	2	1.0
12	Business	16	4	2.0
13	Civil Servant	26	7	3.5
14	Housewife	66	18	9.0
15	Student	39	13	6.5
Gender				
16	Female	101	28	14.0
17	Male	55	16	8.0

Table No.3: Distribution of passive HBsAg respondents based on demographics at Sabon Tasha General Hospital, Kaduna State

S.No	Variables	HBV -Ve (n = 203)	HBV +Ve (n = 47)	Prevalence (%)
Age Group (years)				
1	15–19	77	27	11.0
2	20–24	37	8	3.0
3	25–29	40	4	1.6
4	30–34	22	4	1.6
5	35–39	14	2	0.8
6	40+	13	2	0.8
Education Level				
7	Illiterate	7	1	0.4
8	Primary	50	13	5.2
9	Secondary	109	25	10.0
10	Tertiary	37	8	3.2
Occupation				
11	Applicant	9	2	0.8
12	Business	27	2	0.8
13	Civil Servant	33	9	3.6
14	Housewife	92	19	7.6
15	Student	42	15	6.0
Gender				
16	Male	59	17	6.8
17	Female	144	30	12.0
18	Total	203	47	18.8

Table No.4: Serological test outcome among passive HBsAg respondents attending OPD clinic in Idon General Hospital, Kaduna State

S.No	Variables	HBV-Ve (%)	HBV +Ve (%)	Total (%)	χ^2 (OR)	p-value
Age group (years)						
1	15–19	29.6	11.2	40.8		
2	20–24	13.6	4.4	18.0		
3	25–29	7.2	0.8	8.0	27.383	0.018 *
4	30–34	4.8	0.8	5.6		
5	35–39	4.8	0.4	5.2		
6	40+	2.0	0.0	2.0		
Education						
7	Illiterate	2.8	0.4	3.2		
8	Primary	18.0	6.4	24.4	1.783	0.619
9	Secondary	37.6	9.2	46.8		
10	Tertiary	4.0	1.6	5.6		
Occupation						
11	Applicant	3.6	0.8	4.4		
12	Business	6.4	1.6	8.0		
13	Civil Servant	10.4	2.8	13.2	0.441	0.979
14	Housewife	26.4	7.2	33.6		
15	Student	15.6	5.2	20.8		
Gender						
16	Female	40.4	22.0	62.4		
17	Male	11.2	6.4	17.6	0.018	0.892
18	Total (n=200)	62.4	17.6	100.0		

* Significant at $p < 0.05$; χ^2 = Pearson Chi-square; percentages are row percentages.

Table No.5: Serological test outcome among passive HBsAg respondents attending OPD clinic in Sabon Tasha General Hospital, Kaduna State

S.No	Variables	HBV -Ve (%)	HBV +Ve (%)	Total (%)	χ^2 (OR)	p-value
Age Group (years)						
1	15–19	30.8	10.8	41.6		
2	20–24	14.8	3.2	18.0		
3	25–29	16.0	1.6	17.6	50.319	0.006 *
4	30–34	8.8	1.6	10.4		
5	35–39	5.6	0.8	6.4		
6	40+	5.2	0.8	6.0		
Education						
7	Illiterate	2.8	0.4	3.2		
8	Primary	20.0	5.2	25.2	1.803	0.614
9	Secondary	43.6	10.0	53.6		
10	Tertiary	14.8	3.2	18.0		
Occupation						
11	Applicant	3.6	0.8	4.4		
12	Business	10.8	0.8	11.6		
13	Civil Servant	13.2	3.6	16.8	2.458	0.652
14	Housewife	36.8	7.6	44.4		
15	Student	16.8	6.0	22.8		
Gender						
16	Male	23.6	6.8	30.4		
17	Female	57.6	12.0	69.6	0.047	0.829
18	Total (n=250)	81.2	18.8	100.0		

* Significant at $p < 0.05$; χ^2 = Pearson Chi-square; percentages are row percentages.

Table No.6: Awareness and practice of HBV control measures among health personnel in Idon and Sabon Tasha General Hospitals, Kaduna State

S.No	Variables	Idon General Hospital		Sabon Tasha General Hospital	
		Yes (%)	No (%)	Yes (%)	No (%)
1	Use of personal protective equipment (PPE)	18(72%)	7(28%)	20(80%)	5(20%)
2	Availability of sharp boxes	15(60%)	10(40%)	19(76%)	6(24%)
3	Biohazard waste containers	20(80%)	5(20%)	22(88%)	3(12%)
4	Use of retractable syringes and needles	19(76%)	6(24%)	20(80%)	5(20%)
5	Awareness of hepatitis B vaccine stages	18(72%)	7(28%)	22(88%)	3(12%)
6	Knowledge of booster dose	13(52%)	12(48%)	18(72%)	7(28%)

Key: PPE = Personal Protective Equipment

CONCLUSION

The study revealed a high prevalence of Hepatitis B among patients attending outpatient clinics in the two general hospitals in Kaduna State. Key risk factors identified included age, gender, educational level and occupation. Despite a relatively high use of personal protective equipment, several gaps were noted such as expired PPE, inadequate access to retractable needles and low vaccination coverage among healthcare workers, particularly the failure to complete booster doses. These issues contribute significantly to the ongoing transmission of the virus. To address these concerns, the study recommends enforcing a mandatory HBV vaccination policy for all healthcare workers and increasing public awareness to support broader immunization efforts. Retractable needles should be made available to prevent needle-stick injuries, and hygiene protocols must be improved. Education programs targeting healthcare workers and married couples should be intensified, and routine HBV screening should be instituted for all OPD patients. Lastly, further research should be conducted on the knowledge, attitudes, and practices related to HBV in other hospitals across Kaduna State.

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ETHICAL CONSIDERATIONS

The approval for this work was obtained from the Ministry of Health and Human Services Kaduna State, Nigeria, with approval number MCH/ADM/744/VOL 1/517.

CONFLICT OF INTEREST

We have none to declare.

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