



Risk perception and knowledge of hepatitis B infection among cleaners in a tertiary hospital in Nigeria: A cross-sectional study

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ABSTRACT

Background: Hepatitis B infection is a leading pathogenic infection that constitutes occupational hazard to health care workers. The current study examines the knowledge of hepatitis B infection and hepatitis B vaccination and uptake of the vaccine among the cleaners in a tertiary hospital in Nigeria.

Materials and methods: A cross-sectional hospital-based study of 89 cleaners using a standardized interviewer-administered questionnaire for data collection was conducted. Data were analyzed with SPSS version 21 software.

Results: Among the participants, 12 (13.5%), 12 (13.5%) and 19 (21.3%) had low, medium and high-risk perception of acquiring hepatitis B infection respectively. Awareness of hepatitis B infection was low (65.2%). The mean knowledge scores concerning hepatitis B infection (4.24 out of 26) and hepatitis B vaccine (1.06 out of 26) were low. Twenty-five (28.1%) of the participants had ever had screening while none of them reported being vaccinated against hepatitis B.

Conclusions: Hospital cleaners have poor risk perception, low level of awareness and poor knowledge about hepatitis B infection. Health workers might differ in what they know about hepatitis B infection and vaccine because of the differences in the levels of education, training, and perceived relevance within hospital settings.

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1. Introduction

Hepatitis B infection is a viral infection caused by the hepatitis B virus (HBV). The HBV is transmitted through mucosal or percutaneous contact with infected blood and other body fluids, particularly semen and vaginal fluid. Hepatitis B infection is one of the leading bloodborne pathogenic infections that constitute an occupational hazard to health care workers (HCWs).¹ It is an infection that runs a chronic course, and in 15 to 40% of cases, it may lead to chronic liver diseases, liver failure, hepatocellular carcinoma and death.² Hepatitis B infection may also cause the deposition of immune complexes, especially in the kidney. It has a chronic carrier status resulting in inactive HBV carriers being able to transmit the virus.³

It is estimated that HBV accounts for 240 million chronic infections and more than 780,000 annual deaths due to chronic liver diseases globally. Most of the chronic carriers of HBV live in East Asia and sub-Saharan Africa where between 5 and 10% of the adult population are chronic carriers.¹

There is a huge risk of contracting Hepatitis B infection in Nigeria because about 75% of the Nigerian adult population is at risk of exposure to the virus and between 9% and 39% have inactive HBsAg state, in spite of very low vaccination rates.⁴ Different reports have shown varying estimates of national and group specific HBsAg prevalence rates. The prevalence is between 10 and 15% in the general population; 25.7% among surgeons; 23.4% among voluntary blood donors and 16.3% among infants.^{5–8} It is the major risk factor for chronic liver diseases in Nigeria. In southern Nigeria, 58.1% of patients with chronic liver diseases were found to be positive for hepatitis B surface antigen (HBsAg).⁹ A systematic review of studies on hepatitis B infection in Nigeria between the year 2000 and 2013 gave a pooled prevalence of hepatitis B in Nigeria as 13.6%.¹⁰

Abbreviations: HBV, hepatitis B virus; HCW, health care workers; HBsAg, hepatitis B surface antigen; BUTH, Babcock University Teaching Hospital.

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Hepatitis B infection can be prevented by the practice of standard precautions which includes ensuring personal hygiene; the use of relevant personal protective equipment; and by the proper disposal of used sharps, and medical wastes in healthcare settings. The implementation of safe blood and safe sex strategies also protect against the infection.¹ However, the mainstay of hepatitis B prevention is hepatitis B vaccination. Hepatitis B vaccine is safe, cost-effective, and gives protection for at least 20 years or for life. The vaccine is recommended for all children and high-risk individuals including health workers and other people whose occupation expose them to blood and blood products.¹

Transmission of hepatitis B infections occurs in healthcare settings through needle pricks and the reuse of needles and syringes.¹ About 6% of the global populations of health care workers are exposed to hepatitis B virus.¹¹ Studies carried out in South Africa, Sudan, Tanzania, and Morocco showed that health care workers had good knowledge about hepatitis B infection but poor knowledge and uptake of hepatitis B vaccination.^{11–15}

Cleaners, like other hospital workers, have an additional risk of acquiring hepatitis B infection. They are exposed to blood and medical wastes. Unlike other hospital workers, they are usually less educated, have little or no formal training, and often have their specific infection control-related training needs overlooked within the healthcare setting.¹⁶ While many studies examining the knowledge of health workers about hepatitis B infection exist, there is a paucity, if any exist, of studies that concentrate on this group of health workers alone. We are not aware of any such study in Nigeria and sub-Saharan Africa.

The risk of contracting hepatitis B infection remains persistently high in sub-Saharan Africa despite the availability of a safe and cost-effective vaccine. The current study examines the knowledge of hepatitis B infection and hepatitis B vaccination; and the uptake of the vaccine among the cleaners in a tertiary hospital in Nigeria.

2. Materials and methods

2.1. Study design and setting

This is a cross-sectional hospital-based study that was conducted between the 1st and 30th of June 2016 at the Babcock University Teaching Hospital (BUTH), Ilishan-Remo, Nigeria. BUTH is a 250-bed teaching hospital and referral center that serves 3 southwestern states in Nigeria with a combined population of about 23 million. The hospital had 98 Cleaners in its employment at the time of the study.

2.2. Participants and samples

The study was announced at the mandatory daily devotion for all employees of the hospital for five consecutive days. Participation was voluntary and the cleaners were free to decline or withdraw participation from the study at any time without any consequences. All cleaners who had been in the employment of the hospital for at least six months were eligible to take part in the study. Signed consent was obtained from each participant.

An interviewer-administered questionnaire was used to collect information on demographics, the risk of contracting hepatitis B infection (11 items), knowledge about hepatitis B infection (26 items) and vaccine (13 items), and the hepatitis B immunization status of the participants. The language of the interview was English which is well understood by the participants. Blood samples were also taken to evaluate the HBV status of the participants. The interviews were conducted by trained research assistants. These assistants were nurses who received a 2-day training on infection control with emphasis on prevention and

control of occupational exposure to HBV infection; and on the objectives and procedures of the research.

2.3. Data management

The completeness and consistency of the collected data were checked daily by the study supervisors before submission to the Lead investigator. All the data were entered by two data clerks independently. Data cleaning was done by the lead investigator by examining summary tables of the data. Only properly filled questionnaires were included in the analysis. Data was analyzed with SPSS version 21 software. Proportions, means, and standard deviations were derived and the data is presented with frequency tables. Scores of 0 and 1 were allocated to good and bad responses to the HBV infection risk assessment and to the wrong and correct knowledge items respectively. Total scores for each of the participants were derived. Perceived risk of hepatitis B infection was assessed by asking the participants to respond to the closed-ended question “How would you assess your risk of contracting hepatitis B infection?” They were thus categorized as low, moderate, or high risk perception groups. The participants were divided based on the assessment of their actual risk of hepatitis B infection into three groups. The first group; Low-risk group consisted of those whose risk scores were between 0 and 3. The second group; moderate-risk group consisted of those whose risk scores were between 4 and 5. Those with scores of 6 and above were regarded as high-risk. The participants were also categorized into three groups; ‘poorly knowledgeable’, ‘fairly knowledgeable’ and ‘knowledgeable’ about HBV infection based on knowledge scores of <9, 9–13, and >13 respectively out of a maximum possible score of 26. The participants were also determined to have ‘poor’, ‘average’ and ‘good’ knowledge about hepatitis B vaccine based on scores of <5, 5–7, and >7 respectively out of a maximum possible score of 13. Two infectious disease specialists reviewed the instrument and established content validity and suitability in the study context. Test-retest reliability was conducted to assess the stability of the instrument by estimating the intra-class correlation coefficient (ICC). Twenty cleaners from a tertiary hospital participants completed the questionnaire twice at two weeks interval. ICC values of 0.40 or above were considered satisfactory. The study instrument was then pretested among 20 cleaners in another tertiary hospital and necessary corrections were made.

3. Results

Eighty-nine of the ninety-eight cleaners in the employment of the BUTH fully participated in the study giving a response rate of 90.8%.

3.1. Socio-demographic characteristics of the participants

The average age of the participants was 46.00 ± 8.49 years (95% CI = 44.2, 47.7). The mean duration of their work experience was 5.20 ± 2.65 years (95% CI = 4.7, 5.8). There were about the same number of men and women. All the participants had completed at least primary school education (Table 1).

3.2. Actual and perceived risk of acquiring hepatitis B infection among the participants

The participants were required to give an assessment of their perceived risk of acquiring hepatitis B infection. The participants regarded themselves as having low (13.5%), medium (13.5%) and high-risk (21.3%) of acquiring hepatitis B infection respectively. The remaining 46 (51.7%) participants responded that they were unable

Table 1
Socio demographic characteristics of the Cleaners at Babcock University Teaching Hospital, June 2016.

Variable	Frequent	Percent
Age (in years)		
25–34	9	10.1
35–44	28	31.5
45–54	33	37.1
55–64	19	21.3
Sex		
Male	44	49.4
Female	45	50.6
Religion		
Christianity	57	64
Islam	30	33.7
Others	2	2.2
Ethnicity		
Igbo	46	51.7
Yoruba	35	39.3
Hausa	8	9
Others		
Highest level of education completed		
Primary	24	27
Secondary	48	53.9
Tertiary	17	19.1
Years of working experience		
1–3 years	32	36
4–6 years	27	30.3
7–9 years	27	30.3
10 or more years	3	3.4

to assess their risk of acquiring hepatitis B infection. Their actual risk of acquiring hepatitis B infection was also assessed by asking questions about previous occupational and non-occupational exposures. Exposure to occupational and non-occupational risks factors for hepatitis B infection is prevalent among the participants (Table 2).

An assessment of the actual risk of acquiring hepatitis B infection showed that 34 (38.2%), 39 (43.8%), and 16 (18.0%) had low, moderate, and high-risk respectively. No statistically significant association was found between the participants' actual and perceived risk of acquiring hepatitis B infection ($\chi^2 = 2.413$, $df = 6$, $p = 0.878$).

3.3. Knowledge of the participants about hepatitis B infection

Fifty-eight (65.2%) of the participants were aware of hepatitis B infection while thirty-one (34.8%) had not heard of hepatitis B infection before.

The participants were required to respond to 26 questions about hepatitis B infection. The questions were in four domains,

Table 2
Hepatitis B infection risk (occupational and non-occupational) among the Cleaners at Babcock University Teaching Hospital, June 2016.

Variable	Yes (%)	No (%)
Have you ever been transfused with blood or blood products?	37 (41.6)	52 (58.4)
Have you ever had surgery done?	21 (23.6)	68 (76.4)
Do you use of gloves every time you carry out a procedure involving body fluids	17 (19.1)	72 (80.9)
Have you had a needle stick injury in the last one year?	24 (27.0)	65 (73.0)
Have you had any cut injury in the last one year?	28 (31.5)	61 (68.5)
Have you ever had exposure to blood or body fluids on your mucous membrane in the last one year?	30 (33.7)	59 (66.3)
Do you have any body scarification?	41 (46.1)	48 (53.9)
Have you had any training on infection in the last one year?	35 (39.3)	54 (60.7)
Have you ever had exposure to blood or body fluids on intact skin?	57 (64.0)	32 (36.0)
Have you ever had splash of blood or body fluids to eye or mouth?	9 (10.1)	80 (89.9)
Have you ever had splash of blood on cuts or unprotected skin?	18 (20.2)	71 (79.8)

namely; routes of transmission (6 items), at-risk-groups (7 items), modes of prevention (6 items), and general questions (7 items). The mean hepatitis B infection knowledge score was 4.24 ± 3.69 . The highest and lowest scores were 12 and 0 respectively. Eighty (89.9%) of the participants had poor knowledge about hepatitis B infection while the remaining nine (10.1%) had fair knowledge. None of the participants had good knowledge about hepatitis B infection. More than 50% of the participants gave the response 'I don't know' to all of the items across all the four domains. Misconceptions about all the four knowledge domains of hepatitis B infection also exist among significant proportions of the participants (Table 3).

3.4. Knowledge of the participants about hepatitis B vaccine

The participants were required to respond to 13 questions about hepatitis B vaccine. The mean hepatitis B vaccine knowledge score was 1.06 ± 1.75 . The highest and lowest scores were 8 and 2 respectively. Eighty-three (93.3%) of the participants had poor knowledge about hepatitis B vaccine while the five (5.6%) had fair knowledge. Only one (1.1%) of the participants had good knowledge about hepatitis B vaccine. More than 60% of the participants gave the response 'I don't know' to all the 13 questions that were used to assess the knowledge about hepatitis B vaccine. Misconceptions about hepatitis B vaccine were also noted among the participants (Table 4).

3.5. Hepatitis B screening and vaccination status of the participants

Twenty-five (28.1%) of the participants have ever had hepatitis B screening while 64 (71.9%) had never been screened for hepatitis B before. Seventy-two (80.9%) of the participants were not aware of their 'current' hepatitis B status. Fourteen (15.7%) of the 17 participants who were aware of their 'current' status were negative while three (3.4%) were positive for HBsAg. Two of three who claimed to be positive for hepatitis B said they completed the full course of treatment while the remaining one had no treatment at all.

All the participants responded that they were not vaccinated at the time of the study. The main reasons they gave for not being vaccinated were the lack of awareness (69.7%), inaccessibility of vaccine (23.6%), and cost (6.7%).

3.6. Perceived challenges to the implementation of hepatitis B infection control program among the participants

The participants identified the possible barriers to the successful implementation of hepatitis B infection control program to include; low-risk perception among health workers, the poor orientation of new workers, lack of or poor knowledge, and the poor implementation of hospital policies (Table 5).

Table 3
Knowledge of hepatitis B infection among the Cleaners at Babcock University Teaching Hospital, June 2016.

Variable	Correct (%)	Wrong (%)	I don't know (%)
Routes of transmission			
Sharps injury	25 (28.1)	9 (10.1)	55 (61.8)
Blood donation from infected person	13 (14.6)	14 (15.7)	62 (69.7)
Sexual intercourse with infected person	12 (13.5)	15 (16.9)	62 (69.7)
From mother to child during pregnancy	12 (13.5)	12 (13.5)	65 (73.0)
Faeco-oral	11 (12.4)	8 (9.0)	70 (78.7)
Polluted water	5 (5.6)	10 (11.2)	74 (83.1)
At risk groups			
Commercial Sex Workers	26 (29.2)	17 (19.1)	46 (51.7)
Men who sleep with men	4 (4.5)	20 (22.5)	65 (73.0)
Individuals with multiple sexual partners	7 (7.9)	16 (18.0)	66 (74.2)
Sickle cell disease patients	7 (7.9)	24 (27.0)	58 (65.2)
Long distance drivers	15 (16.9)	15 (16.9)	59 (66.3)
Health care workers	9 (10.1)	18 (20.2)	62 (69.7)
Injection drug users	14 (15.7)	20 (22.5)	55 (61.8)
Modes of prevention			
Vaccination	23 (25.8)	11 (12.4)	55 (61.8)
Proper disposal of sharps	8 (9.0)	19 (21.3)	62 (69.7)
Avoiding multiple sexual partner	11 (12.4)	13 (14.6)	65 (73.0)
Avoiding drinking contaminated water	20 (22.5)	6 (6.7)	63 (70.8)
Avoiding uncooked food	18 (20.2)	6 (6.7)	65 (73.0)
Consistent and appropriate use of gloves	7 (7.9)	13 (14.6)	69 (77.5)
Others			
Hepatitis B infected person may be asymptomatic for long time	10 (11.2)	23 (25.8)	56 (62.9)
Every person exposed to hepatitis B virus will develop acute hepatitis immediately	29 (32.6)	10 (11.2)	50 (56.2)
Hepatitis B virus is highly infectious	24 (27.0)	17 (19.1)	48 (53.9)
Only small proportion of the world population is infected with hepatitis B virus	18 (20.2)	15 (16.9)	56 (62.9)
Hepatitis B virus mainly affects liver	19 (21.3)	13 (14.6)	57 (64.0)
Hepatitis B is more infectious than HIV	15 (16.9)	17 (19.1)	57 (64.0)
Hepatitis B infection is more common in Sub Saharan Africa	15 (16.9)	14 (15.7)	60 (67.4)

Table 4
Knowledge of hepatitis B vaccine among the Cleaners at Babcock University Teaching Hospital, June 2016.

Variable	Correct (%)	Wrong (%)	I don't know (%)
There is effective vaccine to prevent hepatitis B infection	27 (30.3)	6 (6.7)	56 (62.9)
Hepatitis B vaccine can be given as post-exposure prophylaxis	7 (7.9)	15 (16.9)	67 (75.3)
Hepatitis B vaccine is contra indicated for immune compromised patients	7 (7.9)	8 (9.0)	74 (83.1)
Hepatitis B vaccine is effective to treat patients with acute hepatitis B infection	6 (6.7)	5 (5.6)	78 (87.6)
Hepatitis B vaccine is highly effective in preventing hepatitis B infection if given within 48 hours after exposure	6 (6.7)	3 (3.4)	80 (89.9)
Hepatitis B vaccine should be given to health care workers as part of work place safety	5 (5.6)	5 (5.6)	79 (88.8)
Full course of hepatitis B vaccine may give lifelong immunity but for Health professionals, one further booster after 5 years of the first dose is recommended	6 (6.7)	5 (5.6)	78 (87.6)
After taking full dose vaccination of hepatitis B, there is no need for a blood test to confirm immunity against hepatitis B	7 (7.9)	3 (3.4)	79 (88.8)
Full dose hepatitis B vaccine provides 100% protection for 90% of adults	3 (3.4)	7 (7.9)	79 (88.8)
Full dose hepatitis B vaccine protects against HBV for at least 15 years	4 (4.5)	6 (6.7)	79 (88.8)
Hepatitis B vaccine causes problems if given to people who are already immune	5 (5.6)	2 (2.2)	82 (92.1)
Hepatitis B vaccine is recommended for all health care workers	5 (5.6)	5 (5.6)	79 (88.8)
One or two does of hepatitis B vaccine are sufficient to be fully immunized for an adult	6 (6.7)	7 (7.9)	76 (85.4)

Table 5
Perceived challenges to the implementation of hepatitis B infection control program among the Cleaners at Babcock University Teaching Hospital, June 2016.

Variable	Yes (%)	No (%)
Inexistent hospital policy	36 (40.4)	53 (59.6)
Poor orientation of new health workers	46 (51.7)	43 (48.3)
Low risk perception among workers	54 (60.7)	35 (39.3)
Poor implementation of hospital policy	40 (44.9)	49 (55.1)
Poor knowledge	42 (47.2)	47 (52.8)
Fear of side effects of vaccine/injection	37 (41.6)	52 (58.4)

4. Discussion

Occupational exposure to blood, blood products, and other body fluids places health care workers at an additional risk of contracting hepatitis B infection over people in the general population.¹ The high response rate that was noted in this study may underscore an interest in hepatitis B infection among the participants. The Cleaners have both occupational and non-occupational exposure to the risk factors for hepatitis B infection. Most of them have low to moderate risk of acquiring hepatitis B infection although a significant proportion has a high-risk of

acquiring the infection. In contrast, most of the cleaners had no or poor risk perception of contracting hepatitis B infection. The perception of the risk of contracting hepatitis B infection is quite low when compared with other health care workers.^{17,18} Ibekwe and Ibeziako¹⁷ have also found statistically significant difference in the risk perception for hepatitis B infection among ward attendants and other health workers in a tertiary hospital in eastern Nigeria. This difference may be because cleaners tend to be less educated, have little or no medical training, and often have their specific training needs overlooked within the healthcare setting.¹⁶ Poor risk perception in the presence of significant levels of actual risk of contracting hepatitis B infection may actually lead to an increased risk. This is because the participants are unable to appreciate the dangers that they are exposed to and as such, are less likely to take necessary precautions. This is the case among the participants in this study among whom only 19.1% use gloves every time they carry out a procedure involving body fluids.

About 90% of the participant had poor knowledge about hepatitis B with a mean score of 4.24 out of the maximum possible score of 26. More than 50% of the participants had no knowledge of hepatitis B while misconceptions were highly prevalent. Other studies among the general population of health workers and those among doctors and nurses have shown much higher levels of knowledge and significantly lower levels of misconceptions about hepatitis B infection.^{19–21} This difference suggests that cleaners may differ significantly from other health workers in their knowledge about hepatitis B infection. Health workers may not be a homogenous group as it relates to their knowledge about hepatitis B infection. This is probably one of the first times that the risk and knowledge of hospital cleaners about hepatitis B infection have been described. It is important for future studies to differentiate between the roles of clinical and nonclinical health workers as it relates to the risk of hepatitis B infection. Interventions aimed at the control of hepatitis B infection in health care settings through the improvement of knowledge of health workers may need to be structured to address the specific needs of the various categories of health workers separately. Knowledge gaps exist across all the four hepatitis B knowledge domains (routes of transmission, at-risk-groups, modes of prevention, and general questions) that were assessed. In fact, more than a third of the participants were not aware of hepatitis B infection. There is, therefore, an urgent need for training for the cleaners on the transmission, risk, prevention and sundry issues as it relates to hepatitis B infection.

The participants' awareness and knowledge about hepatitis B vaccine were also poor. This may be related to poor knowledge about hepatitis B infection. The knowledge about the vaccine is poorer and associated with more misconceptions than the knowledge about the infection. The cleaners have poorer knowledge about the vaccine when compared with findings among general and other categories of health workers.^{11,18} The levels of awareness of hepatitis B infection and its vaccine have been observed to be generally lower than that of HIV in spite of it being more infectious than HIV.²² The unusually low levels of awareness and knowledge about hepatitis B vaccine, a potent vaccine that has been around since 1981, calls for prompt action among this group of hospital staff.

None of the participants reported having received hepatitis B vaccination. Studies have reported poor levels of vaccination among health workers^{11,13–15} but even at that, a zero vaccination level is unacceptable. This is particularly poor considering the risk of occupational exposure that is prevalent in health workers including cleaners. However, this may be explained by the low level of awareness and poor knowledge of the infection and vaccine that is prevalent among the participants. Although some of the participants suggested that accessibility was a barrier to their

receiving the vaccine, hepatitis B is widely available in Nigeria. The vaccine is available for free as part of the National Programme on Immunization (NPI) for children less than one year both in the monovalent form and as part of the pentavalent vaccine.^{23,24} It is also available for adults but at a cost. It is most likely that lack of awareness/poor knowledge about HBV and cost are the major barriers.

Participants in this study identified the possible challenges to a successful implementation of hepatitis B control in health care settings. The identified challenges are similar to those identified by other studies among the general and specified populations of health workers.¹⁸ Most of the participants listed inexistence of hospital policy as a barrier. However, the hospital has an operational infection control policy with a duly constituted infection control committee. This may suggested that the policy is not well-disseminated and that the committee needs to device appropriate strategies to disseminate the policy to different cadres of health workers.

However, the findings of this study should be interpreted with some caution. The data that was collected is subject to recall bias. Besides, the single-site study provides some challenges for external validity. However, the study provides useful insight to the possible peculiarity of nonclinical health workers which could be used as basis for future larger studies. It provides a basis of focus both for research and policy for the inclusion hospital cleaners in hepatitis B infection control among health workers.

5. Conclusions

Health workers, including cleaners, are at an increased risk of hepatitis B infection compared to the general population because of occupational exposure to body fluids. Hospital cleaners have poor risk perception, low awareness, and knowledge about hepatitis B infection. They have poor knowledge and uptake of hepatitis B vaccine. A lot of misconceptions and gaps also exist in their knowledge. Their knowledge about hepatitis B vaccine and infection is poorer than that of the general population of health workers and some specific health professionals including Doctors and Nurses. It is likely that health workers differ in what they know about hepatitis B infection and vaccine. This may be due to the differences in the levels of education, training, and perceived relevance within hospital settings. This study underscores the weakness that is inherent in approaching hospital staff as a homogenous unit as it relates to hepatitis B control. Hospital cleaners have an urgent need for training on the transmission, risk, prevention and sundry issues as it relates to hepatitis B infection and vaccine. In order to achieve effective control of hepatitis B infection in health care settings, hospital administrations should pay attention to staff training and retraining with particular attention being paid to categories of workers who may easily be overlooked.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

OA, OS, CE and DO conceived the study and conducted the literature search. OA designed the study and wrote the first draft of the manuscript. AO, BM, and AA participated equally in data

collection and analysis. All the authors reviewed and approved the final draft of the manuscript.

Ethics approval and consent to participate

This study was approved by the Babcock University Human Research Ethics Committee (BUHREC/005/17). All participants were required to sign an informed consent form that also covered for HBV sample analysis. Each participant received a unique identification code. The personal identification details of participants were not required at any stage during the study. The study supervisors made sure that privacy and confidentiality were maintained all through the period of the study. The supervisors gave each participant an educational material on hepatitis B infection and vaccine after completion of the questionnaire. Eligible participants were referred to the Community Medicine Department clinic to access hepatitis B vaccine which was made available to them for free. Those who gave consent to receive the vaccine were given 3 doses of hepatitis B vaccine (at first contact, at one month and at two months) by qualified health workers in the Department. They were educated on the common side effects of the vaccine and encouraged to immediately present back at the clinic in case they noticed any of those symptoms. Hepatitis B positive participants were referred for specialist care.

The dataset supporting the conclusions of this article is available from the corresponding author on reasonable request.

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