

Assessment of Hepatitis B Vaccination Status, and Cost of Hepatitis B Vaccine Among Medical Students in a Teaching Hospital in Plateau State, Nigeria

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Abstract

Background: Hepatitis B infection remains a common occupational risk for healthcare workers and medical students. A healthcare worker has four times greater probability of contracting Hepatitis B infection compared with the general population. This study seeks to assess Hepatitis B vaccination status, and the cost of Hepatitis B vaccine among medical students in a Teaching Hospital in Plateau State, Nigeria.

Methods: This was a descriptive cross-sectional study done between March to August 2021 among 236 clinical students using a Multistage sampling technique. Data was collected using an interviewer-administered structured questionnaire and analysed using the IBM SPSS 28 (Statistical Package for the Social Sciences). Ethical approval was granted by Bingham University Teaching Hospital, Ethics Committee, Jos, Plateau State

Results: The majority of the respondents were within the age range of 22 – 25 years (62.3%). Females were 57.6%, while males were 41.9% and 0.4% of the respondents chose not to identify their sex. About 85.2% of respondents have been Vaccinated against HBV, and 11.4% do not feel the need to. 5.7% are afraid of the side effects, and half 51.7% of the respondents vaccinated had the full dose (3 doses).

On the amount spent by the respondents on the Vaccine. 66.2% had cost between 1,500-5,000 Naira, 13.0% bore no cost, and 11.9% had cost between 700 – 1,400 Naira. Concerning indirect cost, 1.5% had no indirect cost, 17.4% had costs between 500 - 5,000 Naira, and 81.1% had cost greater than 5,000 Naira.

Half 52.2% think it is not expensive while 47.8% think it is expensive

Conclusion: The majority of respondents have been Vaccinated against HBV, with about half having a full dose. Over two-thirds had cost between 1,500-5,000 Naira and an indirect cost of greater than 5,000 Naira. Government and Nongovernmental organizations should subsidize hepatitis vaccine complete dose for all healthcare workers, students and trainees within the hospital environment.

Keywords: Practice, Vaccination Status, Vaccine Cost, Hepatitis B Virus Infection, Hepatitis B Vaccination, Medical Students

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INTRODUCTION

Vaccination, the mainstay of prevention of Hepatitis B infection is highly effective and has few side effects. The DNA HBV vaccine has been available since 1982 and contains HBsAg produced by recombinant DNA techniques (1). Medical students and health care workers are at high risk of contracting Hepatitis B virus infection, hence, the vaccine is strongly recommended for them (2). The World Health Organization advocates that all children in endemic countries be vaccinated against HBV within 24 hours of birth (3).

WHO recommends that all infants should receive their first dose of vaccine as soon as possible after birth, preferably within 24 hours (4). Delivery of Hepatitis B vaccine within 24 hours of birth should be a performance indicator for all immunization programs (5). The birth dose should be followed by 2 or 3 doses to complete the primary series (5). There is no evidence to support the need for a booster dose of Hepatitis B vaccine (6). Protection lasts at least 20 years, and is possibly life-long. WHO strongly recommends that all regions and associated countries develop goals for Hepatitis B control appropriate to their epidemiological situation.

Children younger than 19 years of age who have not yet received the vaccine should also be vaccinated (7). Hepatitis B vaccine is also recommended for certain unvaccinated people whose sex partners have Hepatitis B, sexually active persons who are not in long-term monogamous relationship, persons seeking evaluation or treatment for a sexually transmitted disease, who have household contact with someone infected with the Hepatitis B and also travelers to regions with increased rates of Hepatitis B (8).

In Nigeria, since 2004, the use of monovalent HBV vaccine in providing three doses of HBV immunization started at birth (7). In providing immunization, a pentavalent vaccine comprising DPT, HBV, Hib was introduced to replace the trivalent DPT and monovalent HBV in 2012 which is administered as three doses commencing at the age of six weeks (9). The approximated population prevalence of chronic Hepatitis B virus in Nigeria is high and adds to the importance of protecting health care workers who provide clinical care (10). A study reported that 8.7% of the source of occupational exposure to body fluids were positive to Hepatitis B surface antigen (HBsAg) at a tertiary referral centre in Nigeria (11).

Vaccination programs in Nigeria have not received appropriate attention and financing by the Government due to infrastructural problems of health delivery system as well as interrelation between local and national politics (12). Lack of adequate knowledge and of the benefits of vaccination and misconception due to religious beliefs and vaccination controversies may also impede Hepatitis B vaccination (13). There is a high risk of getting infected with HBV in Nigeria due to low vaccination rates as well as unsafe practices like transfusion of unscreened blood, unsafe sexual activities and sharing of sharps (14). Hepatitis B virus is very efficiently transmitted in the setting of a percutaneous injury that involves an instrument containing HBV infected blood (15). Hepatitis B virus can survive in dried blood for up to a week and thus may be transmitted via discarded needles or fomite, even days after initial contamination (15). Medical students are at higher risk as they are just learning the skill of personal protection and also come in contact with blood and other body fluids (16).

Hepatitis B infection remains a common occupational risk for healthcare workers and medical students (17). A healthcare worker has four times greater probability of contracting Hepatitis B infection compared with general population (17). Vaccination for HBV was introduced in Nigeria as part of the national immunization program in 2004, and most hospitals and laboratories screen for HBV and Hepatitis C virus before transfusion (7). However, the prevalence of HBV has remained particularly high as a result of certain traditional/cultural practices which include traditional scarification, tribal markings, uvulectomy and circumcision, inadequate knowledge about the modes of transmission and prevention (7). This lack of awareness of HBV, its risk factors, and its consequences are recognized as major deterrents to adopting positive preventive behavior including immunization in HBV endemic populations (16).

To ensure effective implementation of Hepatitis B immunization, prior identification of their baseline awareness and knowledge and then their willingness to take the vaccine is of paramount importance (18). A good knowledge of Hepatitis B infection and means of transmission as well as sufficient uptake on vaccination will help curb infection rate which is the hallmark of prevention of transmission of Hepatitis B infection among health care workers (HCWs) and medical students. This study seeks to evaluate hepatitis B vaccination status, and

cost of Hepatitis B vaccine among medical students in a Tertiary Hospital in Plateau State, Nigeria.

METHODOLOGY

This was a descriptive cross-sectional study done between March and August 2021 among 236 the clinical arm of medical students in a Tertiary Hospital in Plateau State, Nigeria. Plateau state has a number of Health Facilities which include primary, secondary and tertiary facilities (this includes one Federal - Jos University Teaching Hospital and one State- Plateau specialist Hospital and a faith based one – Bingham University Teaching Hospital) (19) (20) (21) (22) . The study was carried out in Bingham University Jos Campus, Plateau State, Nigeria. Bingham University is a private University owned by Evangelical Church Winning All (ECWA), established in 2005. The University has two Campuses; the main Campus located in New Karu, Nassarawa state and the Jos Campus, where the College of Medicine and Health Science is located(20) (21) (22) .

A sample size of 236 was calculated using the Cochran equation (23). $n = z^2pq/e^2$

n = minimum sample size; z = standard normal deviation at 95%; Confidence interval =1.96; p = proportion of the population having the characteristics of interest (obtained from reviewing of data from a similar study done) = 83.2% (24); q = 1-p; d = level of precision which is usually 0.05; $n = (1.96) \times 0.832 \times (1-0.832) / (0.05)^2$; $n = 3.8416 \times 0.832 \times 0.168 / 0.0025$; $n = 214.78539264$; $n = 215$. The calculated minimum sample size was 215. A non-response rate of 10% was added, hence the final value is 236.

Multistage sampling technique was employed in the selection of study participants.

FINDINGS

Table 1. Socio-demographic characteristics of respondents.

Variables	Frequency	Percent (%)
Age		
18-21	55	23.3
22-25	147	62.3
26-29	31	13.1
>=30	3	1.3
Total	236	100.0
Sex		

Stage 1 – Selection of Tertiary Hospitals- from 3 tertiary hospitals

Stage 2 – Selection from each class- Clinical medical students of BHUTH

Proportional allocation based on size of the class using the formula:

$$\text{Proportion (p)} = \frac{\text{number of students in each class (n)}}{\text{sample size}}$$

$$\text{Total number of students in BHUTH (t)}$$

There are 5 classes from 400 – 600l

Stage 3 – selection of students - Every person from the class to be studied was assigned a number and using Simple Random Sampling (balloting), we randomly selected the number of participants for each class as calculated above.

Data collection tools were pre-tested among selected students at University of Jos, Plateau state. Collected quantitative data was entered and analyzed using Statistical Package for Scientific Solution (SPSS) version 20. Descriptive statistic was carried out in line with the objectives of the study. Tables, charts, proportions and percentages were used to describe the findings.

Ethical approval was obtained from the ethical committee of Bingham University Permission was obtained from the Teaching Hospital, while students gave assent for questionnaires to be administered. Individual informed consent was attached to each questionnaire and the respondent gave his or her consent before the questionnaires were filled.

Male	99	41.9
Female	136	57.7
Choose not to identify	1	0.4
Total	236	100.0
Marital status		
Single	231	97.9
Married	5	2.1
Total	236	100.0

A) Socio-demographic characteristics of respondents

Table 1 illustrates the Socio-demographic characteristics of respondents. Majority of the respondents were within the age range of 22 – 25 years (62.3%), followed by 18 – 21 years (23.3%) and 26 – 29 (13.1%) with ages >30 years

(1.3%) being the least proportion of respondents. Females made up the majority of the respondents at 57.6%, while males were 41.9% and 0.4% of the respondents chose not to identify their sex. The respondents were predominantly single at 97.9% and only 2.1% of them being married.

Table 2. HBV vaccination status, reasons not being vaccinated for HBV, number of doses received, willingness to take HBV vaccine

HBV Vaccination Status	Frequency	Percent (%)
Vaccinated	201	85.2
Not vaccinated	35	14.8
Total	236	100.0
Reason for Not Being Vaccinated	Frequency	Percent (%)
I don't feel the need to	4	11.4
I don't know where to go and receive the vaccine	7	20.0
It is expensive	17	48.6
Fear of side effects	2	5.7
Rumors about the vaccine	0	0
I am afraid of contracting the virus from the vaccine	0	0
Others	5	14.3
Total	35	100.0
Willingness to Receive HBV Vaccine	Frequency	Percent (%)
Willing	34	97.1
Not willing	1	2.9
Total	35	100.0
Number of doses of HBV Vaccine received	Frequency	Percent (%)
1 dose	13	6.5
2 doses	60	29.9
3 doses	122	60.7
More than three doses	6	2.9
Total	201	100.0

B) HBV vaccination status, reasons not being vaccinated for HBV, number of doses received, willingness to take HBV vaccine

Table 2 show that 85.2% of respondents have been Vaccinated against HBV while 14.8% have not been Vaccinated.

Of the respondents that have not been Vaccinated, 48.6 % of respondents are of the opinion that the Vaccine is expensive, 20.0% do not know where to go and receive the Vaccine, 14.3% gave other reasons (they have not had the time and they have been nonchalant) and 11.4% do

not feel the need to. 5.7% are afraid of the side effects.

The Table above shows that of the respondents that have not received the Vaccine 97.1% are willing to be vaccinated while 2.9% do not see the need to.

The Table shows that 51.7% of the respondents vaccinated had the full dose (3 doses), however 29.9% had 2 doses. 6.5% of respondents had just 1 dose and 2.5% had more than 3 doses.

Table 3. Cost Incurred During HBV Vaccination

Direct Cost Incurred During HBV Vaccination	Frequency	Percent (%)
Free	26	13.0
<500 (0.5 USD)	4	2.0
500-700 (0.5 - 0.7 USD)	8	3.9
700-1400 (0.7 - 1.4 USD)	24	11.9
1500-5000 (1.5 - 5 USD)	133	66.2
>5000 (5 USD)	6	3.0
Total	201	100.0
Indirect Cost (Transport, Waiting time, etc)		
None	3	1.5
500 - 5,000 (0.5 - 5 USD)	35	17.4
>5,000 (> 5USD)	163	81.1
Total	201	100.0
Perception of Cost of HBV Vaccine		
	Frequency	Percent (%)
Expensive	96	47.8
Not expensive	105	52.2
Total	201	100.0
1 USD - 1000 Naira		

C) Cost Incurred During HBV Vaccination

Table 3 illustrates the amount spent by the respondents on the Vaccine. 66.2% had cost between 1,500-5,000 Naira, 13.0% bore no cost, 11.9% had cost between 700 – 1,400 Naira. 3.9% had cost between 500 – 700 Naira while 3.0% had cost >5000 and 2.0% had cost <500 Naira.

Indirect cost, 1.5% had no indirect cost, 17.4% had cost between 500 - 5,000 Naira, 81.1% had cost greater than 5,000 Naira.

Half 52.2% think it is not expensive while 47.8% think it is expensive.

DISCUSSION

The level of practice of HBV vaccination was determined by assessing the rate of vaccination of respondents. A great proportion (85.2%) of the respondents were found to have received at least one dose of HBV vaccine. This is similar to a study conducted in Himalayan university India (25) with a slightly lower finding of 82.8% who have received at least one dose of the vaccine and a significantly low (14.2%) percentage of student had received at least one dose of HBV vaccine in university in Enugu (26). Of the 85.2% respondents that have been vaccinated 51.7% got the complete dose of the vaccine (3 doses), this is in keeping

with the study carried out in a University in India where 62.4% of respondent were fully vaccinated (27) (28). This finding shows that a high proportion of the students were vaccinated. This may be attributable to availability and access of the vaccine. Unlike the findings in Enugu (26) which were a low percent (48.9 %) of respondent were fully vaccinated (28). In this study significant percentage (14.8%) of respondent have not been vaccinated and reasons like cost (7.2%), inaccessibility (3%) and not feeling the need to be vaccinated (1.7%) were stated. This is similar to the study conducted in a secondary health facility in Lagos were 22.4% of the respondent were not vaccinated and the major reason for that was inaccessibility of the vaccine (1.5%) and cost of the vaccine (0.7%) (29). In another study conducted in university of Jos, 42.4% of respondent stated not knowing where to get the vaccine as a major obstacle to getting vaccinated (30). In this study there is a high proportion of people who are aware of HBV vaccine (99.6%) and this correlates with the proportion of respondent that have been vaccinated (85.2%), this is in keeping with the study conducted in a university in Nigeria among medical and dental students (24) where 83.2 % of them were aware of the vaccine and 79.65 % of them had been vaccinated. Its worthy of note that despite the high uptake of hepatitis vaccine, students still felt it was expensive to get the vaccine. This could be a huge barrier in access to the vaccines and will further lead to low uptake of the vaccine. Another barrier was that respondents stated that they did not know where to go to get the vaccine. This may sound strange as most primary health center were giving hepatitis vaccine to children. The issue then is, do these health centers give adult vaccination to adolescents and students who desire the vaccine?

The positive findings in this study is the overwhelming willingness of all participants to take the vaccine. This makes the required behavioural change or action easy. It means by simply providing the service, and creating awareness on location and availability, we can achieve 95% coverage in our communities.

This study shows that there is a challenge with completion of vaccination as seen where about half had just one dose, this is also seen in studies done in Enugu (26), Lagos (29) and Jos (30). This situation requires targeted solution especially with follow up and reminders. More than a two-thirds of of students stated they spent about 1,500 to 5,000 Naira (1- 5 USD) on complete dose of vaccine. While

80% spent more than 5,000 Naira (5 USD) on indirect cost like transportation, absence from work or loss of business while waiting for the job. There is need to subsidize the cost of vaccine to enable increase in coverage and access to those who need it.

CONCLUSION

Majority (85.2%) of respondents have been Vaccinated against HBV, 11.4% do not feel the need to. 5.7% are afraid of the side effects, half 51.7% of the respondents vaccinated had the full dose (3 doses). Over two third (66.2%) had cost between 1,500-5,000 Naira, 13.0% bore no cost. Concerning indirect cost, 1.5% had no indirect cost,, 81.1% had cost greater than 5,000 Naira. Half 52.2% think it is not expensive while 47.8% think it is expensive

RECOMMENDATIONS

To the Government

Government and Non governmental organizations can get funding to subsidize hepatitis vaccine complete dose for all healthcare workers and students and trainee within the hospital environment.

Health policies should be aimed at increasing access and coverage of the HBV Sin risk populations like medical students.

To Hospitals and Training Institutions

Primary Health centers and hospitals should have signage indicating that they give hepatitis vaccines and other adult vaccines They should also create awareness on availability and methods of access of these vaccine. Since respondents did not know where to get the vaccines.

Health centers and hospitals were vaccines are available should send reminders electronically to clients on dates of appointments or create an appointment card for those with first or second dose of the vaccine to remember to complete the process.

Medical institutions should take an initiative in screening Hepatitis B status of the students at the time of entry into medical course and providing free HBV vaccines to all the incompletely vaccinated and non-vaccinated students.

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Cite this article: Ifeanacho Okonkwo, Kingsley Chinedu Okafor, Toluwani Bamisaiye, *et al.* *Assessment of Hepatitis B Vaccination Status, and Cost of Hepatitis B Vaccine Among Medical Students in a Teaching Hospital in Plateau State, Nigeria. International Journal of Research in Medical and Clinical Sciences*. 2023;1(2): 58-65.

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