Original Article

Hepatitis B Vaccine Uptake among Voluntary Blood Donors in Jos: Implication on Blood Safety

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ABSTRACT

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Hepatitis B virus (HBV) is a transfusion-transmissible pathogen that poses a significant threat to blood safety. The virus' burden is high in the general population and among blood donors in Sub-Saharan Africa, leading to more donor rejection; blood discards, and increased risk of contamination of the blood supply. Hepatitis B Virus is vaccine-preventable; increased burden of infection may suggest a gap in vaccination. The study aimed to assess the level of hepatitis B virus vaccine uptake and identify factors affecting uptake of the vaccine among voluntary non remunerated blood donors (VNRBD) in Jos, Nigeria. A survey was conducted at the National Blood Transfusion Service (NBTS), Jos, among consenting VNRBD aged between 18 and 65 years from October to December 2020 using a structured questionnaire to collect information on vaccination status, socio-demographics and others. Of the 120 VNRBD interviewed, 36.7% received one or more doses of the HBV vaccine, while the majority (63.3%) were unvaccinated. Among the unvaccinated donors, 57.9% were unaware that HBV has a vaccine, 21.1% did not know where to get the vaccine, 7.9% had no time to get vaccinated; 3.9 % believed that there was no need to get vaccinated because they tested negative for the virus, while 9.2% gave no reason. Our study found a low uptake of HBV vaccine among VNRBD in our environment. We advocate for increased awareness and strong legislation to ensure universal access to the vaccine by Nigerians.

Keywords: Hepatitis B virus, Vaccine uptake, Voluntary non remunerated blood donors, Blood safety

INTRODUCTION

Blood transfusion service worldwide faces risks from both known and unknown pathogens.¹ While some of what is known are tested for, a significant threat is posed to transfusion safety from transfusion transmissible pathogens that can exist in a state of latency.² One such pathogen is the Hepatitis B virus (HBV), implicated in

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chronic liver disease and hepatocellular carcinoma.^{3,4} The global burden of HBV is high, posing a significant threat to the availability of safe blood worldwide.⁵ This threat is accentuated in resource-limited countries where frequent disruptions of basic testing kits are experienced in the background of the scarcity of advanced screening methods.⁵ Several studies have documented a high prevalence of HBV among Voluntary non-remunerated Blood Donors (VNRBD) in Sub-Saharan Africa.^{6,7,8} This high prevalence translates to more blood discards which come at an enormous cost to the regional blood services.⁶ It also heightens the risk of introducing a positive unit into the transfusion chain with its attendant consequences on blood safety.^{9,10} Priority must be given to the vaccination of the population as blood donors are derived from the community. Available literature searched showed a paucity of studies that specifically addressed the status of HBV vaccination of blood donors in our environment. This study aimed to assess the level of hepatitis B virus vaccine uptake, identify factors affecting uptake of the vaccine among VNRBD in Jos, Nigeria and generate baseline data to influence policy decision on blood safety in our environment.

MATERIALS AND METHODS

Study area

The study was conducted at the National Blood Transfusion Service (NBTS), North-Central Zone of Nigeria. The NBTS is located in Jos, the capital of Plateau State and serves the blood need of Plateau State and the neighbouring States of Bauchi, Kaduna, Benue, Nasarawa Taraba.

Study design

This was a cross-sectional facility-based study conducted between October and December 2020. Participants were consenting VNRBD aged 18 – 65 years presenting at the regional NBTS for blood donation. As the participants arrived for blood

donation, the study objective was explained to them and their consent sought to participate in the study. All the participants gave informed consent and were consecutively recruited until the desired sample size of 120 was attained. A structured questionnaire was used to obtain socio-demographic, HBV immunization history and other information from subjects.

Ethical Approval

Ethical approval was obtained from the NBTS before the work was carried out. Informed consent was obtained from each subject before enrollment.

Data Analysis

Data obtained were cleaned, coded and entered into a predesigned excel spreadsheet and subsequently analyzed using the IBM Statistics for windows, version 23.0 (Chicago, IL: IBM Corp). Mean, and Standard deviation were used to summarize normally distributed continuous variable. Chi-square was used to test the associations between categorical variables. Results were presented using tables and charts.

RESULTS

A total of 120 blood donors were interviewed, of which 86 (71.7%) were males and 34 (28.3%) females, giving a Male: Female of 2.5:1. They were aged between 18 and 58 years with a mean ($\pm$ SD) of 36.12 ± 10.22 years, and a median age of 35 years. The highest number of donors belonged to the age group of 28-37 years. The majority of blood donors were self-employed 41 (34.2%), others were civil servants; 34 (28.3%), students; 26 (21.7%), business; 6 (5.0%) and security personnel and clergies; (10.8%). Ninety-six (80.0%) of subjects attained tertiary level education, while those with secondary and primary education were 18.3% and 1.7%, respectively. Sixty-four (53.3%) of subjects were married and 53 (46.7%) unmarried (Table 1).

All the subjects (100%) were voluntary non-remunerated donors. First-time and Repeat donors were

Table 1. Socio-demographic characteristics of Voluntary Blood donors in Jos between October and December 2020

Demographic characteristics	Frequency	Percentage
Age group		
18 -27	25	20.8
28 -37	48	40.0
38 -47	26	15.8
48 -57	19	21.7
58 -67	2	1.7
Gender		
Male	86	71.7
Female	34	28.3
Educational level		
Primary	2	1.7
Secondary	22	18.3
Tertiary	96	80.0
Marital status		
Married	64	53.3
Single	56	46.7
Occupation		
Civil servant	34	28.3
Self-employed	41	34.2
Student	26	21.7
Business	6	5.0
Others	13	10.8

Figure 1. Type of Voluntary blood donors at NBTS Jos, between October and December 2020**Table 2. Frequency of blood donation among Voluntary Blood donors in Jos between October and 2020**

Grouping	Frequency (n=99)	Percentage
10	70	70.7
11 -20	19	19.2
>20	10	10.1

Table 3. Hepatitis B Vaccination status of voluntary blood donors in Jos between October and December 2020

Variables	Frequency	Percentage
Vaccination status		
Vaccinated	44	36.7
Unvaccinated	76	63.3
Reasons for not vaccinated (n=76)		
Not aware of the vaccine	44	57.9
Don't know where to get the vaccine	16	21.1
No time to get vaccinated	6	7.9
Tested negative	3	3.9
No reason	7	9.2
Completed recommended 3 doses (among all the participants) n=120		
Completed	31	25.8
Received vaccine (among those that were aware of hepatitis B vaccine) n=66		
Yes	41	62.1
No	25	37.9

16.7% and 83.3%, respectively (Figure 1).

The frequency of donation by subjects ranged from 2 to 34 times as the time the study was being conducted. The majority of repeat donors (70.7%) had donated up to ten times. (Table 2).

Subjects who received the vaccine constituted 36.7%, while the majority (63.6%) were unvaccinated against the hepatitis B virus. Among the unvaccinated subjects, 44 (57.9%) were unaware that hepatitis B has a vaccine, 16 (21.1%) did not know where to get the vaccine, 3(3.9%) subjects felt they did not need the vaccine since they tested negative for the virus; 6 (7.9%) had no time to get vaccinated, while 7 (9.2%) gave no reason for their unvaccinated status. The majority (70.5%) of those that had the vaccine completed the recommended three doses, while the remaining 29.5% were yet to do so (Table 3).

DISCUSSION

In our study, only 44 (36.7%) of voluntary blood donors received one or more doses of HBV vaccine, of which 31 (70.5%) completed the recommended three doses of the vaccine that offer protection against HBV. However, the low uptake of vaccination found in our study is higher than that reported by Bonsu *et al.*,¹¹ Abdo *et al.*¹² and El-Ghitny *et al.*¹³ from Ghana, Sudan and Egypt, respectively. The low uptake of HBV vaccine by VBD in this study may reflect that in the general population where donors are derived from. Among medical students, low uptake was reported in Cameroun (26.05%),¹⁴ Kenya (44.3%),¹⁵ and Ghana (30%).¹⁶ Among health care personnel, low uptake was reported in Tanzania (33.6%),¹⁷ Ethiopia (27.6%)¹⁸ and Enugu, South Eastern Nigeria (14.2%).¹⁹ However, higher uptake was found in developed countries such as Italy (80%)²⁰ and France (88.6%).²¹ The higher uptake seen in developed countries may be due to enhanced awareness and universal implementation of routine childhood anti HBV vaccination. Among the unvaccinated subjects, identified factors

affecting vaccine uptake included poor knowledge of the availability of HBV vaccine (57.9%), access to the vaccine (21.1%), and poor perception of the need for vaccination (3.9%). These identified negative factors affecting vaccine uptake can be reduced through targeted dissemination of the right information about the availability of vaccine and where it can be accessed. During pre-donation counselling, information about HBV vaccination should be sought, and donors counselled on the need to get vaccinated to ensure complete protection from the virus. The majority (83.3%) of our subjects were repeated donors, with donation frequency ranging from two to thirty-four. Most of them were young and have attained tertiary level education; therefore, commitment to blood donation is done from an informed position. Such blood donors needed to be protected against HBV to guarantee a stable pool of safe VNRBD that can be retained over several years.

The expanded program on immunization (EPI) had been in place in Nigeria for decades.²² Hepatitis B vaccine was incorporated as part of the routine childhood immunization in 1990, with the vaccine given at birth, 6 and 14 weeks.²² The vaccine is safe and effective. Its introduction led to a decline in the proportion of under-five children chronically infected with the virus from 5% in the pre-vaccination era to under 1% in 2019.²³ The estimated global coverage of the vaccine in 2019 was 43%, while the coverage in Africa was lower (6%).²³ In Nigeria, a significant proportion of births are done outside the hospital setting, depriving the newborns of the HBV vaccine.²⁴ One of the strategies to improve access to vaccines for babies born outside the hospital setting is to educate the traditional birth attendants of the usefulness and availability of the vaccines. Such information can be passed to the mothers, who will be directed to immunization centres for vaccination of the newborns. As childhood immunization is being strengthened through well-articulated and nationally accepted policies, a well-defined strategy to bring the

unvaccinated adult population into the vaccine net must be developed. As adults cannot be forced to get vaccinated in contrast to newborns, the concept must be made attractive to them; aggressive and targeted dissemination of information on the benefits of the vaccine will facilitate voluntary acceptance. The right information can be passed to the population at health facilities, places of worship, billboards, health education in schools, print, and electronic media. Hepatitis B is vaccine-preventable; therefore, a high burden of it and other vaccine-preventable infections in any society suggests a gap in vaccination.

The rational use of blood and blood products demands that recipients of blood and products be given only the desired component.²⁵ Whole blood, when separated into its various component, can benefit more than one recipient; the transfusion of such components from a donor with occult HBV puts more than one recipient at risk of HBV infection.²⁶ In a setting where the supply of basic donor testing kits are frequently erratic and advanced screening using individual donor nucleic acid amplification is unavailable in many blood banks, transfusion safety in Sub Saharan Africa cannot be guaranteed in the face of a high burden of HBV among blood donors.⁵ Therefore, vaccination against HBV offers a cost-effective means of narrowing the existing gap in transfusion safety while availing an increased number of voluntary blood donors for retention.^{27,28,29}

The lifetime cost of managing a patient with chronic hepatitis B, liver cirrhosis, and HBV-induced hepatocellular carcinoma cannot be compared to the cost of three doses of highly effective HBV vaccine.^{30,31}

It is hoped that the negative factors affecting enhanced vaccine uptake among blood donors and, by extension, the general population identified in this study will attract the required attention of the policymakers and appropriately addressed to tackle the menace of HBV in our society. Universal HBV vaccine coverage in Nigeria is possible; the right political will and appropriate legislations are needed to actualize it.

CONCLUSION

Our study found a low uptake of HBV vaccine among blood donors in our environment. Insufficient knowledge about the existence of the vaccine and where it can be accessed were some of the identified factors limiting vaccine uptake in the majority of the subjects. We advocate for increased awareness at governmental and non-governmental fora and the enactment of strong legislation that will ensure universal access to the vaccine by Nigerians.

Limitations

Our study relied on self-reported hepatitis B vaccination by subjects. It did not confirm their seroconversion status, which could have allowed us to assess vaccine efficacy or failure.

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Conflict of interests: None declared

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