International Journal of Clinical Science and Medical Research

ISSN(print): 2770-5803, ISSN(online): 2770-582X

Volume 02 Issue 12 December 2022

DOI: https://doi.org/10.55677/IJCSMR/V2I12-02/2022, Impact Factor: 5.868

Page No : 101-104

Low Rate of HBV Vaccination Status and E-Antigenaemia among CHBVI Patients in North-Central Nigeria

McHENRY S.I.[1], ADOLE MARY-JAYNE[2], DAVID N.P.[3], DUGURU M.J.[4], MALU A.O.[5], OKEKE E.N.[6]

[1-6] JOS University Teaching Hospital Nigeria

ABSTRACT

Published Online: December 09, 2022

Introduction: Hepatitis B is a leading cause of end-stage liver disease in our environment. A very helpful means of its prevention is HBV vaccination. This study aimed to assess the level of compliance with HBV vaccination among adults in our environment by using the vaccination status of CHBVI patients as a surrogate marker and seeing if their status of HBV vaccination is related to e-antigen expression.

Method: An interviewer-administered questionnaire was used to obtain information about the patients. A Hepatitis B panel was obtained using the LumiQuick HBV-5 panel Test Card. Data were analysed using SPSS version 26. Means/medians were used to express numerical data. Cross-tabulation was used to compare categorical variables.

Results: One hundred and seventy-six (176) chronic hepatitis B patients participated in this study. Less than half (37.6%) were females. The mean age of the participants was 39.52(SD 11.57) years. Patients with complete vaccination were 4.5%, incomplete vaccination 6.4%, none vaccinated 89.2%. The proportion of those with no vaccination and complete vaccination was not significantly different (p=0.85) in females (89.8%; 5.1%) and males (88.8%; 4.1%).

Educational level was seen to affect vaccination status. Those with no formal education had no vaccination at all. No one with primary education had complete vaccination. Those with a secondary level of education had 28.7% complete vaccination. Tertiary education holders had the most proportion with complete vaccination (71.4%), p=0.63

Of all the patients who participated in the study, e-antigenemia was found in 12.4% while 87.6% were e-antigen negative. Sixty-three per cent (63%) were e-antibody positive. Many (60.9%) had a combination of eAg-/eAb+. But as much as 24.3% were negative for both e-antigen and e-antibody (eAg-/eAb-). AST level was the only significant predictor of HBeAg status, p-= 0.016

Conclusion: There is a high prevalence of pre-cure/core mutant HBV in North central Nigeria. The majority of adults in our environment are hepatitis B virus non-vaccinated and even those who start the process of vaccination rarely complete it.

KEYWORDS:

Chronic Hepatitis B virus infection; Hepatitis B virus

Corresponding Author: McHENRY S.I.

***Cite this Article: McHENRY S.I., ADOLE MARY-JAYNE, DAVID N.P., DUGURU M.J., MALU A.O., OKEKE E.N. (2022). Low Rate of HBV Vaccination Status and E-Antigenaemia among CHBVI Patients in North-Central Nigeria. International Journal of Clinical Science and Medical Research, 2(12), 101-104**

ABREVIATIONS

Ab	Antibody
Ag	Antigen
CHBVI	Chronic Hepatitis B virus infection
EDTA	Ethylenediamine tetra acetic acid
JUTH	Jos University Teaching Hospital
HBcAb	Hepatitis B core antibody
HBeAb	Hepatitis B envelope antibody
HBeAg	Hepatitis B envelope antigen
HBsAb	Hepatitis B surface antibody
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
IgM	Immunoglobulin M
PHC	Primary health center
WHO	World health organization

INTRODUCTION

Recent data show the higher global prevalence of hepatitis B, with about 400 million chronic carriers of hepatitis B.[1,2] The increase is still surging and our best bet in curbing this includes intensive and efficient awareness; vaccination; and prompt treatment. In Nigeria, most primary health centers (PHCs) across all the 774 local government areas have incorporated HBV vaccination into the immunization schedule since the early 2000s. This has been very encouraging; however, the uptake has been either absent in many individuals or incomplete.

Factors responsible for this include ignorance, improper health education, vaccine hesitancy, unavailability of vaccines, poor perception of the risk of contracting HBV[3] and cultural beliefs. In adults, aged over 20 years, missed or even absent doses are common as most centres where HBV vaccination is given are free only for children.

The WHO in 2015 set a global target of 90% vaccine coverage and reduced infection rate by 90%.[4] This is very ambitious, but the figures in Nigeria are way behind.

Hepatitis B e-antigenemia is one of the markers of infectivity.[5] However, in patients without e-antigen, possibilities include basal core/pre-core mutants, seroconversion, or low levels below detection limits. All these possibilities have implications for outcomes and treatment.

This study aimed to determine the status of HBV e-antigenemia, e-antibodies and vaccination status in Nigerians with CHBVI.

METHODS

One hundred and seventy-six (176) treatment-naive consenting CHBVI adults who attend the medical outpatient clinic of the Jos University Teaching Hospital (JUTH) aged between 18 to 69 years participated in the study. An interview-administered questionnaire was used to obtain biophysical data after obtaining ethical clearance. The Hepatitis B panel was assayed via a rapid diagnostic kit (LumiQuick HBV-5 panel Test Card). The blood sample, 5ml for the panel was collected in an EDTA bottle and centrifuged to separate the plasma. This was then pipetted on the cards and read off after 10-15 minutes. This showed status of HBsAg, HBsAb, HBeAg, HBeAb, HBcAb-IgM).

Data analysis was done using SPSS version 26. Continuous variables were summarized as means and median. Regression analysis was also used to predict dependent from independent variables. The level of significance was set as $p < 0.05$

RESULTS

One hundred and seventy-six (176) chronic hepatitis B patients participated in this study. Most were males (62.4%) and 37.6% were females. The mean age of the participants was 39.52(SD 11.57) years. Many had tertiary education (46.6%); 24.4% had secondary education, and just 1.7% had no formal education. The categories of occupation included Students (8.8%), Civil servants (39.0%), Farmers (8.8%), Traders (16.2%), Others (16.2%) and Unemployed (11.0%). Overall, only 4.5% had complete vaccination. About 6.4% had incomplete vaccination and as much as 89.2% had no HBV vaccination. Patients with complete vaccination were 4.5%, incomplete vaccination 6.4%, none vaccinated 89.2%. The proportion of those with no vaccination and complete vaccination was not significantly different (p=0.85) in females (89.8%; 5.1%) and males (88.8%; 4.1%).

Table 1: HBV Vaccination? (None, Incomplete or Complete)

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid		0	0	0	0
	0	157	89.2	89.2	89.2
	1	11	6.4	6.4	95.5
	2	8	4.5	4.5	100.0
	Total	176	100.0	100.0	

Educational level was seen to affect vaccination status. Those with no formal education had no vaccination at all. Zero per cent (0.0%) of those with primary education had complete vaccination. But more with primary had incomplete (20.0 %) and no vaccination (17.1%). Those with a secondary level of education had 28.7% complete vaccination. Tertiary education holders had the most proportion with complete vaccination (71.4%), p=0.63. Civil servants have the most proportion (50.0%) with complete vaccination. Traders and farmers had no one with complete vaccination.

Of all the patients who participated in the study, e-antigenemia was found in 12.4% while 87.6% were e-antigen negative. Sixty-three per cent (63%) were e-antibody positive. Many (60.9%) had a combination of eAg-/eAb+. But as much as 24.3% were negative for both e-antigen and e-antibody (eAg-/eAb-).

Table 2: HBV Vaccination? (None, Incomplete or Complete) * HBeAG- and HBeAb- Crosstabulation

			HBeAG- and HBeAb-		
			YES	NO	Total
HBV Vaccination? (None, Incomplete or Complete)	0	Count	31_a	92_a	123
		% within HBeAG- and HBeAb-	93.9%	89.3%	90.4%
	1	Count	0_a	8_a	8
		% within HBeAG- and HBeAb-	0.0%	7.8%	5.9%
	2	Count	2_a	3_a	5
		% within HBeAG- and HBeAb-	6.1%	2.9%	3.7%
Total		Count	33	103	136
		% within HBeAG- and HBeAb-	100.0%	100.0%	100.0%

Each subscript letter denotes a subset of HBeAg- and HBeAb- categories whose column proportions do not differ significantly from each other at the .05 level. **P= 0.078**

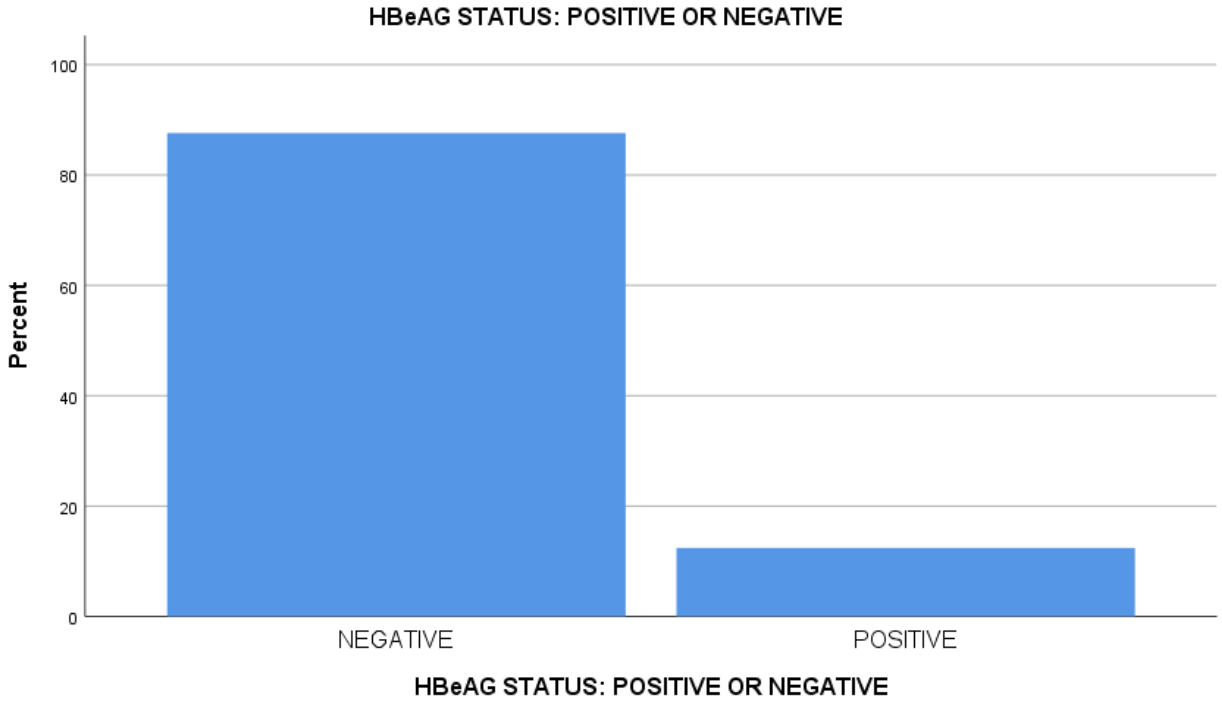

Figure 1: A bar chart showing the HBe-antigen status of participants

DISCUSION

HBV vaccination is very important in preventing chronic hepatitis b. This study focused on patients who were treatment naïve. The Nigerian government does provide free vaccination for its populace, especially infants since the early 2000s. Some facts that are obvious in this study include a very low rate of HBV vaccination completion (4.5%). A larger proportion (89.2%) of both males and females had no vaccination at all. This reflects what happens in society, especially in adults.

Most occupations that require little or no formal education have a chunk of those without vaccination. This included farmers and traders. Civil servants had a higher portion with complete vaccination. This is largely due to higher education requirements to be employed and the government's policy in Nigeria of mandating all those employed to get tested and vaccinated for record purposes.

It's also of note that the level of e-antigenemia was low (12.4%), and many had e-antibody positivity (63.0%). But, about a quarter (24.3%) had neither e-antigen nor e-antibody. This is the kind of panel seen in HBV patients who may have basal/pre-core mutant form. This should be borne in mind as it has consequences on outcome and treatment response. There are studies in north central Nigeria basal core/pre-core mutants. [6] This showed the majority infected with genotype E (45/46) also 79.8% were HBe-antigen negative. [6] This is similar to this current study where 87.6% were negative for e-antigen.

In Southeastern Nigeria, genotypes A1 and D were found to be common and also showed basal core/pre-core mutants.[7] The commonest mutations in previous studies was G896A demonstrated in Southeast Nigeria[7], APIN JUTH Jos (57%)[6], France (54%)[8], Iran (34.1%%)[9] and India (16.7%)[10]. In this index study, as much as 24.3 % had no e-antigen and e-antibody. The mutation above leads to a premature stop codon TAG, which leads to the termination of HBeAg expression.[11] Hence inability to express e-antigen also means less likely to express e-antibody. And this was the case in about one-quarter of the participants.

All of these buttresses the importance of HBV vaccination which for now is below par in Nigeria. As typified by a study in India where a mutants form of HBV was found mostly in nonvaccinated patients (31.7%) as compared to vaccinated patients (6.3%).[10]

Interestingly, 31/33, 93.9% who had neither eAg nor eAb (i.e eAg-/eAb-) were those who never had HBV vaccination. While only 2/33, 6.1% had this combination in the group who were fully vaccinated; **p=0.078.** This is similar to the Indian experience in 2014.[10]

CONCLUSION

There is a high prevalence of pre-cure/core mutant HBV in North central Nigeria. The majority of adults in our environment are hepatitis B virus non-vaccinated and even those who start the process of vaccination rarely complete it. There is a need to fashion means of increasing the level of vaccination as the consequences of this non-vaccination and subsequent mutation of HBV can be devastating

REFERENCES

1. McMahon BJ. Epidemiology and Natural History of Hepatitis B. Semin Liver Dis. 2005 Feb;25(S 1):3–8.
2. Kowdley KV. The Cost of Managing Chronic Hepatitis B Infection: A Global Perspective. J Clin Gastroenterol. 2004 Dec;38(10):S132.
3. Ibekwe RC, Ibeziako N. Hepatitis B vaccination status among health workers in Enugu, Nigeria. Niger J Clin Pract. 2006 Oct 3;9(1):7–10.
4. Organization WH. Global hepatitis report 2017. World Health Organization; 2017.
5. Chen Y sheng, Liang X feng, Hu J feng. [The serum markers of hepatitis B virus (HBV) infection and the natural history of chronic HBV infection]. Zhongguo Yi Miao He Mian Yi. 2009 Jun;15(3):279–83.
6. Grant J, Agbaji O, Kramvis A, Yousif M, Auwal M, Penugonda S, et al. Hepatitis B virus sequencing and liver fibrosis evaluation in HIV/HBV co-infected Nigerians. Trop Med Int Health. 2017;22(6):744–54.
7. Mbamalu C, Ekejindu I, Enweani I, Kalu S, Igwe D, Akaeze G. Hepatitis B virus precore/core region mutations and genotypes among hepatitis B virus chronic carriers in South-Eastern, Nigeria. Int J Health Sci. 2021;15(2):26–38.
8. Ducancelle: Different precore/core mutations of hepatitis... - Google Scholar [Internet]. [cited 2022 Aug 20]. Available from: https://scholar.google.com/scholar_lookup?journal=J+Gastroenterol+Hepatol&title=Different+precore/core+mutations+of+hepatitis+B+interact+with,+limit,+or+favor+liver+fibrosis+severity&author=A+Ducancelle&author=A+Pivert&author=S+Bertrais&author=J+Boursier&author=V+Balan&volume=31&publication_year=2016&pages=1750-6&pmid=26992056&
9. Kheirabad: Prevalence and characteristics of pre-core... - Google Scholar [Internet]. [cited 2022 Aug 20]. Available from: https://scholar.google.com/scholar_lookup?journal=Electron+Phys&title=Prevalence+and+characteristics+of+precore+mutation+in+Iran+and+its+correlation+with+genotypes+of+Hepatitis+B&author=AK+Kheirabad&author=G+Farshidfar&author=S+Nasrollaheian&author=H+Gouklani&volume=9&publication_year=2017&pages=4114-23&
10. Bhattacharya H, Bhattacharya D, Nagarajan M, Reesu R, Roy S, Attayur PS. Prevalence of Mutations in Basal Core Promoter and Precore Region of Hepatitis B Virus in Vaccinated and Nonvaccinated Individuals of the Aboriginal Nicobarese Tribe of Car Nicobar Island, India. Intervirology. 2014;57(6):357–64.
11. Genotypes and viral variants in chronic hepatitis B: A review of epidemiology and clinical relevance - PMC [Internet]. [cited 2022 Aug 20]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4381158/