Vaccination status and knowledge of viral Hepatitis B: A World Hepatitis Day survey

Abstract

Background: Hepatitis B (HBV) poses a continual Public Health threat globally despite the availability of a safe, and effective vaccine.The HBV vaccine provides a 98-100% coverage thereby preventing complications of the infection such as liver cirrhosis. Despite the wide coverage of HBV vaccine in developed countries, its uptake in Sub-Saharan Africa where the disease burden is high remain abysmal. The aim of this study is to determinethe knowledge of Hepatitis B Vaccine, its uptake and barriers to vaccination among the residents of Rivers State.

Methodology: This is a cross-sectional study of 133 participants in a world hepatitis day campaign using personnel administered validated questionnaire. data was analyzed with Microsoft excel software and Think-Cell.

Result: 69% of the 133 participants (47 males and 86 females with an age range from 14-85 years with a mean age of 40.34 years) were aware of the HBV vaccine. Strong Predictors of vaccine knowledge were female gender, young adults and healthcare related occupation. Vaccine uptake was less than 10% among the participants and unavailability of the HBV vaccine was the major reason given for non-vaccination.

Conclusion: Knowledge of HBV vaccine varies depending on gender, age and occupation. There is a need to improve HBV vaccine awareness and uptake in Nigeria.

Keywords: Vaccination HepatitisB HBV vaccine uptake

Introduction

Hepatitis B poses a continual Public health threat globally despite the availability of a safe, and effective vaccine and treatment resulting in 1.1million deaths in 2022 alone.(1)Globally, The burden of viral Hepatitis B is higher in low to medium income countries in Asia and Africa (2) and Healthcare workers are disproportionately more exposed to the hepatitis B virus (HBV) as an occupational hazard. An estimated 2million

Healthcare workers are at risk of exposure annually with 90% of them in Sub-Saharan Africa. (3) Discovered in 1965 by Dr. Baruch Blumberg with the first experimental form in 1970 and originally called the “Australian antigen,” the HBV vaccine has transitioned from the “Heptavax” – an inactivated form of vaccine derived from the plasma of the blood of hepatitis B virus-infected (HBsAg-positive) donors in 1980 to the currentgenetically engineered (or DNA recombinant) form in 1986. (4)

Nigeria introduced the monovalent HBV vaccine into her National program of Immunization (NPI) in 2004 to be given at 6, 10, and 14 weeks of age(5,6) and the pentavalent form of the vaccine in 2012 comprising diphtheria, tetanus, pertussis, HBV, and Hemophilus influenza type B which is given at birth.(5,7)The HBV vaccine is safe, effective and provides a 98-100% coverage thereby preventing complications of the infection such as liver cirrhosis and hepatocellular carcinoma.(8)

Though HBV vaccine coverage has been widely available for all in the United States and other developed countries for several decades (9)The NPI regimen in Nigeria is mostly child-driven and targets infants. Hepatitis Bvaccine uptake in Nigeria across different sectors and age groups varies despite the pooled HBV prevalence of 9.5% in Nigeria.(10) Multiple studies have reported varying vaccination uptake rates of 20- 50% among healthcare workers (11–14) and up to 76.3% in non-clinical workers.(13) These varying rates have been alluded to multiple factors by different researchers in Nigeria. Ibekwe et al (12) reported that prior training in infection control and professional groups were independent factors that affect HBV vaccine uptake. Sofola et al (14) on the other hand argue that poor uptake of HBV vaccine among his respondents was as a result of complacency which was observed in 54% of them. Furthermore, knowledge of viral hepatitis B and its prevention is directly proportional to the occupation, level of education and attitude to vaccination of the individual. (12,15)Thereis little or no published report regarding HBV vaccination coverage inRivers State, therefore, the purpose of this study is to determinethe knowledge of Hepatitis B Vaccine, its uptake and barriers to vaccination among the residents of Rivers State.

Methodology

Study design and site: This is a cross-sectional study carried out during 2022World Hepatitis Day community outreach in Port Harcourt, Rivers State a densely populated city with varying ethnic groups. The study targeted the Rivers State University Teaching Hospital community plus its environs of Old GRA/ Township/Borokiri axis as well as the Rivers State University community, Nkporlu, mile 3 Diobu.

Study tool: A structured pretested validated questionnaire was administered by trained assistant researchers to residents who attended the campaign and gave consent. The questionnaire comprises of 20 items categorized into four sections namely basic demography, knowledge of recommended HBV vaccine, vaccination status/reasons for not being vaccinated and history of testing for viral hepatitis B and C.

Inclusion/Exclusion criteria: All attendees who gave informed consent were included into the study. However, those with incomplete data were excluded from the study.

Participants were considered to be adequately vaccinated if they had received the minimum vaccination for HBV of 3 doses of 0.5ml intramuscular injection of Engerix-B® or Recombivax-HB® at 0,1-, and 6-months schedule. Participants who did not receive any of the dose or did not complete the 3 doses were deemed unvaccinated.

Ethical approval was obtained from the Rivers State University Teaching Hospital ethical committee with number RSUTH/REC/2022213.

Statistical analysis was performed using Microsoft Excel software and Think-cell. Categorical variables were presented as frequencies and percentages, while continuous variables were described using the mean and standard deviation. Factors associated with vaccination or lack of it among participants were identified using the $\chi 2$–test and multivariable logistic regression analysis.

Results

There were 133 respondents (47 males and 86 females) with an age range from 14-85 years with a mean age of 40.34 years. The participants consist of more young adults within the age group of 18-45 years with a female preponderance as shown in table1.

Table 1. composition of the respondents by age group and sex

Age / Sex	<18	18-45	46-65	>65	Total
Male	1	26	16	4	47
Female	1	58	22	5	86
Total	2	84	38	9	133

Sixty nine percent (69%, n=92) of the 133 respondents are aware of the HBV vaccine while 31%(n=41) had no knowledge of the existence of the HBV vaccine.

Knowledge of HBV Vaccine by Sex and age

More females than males had knowledge of vaccination against Hepatitis B infection [76% (n=65) vs 57% (n=27)]even when compared across different age brackets. (table 2&3). females aged 18-45 years had the most knowledge while the younger people <18years had the least knowledge of hepatitis B vaccine. (Figure 1)

Table 2: Comparison of HBV vaccine knowledge by age and sex

	No of respondents		Knowledge of HBV vaccine		
Sex / Age	Male	Female	Male	Female	Total
<18	1	1	0	0	2
18-45	26	58	18	45	84
46-65	16	22	7	15	38
>65	4	5	2	5	9
Total	**47**	**86**	**27**	**65**	**133**

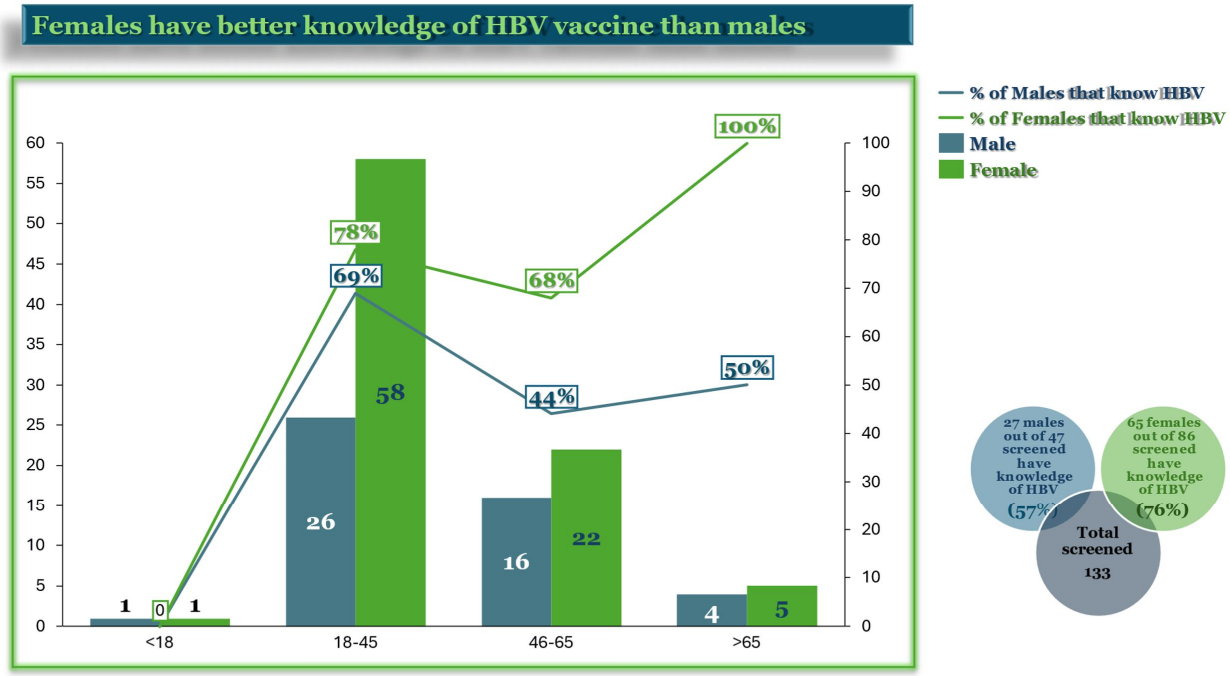

Figure 1: knowledge of HBV vaccine across different age distributions in males and females.

The knowledge of HBV Vaccine was higher in the age group 18-45as seenin table 3 and the analysis below.

Age / Sex	<18	18-45	46-65	>65	Total
Male	1 (35.4)	26 (35.9)	16 (35.6)	4 (36.0)	47
Female	1 (64.8)	58 (65.2)	22 (64.9)	5 (65.2)	86
Total	2	84	38	9	133

Table 3: age dependency of the knowledge of HBV vaccine. (Expected frequencies are shown in parentheses)

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

$$= \frac{(1-35.4)^2}{35.4} + \frac{(26-35.9)^2}{35.9} + \frac{(16-35.6)^2}{35.6} + \frac{(4-36.0)^2}{36.0} + \frac{(1-64.8)^2}{64.8} + \frac{(58-65.2)^2}{65.2} + \frac{(22-64.9)^2}{64.9} + \frac{(5-65.2)^2}{65.2} \approx 222.46$$

Decision and interpretation

H_0: Knowledge of HBV Vaccine is independent of age

H_a: Knowledge of HBV Vaccine is dependent on age

$\alpha = 0.01$

d.f. = (2 – 1)(4 – 1) = 3

Test Statistic: $\chi 2 = 222.5$Decision: **Reject H_0**

Knowledge of HBV vaccine by occupation

Health Care Workers have more knowledge of HBV vaccines than any other occupation represented as 97% of them are aware of the vaccine while only one of the applicants is aware of vaccination against HBV. (figure 2)

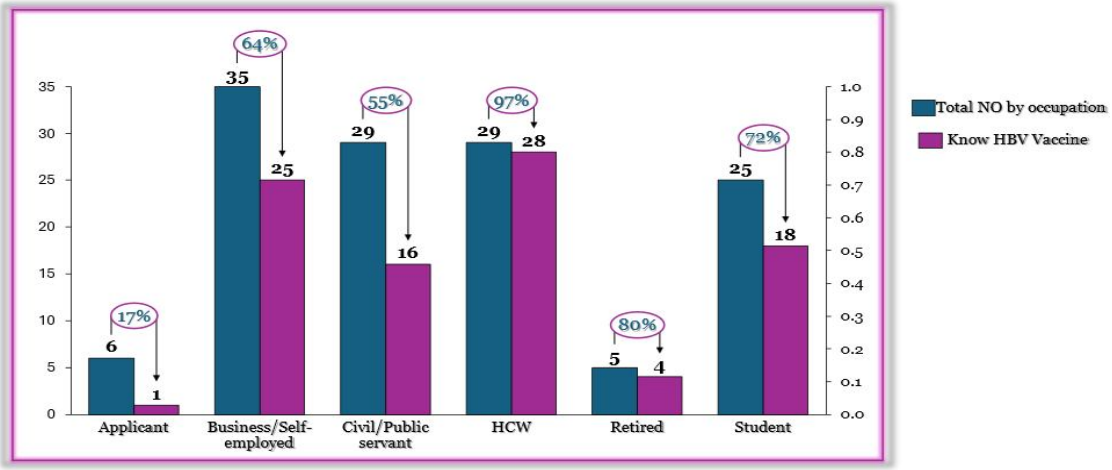

Figure 2: knowledge of HBV vaccine by occupation

However, out of 44 respondents who were combined healthcare workers and medical students, a majority 39 (89%)have knowledge of HBV vaccine but only 10% have been vaccinated for HBV (figure3 & 4)

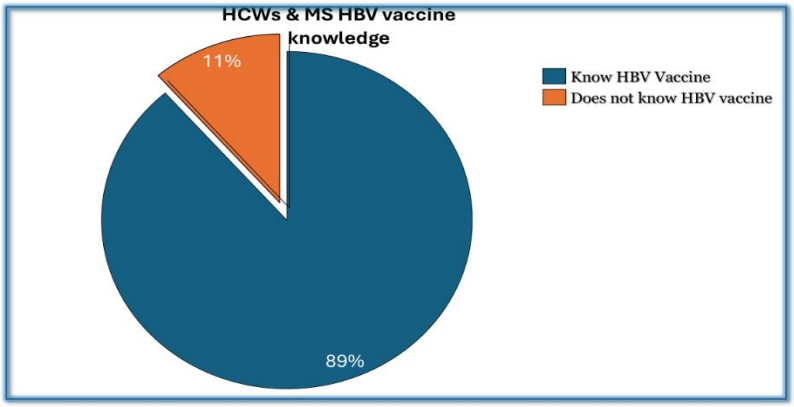

Figure 3: Healthcare workers and medical students' knowledge of HBV vaccine

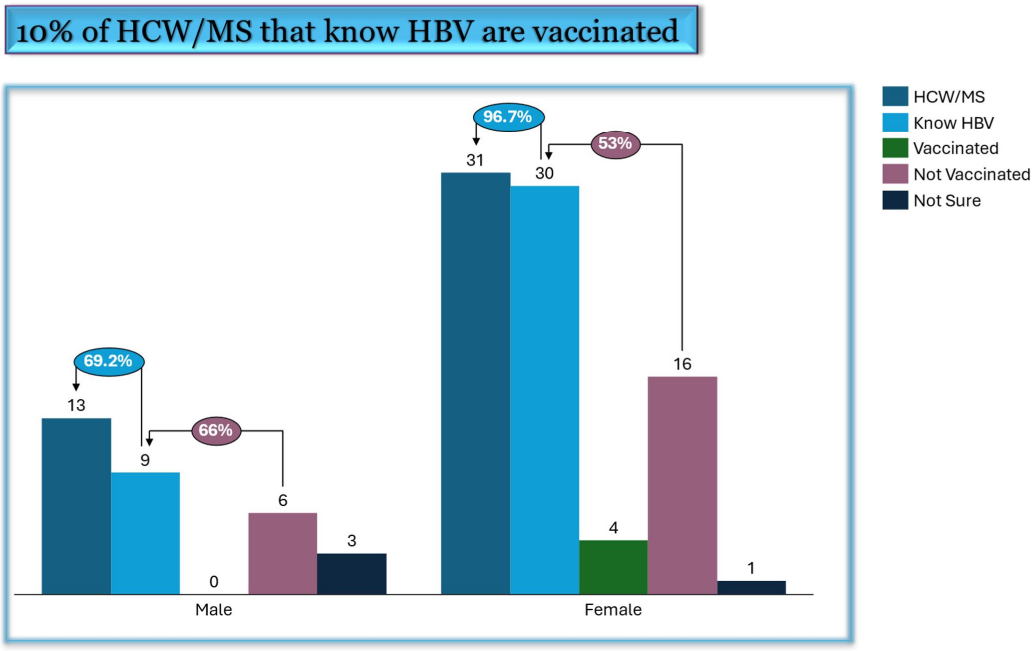

figure 4: Percentage of vaccinated HCW and Medical student

Vaccination status and reasons for lack of vaccination against Hepatitis B

In this study, less than 10% of the population with knowledge of HBV vaccine has been vaccinated against it. Reasons given for non-vaccination include unavailability of the HBV vaccine in 42.1%, 12.2% believed the vaccines where too expensive, 26.3% do not know where to get the vaccines, 3,5% gave safety concerns and 15.7% had no clear reasons for not seeking vaccination. See table 4.

Not Vaccinated	Reasons for non-vaccination				
	Unavailability	Expensive	Does not know where	Safety reasons	No reason
57	24(**42.1%**)	7(**12.2%**)	15(**26.3**)	2(**3.5%**)	9(**15.7%**)

Table 4: Reasons for non-vaccination

Females were more vaccinated compared to their male counterparts among those who have knowledge of the vaccine (9% vs4%), however the reasons for lack of vaccination varied in both sexes. (figure 5)

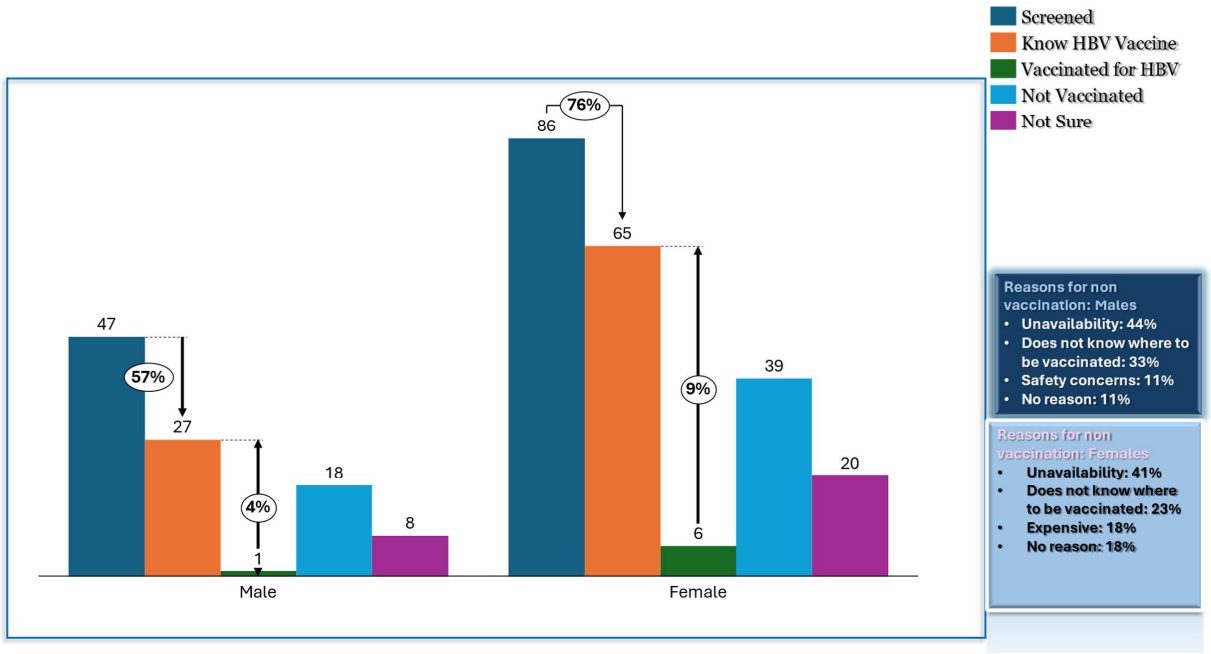

Figure 5: Reasons for non-vaccination in males and females

Also, more females had knowledge of HBV vaccine and have been vaccinated than their male counterparts (6 females and 1 male). Thus, from table 4 only 7 persons out of a total of 133 respondents have been vaccinated against the hepatitis B virus.

SEX CATEGORY	Number of respondents	Know HBV Vaccine	Vaccinated for HBV	Not Sure	Not Vaccinated	Reasons for non vaccination				
						Unavailability	Expensive	Does not know where	Safety reasons	No reason
Male	47	27	1	8	18	8(44%)	0	6(33%)	2(11%)	2(11%)
Female	86	65	6	20	39	16(41%)	7(18%)	9(23%)	0	7(18)

Table 5: Knowledge of HBV vaccine and vaccination status by sex

Discussion

This was a cross-sectional study to determine the knowledge of Hepatitis B Vaccine, its uptake and barriers to vaccination among the residents of Rivers State.Our study revealed that 69% (n=92) of our respondents have knowledge of the HBV vaccine. However, this knowledge was significantly dependent on age, sex as well as occupation. Our study revealed that among all represented occupations, 97% of HCWs exhibited good knowledge of the HBV vaccine. This observation aligns with other reported rates in Nigeria. (3,16,17)

Knowledge of HBV vaccine can vary by age and gender. In our study, respondents aged 18-45 years and females demonstrated a higher knowledge than any other age groups and the male gender respectively. Multiple studies have reported that young adults, occupation and professional groups such as medical practitioners were major predictors of good knowledge of HBV vaccine.(19-21)Oni et al (3) in a study of 256 healthcare workers in southwestern Nigeria reported that over 80% of female respondents and

respondents in the young adult age group had a better knowledge of an effective vaccine against Hepatitis B. However, another study (18) determined that sociodemographic factors such age and sex were inconclusive predictors of the knowledge of the HBV vaccine rather being a Physician, exposure to HBV information, prior infection prevention training and having a higher education were positively associated with a better knowledge of HBV vaccine. Furthermore, clinical HCWs and recently employed HCWs were more likely to have knowledge of HBV vaccine when compared to older and non-clinical HCWs. (17)

In this cross-sectional study, more females have been vaccinated compared to the males (table 5) and the reasons for non- uptake of HBV vaccine in both genders include unavailability of the HBV vaccine, cost of the vaccine, poor knowledge of where to get the vaccines, and safety concerns. A National pilot study in Nigerian pregnant women reported a lack of awareness of the vaccine, inadequate access to vaccine, and positivity to hepatitis B virus as comparable reasons for non-uptake of HBV vaccination. (22)

Several reasons have been given for poor vaccine uptake among healthcare workers including lack of awareness about the need for the vaccine, concerns about vaccine safety, cost of the vaccine, inadequate access to vaccination services, fear of needles, distrust in the healthcare system, lack of time, lack of employer policies encouraging vaccination, and sometimes, simply forgetting to get vaccinated.(16,18,23) In our study, despite a high knowledge of HBV vaccine among HCWs and medical students (up to 97%), vaccine uptake amongst this population remain abysmal as only 10% of the them have been vaccinated alluding to the aforementioned reasons for their lack of vaccine uptake.

References

1. World Health Organization Hepatitis B virus infection 2023 (2023) [accessed 5 October 2023] https://www.who.int/news-room/fact-sheets/detail/hepatitis-bHepatitis B [Internet]. [cited 2024 Oct 5]. Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b

2. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. The Lancet. 2015 Oct 17;386(10003):1546–55.

3. Oni OI, Osho OP, Oluwole MT, Osho ES, Ogungbeje A, Raji HM. Assessing the level of knowledge, uptake of hepatitis B virus vaccine, and its determinants among health workers across various levels of health facilities in Ondo, South West, Nigeria. Egypt J Intern Med. 2022 Nov 5;34(1):80.

4. Hepatitis B Foundation: History of Hepatitis B Vaccine [Internet]. [cited 2024 Oct 7]. Available from: https://www.hepb.org/prevention-and-diagnosis/vaccination/history-of-hepatitis-b-vaccine/

5. Olayinka AT, Oyemakinde A, Balogun MS, Ajudua A, Nguku P, Aderinola M, et al. Seroprevalence of Hepatitis B Infection in Nigeria: A National Survey. Am J Trop Med Hyg. 2016 Oct 5;95(4):902–7.

6. National Programme on Immunization and Partners. Five Years NationaStrategic Plan 2003–2007. Abuja, Nigeria: National Programme on Immunization; 2002. pp. 19–20.

7. Nigeria launches pentavalent vaccine [Internet]. [cited 2024 Oct 12]. Available from: https://www.gavi.org/news/media-room/nigeria-launches-pentavalent-vaccine

8. Thote SR, Soyam GC, Dhakate MA. Hepatitis B vaccination status and knowledge, attitude, and practice of hepatitis B among medical students at a medical college in central India. Int J Community Med Public Health. 2023 Feb 28;10(3):1244–9.

9. Poland GA, Jacobson RM. Clinical practice: prevention of hepatitis B with the hepatitis B vaccine. N Engl J Med. 2004 Dec 30;351(27):2832–8.

10. Ajuwon BI, Yujuico I, Roper K, Richardson A, Sheel M, Lidbury BA. Hepatitis B virus infection in Nigeria: a systematic review and meta-analysis of data published between 2010 and 2019. BMC Infect Dis. 2021 Oct 30;21(1):1120.

11. Ogoina D, Pondei K, Adetunji B, Chima G, Isichei C, Gidado S. Prevalence of Hepatitis B Vaccination among Health Care Workers in Nigeria in 2011–12. Int J Occup Environ Med. 2014 Jan 1;5(1):51–6.

12. Rc I, N I. Hepatitis B vaccination status among health workers in Enugu, Nigeria. Niger J Clin Pract [Internet]. 2006 Jun [cited 2024 Oct 13];9(1). Available from: https://pubmed.ncbi.nlm.nih.gov/16986281/

13. Fatusi AO, Fatusi OA, Esimai AO, Onayade AA, Ojo OS. Acceptance of hepatitis B vaccine by workers in a Nigerian teaching hospital. East Afr Med J. 2000 Nov;77(11):608–12.

14. Sofola OO, Uti OG. Hepatitis B virus infection and prevention in the dental clinic: knowledge and factors determining vaccine uptake in a Nigerian dental teaching hospital. Nig Q J Hosp Med. 2008 Jul-Sep;18(3):145-8.

15. Naqid IA, Mosa AA, Ibrahim SV, Ibrahim NH, Hussein NR. Hepatitis B vaccination status and knowledge, attitude, and practice towards Hepatitis B virus among medical sciences students: A cross-sectional study. PLOS ONE. 2023 Nov 6;18(11):e0293822.

16. Kooffreh-Ada M, Okpokam D, Chukwudike E, Oku A, Ameh S, Effa E. Hepatitis B virus knowledge and vaccination status mong health-care workers in Calabar, Nigeria. Niger J Med 2021; 30:79-85.

17. Osagiede EF, Awunor NS, Osagiede ET , Abah SO. Factors Influencing Knowledge of Hepatitis B Vaccination amongst Healthcare Workers in a Rural Teaching Hospital in Southern Nigeria . International Journal of Occupational Safety and Health, Vol. 12 No. 2 (2022), 89 – 96

18. Machmud PB, Glasauer S, Gottschick C, Mikolajczyk R. Knowledge, Vaccination Status, and Reasons for Avoiding Vaccinations against Hepatitis B in Developing Countries: A Systematic Review. Vaccines. 2021 Jun 9;9(6):625.

19. Adekanle O., Ndububa D.A., Olowookere S.A., Ijarotimi O., Ijadunola K.T. Knowledge of hepatitis b virus infection, immunization with hepatitis b vaccine, risk perception, and challenges to control hepatitis among hospital workers in a Nigerian tertiary hospital. Hepat. Res. Treat. 2015; 2015:439867.

20.Jaquet A., Wandeler G., Tine J., Diallo M.B., Manga N.M., Dia N.M., Fall F., Dabis F., Seydi M. Prevention and care of hepatitis b in Senegal; Awareness and attitudes of medical practitioners. Am. J. Trop. Med. Hyg. 2017; 97:389–395.

21.Chan O.K., Lao T.T., Suen S.S.H., Lau T.K., Leung T.Y. Knowledge on hepatitis b infection among pregnant women in a high endemicity area. Patient Educ. Couns. 2011; 85:516–520.

22. Eleje GU, Akaba GO, Mbachu II, Rabiu A, et al.Triplex Infection in Pregnancy Collaboration Group. Pregnant women's hepatitis B vaccination coverage in Nigeria: a national pilot cross-sectional study. Ther Adv Vaccines Immunother. 2021 Jul 29; 9:25151355211032595.

23. Botchway ET, Agyare E, Seyram L, Owusu KK, Mutocheluh M, Obiri-Yeboah D. Prevalence and attitude towards hepatitis B vaccination among healthcare workers in a tertiary hospital in Ghana. Pan Afr Med J. 2020 Aug 5; 36:244