Int J Biol Med Res. 2024; 15(3): 7821-7824

Contents lists available at BioMedSciDirect Publications

International Journal of Biological & Medical Research

Journal homepage: www.biomedscidirect.com

Original article

THE PREVALENCE OF HEPATITIS B VIRUS IN A PERIURBAN COMMUNITY IN NASARAWA STATE, NIGERIA

Gracious Adalci Bahuyak and Oluwatoyosi Adekeye
Bingham University, Karu, Nasarawa State
Department of Community Medicine and Primary Health Care.

A R T I C L E I N F O

Keywords:
Prevalence
Hepatitis B virus
Periurban Community
Nasarawa State

A B S T R A C T

Introduction:The 2024 Global Hepatitis Report from the World Health Organization (WHO) highlights an alarming increase in fatalities due to viral hepatitis. There is a high burden of Hepatitis virus infection in Nigeria, despite the availability of a safe and effective vaccine against the virus. The study aimed to determine the prevalence of Hepatitis B virus in a periurban community in Nasarawa State, Nigeria. Methodology:This cross-sectional study was conducted in a periurban communityusing a multistage sampling technique to select participants in the community. Socio-demographic data were obtained from the participants using an interview-administered questionnaire while, capillary whole blood was collected by a finger-stick procedure from each participant using a sterile lancet and assayed using kits developed by Micropoint. Data were analyzed using version 25.0 of IBM-SPSS for Windows. A total of 180 participants were recruited for this study. Results: The result showed a prevalence of 8.6%. The findings also show that there was a statistically significant association between the prevalence of HBsAg and gender (Chi-square = 6.386, P-value = 0.012). The statistical significance was taken at P-value< 0.05 while examining the odd ratio (OR) and adjusted odd ratio (AOR) of the variables and only gender was a statistically significant predictor of HBsAg prevalence, where the female category was less likely to have HBsAg than the male category (OD = 0.242, P-value = 0.018; AOR = 0.219, P-value = 0.017). Conclusion:The findings of this study reveal a high prevalence of hepatitis B among residents of this community in Nasarawa State. Therefore, adequate health education and mass screening and vaccination campaigns are recommended, coupled with sustained community engagement, to reduce the burden of hepatitis B and move towards the WHO's goal of eliminating the disease by 2030.

© Copyright 2023 BioMedSciDirect Publications IJBMR -ISSN: 0976:6685.

Introduction

Hepatitis is an inflammation of the hepatocytes (also known as liver cells), and it is typically caused by hepatitis viruses. Hepatitis B virus is of significant global health concern, particularly due to its high prevalence and potential for severe liver-related complications(1,2). This virus can lead to chronic infections, which can progress silently and result in liver cirrhosis, liver cancer, and even death. It is the main global contributor to cirrhosis, hepatocellular cancer, and liver-related mortality(3).

The 2024 Global Hepatitis Report from the World Health Organization (WHO) indicates a concerning rise in the number of fatalities attributed to viral hepatitis. This disease now ranks as the second most significant infectious cause of death worldwide, claiming 1.3 million lives annually, which equals the toll of tuberculosis, another major infectious disease. Despite the availability of improved diagnostic and treatment options, as well as decreasing costs of these products, the rates of testing and treatment coverage have reached a plateau. However, the report suggests that achieving the WHO's goal of eliminating hepatitis by 2030 is still feasible, provided immediate and decisive actions are implemented(4).

Corresponding author
Gracious Adalci Bahuyak
Bingham University, Karu, Nasarawa State
Email: graciousbahuyak@gmail.com

© Copyright 2023 BioMedSciDirect Publications IJBMR -ISSN: 0976:6685.

Recent data from 187 countries reveals a concerning trend in the estimated death toll from viral hepatitis, which rose from 1.1 million in 2019 to 1.3 million in 2022. Hepatitis B alone accounted for 83% of these fatalities. The impact of viral hepatitis differs significantly by region. In the WHO African Region, 63% of new hepatitis B infections occur, yet only 18% of newborns receive the hepatitis B birth-dose vaccination despite this high burden. In the Western Pacific Region, which accounts for 47% of hepatitis B deaths, treatment coverage is at a mere 23% among diagnosed individuals, a level insufficient for reducing mortality rates(4).

Though HBV infections are usually asymptomatic and present with rather mild symptoms during childhood, worries about their long-term clinical effects point to the necessity of early detection and treatment (5). Early detection through screening programs plays a crucial role in preventing transmission, providing timely treatment, and reducing the burden of Hepatitis B virus(6).

HBV is primarily acquired at birth and the first few years of life in regions with high endemicity, where at least 8% of the population are chronic carriers (7). Perinatal transfer of an infection from a pregnant woman to her unborn child is frequent. About 90% of prenatal infections, 30% of early childhood infections, and 6% of infections beyond the age of five may all result in chronic infection (8).Nigeria is hyperendemic for HBV with a prevalence of about 12%. With a population of 170 million as of the 2006 census, this translates to roughly 23 million HBV infections (9). This study sought to determine the prevalence of Hepatitis B virus infection among adult residents in a sub-urban community in Nasarawa State, Nigeria.

Materials and Methods

Study Settings and Participants

A cross-sectional study was conducted from December, 2023-January 2024 in Auta Balefi, community of Karu Local Government Area of Nasarawa State. The participants included people who were residents of Auta Balefi and 18years and above of age. A multistage sampling technique was used in the selection of participants. A sample size of 180 was determined

usingCochran's formula, using a prevalence of 13.3% based on the work done by Olayinka et al, 2016(10).

Method of Data Collection

Capillary whole blood was collected by a finger-stick procedure from each participant using a sterile lancet. Samples were assayed using kits developed by Micropoint. The manufacturer's instructions on the use of the kits were strictly adhered to. Positive and negative controls were run for each pack of test kitbefore use. A self-administered questionnaire was used for collecting information on the socio-demographic characteristics of participantsand also for section was provided for writing the HBsAg test result of each participant.

Data Analysis

Data were entered into Microsoft Excel (2016) and then imported into IBM SPSS version 25 (IBM Corp., Armonk, NY, USA) for analysis. For each quantitative and categorical variable, descriptive statistics were computed and expressed as frequency and percentage Associations between demographic variables and prevalence analyzed using chi-square tests. Significantly associated variables were included in multivariate regression analysis, and potential confounders were controlled for, to assess the independent effect of each variable.

Ethical Consideration

Ethical approval was obtained from Bingham University Health Research Ethics Committee (BHU-HREC) with the registration number NHREC/21/05/2005/01119. Written informed consent was obtained from study participants.

Post Research Benefits

The results, obtained from the data generated from the study, can inform targeted public health interventions. The study also helped participants know their hepatitis B status and receive information about HBV, its transmission and preventive measures. This knowledge will equip them to make informed decisions about their health and reduce the risk of hepatitis B transmission within the community.

Quality Assurance

The data collection team included two research assistants with health sciences backgrounds and prior research data collection experience. During data collection, random checks were done by the principal researcher to ensure that tests are carried out appropriately, results read accurately and questionnaires correctly filled. Each day after data collection, a team meeting was held, and all work done for the day recapped and cross-checked. Possible erratic responses were identified, discussed, and corrected.

Limitation

Potential limitations to this research that would be taken into consideration include; RDTs, which may have limitations in detecting infections during the early stages/window period of Hepatitis B. Hence, the implementation of supplementary testing methods, such as laboratory-based enzyme immunoassays (EIAs) or polymerase chain reaction (PCR) test, was done to confirm or validate RDT results in cases with conflicting or inconclusive results.

Finger stick prick samples obtained for RDTs may vary in quality and volume. Factors such as inadequate blood volume, contamination, or improper collection technique could affect the reliability of the test results. Therefore, clear instructions and training on obtaining an adequate blood volume, ensuring proper capillary filling, and minimizing sample contamination were provided to research assistants. Calibrated pipettes were used to improve consistency and reliability.

RESULT

Socio-Demographic Characteristics of the Respondents

In this study, most of the participants (44.4%) were in the 21-30 years age bracket, the mean± S.D was (32.33 ± 12.47), as the minimum and maximum ages were 18 years and 71 years respectively. Most of the participants (55.0%) were female, and most of them were single (54.4%). Less than half of the participants (43.3%) had tertiary education. See Table 1.

Table 1: Socio-demographic characteristics of the respondents

Socio-demographics	N = 180	%
Age group		
20 and below	21	11.7
21-30 years	80	44.4
31-40years	43	23.9
41-50 years	17	9.4
Above 50 years	19	10.6
Mean ± S.D years	32.33 ± 12.47	
Range (Min-Max)	18-71	
Gender		
Female	99	55.0
Male	81	45.0
Marital Status		
Married	82	45.6
Single	98	54.4
Educational Status		
None	2	1.1
Primary Education	31	17.2
Secondary Education	69	38.3
Tertiary Education	78	43.3

Prevalence of HBsAg

In this study, the number of participants with positive HBsAg was 16 out of the 180 participants, this amounted to 8.9% of the population. Hence, the prevalence was calculated to be 8.9%. The age distribution of HBsAg prevalence showed that there is a higher prevalence in the 31-40 years category (14.0%), likewise, in gender, the male category had a higher prevalence (14.8%). The distribution of HBsAg was examined according to marital status, educational status and vaccination status, the following categories had higher prevalence: single (9.2%), tertiary education (12.8%), and unvaccinated (9.9%) respectively. See Table 2.

Bivariate Analysis of The Association of Sociodemographic factors with prevalence of HBsAg

The chi-square test of association was used to determine the association of socio-demographic factors with the prevalence of HBsAg, taking statistical significance at P-value < 0.05. There was no statistically significant association of HBsAg prevalence with the following socio-demographic factors: Age group (Chi-square= 0.486, P-value = 0.922), Marital status (Chi-square = 0.023, P-value = 0.879), Educational status (Chi-square = 3.141, P-value = 0.370). However, there was a statistically significant association between the prevalence of HBsAg and gender (Chi-square = 6.386, P-value = 0.012). See Table 3.

Multivariate Analysis of the Relationship of Socio-demographic Factor with HBsAg Prevalence

Multivariate analysis was done using logistic regression and multiple logistic regression to determine which variables would be predictors of the prevalence of HBsAg, the statistical significance was taken at P-value< 0.05 while examining the odd ratio (OR) and adjusted odd ratio (AOR) of the variables. It was observed that only gender was a statistically significant predictor of HBsAg prevalence, where the female category was less likely to have HBsAg than the male category (OD = 0.242, P-value = 0.018; AOR = 0.219, P-value = 0.017). See Table 4

Table 2: The distribution of HBsAg according to socio-demographics

Socio-demographics	Negative	Positive
Age group		
20 and below	21 (100.0)	0 (0)
21-30 years	73 (91.3)	7 (8.8)
31-40years	37 (86.0)	6 (14.0)
41-50 years	15 (88.2)	2 (11.8)
Above 50 years	18 (94.7)	1 (5.3)
Gender		
Female	95 (96.0)	4 (4.0)
Male	69 (85.2)	12 (14.8)
Marital Status		
Married	75 (91.5)	7 (8.5)
Single	89 (90.8)	9 (9.2)
Educational Status		
None	2 (100)	0 (0)
Primary Education	30 (96.8)	1 (3.2)
Secondary Education	64 (92.8)	5 (7.2)
Tertiary Education	68 (87.2)	10 (12.8)
Vaccination Status		
Unvaccinated	118 (90.1)	13 (9.9)
Vaccinated	46 (93.9)	3 (6.1)

Table 3: Bivariate analysis of the Association of Sociodemographic Factors with Prevalence of HBsAg

Socio-demographics	Negative	Positive	Chi-square	P-value
Age group			3.895	0.420
20 and below	21 (100.0)	0 (0)		
21-30 years	73 (91.3)	7 (8.8)		
31-40years	37 (86.0)	6 (14.0)		
41-50 years	15 (88.2)	2 (11.8)		
Above 50 years	18 (94.7)	1 (5.3)		
Gender			6.386	0.012*
Female	95 (96.0)	4 (4.0)		
Male	69 (85.2)	12 (14.8)		
Marital Status			0.023	0.879
Married	75 (91.5)	7 (8.5)		
Single	89 (90.8)	9 (9.2)		
Educational Status			3.141	0.370
None	2 (100)	0 (0)		
Primary Education	30 (96.8)	1 (3.2)		
Secondary Education	64 (92.8)	5 (7.2)		
Tertiary Education	68 (87.2)	10 (12.8)		

*significant at P-value< 0.05

Table 4: Multivariate Analysis of the Association of Socio-demographic Factor with HBsAg prevalence

Variable	OR (95%CI)	P-value	AOR	P-value
Age group				
20 and below	0.056 (0.200-1.855)	0.998	0.000	0.369
21-30 years	1.726 (0.199-14.93)	0.620	1.922	0.744
31-40years	2.919 (0.326-26.10)	0.338	3.187	0.858
41-50 years	2.400 (0.198-29.13)	0.492	3.207	0.250
Above 50 years	1 (Ref)		1 (ref)	
Gender				
Female	0.242 (0.075-0.783)	0.018*	0.219	0.017*
Male	1 (Ref)		1 (Ref)	
Marital Status				
Married	0.923 (0.328-2.597)	0.879	1.651	0.492
Single	1 (Ref)		1 (Ref)	
Educational Status				
None	1 (Ref)		1 (Ref)	
Primary Education	1.227 (0.028-1.851)	0.999	1.267	0.226
Secondary Education	1.531 (0.172-1.639)	0.166	1.612	0.424
Tertiary Education	1.147 (0.339-1.917)	0.271	1.211	0.149

Discussion

In this study, the prevalence of HBsAg among participants screened for HBV infection in Auta Balefi, Karu, Nasarawa State, Nigeria was 8.9%. Nigeria is known to be endemic for HBV infection (11). The severity of HBV infection has been classified by the WHO according to their prevalence into low (<2%), moderate (2% - 8%) and high (>8%) prevalence (12). This shows that there is a high endemicity of hepatitis b virus in this community.

The prevalence of hepatitis B among the study participants (8.9%) is comparable to the studies of Ayele et al. 7.3% (13) and 8.4% by Khan et al. (14). However, the study finding is slightly higher than the 6.3% reported by Lingani et al. (15). Comparable research however showed a higher rate of 16.8% in studies conducted (16) in Jos, Plateau State Nigeria, 17.0% done among patients in Nasarawa State, Nigeria (17) and 19.5% among participants in Northeast, Nigeria (18).

Studies from other countries reported varying prevalence rates. They comprise; 6.7% reported among Ghanaian students (19), 3.9% among Ethiopian patients (20) and 8.5% among HIV patients in South Africa (21). The degree of HBV endemicity frequently correlates with the major mode of transmission. These variances may be attributable to sample size disparities, geographical diversity, methods of detection, cultural practice differences, and behavioural divergences for the risk factors.

It was observed that only gender was a statistically significant predictor of HBsAg prevalence, where the female category was less likely to have HBsAg than the male category (OD = 0.242, P-value = 0.018; AOR = 0.219, P-value = 0.017). Males reported a higher prevalence (19.8%) than females (4.0%). This finding finds support in reports by (21–23) while contradicting the report of Grace, et al. (24) carried out among HIV patients in Keffi, Nigeria which stated otherwise.

Furthermore, the infection was highest among patients aged 31-40years old (14.0%) which could be as a result of the enhanced sexual activity within this age group. This report agrees with similar findings from different researchers (22,23). Higher prevalence was also recorded among patients who were single (9.2%). The studies by Anaele CC, et al. (23) among febrile patients in Imo, Mohammed HI, et al. (25) among subset of young people in Keffi, Nasarawa State and Isa I, et al. (26) among students in a tertiary institution in North Western Nigeria correlates with the outcome of this study. This might be because singles often engage in activities that puts them as risks. These include; risky sexual activities, use of sharp objects for tattooing and drug injection, which are all means of transmission of the virus. Also, the viral infection was higher among those without history of HBV vaccination (9.9%) than those that are unvaccinated (6.1%). This finding finds support from a study done by Tella et al. which also recorded a higher prevalence rate HBV among those unvaccinated as compared to those that have received a dose or more of the vaccine(17). This report is obvious because HBV vaccine helps to mitigate the spread of the infection when the dose is taken completely.

Conclusion

In conclusion, this study highlights the significant prevalence of Hepatitis B among residents in Auta Balefi (a sub-urban community) in Nasarawa State. The high prevalence rate of 8.9% shows the urgent need for interventions such as improving access to testing, implementing fair treatment approaches and strengthening preventive efforts in primary care (eg.Vaccination) in order to reduce theburden of the disease.

Acknowledgements

The researcher would like to thank all the research assistants for their help during the data collection process and also thank all the participants for their cooperation during data collection.

REFERENCES

[1] Muriuki BM, Gicheru MM, Wachira D, Nyamache AK, Khamadi SA. Prevalence of hepatitis B and C viral co-infections among HIV-1 infected individuals in Nairobi, Kenya. BMC Res Notes. 2013 Dec;6(1):363.

[2] Esan AJ, Omisakin CT, Ojo-Bola T, Owoseni MF, Fasakin KA, Ogunleye AA. Sero-prevalence of hepatitis B and hepatitis C virue co-infection among pregnant women in Nigeria. Am J Biomed Res. 2014;2(1):11–5.

[3] Ringehan M, McKeating JA, Protzer U. Viral hepatitis and liver cancer. Philos Trans R Soc B Biol Sci. 2017 Oct 19;372(1732):20160274.

[4] World Health Organisation (WHO). WHO sounds alarm on viral hepatitis infections claiming 3500 lives each day [Internet]. 2024 [cited 2024 May 11]. Available from: https://www.who.int/news/item/09-04-2024-who-sounds-alarm-on-viral-hepatitis-infections-claiming-3500-lives-each-day

[5] Tovo PA, Lazier L, Versace A. Hepatitis B virus and hepatitis C virus infections in children. Curr Opin Infect Dis. 2005;18(3):261–6.

[6] Nnakenyi ID, Uchechukwu C, Nto-Ezimah U. Prevalence of hepatitis B and C virus co-infection in HIV positive patients attending a health institution in southeast Nigeria. Afr Health Sci. 2020;20(2):579–86.

[7] Hou J, Liu Z, Gu F. Epidemiology and prevention of hepatitis B virus infection. Int J Med Sci. 2005;2(1):50.

[8] Lok AS, McMahon BJ. Chronic hepatitis B. Hepatology. 2007;45(2):507–39.

[8] Malu AO, Borodo MM, Ndububa DA, Ojo OS, Anomneze EE, Lesi OA, et al. Hepatitis B and C treatment guidelines for Nigeria 2015. Niger J Gastroenterol Hepatol. 2015;7(2):63–75.

[9] 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;95(4):902.

[10] Okonkwo U, Otu A, Ameh S, Okpara H. Public Awareness of hepatitis B virus infection in Cross River State, Nigeria: a population-based survey. West Afr J Med. 2018;35(2):79–84.

[11] World Health Organization (2017). Hepatitis B Fact sheet No. 204. Available at http://www.who.int./mediacentre/factsheets/fs204/en/Accessed 15 April 2018

[12] Ayele A, Abera D, Hailu M, Birhanu M, Desta K. Prevalence and associated risk factors for Hepatitis B and C viruses among refugees in Gambella, Ethiopia. BMC Public Health. 2020 Dec;20(1):721.

[13] Khan A, Afzal S, Yaqoob A, Fatima R, Ul Haq M, Junaid K, et al. Epidemiology of viral hepatitis B and C in Punjab, Pakistan: a multicenter cross-sectional study, 2017-18. F1000Research. 2019;8:2065.

[14] Lingani M, Akita T, Ouoba S, Nagashima S, Boua PR, Takahashi K, et al. The changing epidemiology of hepatitis B and C infections in Nanoro, rural Burkina Faso: a random sampling survey. BMC Infect Dis. 2020 Dec;20(1):46.

[15] Nkup JY, Ocheme J, Jesinta S, Samirah D, Nanya C, Innocent O, et al. Seroprevalence of Hepatitis B surface antigen (HBsAg) and hepatitis B antibodies among commercial motor park workers in Jos North, Nigeria. Saudi J Pathol Microbiol. 2019;4(3):240–4.

[16] Tella EE, Attah AA, Al Mustapha FY, Danjuma ED, Oti VB. Hepatitis B Virus Infection Prevalence among Patients in a Local Community Hospital in Nasarawa State, Nigeria. Epidemiol Int J. 2021;5:000203.

[17] Isaac WE, Jalo I, Ajani A, Oyeniyi CO, Abubakar JD, Aremu JT. Hepatitis B Envelope Antigen in Children and Adults with Hepatitis B Infection in Tertiary Health Facility in North East Nigeria During the Period 2000-2015. J Hepat Res. 2021;6(1):1045.

[18] Tawiah PA, Abaka-Yawson A, Effah ES, Arhin-Wiredu K, Oppong K. Prevalence and risk factors of hepatitis B virus infection among medical laboratory science students in a Ghanaian tertiary institution. J Health Res. 2021;36(3):442–52.

[19] Geta M, Yizengaw E, Getaneh Z, Getahun T. Seroprevalence of Hepatitis B Virus Infection Among Patients Attending at Addis Alem Primary Hospital, Bahir Dar, Northwest Ethiopia. Int J Gen Med. 2021 Feb;Volume 14:405–11.

[20] Msomi N, Naidoo K, Yende-Zuma N, Padayatchi N, Govender K, Singh JA, et al. High incidence and persistence of hepatitis B virus infection in individuals receiving HIV care in KwaZulu-Natal, South Africa. BMC Infect Dis. 2020 Dec;20(1):847.

[21] Omatola CA, Onoja BA, Agama J. Detection of hepatitis B surface antigen among febrile patients in Ankpa, Kogi State, Nigeria. J Trop Med [Internet]. 2020 [cited 2024 Mar 11];2020. Available from: https://www.hindawi.com/journals/jtm/2020/5136785/

[22] Anaele CC, Emeonye OP, Nwatu MSB, Cosmas SA, Chukwu UJ, Idabor U, et al. Prevalence of Hepatitis B Virus among Febrile Patient in General Hospital Okigwe, Imo State, Nigeria. J Biosci Med. 2021;9(5):12–9.

[23] Grace P, Victor O, Gloria A, Abimiku A, Raphael G. Seroprevalence of Hepatitis B and C Viruses among Human Immunodeficiency Virus Infected Patients Accessing Healthcare in Federal Medical Centre, Keffi, Nigeria. J Adv Microbiol. 2017 Jan 10;3(4):1–6.

[24] Mohammed HI, Pennap GR, Oti VB, Adoga MP. Markers of hepatitis B virus infection in a subset of young people in central Nigeria. Sci Afr. 2019;5:e00121.

[25] Isa I, Aminu M, Abdullahi SA, Sani MA, Esona MD. Seroprevalence of hepatitis B virus in a tertiary institution in North Western Nigeria. Afr J Microbiol Res. 2015;9(3):171–9.

© Copyright 2023 BioMedSciDirect Publications IJBMR -ISSN: 0976:6685.