WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Seroprevalence Of Hepatitis B Surface Antigen Among Antenatal Attendees At Peace House Bethany Medical Centre, Gboko Benue State

[1]Yongoikyo T., [2]Tarkumbul E. S., [3]Fukki K.E., [4]Klingret P. S., [5]Dauda B., [6]Okpokwu M. B., [7]Abraham D.

[1]Department of Chemical Pathology, Benue State University Teaching Hospital
[2]Department of Public Health, National Open University of Nigeria, Abuja.
[3]Department of Medical Microbiology, Solat Women Hospital, Jos
[4]School of Medical Laboratory Sciences, Plateau State College of Health Technology, Zawan
[5]Department of Histopathology, Federal College of Medical Laboratory Science and Technology Jos, Plateau State
[6]Federal College of Medical Laboratory Science and Technology, Jos
[7]Department of Public Health, National Open University of Nigeria.
Emails: ternayongoikyo@gmail.com, etarkumbul@gmail.com, fukkispecial@gmail.com, anthonyklingret@gmail.com, barkadauda@yahoo.com, bukkyokpokwu@gmail.com, abrahamdadi07@gmail.com
Correspondence email: etarkumbul@gmail.com

DOI : https://doi.org/10.55248/gengpi.07.1026.34077

ABSTRACT :

Hepatitis B is a vaccine-preventable liver infection caused by the hepatitis B virus (HBV). It is spread when blood, semen, or other body fluids from an infected person enters the body of someone not infected. The research was carried out to determine the sero-prevalence of hepatitis B surface antigen among antenatal attendees at Peace House Bethany Medical Center Gboko, Benue State. A total of 150 randomly selected subjects were recruited into the study. Blood samples were collected and tested using the routine rapid hepatitis B surface antigen diagnostic strip. The study recorded an overall prevalence of 8.7% among study participants. Findings based on age reviewed prevalence of 15.4%, 30.8% and 15.4% and 38.4% among subjects aged 21-25 years, 26-30 years, 31-35years and 36-40years respectively. Based on occupational status, employed subjects recorded lower prevalence (38.5%) compared to unemployed subjects (61.5%).

Keywords: Seroprevalence, Hepatitis B Surface Antigen, Antenatal Attendees.

Introduction

Hepatitis B is a vaccine-preventable hepatic infection caused by the hepatitis B virus (HBV), a partially double-stranded DNA virus of the Hepadnaviridae family. Transmission occurs when blood, semen, or other bodily fluids from an HBV-infected individual come into contact with the mucosa or parenteral circulation of a susceptible, uninfected person. The principal routes of transmission include sexual contact, the sharing of needles, syringes, or other injection-drug equipment, and perinatal (vertical) transmission from mother to infant at birth (Mustapha et al., 2020).

Acute HBV infection is frequently asymptomatic. When clinical manifestations do occur, they may include fatigue, anorexia, abdominal pain, nausea, and jaundice. In many individuals, the infection is self-limiting and resolves as an acute illness. In others, however, it progresses to chronic infection, which may culminate in severe and potentially fatal sequelae such as cirrhosis and hepatocellular carcinoma (CDC, 2020).

Hepatitis B surface antigen (HBsAg) is the earliest serological marker to appear in acute infection. It is detectable as early as 1 week and as late as 9 weeks post-exposure, with a mean window of approximately 4 weeks (Charles, 2018).

The World Health Organization (WHO) recommends expanding infant immunization coverage as the primary intervention for reducing the burden of hepatitis B. Vaccination reduces the risk of hepatitis B occurrence by approximately 3.6-fold (relative risk 0.28) among newborn infants of HBsAg-positive mothers (Lee et al., 2006).

Nevertheless, the management of chronic hepatitis B (CHB) during pregnancy remains challenging and requires comprehensive maternal-fetal care. Despite standard immunoprophylaxis, a substantial proportion of infants born to mothers with high viral loads (high HBV DNA levels) still acquire the infection. Emerging evidence suggests that antiviral therapy administered in the third trimester may reduce the risk of immunoprophylaxis failure (Hannah et al., 2013).

The majority of HBV infections are acquired during infancy and early childhood (Tanga et al., 2019). Perinatal transmission occurs predominantly at or around the time of delivery, through exposure of the neonate to maternal blood and genital secretions (Angounda et al., 2016). Many countries have

implemented routine antenatal screening for hepatitis B, and these programmes have contributed to a reduction in disease prevalence (Tanga et al., 2019). However, such targeted screening and care remain largely unavailable in many antenatal clinics in Benue State.

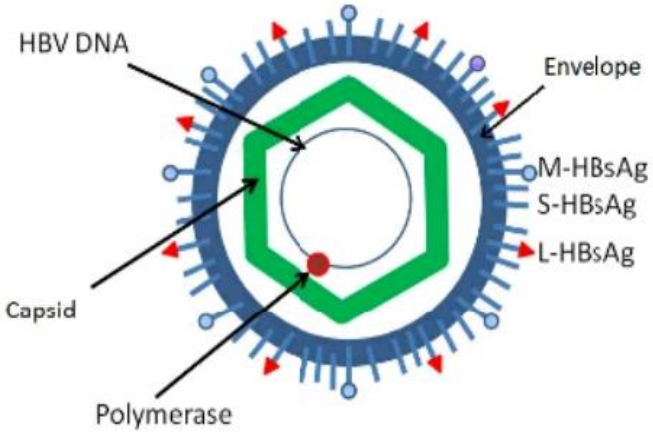
More than 2 billion people worldwide have been exposed to hepatitis B virus (HBV) at some point in their lives, and an estimated 350-400 million are chronic carriers (Adegbesan-Omilabu et al., 2015). HBV causes both acute and chronic liver disease and accounts for an estimated 1 million deaths annually worldwide. Its prevalence varies geographically but is highest in tropical regions. In sub-Saharan Africa, an estimated 5-15% of adults are chronically infected. Chronically infected individuals face a 15-25% risk of premature death in adulthood from HBV-related cirrhosis and hepatocellular carcinoma, while a small proportion of those with acute infection may succumb to fulminant hepatic failure (Asaga et al., 2019).

In Nigeria, HBV prevalence varies considerably across populations and regions. A prevalence of 11.6% has been reported among blood donors and pregnant women in Maiduguri (Adebola et al., 2016). Other reported rates include 4.3% among pregnant women in Port Harcourt, 5.7% among mothers and their preschool children in Ilorin, 8.3% among pregnant women in Zaria, 17.1% among female sex workers in Nasarawa, 14.9% among healthy blood donors in Yola, and 25.7% among surgeons in Lagos. Healthcare workers have a 3- to 5-fold higher prevalence of HBV than the general population, with surgeons and dentists reporting the highest number of cases (Asaga et al., 2019).

The hepatitis B virion is a spherical, enveloped particle with a layered architecture. At its core lie the viral genome, a partially double-stranded circular DNA molecule, and the viral DNA polymerase, both enclosed within an icosahedral nucleocapsid (a protein shell). The nucleocapsid is in turn surrounded by a lipid envelope. The viral DNA carries the genetic information required to produce new virions following infection of host hepatocytes. During replication, the DNA polymerase, which also functions as a reverse transcriptase, synthesises new viral DNA, enabling the virus to propagate and infect further cells (Jeremy, 2020).

The capsid protects the viral genome from degradation. Its icosahedral symmetry refers to a polyhedral structure with 20 triangular faces. The capsid is composed of the hepatitis B core antigen (HBcAg), a structural protein essential for genome packaging and viral replication (Jeremy, 2020).

The envelope encloses the nucleocapsid and shields the virion from the external environment. Embedded within it are the hepatitis B surface antigens (HBsAg), which occur in three forms: small (S-HBsAg), middle (M-HBsAg), and large (L-HBsAg). These surface proteins mediate recognition of, and attachment to, host cell receptors (Jere



Jeremy, 2020

Research Methodology

Study area
The study was conducted at Peace House Bethany Medical Center, Gboko, Benue State, Nigeria. Benue State is located in the North Central geopolitical zone of Nigeria. Gboko is the headquarters of Gboko Local Government Area and is regarded as the heartland of the Tiv people, the predominant ethnic group in the state. The town lies within the Benue valley, in the Guinea savanna belt of Nigeria's Middle Belt.
Population of the study
The study population comprised of 150 antenatal attendees at Peace House Bethany Medical Center Gboko, Benue State. All subjects who came for antenatal booking were counseled for Hepatitis B screening in addition to the routine screening. Those who consented to be a part of the study were recruited into the study.

Sample collection
Three milliliters (3 mls) of venous blood sample was taken from the antecubital vein of every participant into a plain sterile container (no anticoagulant) and was allowed to clot for 45 minutes. Using an applicator stick, the clotted blood was dislodged and then centrifuged at 2,500 revolutions per minute (rpm) for 5 minutes. The serum obtained was carefully picked using an automatic micropipette and transferred into another plain container, after which it was carefully stored at -200C until ready for analysis.

Procedure for Testing

Procedure for sample testing was obtained from manufacturer's test kit inserts and was carried out as follows:

- The HBsAg test strip was unsealed and labeled
- Three drops of serum were added on the strip (in the pad-like area) and allowed for 15 minutes

- The result was read and recorded
- The procedure was repeated for all 150 samples

Test Interpretation

Test results were read as **positive** if the control and test line appeared on the test strip; as **negative** if only the control line appeared; and as **invalid** if only the test line appeared or if no line appeared from both the control and test region.

Results

The result obtained from the study was subjected to statistical analysis using frequency and percentage

Table I: Overall sero-prevalence of hepatitis B Surface antigen among study subjects

Subjects	Frequency	Percentage
Positive	13	8.7%
Negative	137	91.3%
Total	**150**	**100%**

Table II: Sero-Prevalence of Hepatitis B Surface Antigen among subjects based on age group

Age group	Frequency	Percentage
21-25	2	15.4%
26-30	4	30.8%
31-35	2	15.4%
36-40	5	38.4%
Total	**13**	**100%**

Table III: Sero-Prevalence of Hepatitis B Surface Antigen among subjects based on occupational status

Occupation Status	Frequency	Percentage
Employed	5	38.5%
Unemployed	8	61.5%
Total	**13**	**100%**

Discussion

Based on the study which was conducted to determine the sero-prevalence of hepatitis B surface antigen among subjects recorded an overall prevalence of 8.7%. This finding is lower than an earlier result of 9.5% obtained in western Niger (Ajuwon *et al*., 2021), 19.8% in Keffi (Mac *et al*., 2019), 9.20% in Gambia (Bittaye *et al*., 2019). The difference in this study might be due to many factors such as socioeconomic, sociocultural, and sexual practices including the study setting. Furthermore, the variations could be due to the small sample size done in a single health center. However, the prevalence is higher than the prevalence in earlier studies from other African Countries such as Uganda (2.9%) (Kayondo *et al*., 2020), Kenya (3.8%) (Ngaira *et al*., 2016), and Ethiopia (3.5%) (Charnet *et al*., 2017). The reason for this prevalence is not clear but could be due to a lack of access to universal testing of all pregnant women for hepatitis B. This suggests the need for urgent implementation and support of a national program for universal testing of hepatitis B in intermediate and high endemic regions.

Based on age group, the study recorded a prevalence of 15.4%, 30.8%, 15.4% and 38.4% for subjects aged 21-25years, 26-30years, 31-35years and 36-40years respectively. The study reveal a non-linear relationship between age and prevalence of infection as suggested by Noubiap *et al*., 2015 and Bayo *et al*., 2014. However, highest prevalence was recorded among subjects in the highest age group. This could be attributed to increase re-exposure as one advance in age.

Occupational related prevalence revealed that unemployed subjects had higher rate of infection (61.5%) compared to employed subjects (38.5%). This is similar to findings of Anejo-Okopi *et al* who also recorded higher prevalence in unemployed subjects in Otukpo, Benue State, Nigeria (Anejo-Okopi *et al*., 2023). This might be due to the influence of economic empowerment that is directly proportional to a casual sexual lifestyle that drives the transmission of HBV infection.

Conclusion

Base on the study, it was established there is prevalence of hepatitis B surface antigen among the studied population. Highest prevalence were recorded in subjects aged 36-40 years (38.4%) based on age group studies. Also, unemployed subjects recorded higher prevalence (61.5%), than employed subjects (38.5%).

Recommendation

I. It is recommended that, all sero-positive subjects for Hepatitis Surface Antigen antibody (HBsAg) cases should be referred to viral load study (RT-PCR) to confirm the results since HBsAg-Ab positivity does not reflect the prevalence of HCV as it does not differentiate between old resolved and recent cases.

II. Hepatitis B virus screening should be incorporated into the routine antenatal clinical investigations for all women attending the antenatal clinic except where a woman has already being documented to be HBV positive. Awareness campaign of the disease and widespread coverage of the HBV immunization of the population should be encouraged.

III. Routine screening of asymptomatic people especially women of child bearing age to enable early detection and intervention; mass

immunization against HBV and public health education to enlighten people of the observable risk factors and routes of infection is also recommended. Furthermore, a wider study involving rural dwellers and urban distribution is needed to determine burden of the disease.

REFERENCES

- Adebola T, Akin O, Muhammad S, Anthonia A, Patrick N (2016) Seroprevalence of Hepatitis B infection in Nigeria: A national survey. *Am J Trop Med Hyg* 95: 902 ➔907
- Adegbesan-Omilabu M, Okunade K, Gbadegesin A, Olowoselu O, Oluwole A (2015) Seroprevalence of Hepatitis B virus infection among pregnant women at the antenatal booking clinic of a Tertiary Hospital in Lagos Nigeria. *Niger J Clin Pract* 18: 819-823.
- Ajuwon I, Yujuico I, Roper K, Richardson A, Sheel M, Lidbury A (2021); Hepatitis B virus infection in Nigeria: A systematic review and meta-analysis of data published between 2010 and 2019. *BMC Infect Dis.* 21:1120.
- Anejo-Okopi J, Aju-Ameh O, Agboola O, Edegbene O, Ujoh A, Audu O (2023); Prevalence of hepatitis B virus infection and effects of service charges on notification among pregnant women attending antenatal care at General Hospital, Otukpo, Nigeria. *Ann Med Res Pract* 4:1
- Angounda, B. M., Ngouloubi, G. H., Dzia, A. B., et al., "Molecular characterization of hepatitis B virus among chronic hepatitis B patients from Pointe Noire, Republic of Congo." It is in Infectious Agents and Cancer (2016), DOI 10.1186/s13027-016-0088-3.
- Asaga M, Suleiman A, Airiohuodion P (2019) High Prevalence of Hepatitis B Virus Infection among Pregnant Women Attending Antenatal Care in Central Nigeria. *J Infect Dis Epidemiol* 5:068.
- Bayo P, Ochola E, Oleo C, Mwaka D (2014). High prevalence of hepatitis B virus infection among pregnant women attending antenatal care: A cross sectional study in two hospitals in northern Uganda. BMJ Open 4:e005889.
- Bittaye M, Idoko P, Ekele A, Obed A, Nyan O (2019). Hepatitis B virus sero-prevalence amongst pregnant women in the Gambia. *BMC Infect Dis.* 19:259.
- Center for Disease Control (CDC) (2020); Viral Hepatitis: perinatal transmission; US department of health and human services; www.cdc.gov
- Charles D. (2018) ↑Hepatitis B virus infection↓ www.verywellhealth.com
- Chernet A, Yesuf A, Alagaw A (2017). Seroprevalence of hepatitis B virus surface antigen and factors associated among pregnant women in Dawuro zone, SNNPR, Southwest Ethiopia: A cross sectional study. *BMC Res Notes* 10:418.
- Hannah M, Calvin Q, Pan M, Lee M (2013) Antiviral Therapy for Chronic Hepatitis B in Pregnancy; *Semin Liver Dis* 33(2):138-146.
- Jeremy B (2020). Hepatitis B Virus: structure and function; www.study.com
- Kayondo P, Byamugisha JK, Ntuyo P (2020). Prevalence of hepatitis B virus infection and associated risk factors among pregnant women attending antenatal clinic in Mulago Hospital, Uganda: A cross-sectional study. *BMJ Open* 10:e033043.
- Lee, C., Gong, Y., Brok, J., Boxall, E. H., & Gluud, C. (2006). Hepatitis B immunisation for newborn infants of hepatitis B surface antigen-positive mothers. Cochrane Database of Systematic Reviews, (2), Article CD004790. https://doi.org/10.1002/14651858.CD004790.pub2
- Mac A, Suleiman C, Airiohuodion E (2019). High prevalence of hepatitis B virus infection among pregnant women attending antenatal care in central Nigeria. *J Infect Dis Epidemiol*. 5:68.
- Mustapha, G. U., Ibrahim, A., Balogun, M. S., Umeokonkwo, C. D., & Mamman, A. I. (2020). Seroprevalence of hepatitis B virus among antenatal clinic attendees in Gamawa Local Government Area, Bauchi State, Nigeria. BMC Infectious Diseases, 20(1), Article 122. https://doi.org/10.1186/s12879-020-4863-9
- Ngaira A, Kimotho J, Mirigi I, Osman S, Ng'ang'a Z, Lwembe R (2016); Prevalence, awareness and risk factors associated with hepatitis B infection among pregnant women attending the antenatal clinic at Mbagathi district hospital in Nairobi, Kenya. *Pan Afr Med J.* 24:315.
- Noubiap J, Nansseu R, Ndoula T, Bigna J, Jingi M, FokomDomgue J (2015). Prevalence, infectivity and correlates of hepatitis B virus infection among pregnant women in a rural district of the far North region of Cameroon; BMC Public Health 15:454
- Tanga, A. T., Teshome, M. A., Hiko, D., Fikru, C., & Jilo, G. K. (2019). Sero-prevalence of hepatitis B virus and associated factors among pregnant women in Gambella hospital, South Western Ethiopia: Facility based cross-sectional study. BMC Infectious Diseases, 19, Article 602. https://doi.org/10.1186/s12879-019-4220-z