

Prevalence of Hepatitis B Virus Infection and Its Associated Factors among Pregnant Women Accessing Ante Natal Care at a Tertiary Hospital in Enugu State, Nigeria

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DOI: [10.36348/sijog.2021.v04i12.001](https://doi.org/10.36348/sijog.2021.v04i12.001)

Received: 05.11.2021 | Accepted: 09.12.2021 | Published: 17.12.2021

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Abstract

Background: Hepatitis B virus (HBV) infection is a serious global public health problem, with WHO Western Pacific and African region worst hit. The objective of this study was to determine the prevalence of HBV infection and its associated factors among pregnant women accessing Ante-Natal Care (ANC) at a tertiary hospital in Enugu State, South-East Nigeria. **Methods:** This was a prospective cohort study that involved all the women that attended ANC of a tertiary hospital in Enugu State Nigeria for a period of 12 months (June 2020-May 2021). Data was retrieved from the patient's ante-natal cards and entered into a pro forma. Data was analysed using SPSS version 25 and variables were presented as frequencies, percentages, means, and standard deviation. Chi-square test was used to determine factors that affected the prevalence of HBV with the level of significance set at $p \leq 0.05$. **Results:** All the ANC attendees in the hospital were tested for HBV with annual prevalence of 1.0%. The mean age of the women was 29.78 ± 4.70 with a range of 16-46 years. Women aged 31 – 40 years, married and with tertiary education had the highest HBV prevalence. Occupation and parity were the only factors associated with the prevalence of HBV. **Conclusion:** The Prevalence of HBV among the pregnant women showed low endemicity.

Key words: Ante-natal clinic, Enugu State, Hepatitis B Virus infection, Nigeria, pregnant women, prevalence.

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INTRODUCTION

Hepatitis B Virus (HBV) disease is a liver infection that is potentially life-threatening. It is a major global public health problem, especially in Asia, Africa, Southern Europe and Latin America. In 2017, the World Health Organization (WHO) Global Report showed that the number of people with active HBV who tested positive for Hepatitis B surface antigen (HBsAg) was highest in the WHO Western Pacific Region (115 million cases) and the WHO African Region (60 million cases); together these two regions accounted for 68% of the global HBV burden [1]. Globally, there are over 20 million new HBV infections annually with about 350–400 million chronic carriers [2]. With 400 million people infected with HBV globally, the risk continues to rise as prenatal and early childhood infections continues [3]. It is difficult however, to identify the exact burden of HBV in Africa due to lack of screening mechanisms and poor record

keeping, but 56% until 98% of the adult population showed evidence of past exposure to HBV infection and the seroprevalence of hepatitis B surface antigen (HBsAg) has been estimated to range from 6% to 20% [4-6]. In 2017, WHO reported that HBV infection in pregnancy can result in pre-term delivery with consequent low birth weight in addition to the vertical transmission [1]. Moreover, studies have reported an association between HBV infection with, antepartum haemorrhage, gestational diabetes mellitus and threatened preterm labour [4-6].

HBV is the most serious type of viral hepatitis. It can lead to chronic liver disease with high risk of death from cirrhosis and liver cancer [7]. Infection with HBV poses a major public health burden because of its very contagious nature, as it is 50–100 times more contagious than Human Immune Deficiency Virus (HIV) [8]. HBV infection can be transmitted from one person to another through several means. The pattern of

transmission depends on the number of chronic carriers in the community. In endemic areas such as Sub-Saharan Africa, transmission is mainly either vertical, from a carrier mother to her new-born; by parenteral route (exposure to contaminated blood or body fluids, blood transfusion, use of contaminated needles, syringes, and sharps); or through unprotected sexual contact with an infected person [9, 10]. About 10% of transmission occurs in utero [9]. Vertically transmitted HBV infection can lead to impaired cognitive and physical development in later life of the children. This vertical transmission occurs mainly during labour and delivery [11]. Vertical transmission from chronic carrier mothers exceeds 90% and accounts for up to 40% of the world carriers in endemic areas. Study have shown that children infected within the first year of life have a 90% chance of becoming chronic carriers while only about 10% of those infected at adulthood becomes chronic carriers [12] and are prone to cirrhosis and liver cancer in adult life [13]. Mothers who are Hepatitis B e antigen positive have higher risk of perinatal HBV transmission with infective rate of 70% to 90% at age of 6 month and without any form of intervention, about 90% of these children remain chronically infected [14]. A Gambian study has suggested that liver cancer is more likely in individuals who acquired HBV perinatally than in those infected through horizontal transmission [15]. It also showed that interrupting vertical transmission in Sub-Saharan Africa will help reduce the burden of liver disease [15].

Different studies have reported different prevalence of HBV among sub-populations worldwide with varying estimates depending on the methods used and the study population. The prevalence of chronic HBV infection among women of reproductive age globally was reported to be 3.5% globally and 6–25% in African countries [16]. Furthermore, a national survey on HBV infection in Nigeria showed a prevalence of 12.2% among the general population [17] while a systematic review of HBV infection among pregnant women in Nigeria reported a prevalence of 14.1% [18]. The objectives of the study was to determine the prevalence of HBV infection and its associated factors among pregnant women accessing Ante-Natal Care (ANC) at a tertiary hospital in Enugu State, South-East Nigeria

METHODS

Study area

The study was conducted at Obstetrics and Gynecology Department of Enugu State University of Technology Teaching Hospital (ESUT-TH) Park Lane Enugu, Nigeria. ESUT-TH is a tertiary health institution that provides tertiary health services and acts as a referral center for patients within and outside the state. It is located within the state capital, Enugu.

Study design

The study was a prospective cohort study

Study population

All the pregnant women that booked and attended ANC at ESUT-TH Park Lane Enugu within the time of data collection.

DATA COLLECTION METHOD

Data collection lasted for 12 months (June 2020-May 2021). All the data were retrieved from the patient's ante-natal cards and entered into a pro forma. It was done on each ante natal day. Information retrieved included maternal socio-demographic characteristics and Hepatitis B sero-status. Two trained research assistants were used to collect the data.

Data management

Independent variable

Socio-demographic characteristics of the women

Dependent variable

Hepatitis B status of the women

STATISTICAL ANALYSIS

All the collected data were analyzed with SPSS version 25. Univariate analysis was performed. Chi square test with significant level of ≤ 0.05 was used to test for association between socio-demographic characteristics and hepatitis B status of the women.

RESULTS

All the ANC attendees were routinely screened for HBV at booking. About 1568 women booked within the 12 months of data collection.

Table-1: Socio-demographic characteristics of the women

Variable	Frequency	Percentage
Age		
Mean \pm SD	29.78 \pm 4.70	
Range	16-46	
Age in group		
≤ 20 years	30	1.9
21-30	878	56.0
31-40	646	41.2
41-50	14	0.9

Variable	Frequency	Percentage
Marital status		
Married	1519	96.9
Single	49	3.1
Ethnicity		
Igbo	1554	99.2
Yoruba	2	0.1
Hausa	10	0.6
others	2	0.1
Religion		
Christianity	1560	99.5
Islam	8	0.5
Occupation		
Civil servants	869	55.4
Agricultural workers	12	0.8
Crafts and related trades	171	10.9
Unskilled workers	24	1.5
Unemployed	492	31.4
Educational level		
Tertiary	984	62.8
Secondary completed	574	36.6
Primary completed	10	0.6
Parity		
1-2	1082	69.0
3-4	400	25.5
Above 4	86	5.5
HBV B status		
Negative	1552	99.0
Positive	16	1.0

Table 1 shows the socio-demographic characteristics of the women. The mean age of the women was 29.78±4.70 while most of them were aged 21-30years 878(56.0%). Majority were married 1519(96.9%), Igbos 1554(99.2) and Christians

1560(99.5%). About a third of them were unemployed 492(31.4%). Majority of them 984(62.8%) had tertiary education and of low parity 1082(69.0%). The prevalence of Hepatitis B was 1.0%.

Table-2: Factors that affected the prevalence of Hepatitis B Virus Infection among the pregnant women

Variable	Hepatitis B Status		X ²	P value
	Negative N (%)	Positive N (%)		
Age in years				
≤20	30(100.0)	0(0.0)	3.221	0.359
21-30	872(99.3)	6(0.7)		
31-40	636(98.5)	10(1.5)		
≥41	14(100.0)	0(0.0)		
Marital status				
Married	1503(98.9)	16(1.1)	0.521	0.470
Single	49(100.0)	0(0.0)		
Ethnicity				
Igbo	1538(99.0)	16(1.0)	0.146	0.986
Yoruba	2(100.0)	0(0.0)		
Hausa	10(100.0)	0(0.0)		
Others	2(100.0)	0(0.0)		
Religion				
Christianity	1544(99.0)	16(1.0)	0.083	0.773
Islam	8(100.0)	0(0.0)		
Educational level				
Tertiary	970(98.6)	14(1.4)	4.247	0.120
Secondary completed	572(99.7)	2(0.3)		

Variable	Hepatitis B Status		X ²	P value
	Negative N (%)	Positive N (%)		
Primary completed	10(100.0)	0(0.0)		
Occupation				
Civil servants	863(98.9)	10(1.1)	16.021	0.003*
Agricultural workers	12(100.0)	0(0.0)		
Crafts and related trades	165(96.5)	6(3.5)		
Unskilled workers	24(100.0)	0(0.0)		
Unemployed	488(100.0)	0(0.0)		
Parity				
1-2	1070(98.9)	12(1.1)	15.433	<0.001*
3-4	400(100.0)	0(0.0)		
>4	82(95.3)	4(4.7)		

* Statistically significant

Table 2 shows the factors that affected the prevalence of Hepatitis B among the pregnant women. Only maternal occupation ($\chi^2 = 16.021$, $p = 0.003$) and parity ($\chi^2 = 15.433$, $p < 0.001$) had significant association with Hepatitis B status of the women.

DISCUSSIONS

The prevalence of Hepatitis B virus infection among pregnant women varies among the different regions of the world and even within different sub-regions within the same country [19]. The government and individual's response to the prevention and control of HBV may have contributed to these differences. In our study, the HBV prevalence among the ANC women was 1.0% giving a low endemicity according to WHO classification among the pregnant women in Enugu State Nigeria [20]. This was similar to a report from Iran (1.6%) [7] and Germany 0.48% [21]. This was lower than what was reported in similar studies from Bauchi, Northern Nigeria (6.7%) [22], Benin South-south Nigeria (12.5%) [23], Nassarawa North-central Nigeria (19.5%) [24], Ethiopia 5.9% [25] and Uganda (11.8%) [26]. It is also lower than the prevalence of Hepatitis B among the general population in Nigeria which is 8.1% [27]. The differences in the reported prevalence of HBV among pregnant women may be explained by the level of care of the facility studied, study design, sample size, geographical location and socio-cultural practices. The lower prevalence of HBV compared to the previous Nigerian studies may be due to increased awareness about the disease.

Only maternal occupation and parity had significant association with HBV positivity. Mothers that were involved in crafts and related trades had higher proportion of HBV infection when compared to other occupational groups. This group of women are also likely to be less educated. Contrastingly, similar studies reported no significant association between maternal occupation and HBV infection [26, 28]. Multiparous women with >4 children had more HBV positivity than those with lesser parity. This may be related to their past pregnancy exposures, hospital admissions and past surgical procedures. Other studies

reported similar finding [29, 30] while another study reported a contrast finding [28].

There was no significant association between maternal age, marital status, educational level and HBV positivity. Another study corroborated the finding [28]. This was however, in variance to the report of other study [26].

CONCLUSION AND RECOMMENDATIONS

Our study indicated that the HBV infection among pregnant women in Enugu State is of low endemicity. Maternal occupation and parity were the only factors that significantly affected HBV infection prevalence among the studied women. Although there was low prevalence of HBV infection in the studied population more efforts should be made to reduce prevalence to zero level. Exposed babies should be given Hepatitis B Immune Globulin (HBIG) and hepatitis B vaccine (HBVc) at birth. It has been shown that passive-active post exposure prophylaxis with hepatitis B Immunoglobulin and hepatitis B vaccine is 85 to 95% effective in preventing vertical transmission compared to 70 to 95% of vaccine alone [31].

Ethical clearance

Ethical clearance was obtained from the Research and Ethics Committee of ESUT-TH Park Lane Enugu, Nigeria.

REFERENCES

1. World Health Organization. (2017). Global hepatitis report. Geneva. Available at: www.who.int/hepatitis/publications/globalhepatitis-report2017/en/. [Accessed 24 July 2021].
2. Shazia Parveen, S. R., Janardhan Rao R., & Rama Rao M. V. (2012). Sero-prevalence of Hepatitis B surface antigen among pregnant women attending antenatal clinic in a teaching hospital. *J. Microbiol. Biotech. Res.*, 2(2), 343–345.
3. Allen, N., Bashir, M., & Mugisha I. M. (2017). Prevalence and Associated Factors of Hepatitis B Virus Infection among Pregnant Women Attending Antenatal Care Clinic at Mulago National Referral

- Hospital, Uganda. *International Blood Research & Reviews*, 7(4), 1–10.
4. Metaferia, Y., Tsegaye, D., & Seid, A. (2018). Sero-prevalence and Predictors of Hepatitis B Virus and Hepatitis C Virus Infections among Pregnant Women Attending Antenatal Care in Adjibar Rural Health Center, Northeast Ethiopia. *EC Gynaecology*, 7(11), 421–430.
 5. 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).
 6. Dahie, H., & Heyle, A. (2017). Prevalence of Hepatitis B and Its Associated Factors among Pregnant Women in Mogadishu, Somalia. *Archives of Business Research*, 5(11), <https://doi.org/10.14738/abr.511.3876>
 7. Afzali, H., Heravi, M. M., Moravveji, S., & Poorrahnama, M. (2015). Prevalence of hepatitis B surface antigen in pregnant women in Beheshti Hospital of Kashan, Isfahan. *Iran Red Crescent Med J*, 17(7), 22–6.
 8. Umare, A., Seyoum, B., Gobena, T., & Haile Mariyam, T. (2016). Hepatitis B Virus Infections and Associated Factors among Pregnant Women Attending Antenatal Care Clinic at Deder Hospital, Eastern Ethiopia. *PLOS ONE*, 11(11) e0166936.
 9. Dutta, D. C. (2009). Hepatitis B viral infection in pregnancy. Mita S (Ed). 5th edition. Textbook of obstetrics; 2009. New central book agency (P) ltd. Pg 289–291.
 10. Baawuaga, E. M., Enenebeaku, M. N. O., Okopi, J. A., & Damen, J. G. (2008). Hepatitis B virus (HBV) infection among pregnant women in Makurdi, Nigeria. *J Biomed Res*, 11, 155–9.
 11. Yohanes, T., Zerdo, Z., & Chufamo, N. (2016). Seroprevalence and Predictors of Hepatitis B Virus Infection among Pregnant Women Attending Routine Antenatal Care in Arba Minch Hospital, South Ethiopia. *Hepatitis Research and Treatment*, doi: 10.1155/2016/9290163.
 12. Hadziyannis, S. J. (2011). Natural history of chronic hepatitis B in Euro-Mediterranean and African countries. *J Hepatol*, 55(1), 183–91.
 13. Utoo, B. (2013). Hepatitis B surface antigenemia (HBsAg) among pregnant women in southern Nigeria. *African Health Sciences*, 13(4), 1139–43
 14. Olokoba, A. B., Salawu, F. K., Danaburam, A., Olokoba, L. B., Midala, J. K., & Badung, L. H. (2011). Hepatitis B virus infection among pregnant women in North Eastern Nigeria.—A call for action. *Niger J pract*, 14(1), 10–3
 15. Shimakawa, Y., Bottomley, C., Njie, R., & Mendy, M. (2014). The association between maternal hepatitis B e antigen status, as a proxy for perinatal transmission, and the risk of hepatitis B e Antigenaemia in Gambian children. *BMC Public Health*, 14(1), 532.
 16. Ott, J. J., Stevens, G. A., Groeger, J., & Wiersma, S. T. (2012). Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. *Vaccine*, 30(12); 2212–9.
 17. Olayinka, A. T., Oyemakinde, A., Balogun, M. S., Ajudua, A., Nguku, P., & Aderinola, M. (2016). Seroprevalence of hepatitis B infection in Nigeria: a national survey. *Am J Trop Med Hyg*, 95(4), 902–7.
 18. Musa, B.M., Bussell, S., Borodo, M. M., Samaila, A. A., & Femi, O. L. (2015). Prevalence of hepatitis B virus infection in Nigeria, 2000-2013: a systematic review and meta-analysis. *Niger J Clin Pract*, 18(2), 163–72.
 19. Margolis, H. S., Alter, M. J., & Hadler, S. C. (1991). Hepatitis B: evolving epidemiology and implications for control. *Semin Liver Dis*, 11; 84–92
 20. Hou, J., Liu, Z., & Gu, F. (2005). Epidemiology and prevention of Hepatitis B Virus Infection. *Int J Med Sci*, 2(1), 50–57. Doi:10.7150/ijms.2.50
 21. Lobstein, S., Faber, R., & Tillmann, H. L. (2011). Prevalence of Hepatitis B among pregnant women and its impact on pregnancy and newborn complications at a tertiary hospital in the Eastern part of Germany. *Digestion*, 83(1-2), 76–82.
 22. Mustapha, G. U., Ibrahim, A., Balogun, M. S., Umeokonkwo, C. D., & Mammen, A. I. (2020). Seroprevalence of hepatitis B virus among antenatal clinic attendees in Gamawa Local Government Area, Bauchi State, Nigeria. *BMC Infectious Diseases*, 20:194 <https://doi.org/10.1186/s12879-020-4863-9>
 23. Ugbebor, O., Aigbirior, M., Osazuwa, F., Enabudoso, E., Zabayo, O., & Ewing, G. W. (2011). The prevalence of hepatitis B and C viral infections among pregnant women. *North Am J Med Sci*, 3, 238–241. Doi: 10.4297/najms.2011.3238
 24. Mac, P. A., Suleiman, A. C., & Airiohuodion, P. E. (2019). High Prevalence of Hepatitis B Virus Infection among Pregnant Women Attending Antenatal Care in Central Nigeria. *J Infect Dis Epidemiol*, 5:068. doi. org/10.23937/2474-3658/1510068
 25. Asaye, Z., Aferu, T., Asefa, A., Feyissa, D., Regasa, T., Kebede, O., Feyisa, D., & Feyisa, M. (2021). Prevalence of Hepatitis B Virus Among Pregnant Women on Antenatal Care Follow-Up at Mizan-Tepi University Teaching Hospital and Mizan Health Center, Southwest Ethiopia. *International Journal of General Medicine*, 14, 195–200
 26. Bayo, P., Ochola, E., Oleo, C., & Mwaka, A. M. (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. doi:10.1136/bmjopen-2014-005889

27. Nigeria HIV/AIDS Indicator and Impact Survey NAHIS report. (2019). The journey to hepatitis elimination in Nigeria. Available at <https://www.hepb.org>. Accessed 10/10/2021.
28. Mansour, W., Malick, F., & Sidiya, A. (2012). Risk factors, and molecular epidemiology of hepatitis B and hepatitis delta virus in pregnant women and in patients in Mauritania. *J Med Virol*, 84(11), 86–98
29. Awan, S. N., Nayyar, S., & Ashraf, N. (2006). Obstetrics and perinatal outcome; Risk factors for Hepatitis B and C transmission. *Professional Med J*, 13, 511–516.
30. Ali, H. S., & Memon, M. A. (2007). Prevalence of Hepatitis B infection in pregnant women in a tertiary care hospital. *Infect Dis J Pak*, 2:35–38.
31. Ma, L., Norton, M. G., Mahmood, I., Zhao, Z., Zhong, L., Zhang, P., & Struble, E. B. (2014). Transplacental transfer of hepatitis B neutralizing antibody during pregnancy in an animal model: implications for newborn and maternal health hepatitis research and treatment. *Hepat Res Treat*, 2, 159206.