Social and clinical factors influencing hepatitis b seroprevalence among pregnant women in Gombe: A cross-sectional analysis

Yuguda, I.Y., Akafa, T.A., Chiroma, G.B., Yahaya, R.M., Oladele, G.O., Iseko, K.I.

[1]Ahmadu Bello University, Zaria, Nigeria
[2]Department of Public Health, Gombe State University, Nigeria
[3]Department of Community and Family Medicine, Faculty of Clinical Sciences, College of Health Sciences, Federal University, Wukari, Nigeria.
[4]National Clinical Mentorship Program, State Aids STI Control Program, Nigeria.
[5]Federal Medical Centre, Bida, Nigeria.
[6]Limi Hospital Abuja, Nigeria

A r t i c l e   I n f o

Abstract

Background: Hepatitis B remains a significant global public health issue, especially among vulnerable populations such as pregnant women. Understanding the social factors influencing seroprevalence is vital for developing targeted interventions. This study investigates how age, employment status, education, reproductive history, and income levels affect Hepatitis B prevalence among pregnant women in Gombe, Nigeria

Objectives: To assess the influence of social and clinical factors on Hepatitis B seroprevalence in pregnant women.

Methods: A cross-sectional analysis involving 265 pregnant women was conducted. Participants were surveyed for sociodemographic data and tested for Hepatitis B surface antigen (HBsAg). The analysis focused on demographic characteristics, reproductive history, antenatal care visits, and income levels. Statistical methods were employed to determine associations between these factors and Hepatitis B seroprevalence.

Results: The study revealed that 93.6% of participants tested non-reactive for HBsAg, indicating a low prevalence of Hepatitis B (6.4% reactive cases). No significant correlations were found between sociodemographic factors and infection rates, with all P-values exceeding 0.05, indicating that these factors do not substantially influence Hepatitis B seroprevalence.

Conclusions: The findings suggest that socio-demographic factors have limited influence on Hepatitis B seroprevalence among pregnant women in Gombe. While the low prevalence of 6.4% is encouraging, it raises important public health implications, particularly regarding the ongoing need for effective screening, vaccination, and educational programs targeting this vulnerable group. Given the complexities of infection dynamics, future research should explore additional factors such as healthcare accessibility, community awareness, and cultural practices that may impact Hepatitis B transmission and management. Investigating the role of these elements could inform the development of tailored interventions aimed at minimizing risk and promoting healthier outcomes for both mothers and infants. Furthermore, longitudinal studies could assess changes in seroprevalence over time, offering insights into the effectiveness of public health strategies and guiding policy for improved maternal health services.

Facteurs sociaux et cliniques influençant la séroprévalence de l'hépatite B chez les femmes enceintes à Gombe : analyse transversale

Résumé

Contexte de l'étude : L'hépatite B demeure un problème majeur de santé publique mondiale, en particulier chez les populations vulnérables comme les femmes enceintes. Comprendre les facteurs sociaux qui influencent la séroprévalence est essentiel pour développer des interventions ciblées. Cette étude examine l'influence de l'âge, de la situation professionnelle, du niveau d'éducation, des antécédents reproductifs et des revenus sur la prévalence de l'hépatite B chez les femmes enceintes, au Nigéria.

Objectif de l'étude : Évaluer l'influence des facteurs sociaux et cliniques sur la séroprévalence de l'hépatite B chez les femmes enceintes.

Méthode de l'étude : Une analyse transversale a été réalisée auprès de 265 femmes enceintes. Les données sociodémographiques ont été recueillies et la présence de l'antigène de surface de l'hépatite B (HBsAg) a été recherchée. L'analyse a porté sur les caractéristiques démographiques, les antécédents reproductifs, les consultations prénatales et les revenus. Des méthodes statistiques ont été utilisées pour déterminer les associations entre ces facteurs et la séroprévalence de l'hépatite B.

Résultat de l'étude : L'étude a révélé que 93,6 % des participants étaient non réactifs à l'HBsAg, ce qui indique une faible prévalence de l'hépatite B (6,4 % de cas réactifs). Aucune corrélation significative n'a été trouvée entre les facteurs sociodémographiques et les taux d'infection, toutes les valeurs de p dépassant 0,05, ce qui indique que ces facteurs n'influencent pas substantiellement la séroprévalence de l'hépatite B.

Conclusion : Les résultats suggèrent que les facteurs sociodémographiques ont une influence limitée sur la séroprévalence de l'hépatite B chez les femmes enceintes à Gombe. Bien que la faible prévalence de 6,4 % soit encourageante, elle soulève d'importantes implications en matière de santé publique, notamment en ce qui concerne la nécessité continue de programmes efficaces de dépistage, de vaccination et d'éducation ciblant ce groupe vulnérable. Compte tenu de la complexité de la dynamique de l'infection, les recherches futures devraient explorer d'autres facteurs tels que l'accessibilité aux soins de santé, la sensibilisation de la communauté et les pratiques culturelles qui peuvent avoir un impact sur la transmission et la prise en charge de l'hépatite B. L'étude du rôle de ces éléments pourrait éclairer le développement d'interventions sur mesure visant à minimiser les risques et à promouvoir de meilleurs résultats pour la santé des mères et des nourrissons. De plus, des études longitudinales pourraient évaluer l'évolution de la séroprévalence au fil du temps, offrant ainsi un aperçu de l'efficacité des stratégies de santé publique et orientant les politiques pour l'amélioration des services de santé maternelle.

Mots-clés : Hépatite B, femmes enceintes, facteurs sociodémographiques, séroprévalence, Gombe

INTRODUCTION

Hepatitis B virus (HBV) infection remains a significant global public health challenge, with an estimated 296 million people living with the virus as of 2020 (World Health Organization, 2021) and it is still among the leading causes of mortality. The World Health Organization (WHO) has highlighted hepatitis B as one of the apical infectious causes of chronic liver disease and hepatocellular carcinoma, stressing the need for comprehensive screening and prevention strategies, especially among vulnerable populations, such as pregnant women.[1]

In Nigeria, the prevalence of HBV infection is alarming, with estimates suggesting a national prevalence rate between 8% and 14%.[2,3] Pregnant women are particularly at risk, as uncontrolled maternal HBV can result in vertical transmission, leading to chronic infections in newborns and long-term health complications.[4] The antenatal period presents an opportunity for intervention, allowing for timely screening, immunization, and management to reduce the risk of transmission from mother to child.[5]

Social factors, including socio-demographic status, educational attainment, and employment, significantly influence health outcomes and behaviors related to infectious diseases. Studies have shown that a higher level of education is often associated with increased health literacy, improved healthcare-seeking behavior, and a better understanding of preventive measures for diseases such as hepatitis B.[6] Conversely, low socioeconomic status can lead to barriers in accessing healthcare services, thereby increasing the likelihood of unrecognized and untreated infections.[3,7]

In Gombe State Northeastern Nigeria, the intersection of cultural, economic, and social factors may impact the awareness and management of HBV infection among pregnant women. Despite the critical role of these sociodemographic factors in determining health outcomes, there is a paucity of data specifically examining their influence on hepatitis B seroprevalence in this region.[2,8] Previous research has often focused on broader populations without adequately addressing the unique context of pregnant women in Gombe, which this study aims to rectify.

This cross-sectional analysis aims to assess the prevalence of hepatitis B among pregnant women in Gombe and explore how various social and obstetric clinical factors contribute to the likelihood of infection. Understanding the relationship between these social determinants and HBV seroprevalence is vital for developing targeted interventions that can address the unique challenges faced by pregnant women in Gombe, improve screening rates, and ultimately reduce the burden of hepatitis B in the region.

By elucidating these relationships, this study aims to provide actionable insights for healthcare policymakers and practitioners, facilitating the creation of effective public health strategies that address both the social and clinical dimensions of hepatitis B prevention and care.

This study aims to investigate and identify how various social (sociodemographic) and clinical factors affect the seroprevalence of Hepatitis B among pregnant women in Gombe, Nigeria. Assessing various parameters such as age, employment status, educational level, history of pregnancies, antenatal visit frequency, gestational age at booking, and income levels will contribute valuable insights into the epidemiology of Hepatitis B in the region.

The aim was achieved through determination of the rate of Hepatitis B infection (measured by HBsAg positivity) in the population of pregnant women surveyed, analyzing the impact of sociodemographic factors such as age, education, employment status, income level, antenatal profile, and reproductive history on the prevalence of Hepatitis B, and exploring whether there are significant relationships between these social and clinical factors and the likelihood of testing positive for Hepatitis B. These ultimately will provide insights that can help inform public health policies and interventions aimed at reducing Hepatitis B prevalence among vulnerable populations especially among pregnant women.

MATERIALS AND METHODOLOGY

This study employed a quantitative research method.

Inclusion criteria
- Pregnant women attending the antenatal clinic and labor ward at the study site
- Pregnant women aged 18 years and above.
- Pregnant women who consented to participate in the study.

Exclusion Criteria
- Clients co-infected with Hepatitis B and HIV.

Sample Size Determination
The sample size was calculated as below:

$$N = \frac{Z^2 p(1-p)}{d^2}$$

n = sample size

z = level of confidence (1.96)

p = expected prevalence (0.195) (Peter et al., 2019)

d = level of precision (0.05)

$n = \dfrac{(1.96)^2\, 0.195(1-0.195)}{(0.05)^2}$

$n = \dfrac{3.8416 \times 0.1570}{0.0025}$

$n = 241$

10% attrition = 24

$n = 265$

Sampling Technique

Systematic random sampling was used among clients attending antenatal care, with a sample interval of five based on an average monthly attendance of 627. Written informed consent was obtained, and participants completed a questionnaire and underwent laboratory testing.

Research instrument & administration

A structured questionnaire developed with sections for socio-demographic profile and laboratory results of HBV during pregnancy were used.

Data management and analysis

Data was entered into Microsoft Excel and analyzed using SPSS version 23.
Frequencies and means of continuous variables were calculated. The data were anonymize where personal identifiers such as names were substituted with codes. Additionally, data was securely stored using encrypted files and pass-worded to prevent unauthorized access. Access to data was limited to authorized personnel, ensuring that only those involved in the research can view sensitive information.

Ethical Considerations: Ethical clearance was obtained from the University Research Committee and Gombe State Ministry of Health ethics committee.

RESULTS

The age distribution of respondents in the study shows a predominantly younger demographic, with the largest group being 25-34 years old (35.7%), followed by 18-24 years (24.2%), and 35-44 years (12.6%); there are no participants aged 44 and above. A significant majority (58.2%) of the respondents are unemployed, suggesting a predominantly low-income population that may have limited access to healthcare services. Regarding education, 37.4% completed secondary education, while 20.3% attained tertiary education. A notable minority have no formal education (8.5%) or only informal schooling (2.2%), which may affect their health literacy and access to services. In terms of gravidity, 26.6% of the women reported having more than three pregnancies, indicating varied reproductive experiences. Antenatal care visits were low, with 66.5% attending only one visit; only 3.0% attended two visits and 0.8% had more than four visits. The majority of women (50.0%) booked their antenatal care between 13 and 27 weeks of gestation, while 15.4% booked before 12 weeks, which is optimal. A significant majority (66.8%) of respondents earn less than 30,000 Naira (NGN) per month, underscoring the economic struggles faced by this category of women.

Table 2 above analyzes the relationship between social factors, obstetric profiles, and the seroprevalence of hepatitis among the study cohort. The results show no significant associations for age, employment status, educational level, number of previous pregnancies, antenatal visits, gestational age at booking, or income levels, with all p-values exceeding the standard threshold of 0.05. Specifically, p-values were 0.538 for employment, 0.991 for education, 0.192 for previous pregnancies, 0.799 for antenatal visits, 0.760 for gestational age, and 0.936 for income, indicating that these factors do not significantly influence the likelihood of hepatitis infection among the cohort surveyed.

DISCUSSION

The findings from this study reveal critical insights into the demographic, social, and obstetric clinical profiles and their influence on Hepatitis B seroprevalence among pregnant women in Gombe. The age distribution indicates a predominantly young population, with the majority of participants in their prime childbearing years. This demographic pattern is significant as it underscores the need for targeted public health interventions aimed at younger women, who may face unique health challenges during pregnancy as seen similarly in other Nigerian communities.[2,3,9]

A worrying aspect of the findings is the high unemployment rate of over fifty percent, which is indicative of a low socioeconomic status that could adversely affect healthcare access and overall health outcomes. The low-income levels reported, (more than two-thirds earning less than ₦

30,000, Nigeria currency) further compound this issue, suggesting that economic constraints may limit access to essential healthcare services, including vaccination and timely medical care during pregnancy as seen in other places in developing climes.[10,11]

The educational background of participants shows a disheartening trend, with a significant number having only completed secondary education or lacking formal education altogether. This lack of educational attainment may hinder awareness regarding Hepatitis B prevention and treatment, as well as access to critical health information. This may occur due to the influence of the dominant cultural norms in the region, particularly in areas where poverty and lack of education are prevalent.[5,12]

Interestingly, the seroprevalence data indicates that while a small percentage of less than 7% tested positive for HBsAg, there was no significant correlation between any social and clinical factors and infection rates. These results, particularly the high p-values across various parameters, suggest that traditional risk factors associated with Hepatitis B may not apply to this population in Gombe. This finding is pivotal, as it indicates that other, perhaps unmeasured factors like vaccination status, etc. might be influencing the transmission dynamics of Hepatitis B in this region.[12,13]

The low number of antenatal visits raises concerns regarding the quality of antenatal care received by the participants as up to about 40% of the women attended the clinic only once. Proper prenatal care is crucial for the early identification and management of conditions such as Hepatitis B. The fact that a significant number of women registered late (50.0% booked ANC between 13 and 27 weeks) emphasizes the need for enhanced education and resources to encourage early antenatal care.[6,14]

CONCLUSION

In conclusion, while the results suggest that sociodemographic factors and obstetric profile may not significantly influence Hepatitis B seroprevalence in this population, the underlying issues of high unemployment, low education levels, and late engagement with antenatal care must be addressed which is in tandem with many localities Nigeria.[2,8,12] Future research should aim to identify other potential risk factors that could contribute to Hepatitis B transmission. Public health initiatives should focus on increasing awareness, education, and access to healthcare services for pregnant women in Gombe to mitigate the risk of Hepatitis B and improve maternal health outcomes.

By documenting and discussing the absence of a relationship between sociodemographic factors and hepatitis seroprevalence, researchers and public health officials can better understand and address the factors that contribute to hepatitis transmission and disease burden. Reporting the lack of relationship between sociodemographic characteristics and the seroprevalence of hepatitis can have several important public health and research implications:

1. 1.Targeted Interventions: Understanding that sociodemographic factors do not influence seroprevalence can help public health officials focus on other potential risk factors (such as behavioral, no vaccinations or environmental factors). This allows for the design of more targeted and effective interventions, rather than one-size-fits-all approaches based on sociodemographic characteristics and the obstetric parameters.

2. Resource Allocation: If sociodemographic factors do not correlate with seroprevalence, resources can be allocated more effectively by prioritizing areas of higher seroprevalence regardless of demographic characteristics. This might involve more targeted screening and vaccination programs in high-prevalence areas.

3. Research Gaps: Reporting this scenario highlights the need for further research into what influences hepatitis seroprevalence.

4. Policy Development: The findings can inform health policy by indicating that hepatitis prevention strategies should not be based solely on demographic profiling. Policies can be shaped to address broader community health needs and improve access for all population groups.

5. Epidemiological Insights: It contributes to the broader epidemiological knowledge by providing insights into the dynamics of hepatitis transmission and persistence, potentially uncovering more complex interactions that are not presently evident.

Conflicts of interest: There are no conflicts of interest.

REFERENCES

1. World Health Organization. Hepatitis B. 2021. Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b

2. Eke U, Iwundu CK, Anyaehie US. Seroprevalence of hepatitis B virus infection in pregnant women in Nigeria: A systematic review. Ann Med Health Sci Res. 2014;4(2):334-9. doi:10.4103/2141-9248.155005.

3. Nigeria Centre for Disease Control. Hepatitis B. 2020. Available from: https://ncdc.gov.ng/diseases/info/NDE.

4. Lazarus JV, Wiktor S, Colombo M. Public health and policy aspects of hepatitis B and C in Europe. Hepatol Int. 2017;11(1):1-11. doi:10.1007/s12072-016-9736-7.

5. Barker L, Afdhal NH. Hepatitis B screening and immunization: the importance of primary care. J Clin Gastroenterol. 2017;51(9):839-45. doi:10.1097/MCG.0000000000000866.

6. Olokor T. Socio-demographic factors and reproductive health knowledge on hepatitis B among pregnant women attending antenatal care in Nigeria. J Health Res Rev. 2020;7(3):135-40. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7464971/.

7. Patel P, Koppaka R. Hepatitis B virus: the role of social determinants of health in preventing infection and improving care. Prev Chronic Dis. 2016;13:E143. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5093195/.

8. Akinola OI, Adesiji YO. Prevalence and pattern of hepatitis B virus infection among pregnant women in Nigeria. Niger J Clin Pract. 2018;21(1):1-8. doi:10.4103/njcp.njcp_385_16.

9. Okeke EN, Adimora GN, Odukoya OO. Determinants of hepatitis B virus infection among pregnant women in Lagos State, Nigeria. Hepat Mon. 2017;17(1):e57210. doi:10.5812/hepatmon.57210.

10. Iraji F, Asadollahi K. The impact of socioeconomic factors on the incidence of hepatitis B infection: a study on adults in Iran. Hepat Mon. 2018;18(2):e74612. doi:10.5812/hepatmon.74612.

11. Barker L, Afdhal NH. Hepatitis B screening and immunization: the importance of primary care. J Clin Gastroenterol. 2017;51(9):839-45. doi:10.1097/MCG.0000000000000866.

12. Magaji FA, Okolo MO, Hassan Z, Shambe IH, Pam VC, Ocheke AN, et al. Prevalence of hepatitis B virus infection among pregnant women in Jos, Nigeria. Ann Afr Med. 2020;19(3):176-181. doi: 10.4103/aam.aam_20_19.

13. Tochukwu EJ, Onyinye EN, Obinna OE. Assessing the awareness and acceptability of hepatitis B immunoglobulin among pregnant women in Enugu metropolis, Southeast, Nigeria: A cross-sectional study. SAGE Open Med. 2024; 31(12):20503121241257083. doi: 10.1177/20503121241257083.

14. Wondmeneh TG, Mekonnen AT. Epidemiology of hepatitis B virus infection among pregnant women in Africa: a systematic review and meta-analysis. BMC Infect Dis. 2024;24:921. doi:10.1186/s12879-024-09839-3.

Table 1: Socio-demographic characteristics of the Respondents

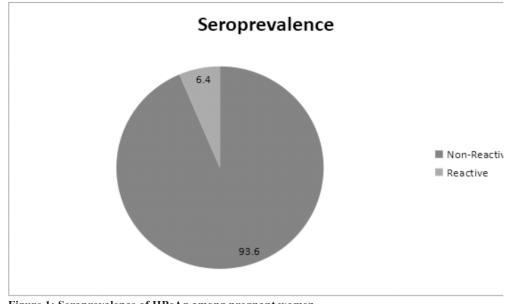| Item	Frequency	Percent
AGE		
18-24	88	24.2
25-34	130	35.7
35-44	46	12.6
44 and above	0	0
EMPLOYMENT STATUS		
Employed	52	14.3%
Unemployed	212	58.2%
EDUCATIONAL LEVEL		
Informal	8	2.2%
None	31	8.5%
Primary	15	4.1%
Secondary	136	37.4%
Tertiary	74	20.3%
NUMBER OF PREVIOUS PREGNANCIES (Gravidity)		
>3	97	26.6%
1	78	21.4%
2	49	13.5%
3	40	11.0%
NUMBER OF ANTENATAL CARE VISITS		
>4	3	0.8%
1	242	66.5%
2	11	3.0%
3	6	1.6%
4	2	0.5%
GESTATIONAL AGE AT BOOKING (in weeks)		
<12	56	15.4%
13-27	182	50.0%
28-40	26	7.1%
AVERAGE INCOME (In Naira/Month)		
<30,000	243	66.8%
>70,000	3	0.8%
30,000 - 50,000	15	4.1%
50,000 - 70,000	3	0.8%

Figure 1: Seroprevalence of HBsAg among pregnant women
The data indicates that 93.6% of pregnant women tested non-reactive for Hepatitis B surface antigen (HBsAg), while 6.4% tested reactive, suggesting a relatively low prevalence of Hepatitis B infection in the sampled population.

Table 2: Relationship between the Sociodemographic status and Hepatitis B virus Seroprevalence

Sociodemographic characteristics	Prevalence			
	Non-Reactive	Reactive	X^2	P-Value
Age				
18-24	86	22		
25-34	118	12	4.218	0.121
35-44	43	3		
Employment Status				
Employed	50	2		
Unemployed	197	15	0.723	0.538
Educational Level				
Informal	8	0		
None	27	4		
Primary	15	0		
Secondary	131	5	7.801	0.991
Tertiary	66	8		
Number of Previous pregnancies				
>3	89	8		
1	73	5		
2	49	0	4.741	0.192
3	36	4		
Number of antenatal visits				
>4	3	0		
1	225	17		
2	11	0	1.652	0.799
3	6	0		
4	2	0		
Gestational Age at booking				
<12	53	3		
13-27	169	13	0.549	0.760
28-40	25	1		
Average Income				
<30,000	227	16		
>70,000	3	0		
30,000-50,000	14	1	0.423	0.936
50,000-70,000	3	0		