

Incidence of Hepatitis B and Hepatitis C virus at Mararaba community, Nasarawa State, Nigeria

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Abstract

The liver plays a crucial role in metabolism and detoxification, and its inflammation, known as hepatitis, can be caused by viruses. The study was carried out to assess the incidence of Hepatitis B and C virus in a group of 97 volunteers from Mararaba, Nasarawa State. Hepatitis B and C Virus are the predominant viral culprits behind liver disease. These infections frequently become long-term, potentially progressing to liver cirrhosis and liver cancer called hepatocellular carcinoma. At Kings Care Hospital Limited, blood samples from study participants were screened for the presence of Hepatitis B surface antigens (HBsAg) and Hepatitis C Virus using rapid test strips. The study also collected demographic data on age and sex of the participants. IBM SPSS Version 25 was used to perform data analysis, which included a Chi-square test. Results showed a low prevalence: 3.1% (n=3) for HBV and 1.0% (n=1) for HCV. Most participants were female (71.1%) and in the 18-35 and 36-60 age groups. Gender and age did not show a statistically significant link to seropositivity. The prevalence rates were consistent with global averages but lower than Nigeria's national rates (8.1% for HBV and 1.1% for HCV). The study's limited number of positive cases affected the statistical power. While the study found low rates of Hepatitis B and C viral infections in Mararaba community, the findings underscore the ongoing need for key interventions.

Keywords: Hepatitis B Virus (HBV), Viral Hepatitis, Hepatitis C Virus (HCV).

INTRODUCTION

Immunity, metabolism, detoxification, as well as digestion and vitamin storage are critical functions performed by the liver, a vital human organ (Kalra *et al.*, 2023). The medical condition of a swollen or inflamed liver is called hepatitis (King *et al.*, 2024). Hepatitis impairs the liver's capacity to fight infections, filter blood, and digest nutrients by causing inflammation and/or liver damage. Although hepatitis viruses are thought to be the cause of the development of instances of this inflammatory liver disease, drugs, alcohol, and other poisons, as well as certain medical conditions, such as autoimmune illnesses, can also cause it Alzahrani *et al.* (2023). Hepatitis B and C are the two most common types of infectious hepatitis viruses, out of the five main strains, known to cause liver inflammation Alzahrani *et al.*, (2023). These infections are chronic in nature, increasing the risk of developing life-threatening conditions such as hepatocellular carcinoma and liver cirrhosis, which results in significant morbidity and death (Ibrahim *et al.*, 2025).

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Prevalence studies quantify the proportion of the population affected by HBV and HCV. There are about 2.2 million people living with the disease in Nigeria, which is about 1% of the population. Okwor, et al. (2025). This data is vital for evaluating the impact of these illnesses on both the healthcare system and the broader community (WHO, 2017). Public health resources, including funding for screening, diagnostic tests, and antiviral medications, are limited. Data obtained from this study could also be used to justify and design targeted public health interventions as well as establishing a foundation for future research. [Centers for Disease Control and Prevention (CDC), 2020].

This research fills a gap in monitoring, evaluation and control measures as well as to raise awareness on incidence of hepatitis B and C viruses among residents in the Mararaba community of Nasarawa State.

MATERIALS AND METHODS

Study population

The participants in this study were patients who volunteered at the Kings Care Hospital limited, Mararaba, Nasarawa state. Demographic data such as age and sex of volunteers were also recorded. The study sample comprised of 97 volunteers.

Sample Collection and Processing

The study was conducted at the science medical laboratory of Kings Care Hospital Limited, located in Mararaba. After being cleansed with an antiseptic, 5 milliliters of blood were collected from participant's veins. To prevent clotting, the blood was drawn using a sterile syringe and needle and then put into containers that held the anticoagulant ethylene diamine-tetra acetic acid EDTA. Afterward, each container was labeled and spun in a centrifuge at 2,000 revolutions per minute for five minutes. The liquid portion of the blood (sera) was isolated from the solid components and immediately screened for the presence of Hepatitis B surface antigens (HBsAg) and the Hepatitis C Virus (HCV). For the rapid detection of Hepatitis B surface antigen (HBsAg) and Hepatitis C virus (HCV) antibodies, specific test strips for HBsAg developed by LAB care diagnostics (india) pvt.ltd, nantong diagnos biotechnology co. Ltd and HCV developed by lab care diagnostics (india) pvt.ltd, accubiotech co., ltd were used. The strips were carefully removed from their packaging and, following the manufacturer's instructions, and dipped into the serum samples. It was crucial to keep the strips vertical and ensure the serum didn't go past the maximum fill line to get an accurate result.

Interpretation of results

Once the strips were ready, they were laid out on a non-absorbent surface and the test began. The results were read after 15 minutes. A positive result was indicated by two distinct red lines: one in the test area and one in the control area. The intensity of these lines varied, reflecting the concentration of the Hepatitis B surface antigen (HBsAg) or Hepatitis C virus (HCV) in the sample. Conversely, a negative result showed only a single colored line in the control area, with no red or pink line visible in the test area. Okwor, *et al.*, (2025)

Statistical analysis

Data was inputted into IBM SPSS Version 25, a statistical software platform, to generate summary statistics. The results are presented in two main sections: descriptive statistics and a bivariate analysis using Chi-square tests at 0.05 significant level.

Ethical considerations

The study was conducted with informed consent of all participants, whose privacy was protected and who could withdraw at any point without penalty.

RESULTS AND DISCUSSION

Descriptive Analysis of Participants

The demographic distribution showed that females constituted the majority of participants (71.1%). Participants were predominantly within the age brackets of 18–35 years (48.5%) and 36–60 years (45.4%) (Table 1). Of the participants tested, Hepatitis B virus was detected in 3.1% of individuals ($n = 3$), and Hepatitis C virus was found in 1.0% of individuals ($n = 1$). These findings are summarized in Table 2.

Socio-demographic and Serological Profile of Participants

Table 1: Socio-demographics of participants

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	28	28.9%
	Female	69	71.1%
Age Group	0–17 (Child)	3	3.1%
	18–35 (Youth)	47	48.5%
	36–60 (Adult)	44	45.4%
	60+ (Elderly)	3	3.1%

Table 2: Serological Profile of Respondents

Variable	Category	Frequency (n)	Percentage (%)
HBV Status	Positive	3	3.1%
	Negative	94	96.9%
HCV Status	Positive	1	1.0%
	Negative	96	99.0%

Association between Serological Status and Socio-Demographic Factors

Bivariate analysis was conducted to examine potential associations between the socio-demographic variables and HBV/HCV status using Chi-square (χ^2) tests. A Chi-square test found that there was no statistically significant link between a person's gender and their HBV status [$\chi^2 (1) = 0.030$, $p = 0.862$]. No notable connection was found between an individual's age bracket and their Hepatitis B Virus status [$\chi^2 (3) = 1.459$, $p = 0.692$]. The test of association between gender and HCV status was not significant [$\chi^2 (1) = 0.410$, $p = 0.522$]. Research did not show a meaningful link between a person's age and their Hepatitis C Virus status [$\chi^2 (3) = 1.790$, $p = 0.617$].

Interpretation and Limitations

The study's findings reveal that the presence of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) was infrequent among the individuals examined. Both viruses were detected in only a small number of the participants, consistently rare across all age categories. However, there was a slight increase in positive cases among individuals aged 18–35 and 36–60 for HBV (Figure 1).

Positive cases were barely visible for Hepatitis C Virus (HCV) and mostly in the 36–60 age group (Figure 2). Both HBV and HCV were rare in both genders. However, the prevalence appeared to be slightly higher in females than in males for both viruses (Figure 4 and 5). The majority of the individuals in the sample fell into the 18–35 and 36–60 age groups, with the 18–35 group being the largest. There were a very few individuals in the 60+ age group. There

were significantly more individual females than as males in all age groups. The gender split was 69 females and 28 males (Figure 3).

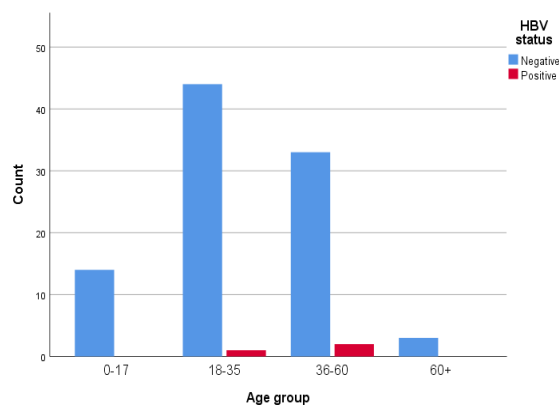


Figure 1. Prevalence (age group vs HBV status)

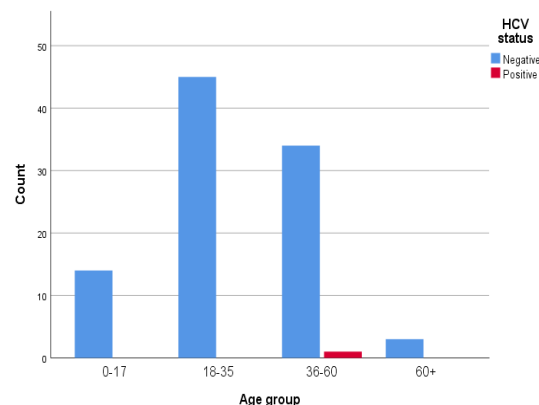


Figure 2. Prevalence (age group vs HCV status)

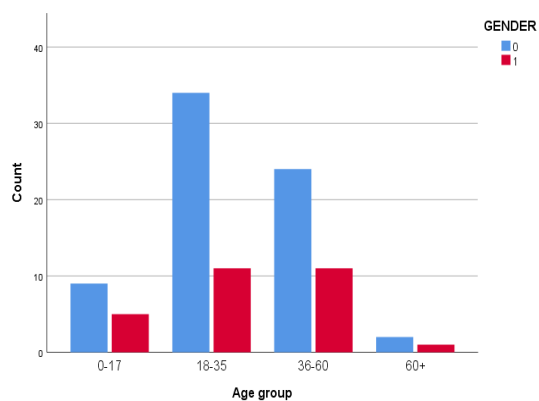


Figure 3: age and gender distribution

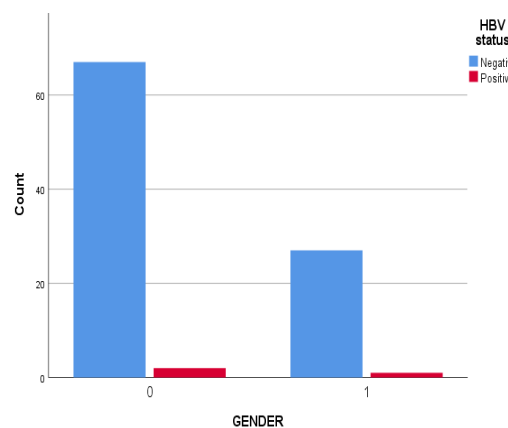


Figure 4: prevalence by gender (HBV status)

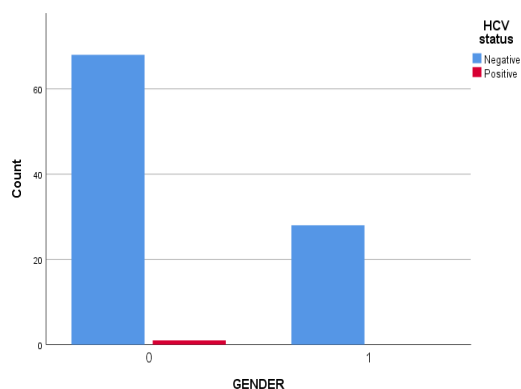


Figure 5: prevalence by gender (HCV status)

No statistically significant associations were identified between socio-demographic factors (age and gender) and HBV/HCV status. These findings may be influenced by the extremely low number of positive case ($n = 3$ and 1 respectively). This limited variability affects the statistical power and reliability of inferential analyses. It is therefore recommended that future studies involve larger and more diverse populations to enhance the robustness of statistical estimates and allow for stronger inferences regarding HBV and HCV risk factors.

DISCUSSION

The frequency of viral hepatitis B and C infections isn't uniform globally. It changes significantly from one region to another and can even differ among specific populations within a single country. This study revealed 3.1% HBV and 1.0% HCV incidence among volunteers at Mararaba community, Nasarawa State. This finding agrees with the global hepatitis report of a viral hepatitis B prevalence rate of 3.3% of the World's population and viral hepatitis C prevalence rate of 0.7% of the world's population (WHO, 2024c). However other studies reported by (Iyama, et al., 2020) in the same state differ with hepatitis B ranging between 7.1 to 13.3% respectively in the general population.

Hepatitis B infection prevalence was lower while HCV infection prevalence was similar when this study was compared to nationwide prevalence rates of 8.1% and 1.1% respectively, reported by the 2018 Nigeria HIV-AIDS Indicator and Impact Survey (NAIIS 2018). It is however crucial to note that Nigeria is regarded as a hyper-endemic area for HBV, and various studies may indicate varied prevalence rates depending on the location or demographic being studied (e.g., pregnant women, blood donors) (WHO, 2023).

Hepatitis B infection prevalence was less in this study compared the range of prevalence rates of 7.1% to 13.3% for Nasarawa State reported in a publication about HIV-hepatitis co-infection (Usman et al., 2020). The HCV infection prevalence of 1.0 % in this study was also found to be lower compared with a study of 4.8% prevalence among pregnant women at a hospital in Lafia (Innocent *et al.*, 2022).

Overall, this study's prevalence rates for HBV and HCV are generally consistent with or slightly higher than global estimates, but lower than prevalence rates reported in some specific regional studies, particularly in Africa, from around the same time period.

CONCLUSION

The study aimed to determine the rate of Hepatitis B and C infections within the volunteer population of Mararaba, Nasarawa State. Based on a study of 97 individuals, a small percentage of participants tested positive for hepatitis. Specifically, 3.09% were found to have Hepatitis B Virus and 1.03% had Hepatitis C Virus. No cases of co-infection were recorded. The highest prevalence was observed among individuals aged 31–50 years, and females had higher participation and positivity rates.

The overall incidence indicates a relatively low but notable presence of HBV and HCV in the community. This aligns with national trends, highlighting the need for sustained public health interventions. Despite the low incidence, the risk factors for transmission and the asymptomatic nature of these infections make community-based screening and preventive health education critically important.

REFERENCES

- Alzahrani, A. R. (2023). Knowledge and attitude of undergraduate health professions students towards Hepatitis B and C. *The Scientific World Journal*, 2023, Article 6699940. <https://doi.org/10.1155/2023/6699940>
- Centers for Disease Control and Prevention (CDC). (2020). *Hepatitis B and C: A Major Public Health Challenge*. Retrieved from <https://www.cdc.gov/hepatitis/>.
- Ibrahim, A. N., Mahmood, A. J., Mosa, A. A., Ahmed, Z. S., Abdullah, A. S., Abdulkareem, D. S., Khalid, R. C., Yousif, I. R., & Abdulqadir, H. H. (2025). Hepatitis B and C virus infection among couples undergoing premarital screening in Iraqi Kurdistan. *IJID Regions*, 14, 100492. <https://doi.org/10.1016/j.ijregi.2024.100492>
- Iyama, M.A., et al. (2020). 'HIV hepatitis co-infection in rural community in Northern Nigeria'. *Pan African medical journal*. 36(352). Available from <https://pmc.ncbi.nlm.nih.gov/articles/PMC7664132/>
- Okwor, V.C. et al., (2025). 'Molecular epidemiology of hepatitis B virus from blood samples obtain from patients in Enugu and Nassarawa, state, Nigeria. <https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-025-11166-0>
- Kalra, A., Yetiskul, E., Wehrle, C. J., et al. (2025). Physiology, liver. In *StatPearls* [Internet]. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK535438/>
- King, L. M. (2024). *Hepatitis B*. WebMD. <https://www.webmd.com/hepatitis/digestive-diseases-hepatitis-b>
- Raheem, Y. A., & Dayar, D. A. (2024). Treatment of chronic hepatitis B infection in Nigeria: The need for a paradigm shift. *Research Journal of Health Sciences*, 12(1), 62-70.
- World Health Organization (WHO). (2017). *Global Hepatitis Report, 2017*. Retrieved from <https://www.who.int/hepatitis/publications/global-hepatitis-report2017/en/>.