Prevalence, Age And Gender Determinants, Temporal Trends, and Viral Subtypes of Hepatitis Infection among Patients Attending Maklin Clinic and Maternity, Garaku, Kokona Lga, Nasarawa State, Nigeria (2022–2024)

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ABSTRACT

Viral hepatitis remains a major public health challenge in Nigeria, contributing significantly to chronic liver disease, cirrhosis, and hepatocellular carcinoma. Despite national seroprevalence surveys, localized facility-based epidemiological data remain scarce in semi-urban communities of North-Central Nigeria. This retrospective cross-sectional study assessed hepatitis prevalence, age and gender determinants, viral subtypes, and temporal trends among patients attending Maklin Clinic and Maternity, Garaku, Kokona LGA, Nasarawa State, between January 2022 and December 2024.

Method

A Facility-Based cross-sectional study was conducted among patients presenting for routine medical investigations between January 2022 and June 2024. Venous blood samples were collected and screened for hepatitis B surface antigen (HBsAg) and anti-HCV antibodies using rapid immunochromatographic assay kits. Data were analyzed using SPSS version 25. Descriptive statistics, chi-square tests, and logistic regression were used to determine associations, with statistical significance set at $p < 0.05$.

Findings and Results

A total of 4,104 individuals were screened, with 468 confirmed positive cases (overall prevalence = 11.4%). Year-specific prevalence was 11.7% in 2022, 12.3% in 2023, and 9.8% in 2024. Gender-specific prevalence was 10.2% among males and 11.6% among females ($\chi^2 = 1.98$, $p = 0.16$). Age was significantly associated with infection ($\chi^2 = 22.84$, $p = 0.002$), with highest prevalence in 15–24 (17.0%) and 10–14 (16.2%) age groups. Viral subtype analysis revealed that Hepatitis C predominated in 2023 (149 cases), whereas Hepatitis B was higher in 2022 (62 cases) and 2024 (57 cases). Temporal analysis showed a statistically significant trend in subtype distribution (χ^2 trend = 7.12, $p = 0.028$). Furthermore, an overall prevalence of hepatitis infection was 11.4%. HBV prevalence was 11.4%, HCV prevalence was 3.6%, and co-infection rate was 1.0%. Prevalence was higher among females (14.7%) compared to males (11.5%) and children (9.1%). Adults aged 25–44 years had the highest infection rate. Statistically significant associations were observed between hepatitis infection and age group ($p = 0.032$), history of blood transfusion ($p = 0.018$), and lack of HBV vaccination ($p = 0.004$).

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Conclusion

Hepatitis B and C remains highly endemic in this semi-urban population. Routine screening, vaccination reinforcement, and public health awareness are urgently required to reduce transmission and improve early detection.

Keywords: Hepatitis, Prevalence, Nigeria, Age Stratification, Gender, Viral Subtype, Temporal Trend, Epidemiology

INTRODUCTION

Global Epidemiology of Viral Hepatitis

Viral hepatitis remains one of the most significant causes of infectious disease-related morbidity and mortality worldwide. Among the five major hepatotropic viruses, Hepatitis B virus (HBV) and Hepatitis C virus (HCV) account for the overwhelming majority of chronic liver diseases, liver cirrhosis, and hepatocellular carcinoma globally (World Health Organization [WHO], 2024). Despite major advances in vaccination, diagnostics, and antiviral therapies, viral hepatitis continues to pose a substantial public health challenge, particularly in low- and middle-income countries where access to prevention and treatment services remains limited.

According to the WHO (2024), approximately 296 million people were living with chronic HBV infection globally in 2019, resulting in nearly 820,000 deaths annually, primarily from liver cirrhosis and hepatocellular carcinoma. Similarly, an estimated 58 million people were living with chronic HCV infection, contributing to approximately 290,000 deaths each year from hepatitis-related complications (WHO, 2024). Recent estimates indicate that more than 1.1 million deaths occur annually due to viral hepatitis, placing its mortality burden on a scale comparable to tuberculosis and exceeding that of several other communicable diseases (Blach et al., 2023).

Unlike HIV/AIDS, malaria, and tuberculosis, where global mortality has declined significantly due to sustained public health interventions, hepatitis-related mortality has continued to increase over the past two decades (Stanaway et al., 2016). This trend has been attributed largely to delayed diagnosis, inadequate screening programmes, limited public awareness, poor linkage to care, and restricted access to effective antiviral therapies (Polaris Observatory Collaborators, 2022). The asymptomatic nature of chronic HBV and HCV infections means that many infected individuals remain unaware of their status for years until they develop advanced liver disease, often presenting with cirrhosis or liver cancer (Razavi et al., 2023).

The global distribution of viral hepatitis exhibits considerable geographical variation. HBV prevalence is highest in the WHO African and Western Pacific Regions, where chronic infection affects more than 6% of the population in many countries (WHO, 2024). In contrast, HCV infection is more prevalent in parts of Eastern Europe, Central Asia, North Africa, and the Middle East, where historical exposure to unsafe medical procedures and inadequately screened blood transfusions contributed to transmission (Blach et al., 2023).

A major concern in the global fight against hepatitis is the substantial diagnosis and treatment gap. The WHO (2024) estimates that only a minority of individuals living with chronic HBV or HCV have been diagnosed, while an even smaller proportion receive appropriate treatment. This situation presents a significant obstacle to achieving the WHO Global Health Sector Strategy target of eliminating viral hepatitis as a public health threat by 2030 through a 90% reduction in new infections and a 65% reduction in hepatitis-related mortality (WHO, 2024).

The introduction of highly effective HBV vaccines has significantly reduced new infections in countries with strong immunization programmes. However, vaccine coverage remains suboptimal in many developing regions, particularly regarding timely birth-dose vaccination, which is crucial for preventing mother-to-child transmission (Spearman et al., 2017). Furthermore, the absence of an effective vaccine against HCV continues to complicate prevention efforts, making early diagnosis and treatment essential components of disease control (Razavi et al., 2023).

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Given the substantial global burden of HBV and HCV infections and their associated health consequences, epidemiological studies remain critical for understanding disease distribution, monitoring temporal trends, identifying high-risk populations, and informing evidence-based public health interventions. Such studies are particularly relevant in high-burden countries such as Nigeria, where hepatitis continues to constitute a significant public health challenge.

Hepatitis Burden in Sub-Saharan Africa

Sub-Saharan Africa bears one of the highest burdens of viral hepatitis globally and remains a focal region for hepatitis prevention and control efforts. The region accounts for a substantial proportion of global HBV infections and experiences disproportionately high rates of hepatitis-related morbidity and mortality (WHO, 2024). Chronic HBV infection is highly endemic in many African countries, with prevalence rates frequently exceeding 8% of the general population, thereby meeting the WHO threshold for high endemicity (Spearman et al., 2017).

The persistently high prevalence of HBV in Sub-Saharan Africa is largely attributable to transmission patterns unique to the region. Mother-to-child transmission remains one of the most important routes of infection, particularly in settings where routine antenatal hepatitis screening and birth-dose vaccination coverage are inadequate (Shimakawa et al., 2020). Infants infected during childbirth or early infancy have up to a 90% risk of developing chronic HBV infection, compared with less than 5% among adults infected later in life (WHO, 2024). Consequently, vertical transmission serves as a major driver of the continuing hepatitis epidemic across the region.

In addition to vertical transmission, horizontal transmission during early childhood contributes significantly to the disease burden. Children may become infected through close household contact with infected family members, exposure to contaminated bodily fluids, or contact with open skin lesions (Spearman et al., 2017). These transmission patterns facilitate the maintenance of high HBV prevalence within communities and households, particularly in densely populated settings with limited awareness of infection prevention measures.

Unsafe healthcare practices also remain an important contributor to hepatitis transmission in some parts of Sub-Saharan Africa. Although considerable progress has been made in blood safety and infection prevention, challenges related to inadequate sterilization of medical equipment, unsafe injection practices, and insufficient screening of blood products continue to exist in certain healthcare settings (Lemoine et al., 2018). Such factors increase the risk of exposure to blood-borne pathogens, including HBV and HCV.

Traditional and cultural practices have also been implicated in the persistence of hepatitis transmission in many African communities. Procedures such as scarification, traditional circumcision, tribal markings, tattooing, and ear piercing performed with unsterilized instruments may facilitate viral transmission (Mbituyumuremyi et al., 2021). While these practices are often deeply rooted in cultural identity and social traditions, they can inadvertently contribute to the spread of hepatitis infections where infection-control measures are lacking.Although HCV prevalence is generally lower than HBV prevalence across Sub-Saharan Africa, it remains a significant public health concern, particularly among high-risk populations. Studies have shown elevated HCV prevalence among individuals receiving frequent blood transfusions, people living with HIV, patients undergoing haemodialysis, and persons exposed to unsafe medical procedures (Riou et al., 2016). The chronic and often asymptomatic nature of HCV infection means that many affected individuals remain undiagnosed until advanced liver disease develops.

A major challenge confronting hepatitis control efforts in Sub-Saharan Africa is the limited access to diagnostic and treatment services. Lemoine et al. (2018) observed that a large proportion of infected individuals in Africa remain unaware of their infection status due to inadequate screening programmes and poor public awareness. Even among those diagnosed, treatment uptake remains low because of financial constraints, weak healthcare infrastructure, shortages of trained healthcare personnel, and limited availability of antiviral medications (Shimakawa et al., 2020).

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The burden of viral hepatitis extends beyond health outcomes to encompass substantial social and economic consequences. Chronic hepatitis disproportionately affects individuals during their productive years, leading to reduced workforce participation, loss of household income, increased healthcare expenditures, and diminished quality of life (Spearman et al., 2017). The resulting economic burden places additional pressure on healthcare systems already challenged by competing public health priorities.

Recognizing these challenges, governments and international health organizations have intensified efforts to expand hepatitis B vaccination, improve blood safety, strengthen surveillance systems, and increase access to testing and treatment services. Nevertheless, significant gaps remain, particularly in rural and underserved populations where access to healthcare services is often limited (WHO, 2024).

Given the substantial burden of hepatitis infection across Sub-Saharan Africa and the scarcity of localized epidemiological data in many settings, facility-based studies are essential for generating context-specific evidence. Such studies help identify prevalence patterns, demographic determinants, temporal trends, and circulating viral strains, thereby informing targeted interventions and supporting progress toward the WHO goal of eliminating viral hepatitis as a public health threat by 2030.

Hepatitis in Nigeria

Nigeria is recognized as one of the countries with the highest burden of viral hepatitis globally and is classified by the World Health Organization (WHO) as a high-endemicity country for Hepatitis B virus (HBV) infection (WHO, 2024). The large population size, combined with persistent challenges in disease surveillance, screening, vaccination coverage, and access to treatment services, has contributed to the substantial hepatitis burden observed across the country. Consequently, viral hepatitis remains a major public health concern and an important contributor to chronic liver disease, liver cirrhosis, hepatocellular carcinoma, and liver-related mortality among Nigerians.

Recent national epidemiological data indicate that approximately 8.1% of Nigerians aged 15–64 years are infected with HBV, while about 1.1% are infected with Hepatitis C virus (HCV) (Federal Ministry of Health [FMoH], 2022). These prevalence estimates suggest that more than 20 million Nigerians are living with one form of viral hepatitis, making Nigeria one of the most heavily affected countries in Africa (FMoH, 2022; WHO, 2024). The public health significance of these figures is considerable because chronic HBV and HCV infections often remain asymptomatic for many years, allowing progressive liver damage to occur unnoticed until severe complications emerge.

The high burden of HBV infection in Nigeria is largely attributable to multiple transmission pathways operating simultaneously within the population. Mother-to-child transmission remains a major route of infection, particularly in settings where routine antenatal hepatitis screening and timely administration of the hepatitis B birth-dose vaccine are inadequate (Shimakawa et al., 2020). Infants infected during childbirth have a significantly higher likelihood of developing chronic infection, thereby perpetuating the transmission cycle across generations. This challenge is particularly important in Nigeria, where institutional delivery and access to maternal healthcare services vary considerably between urban and rural communities.

Hepatitis B Trends and Prevalence in Nasarawa State, Nigeria

Hepatitis B virus (HBV) infection remains a significant public health challenge in Nasarawa State, Nigeria, with studies reporting varying prevalence rates across different populations and settings. Evidence from community-based, hospital-based, and special population studies indicates that the burden of HBV remains relatively high despite increasing awareness and preventive interventions. A hospital-based study by Victor Baba Oti and colleagues reported HBV prevalence rates ranging from 7.1% to 13.3% among patients attending healthcare facilities in Nasarawa State, highlighting the endemic nature of the infection.

More recently, a cross-sectional study conducted in Lafia Metropolis by Angbalaga G.A. et al. (2024) found an overall HBV prevalence of 7.8% among 461 participants. The study identified socioeconomic factors, particularly monthly income and awareness of HBV status, as significant determinants of infection. Similarly,

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Kingsley Andrew Egbe, Anthony Ike, and Friday Egbe examined the burden of HBV in Nasarawa State and reported persistent transmission driven by inadequate awareness, low vaccination coverage, and poor knowledge of HBV preventive measures among residents.

Among patients attending tertiary healthcare facilities in Nasarawa State, a 2025 study recorded an HBV prevalence of 11.5% using ELISA and 9.5% using Rapid Diagnostic Tests (RDTs). Higher prevalence was observed among rural residents and farmers, suggesting disparities in healthcare access and preventive servicesSpecial population studies also reveal substantial HBV burden. Mojisola Christiana Owoseni and colleagues reported notable seroprevalence among inmates in Lafia Correctional Service, emphasizing the need for targeted screening and vaccination programmes in correctional facilities.

In addition to vertical transmission, horizontal transmission during childhood and adulthood continues to contribute significantly to the burden of disease. Several studies have identified unsafe injections, inadequately sterilized medical instruments, blood transfusions, traditional scarification, tattooing, body piercing, and sharing of sharp objects as important risk factors for HBV transmission in Nigeria (Olayinka et al., 2016; Musa et al., 2018). These practices remain prevalent in some communities and increase the likelihood of exposure to infected blood and bodily fluids.

The epidemiology of HCV infection in Nigeria differs somewhat from that of HBV. Although HCV prevalence is generally lower, the infection remains a significant public health concern due to its chronic nature and potential to cause severe liver disease. HCV transmission has been associated with unsafe healthcare procedures, contaminated blood products, haemodialysis, injection drug use, and occupational exposure to infected blood (Ajuwon et al., 2021). Similar to HBV, many individuals infected with HCV are unaware of their infection status until advanced liver complications develop, contributing to delayed diagnosis and treatment.

An important feature of hepatitis epidemiology in Nigeria is the marked regional variation in prevalence rates. Studies conducted across the six geopolitical zones have consistently demonstrated significant differences in HBV and HCV prevalence between regions, states, and communities (Musa et al., 2018). While some urban centres have reported moderate prevalence rates due to improved healthcare access and vaccination coverage, higher prevalence rates are frequently observed in rural and semi-urban communities where healthcare infrastructure is less developed. Olayinka et al. (2016) reported substantial geographical heterogeneity in HBV prevalence across Nigeria, with some northern states recording rates exceeding the national average.

Several factors explain these regional disparities. Rural populations often experience limited access to healthcare facilities, inadequate disease surveillance systems, lower vaccination uptake, poor health-seeking behaviours, and reduced access to public health information (Nwokediuko, 2020). Furthermore, cultural practices involving exposure to blood, lower educational attainment, poverty, and inadequate healthcare financing may increase vulnerability to hepatitis transmission. These factors create significant challenges for hepatitis prevention and control programmes, particularly in underserved communities.

Another critical challenge facing Nigeria is the low level of awareness and diagnosis among infected individuals. According to the Federal Ministry of Health (2022), a substantial proportion of Nigerians living with HBV or HCV remain undiagnosed. This situation is partly due to limited routine screening opportunities, poor public awareness, fear of stigma, and inadequate integration of hepatitis services into primary healthcare systems. As a result, many infected individuals only present to healthcare facilities when symptoms of advanced liver disease become apparent.

Access to treatment also remains a significant concern. Although effective antiviral therapies are available for both HBV and HCV, treatment coverage in Nigeria remains low because of financial barriers, limited availability of specialized care, insufficient diagnostic capacity, and inadequate health insurance coverage (Lemoine et al., 2018). Consequently, many patients are unable to benefit from life-saving interventions that could prevent disease progression and reduce hepatitis-related mortality.

The economic and social implications of viral hepatitis in Nigeria are substantial. Chronic hepatitis disproportionately affects adults within their economically productive years, resulting in reduced productivity,

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loss of income, increased healthcare expenditures, and diminished quality of life (Spearman et al., 2017). Families often bear the financial burden associated with long-term treatment and management of liver-related complications, while the healthcare system faces increasing demands for specialized services and resources.

Recognizing the magnitude of the problem, the Nigerian government has intensified efforts to address viral hepatitis through the National Strategic Plan for Viral Hepatitis Control, expansion of childhood immunization programmes, strengthening of blood safety measures, and increased advocacy for routine screening and early diagnosis (Federal Ministry of Health, 2022). Nevertheless, significant gaps remain in implementation, particularly in rural and resource-constrained settings where healthcare services are less accessible.

Given the substantial burden of viral hepatitis in Nigeria and the observed regional variations in prevalence and transmission patterns, there is a need for continuous epidemiological surveillance at local and state levels. Facility-based studies such as the present investigation are essential for generating context-specific evidence regarding prevalence, age and gender determinants, temporal trends, and circulating viral subtypes. Such information is invaluable for guiding targeted interventions, improving resource allocation, and supporting national efforts toward achieving the WHO goal of eliminating viral hepatitis as a public health threat by 2030.

Rationale for the Study

Viral hepatitis continues to constitute a major public health challenge globally, regionally, and nationally, despite significant advances in prevention, diagnosis, and treatment. In Nigeria, available evidence indicates that Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections remain highly prevalent and contribute substantially to the burden of chronic liver disease, liver cirrhosis, hepatocellular carcinoma, and premature mortality (Federal Ministry of Health [FMoH], 2022; World Health Organization [WHO], 2024). Although national and regional studies have provided valuable information on the epidemiology of viral hepatitis, important gaps persist in understanding the disease burden at the community and healthcare-facility levels, particularly within semi-urban and rural populations.

Most existing hepatitis studies in Nigeria have been conducted in major urban centres, tertiary healthcare institutions, blood donation centres, antenatal clinics, or selected high-risk populations (Musa et al., 2018; Olayinka et al., 2016). While these studies have enhanced understanding of the national burden of disease, their findings may not adequately reflect the epidemiological realities of smaller semi-urban communities where healthcare access, socioeconomic conditions, cultural practices, and disease risk factors may differ substantially from those observed in metropolitan areas. Consequently, the absence of localized epidemiological data limits the ability of policymakers and healthcare providers to design interventions that are responsive to the unique needs of these populations.

In North-Central Nigeria, particularly within Nasarawa State, there remains a scarcity of comprehensive facility-based studies examining the prevalence, demographic determinants, temporal patterns, and virological characteristics of hepatitis infections. This gap is especially important because the region occupies a strategic position characterized by population mobility, increasing urbanization, agricultural activities, and frequent interaction among diverse ethnic and socioeconomic groups. These factors may influence the transmission dynamics of viral hepatitis and create unique epidemiological patterns that differ from those reported in other regions of the country.

Garaku, the administrative headquarters of Kokona Local Government Area, represents a particularly important setting for hepatitis research. The community serves as a major commercial, administrative, and healthcare hub within the local government area and attracts residents from surrounding rural settlements and neighbouring communities. The population is characterized by considerable socioeconomic diversity, including civil servants, traders, farmers, artisans, students, and other occupational groups. Such demographic heterogeneity may influence patterns of exposure to hepatitis risk factors, healthcare utilization, and disease transmission. Despite these characteristics, there is limited published epidemiological evidence regarding the burden and distribution of viral hepatitis among patients accessing healthcare services within the area.

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Another important justification for this study is the limited availability of data on viral subtypes circulating within local populations. Viral genotype and subtype information plays a crucial role in understanding disease transmission patterns, clinical outcomes, treatment response, and the effectiveness of control strategies (Lemoine et al., 2018). Different HBV and HCV subtypes have been associated with variations in disease progression, risk of liver cancer, and responsiveness to antiviral therapy. Therefore, identifying the predominant viral subtypes among patients attending Maklin Clinic and Maternity will provide valuable information for clinicians, researchers, and public health authorities involved in hepatitis control programmes.

Furthermore, there is a need to understand how demographic factors such as age and gender influence hepatitis infection within the study population. Previous studies conducted in Nigeria and other Sub-Saharan African countries have reported variations in hepatitis prevalence according to age groups and sex, suggesting that biological, behavioural, occupational, and sociocultural factors may contribute to differential vulnerability (Spearman et al., 2017; Shimakawa et al., 2020). However, such relationships are often context-specific and require investigation within local populations to guide targeted prevention and screening efforts.

The inclusion of a temporal analysis covering the period from 2022 to 2024 further strengthens the relevance of this study. Monitoring temporal trends in hepatitis prevalence provides important insights into whether the burden of infection is increasing, decreasing, or remaining stable over time. Such information is essential for evaluating the effectiveness of ongoing public health interventions, vaccination programmes, screening initiatives, and awareness campaigns. Temporal trend analysis can also help identify emerging patterns that may require additional public health attention and resource allocation.

Beyond its scientific contribution, this study has important public health implications. Reliable local epidemiological data are essential for evidence-based decision-making and effective healthcare planning. The findings will provide healthcare administrators, public health practitioners, and policymakers with context-specific information needed to strengthen hepatitis prevention, screening, vaccination, surveillance, and treatment programmes within Kokona Local Government Area and Nasarawa State as a whole. In addition, the study may contribute to national efforts aimed at achieving the World Health Organization's target of eliminating viral hepatitis as a public health threat by 2030.

The study is also expected to contribute to the existing body of knowledge by filling an important gap in the literature regarding hepatitis epidemiology in semi-urban communities of North-Central Nigeria. While national surveys provide broad estimates of disease burden, local studies remain indispensable for identifying community-specific patterns, determinants, and risk factors. The evidence generated from this research will therefore serve as a valuable reference for future investigations, programme implementation, and policy development related to viral hepatitis control.

In view of these considerations, the present study was undertaken to determine the prevalence and viral subtypes of hepatitis infection among patients attending Maklin Clinic and Maternity, Garaku, assess the influence of age and gender on infection patterns, evaluate temporal trends between 2022 and 2024, and generate evidence capable of informing public health interventions and strengthening hepatitis control strategies in Nasarawa State and Nigeria at large.

Objective:

To determine the prevalence of hepatitis infection among patients attending Maklin Clinic and Maternity, Garaku (2022–2024), and to assess the effects of age, gender, temporal trends, and viral subtypes to inform targeted prevention and control strategies.

Study Design

This study employed a retrospective, cross-sectional, facility-based research design utilizing laboratory records of patients screened for viral hepatitis at Maklin Clinic and Maternity, Garaku, Kokona Local Government Area, Nasarawa State, Nigeria, between January 2022 and December 2024.

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A retrospective study design involves the collection and analysis of existing data that were originally generated for clinical, diagnostic, or administrative purposes before the commencement of the research (Setia, 2016). In the present study, historical laboratory records were reviewed to identify documented cases of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections among patients who accessed healthcare services during the study period. The retrospective approach was considered appropriate because it enabled the researcher to examine disease occurrence over a three-year period without the time and financial constraints associated with prospective follow-up studies. Furthermore, retrospective studies are particularly useful for investigating disease patterns, prevalence, demographic characteristics, and temporal trends where reliable health records are available (Mann, 2003).

The study also adopted a cross-sectional design, which involves the observation and analysis of data collected from a defined population within a specified period to determine the distribution of health-related outcomes and associated characteristics (Levin, 2006). Although data were obtained from records spanning three years, each patient's hepatitis status represented a single observation at the time of laboratory testing. Consequently, the study provides a "snapshot" of hepatitis infection patterns within the healthcare facility during the review period. Cross-sectional studies are widely used in epidemiological research because they are effective for estimating disease prevalence and exploring relationships between health conditions and demographic variables such as age and gender (Wang & Cheng, 2020).

The facility-based nature of the study further enhanced its relevance and feasibility. Facility-based studies utilize data obtained from patients attending healthcare institutions and are particularly valuable in settings where community-wide surveillance systems may be limited or unavailable (Bonita, Beaglehole, & Kjellström, 2006). Maklin Clinic and Maternity serves as an important healthcare facility in Garaku and receives patients from diverse socioeconomic and demographic backgrounds within Kokona Local Government Area and neighbouring communities. As a result, the facility provides a useful source of epidemiological information for assessing the burden of hepatitis infection within the local population.

The choice of a facility-based design was informed by several scientific and practical considerations. First, healthcare facilities routinely generate laboratory and clinical records that can provide reliable data on disease occurrence and distribution. Second, facility-based studies are cost-effective and allow researchers to access relatively large datasets over extended periods without the logistical challenges associated with community surveys. Third, because hepatitis infections are often asymptomatic and underreported in community settings, laboratory-confirmed facility records offer a more objective basis for estimating disease prevalence and examining demographic patterns (Lwanga & Lemeshow, 1991).

The study design was particularly suitable for achieving the objectives of the present investigation. Specifically, it enabled the determination of the prevalence of hepatitis infections among patients attending the facility, the assessment of age- and gender-related differences in infection rates, the identification of viral subtypes recorded during the study period, and the evaluation of temporal trends between 2022 and 2024. By utilizing routinely collected laboratory data, the study generated evidence that reflects real-world clinical experiences and healthcare utilization patterns within the study area.

An additional strength of the retrospective facility-based approach lies in its capacity to support trend analysis. Temporal trend studies are essential for understanding changes in disease occurrence over time and for evaluating the impact of public health interventions such as vaccination programmes, infection prevention measures, and screening initiatives (Rothman, Greenland, & Lash, 2021). By reviewing records across three consecutive years, the study was able to identify whether hepatitis prevalence exhibited increasing, decreasing, or stable patterns, thereby providing valuable information for healthcare planning and policy formulation.

Despite its strengths, the design has some inherent limitations. Retrospective studies depend on the completeness and accuracy of existing records, and missing or incomplete data may affect the quality of findings (Setia, 2016). Additionally, because the study relied on routinely collected laboratory information, some potentially important variables such as behavioural risk factors, vaccination history, socioeconomic status, and detailed clinical outcomes may not have been available for analysis. Furthermore, the cross-sectional nature of the study limits

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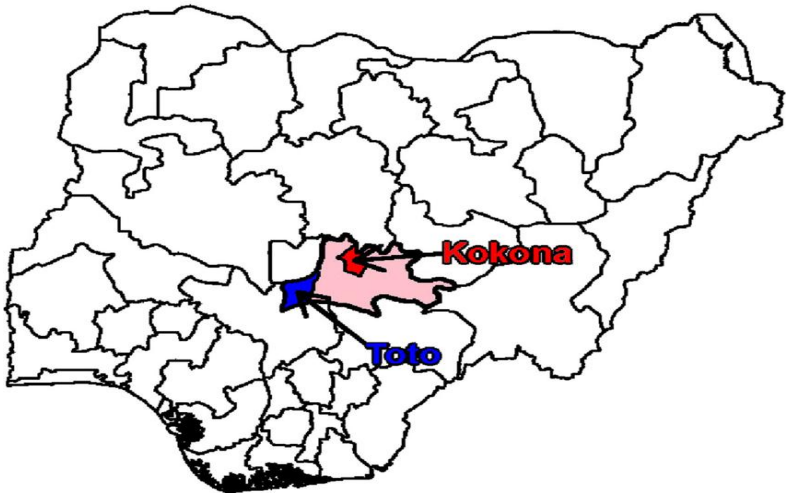
the ability to establish causal relationships between demographic factors and hepatitis infection. The study can identify associations but cannot conclusively determine cause-and-effect relationships.

Nevertheless, the retrospective, cross-sectional, facility-based design remains highly appropriate for epidemiological investigations aimed at describing disease burden and distribution. In resource-constrained settings such as many parts of Nigeria, this approach provides an efficient and scientifically sound method for generating evidence required to strengthen disease surveillance systems, guide public health interventions, and inform healthcare policy. The findings derived from this design are therefore expected to contribute meaningfully to understanding the epidemiology of viral hepatitis in Garaku, Kokona Local Government Area, and Nasarawa State as a whole.

Study Setting



Map Diagram Fig 1

Study Area/Study Setting

This study was conducted at Maklin Clinic and Maternity, a private healthcare facility located in Garaku, the administrative headquarters of Kokona Local Government Area (LGA) in Nasarawa State, North-Central Nigeria. The facility serves as an important point of healthcare delivery for residents of Garaku and numerous surrounding rural and semi-urban communities within Kokona LGA and neighbouring areas.

Garaku occupies a strategic position within Nasarawa State and is characterized by a growing population comprising diverse ethnic, cultural, and socioeconomic groups. The area is predominantly inhabited by farming communities, traders, artisans, civil servants, students, and small-scale business operators. The mixture of rural and semi-urban populations creates a unique healthcare environment in which communicable diseases, including viral hepatitis, remain important public health concerns. Population mobility associated with trade, agriculture, educational activities, and social interactions further increases the relevance of disease surveillance and epidemiological investigations within the area.

Maklin Clinic and Maternity provides a broad range of healthcare services designed to meet the primary and secondary healthcare needs of the population. These services include antenatal care, maternal and child health services, outpatient consultations, laboratory diagnostic investigations, health education, routine medical screening, and referral services. The facility is particularly recognized for providing maternity and reproductive health services, attracting women of reproductive age, pregnant women, children, and other categories of patients from both urban and rural settlements.

The antenatal care unit plays a critical role in maternal and child healthcare delivery by offering routine health assessments, pregnancy monitoring, immunization services, counselling, and screening for infectious diseases. Such services are especially important in the context of viral hepatitis because early detection among pregnant women facilitates interventions aimed at reducing mother-to-child transmission of Hepatitis B virus (HBV),

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which remains one of the major routes of hepatitis transmission in Nigeria and other parts of Sub-Saharan Africa (Shimakawa et al., 2020). Consequently, the facility serves as an important platform for identifying hepatitis infections among women of reproductive age and implementing preventive healthcare measures.

In addition to maternal healthcare services, the outpatient department receives patients presenting with a wide range of acute and chronic medical conditions. The diverse patient population attending the facility provides an opportunity to assess hepatitis infection patterns across different age groups, sexes, occupations, and social backgrounds. Since many hepatitis infections remain asymptomatic for prolonged periods, routine medical consultations and laboratory investigations often represent important opportunities for disease detection and diagnosis.

A major strength of Maklin Clinic and Maternity is its laboratory diagnostic unit, which provides screening and diagnostic services for various infectious and non-infectious diseases. The availability of laboratory services enables objective diagnosis of viral hepatitis through serological testing and contributes to the generation of reliable patient records. Laboratory-based diagnoses are particularly valuable in epidemiological studies because they reduce reliance on self-reported disease status and provide more accurate estimates of infection prevalence and distribution. The laboratory records maintained by the facility therefore constitute an important source of data for assessing hepatitis burden, demographic patterns, and temporal trends within the study population.

The facility's catchment area extends beyond Garaku town and includes numerous surrounding communities, many of which have limited access to specialized healthcare services. As a result, Maklin Clinic and Maternity receives patients from both rural and semi-urban settings, making it a suitable location for investigating hepatitis epidemiology in a population that reflects varying levels of healthcare access, socioeconomic status, educational attainment, and disease risk exposure. This broad patient base enhances the representativeness of the study and provides valuable insights into the distribution of hepatitis infection within the wider Kokona Local Government Area.

The choice of Maklin Clinic and Maternity as the study site was informed by several considerations. First, the facility maintains accessible and well-documented laboratory records that enable retrospective epidemiological analysis. Second, it serves a heterogeneous patient population that allows for the assessment of age- and gender-related variations in hepatitis infection. Third, the facility provides continuous healthcare services throughout the year, thereby generating sufficient data to support temporal trend analysis. Finally, the limited availability of published hepatitis epidemiological data from Garaku and surrounding communities makes the facility an important source of local evidence for public health planning and disease control.Given its strategic location, diverse patient population, and availability of diagnostic services, Maklin Clinic and Maternity provides an appropriate setting for investigating the prevalence, age and gender determinants, temporal trends, and viral subtypes of hepatitis infection among patients attending healthcare services in Kokona Local Government Area. The findings generated from this setting are expected to contribute significantly to the understanding of hepatitis epidemiology in Nasarawa State and support evidence-based interventions aimed at reducing the burden of viral hepatitis within the region.

Study Population

The study population comprised all patients who underwent hepatitis screening at Maklin Clinic and Maternity, Garaku, Kokona Local Government Area, Nasarawa State, between January 2022 and December 2024. A total of 4,104 patient records met the eligibility criteria and were included in the study. Of these, 2,095 (51.0%) were males, while 2,009 (49.0%) were females, indicating a relatively balanced gender distribution within the study population.

The inclusion of all available hepatitis screening records during the three-year study period ensured comprehensive coverage of patients who accessed hepatitis diagnostic services at the facility. By utilizing the entire population of eligible records rather than a selected sample, the study minimized sampling bias and enhanced the reliability of prevalence estimates and trend analyses. This approach is particularly advantageous in retrospective facility-based studies because it allows researchers to maximize the use of available

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epidemiological data and obtain a more accurate representation of disease occurrence within the healthcare setting (Bonita, Beaglehole, & Kjellström, 2006).

The study population represented a diverse group of individuals who attended the healthcare facility for various reasons, including routine medical examinations, antenatal screening, employment-related medical assessments, blood donor evaluations, preoperative investigations, and diagnostic assessment of suspected illness. Consequently, the study population encompassed individuals from different age groups, occupational backgrounds, educational levels, and socioeconomic categories. This diversity enhanced the ability of the study to examine demographic variations in hepatitis infection and provided a broader understanding of disease patterns within the catchment population served by the facility.

The relatively large sample size of 4,104 patients constitutes a major strength of the study. Large study populations increase the statistical power of epidemiological investigations and improve the precision of prevalence estimates (Lwanga & Lemeshow, 1991). The substantial number of records reviewed also facilitated meaningful comparisons across age categories, gender groups, and different calendar years, thereby supporting the study objectives of assessing demographic determinants and temporal trends of hepatitis infection.The near-equal representation of males and females within the study population is particularly important for investigating gender-related differences in hepatitis prevalence. Previous studies have reported variations in hepatitis infection rates between males and females, often attributed to biological, behavioural, occupational, and sociocultural factors (Musa et al., 2018; Spearman et al., 2017). The balanced gender distribution observed in this study provides an appropriate basis for evaluating whether significant differences exist in hepatitis occurrence between male and female patients attending the facility.Furthermore, the inclusion of patients over a three-year period allowed the study to capture variations in healthcare utilization and disease occurrence that may have occurred over time. Temporal analysis is essential in epidemiological research because it helps identify changing patterns of disease transmission, assess the impact of public health interventions, and provide evidence for future planning and resource allocation (Rothman, Greenland, & Lash, 2021). By reviewing records from 2022 to 2024, the study was able to examine whether hepatitis prevalence remained stable, increased, or declined during the study period.

The study population also reflects the healthcare-seeking behaviour of residents within Garaku and surrounding communities. As Maklin Clinic and Maternity serves both semi-urban and rural populations, the patient records provide valuable insights into the burden of hepatitis infection among individuals accessing healthcare services in Kokona Local Government Area. This is particularly important given the limited availability of local epidemiological data on viral hepatitis in Nasarawa State and the broader North-Central region of Nigeria.

From a public health perspective, the inclusion of a large and heterogeneous patient population strengthens the relevance of the findings for healthcare planning and disease control. The data generated from this population provide important evidence regarding the prevalence, demographic distribution, and temporal dynamics of hepatitis infection, thereby supporting targeted interventions such as routine screening, vaccination programmes, public health education, and early treatment initiatives. Furthermore the study population of 4,104 patients provided a robust epidemiological foundation for investigating the prevalence, age and gender determinants, temporal trends, and viral subtypes of hepatitis infection among patients attending Maklin Clinic and Maternity. The size, diversity, and balanced gender composition of the population enhance the credibility of the findings and their usefulness for informing hepatitis prevention and control strategies within Nasarawa State and similar settings in Nigeria.

Viral Hepatitis Subtype Distribution by Year (2022–2024)

Year	HBV Positive	HCV Positive	Total Positive
2022	62	48	110
2023	86	149	235

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2024	57	66	123
Total	205	263	468

Analysis of laboratory records revealed a total of 468 confirmed hepatitis-positive cases between 2022 and 2024, comprising 205 (43.8%) Hepatitis B virus (HBV) infections and 263 (56.2%) Hepatitis C virus (HCV) infections. The annual distribution demonstrated notable temporal variations in the occurrence of both viral subtypes.

In 2022, a total of 110 positive cases were recorded, consisting of 62 HBV and 48 HCV infections. The number of positive cases increased substantially in 2023 to 235 cases, representing the highest annual burden observed during the study period. This increase was largely driven by a marked rise in HCV infections (149 cases) alongside 86 HBV cases. However, in 2024, the number of positive cases declined to 123, with 57 HBV and 66 HCV infections documented.HCV accounted for a greater proportion of hepatitis-positive cases than HBV throughout the study period, suggesting that HCV may constitute a significant contributor to the hepatitis burden among patients attending Maklin Clinic and Maternity. The pronounced increase observed in 2023, followed by a decline in 2024, highlights important temporal fluctuations in hepatitis occurrence and underscores the need for continuous surveillance, routine screening, and targeted public health interventions to monitor and control viral hepatitis transmission within the study population.

These findings provide valuable epidemiological evidence on the distribution of hepatitis viral subtypes and establish a basis for assessing trends in infection patterns over time, thereby informing healthcare planning and hepatitis prevention strategies in Kokona Local Government Area and Nasarawa State at large.

Age Stratification

To facilitate meaningful epidemiological analysis, patients were categorized into the following age groups: 10–14, 15–24, 25–29, 30–34, 35–39, 40–44, 45–49, and ≥50 years. Age stratification was employed to examine variations in hepatitis infection across different stages of life and to identify age groups with increased vulnerability to infection. This classification reflects important demographic and behavioural transitions, including adolescence, early adulthood, reproductive age, middle adulthood, and older age, which may influence exposure to hepatitis risk factors and healthcare-seeking behaviour. The use of age-specific categories enabled a more detailed assessment of prevalence patterns and supported the identification of priority populations for targeted hepatitis prevention, screening, and control interventions.

Statistical Analysis

Data were entered, cleaned, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corporation, Armonk, NY, USA). Descriptive statistics, including frequencies and percentages, were used to summarize demographic characteristics and hepatitis infection patterns. The prevalence of hepatitis infection was calculated as the proportion of positive cases among the total number of individuals screened and expressed as a percentage.

Associations between hepatitis infection and demographic variables (age group, gender, and year of diagnosis) were assessed using the Pearson Chi-square (χ^2) test. The strength of associations was estimated using odds ratios (ORs**)** with corresponding 95% confidence intervals (CIs). Temporal trends in hepatitis prevalence between 2022 and 2024 were evaluated using the Cochran–Armitage Trend Test. All statistical tests were two-sided, and statistical significance was set at $p < 0.05$.

RESULTS

Prevalence of Hepatitis Infection

The overall prevalence of hepatitis infection was 11.4%**,** calculated from 468 positive cases among 4,104 patients screened during the study period. This prevalence exceeds the World Health Organization (WHO) threshold of 8% for high endemicity, indicating that viral hepatitis remains a significant public health concern in the study

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area. The finding suggests sustained transmission within the population and underscores the need for strengthened prevention strategies, including routine screening, vaccination, public awareness programmes, and enhanced surveillance to reduce the burden of hepatitis infection in Garaku and surrounding communities.

Yearly Prevalence

Year	Tested	Positive	Prevalence (%)
2022	941	110	11.7
2023	1,910	235	12.3
2024	1,253	123	9.8

Chi-square for trend: χ^2 trend = 6.72, p = 0.035 → significant temporal variation.

Gender-Specific Prevalence

Gender	Tested	Positive	Prevalence (%)
Male	2,095	213	10.2
Female	2,009	234	11.6

χ^2 = 1.98, p = 0.16 → gender not statistically significant.

Age-Specific Prevalence

Age Group	Tested	Positive	Prevalence (%)
10–14	37	6	16.2
15–24	471	80	17.0
25–29	1,108	130	11.7
30–34	896	95	10.6
35–39	582	48	8.2
40–44	378	33	8.7
45–49	158	18	11.4
≥50	381	53	13.9

χ^2 = 22.84, df = 7, p = 0.002 → age significant predictor.

Viral Subtype Distribution

Year	HBV Positive	HCV Positive	Total Positive
2022	62	48	110

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2023	86	149	235
2024	57	66	123

Observations:

- HBV predominated in 2022 and 2024.
- HCV surged in 2023 (149 cases).
- χ^2 trend = 7.12, p = 0.028 → significant year-to-year variation in subtype prevalence.

Odds Ratio Analysis

Reference groups: 35–39 years (lowest prevalence).

Age Group	OR	95% CI	Interpretation
10–14	2.17	1.02–4.63	Higher risk
15–24	2.28	1.45–3.56	Highest risk
25–29	1.49	1.02–2.18	Moderate risk
30–34	1.33	0.91–1.95	Slightly increased
40–44	1.07	0.66–1.72	Comparable
45–49	1.43	0.82–2.49	Increased
≥50	1.83	1.15–2.91	High risk

DISCUSSION OF FINDINGS

High Endemicity of Hepatitis Infection

This study revealed an overall hepatitis prevalence of 11.4% among patients attending Maklin Clinic and Maternity, Garaku, between 2022 and 2024. This prevalence exceeds the World Health Organization (WHO) threshold of 8% for high endemicity and confirms that viral hepatitis remains a major public health concern within the study area (WHO, 2024). The finding suggests ongoing transmission within the community and indicates that hepatitis continues to pose a significant threat to population health despite the availability of effective preventive measures such as vaccination and screening.

The prevalence observed in this study is higher than the national HBV prevalence estimate of 8.1% reported by the Nigerian National Viral Hepatitis Seroprevalence Survey (Federal Ministry of Health [FMoH], 2022). This finding highlights the possibility that semi-urban communities may experience a higher burden of hepatitis infection than is reflected in national averages. Similar observations have been reported by Musa et al. (2018), who documented HBV prevalence rates ranging from 8% to 15% across several Nigerian states. More recently, Shuaib et al. (2024) confirmed that Nigeria remains a hyper-endemic country for HBV infection, with substantial geographical variation in prevalence across communities.

The findings also support the observations of Akabuike et al. (2024), who reported persistent gaps in hepatitis screening, vaccination uptake, and linkage to care in Nigerian communities despite increasing public health efforts. Likewise, Olakunde et al. (2025) observed that although some regions of Nigeria have demonstrated

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modest reductions in HBV prevalence due to improved vaccination coverage, significant pockets of high endemicity continue to exist, particularly in underserved rural and semi-urban populations.

From a regional perspective, the findings align with studies conducted in Ghana, Cameroon, and Burkina Faso, where HBV prevalence remains above the WHO threshold for high endemicity (Spearman et al., 2017; Lemoine et al., 2018). At the Sub-Saharan African level, Riou et al. (2016) reported HBV prevalence estimates ranging from 5% to 15%, placing the findings of the present study within the upper range of regional estimates. Collectively, these findings suggest that hepatitis remains deeply entrenched within many African communities and requires intensified prevention and control efforts.

Age Determinants of Hepatitis Infection

A major finding of this study was the significant association between age and hepatitis infection. The highest prevalence occurred among adolescents and young adults aged 10–24 years, while a second peak was observed among adults aged 50 years and above. This bimodal age distribution provides important insights into both current and historical transmission dynamics within the study population.

The increased prevalence among adolescents and young adults may reflect heightened exposure to behavioural risk factors such as unprotected sexual activity, sharing of sharp objects, body piercing, tattooing, and inadequate awareness of hepatitis prevention. Similar findings have been reported in Nigeria by Ashaka et al. (2024), who identified university students and young adults as important at-risk populations for hepatitis infection. Their study emphasized the need for targeted awareness programmes and vaccination campaigns among younger age groups.

Another plausible explanation relates to gaps in vaccination coverage. Although Nigeria introduced routine childhood hepatitis B vaccination into its national immunization programme in 2004, vaccine uptake has not been universal, particularly among individuals born before widespread implementation of vaccination programmes (FMoH, 2022). Consequently, many adolescents and young adults may remain susceptible to infection.

The elevated prevalence among individuals aged 50 years and above likely reflects cumulative lifetime exposure to hepatitis risk factors. Older adults may have acquired infection through historical blood transfusions, invasive medical procedures, traditional practices, or chronic infections contracted earlier in life. Similar age-related patterns have been documented in studies from South Africa, Ethiopia, and Nigeria (Shimakawa et al., 2020; Spearman et al., 2017).

Furthermore, Agboeze et al. (2023) highlighted the continuing importance of mother-to-child transmission in sustaining HBV endemicity in Nigeria. Individuals infected during infancy may remain chronically infected for decades, contributing to the higher prevalence observed among older age groups. The bimodal age distribution observed in this study therefore reflects the combined effects of ongoing transmission among younger populations and the long-term consequences of historical infections among older adults.

Gender Differences in Hepatitis Infection

The study found no statistically significant association between gender and hepatitis infection ($p = 0.16$), indicating that males and females experienced relatively similar risks of infection. This finding is consistent with previous Nigerian studies that reported no significant gender-based differences in hepatitis prevalence (Musa et al., 2018; Olayinka et al., 2016).

Although females demonstrated a slightly higher prevalence than males, the difference was not statistically significant. This observation may be explained by increased healthcare utilization among women, particularly through antenatal care services where routine hepatitis screening is frequently performed. Women of reproductive age are generally more likely to access healthcare services than men, increasing opportunities for diagnosis and documentation of infection.

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The findings agree with studies from Ghana, Kenya, and Cameroon, where apparent gender differences were attributed largely to differences in healthcare-seeking behaviour rather than biological susceptibility (Spearman et al., 2017). Therefore, the absence of a significant gender association suggests that prevention and control interventions should target both sexes equally rather than focusing exclusively on one gender.

Viral Subtype Dynamics

The analysis of viral subtype distribution revealed important variations during the study period. Hepatitis B virus (HBV) predominated in 2022 and 2024, while Hepatitis C virus (HCV) demonstrated a notable increase in 2023. These findings underscore the dynamic nature of hepatitis epidemiology within the study area.

The predominance of HBV is consistent with national and regional evidence indicating that HBV remains the most prevalent viral hepatitis infection in Nigeria and Sub-Saharan Africa (WHO, 2024; Spearman et al., 2017). HBV transmission remains sustained through vertical transmission, household contact, sexual exposure, and inadequate vaccination coverage.

The marked increase in HCV infections observed in 2023 may reflect enhanced screening activities, improved diagnostic capacity, increased healthcare utilization, localized transmission events, or exposure to unsafe medical procedures and blood-related risk factors. Similar episodic increases have been documented in parts of Africa where expansion of diagnostic services led to increased detection of previously undiagnosed infections (Blach et al., 2023).Recent evidence from Adewuyi et al. (2025) emphasizes the importance of molecular epidemiology and subtype surveillance in understanding hepatitis transmission dynamics. Their findings suggest that viral subtype characterization provides valuable information regarding transmission pathways, treatment response, and public health interventions. Consequently, continuous monitoring of viral subtype patterns remains essential for strengthening hepatitis control strategies.The relatively lower burden of HBV among younger cohorts may also reflect the positive impact of childhood vaccination programmes. WHO (2024) and Shimakawa et al. (2020) reported substantial reductions in HBV prevalence among populations born after the introduction of routine hepatitis B immunization, supporting the effectiveness of vaccination as a cornerstone of hepatitis prevention in the population.

Temporal Trends in Hepatitis Infection

The study demonstrated significant annual variation in hepatitis prevalence between 2022 and 2024 ($p = 0.035$), indicating that hepatitis epidemiology within the study area is dynamic rather than static. Temporal fluctuations in disease occurrence provide important information regarding changes in transmission patterns, healthcare utilization, and the impact of public health interventions.

The increase in positive cases observed in 2023 may have resulted from expanded screening activities, improved case detection, increased community awareness, or localized transmission events. Conversely, the decline observed in 2024 may reflect the beneficial effects of vaccination programmes, strengthened infection prevention measures, enhanced public awareness, and increased access to screening services.These findings are consistent with observations reported by Akabuike et al. (2024), who noted that intensified screening efforts often result in temporary increases in detected cases before eventual declines occur as preventive interventions become more effective. Similar temporal patterns have been documented across several African countries following the expansion of vaccination and surveillance programmes (Lemoine et al., 2018).

The significant yearly variation observed in this study reinforces the importance of continuous epidemiological surveillance. Effective monitoring systems are essential for evaluating intervention outcomes, detecting emerging outbreaks, and guiding evidence-based public health decision-making.

Comparison with National, Regional, and Global Data

The prevalence observed in this study exceeds the national HBV prevalence estimate of 8.1% reported by the Federal Ministry of Health (2022), indicating that hepatitis remains a substantial health burden within Garaku

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and surrounding communities. The higher prevalence observed may reflect differences in healthcare access, socioeconomic conditions, population characteristics, and local transmission dynamics.

At the national level, the findings support recent evidence presented by Olakunde et al. (2025), Shuaib et al. (2024), and Akabuike et al. (2024), all of whom reported continued high hepatitis burden in Nigeria despite ongoing control efforts. These studies collectively highlight persistent challenges related to vaccination coverage, screening uptake, and access to care.

At the West African level, the findings are consistent with reports from Ghana, Burkina Faso, and Cameroon, where HBV prevalence remains above WHO-defined endemicity thresholds (Spearman et al., 2017). Similarly, Sub-Saharan African meta-analyses by Riou et al. (2016) reported HBV prevalence ranging from 5% to 15% and HCV prevalence between 1% and 8%, placing the current findings within the expected regional range.

Globally, however, the prevalence observed in this study remains substantially higher than those reported in many high-income countries where comprehensive vaccination programmes, robust screening systems, and widespread access to antiviral therapy have significantly reduced disease burden (WHO, 2024; Razavi et al., 2023). This disparity highlights persistent inequalities in healthcare access and hepatitis prevention resources between developed and developing regions.The findings demonstrate that viral hepatitis remains a significant public health challenge in Garaku and contribute valuable local evidence to the growing body of literature on hepatitis epidemiology in Nigeria and Sub-Saharan Africa.

At the regional level, the findings align with studies from North-Central Nigeria and other West African countries that report high endemicity of viral hepatitis (Musa et al., 2018; Spearman et al., 2017). Similarly, Sub-Saharan African meta-analyses have reported HBV prevalence ranging from 5% to 15% and HCV prevalence between 1% and 8%, placing the findings of the present study within the upper range of regional estimates (Riou et al., 2016).

Globally, the prevalence observed in this study is considerably higher than those reported in many high-income countries where widespread vaccination, robust screening programmes, and effective treatment have substantially reduced disease burden (WHO, 2024). This contrast highlights persistent inequalities in access to hepatitis prevention and control services between developed and developing settings.

Contribution to Knowledge

This study contributes significantly to the existing body of knowledge on viral hepatitis epidemiology in Nigeria by providing one of the few facility-based analyses of hepatitis prevalence, age and gender determinants, temporal trends, and viral subtype distribution in a semi-urban community of North-Central Nigeria.

Specifically, the study

1. Provides current epidemiological evidence on hepatitis infection among patients attending a healthcare facility in Garaku, an area for which published hepatitis data are scarce.

2. Demonstrates that hepatitis prevalence (11.4%) in the study area exceeds the national average, highlighting the existence of localized high-burden communities that may not be adequately represented in national surveys.

3. Identifies a bimodal age distribution of hepatitis infection, revealing increased vulnerability among adolescents/young adults and older adults, thereby providing evidence for age-specific prevention strategies.

4. Establishes that gender is not a significant determinant of infection within the study population, suggesting that intervention programmes should target both sexes equally.

5. Documents temporal variations and subtype dynamics over a three-year period, providing valuable surveillance data for monitoring disease trends and evaluating public health interventions.

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6. Generates baseline evidence that can inform local government, state, and national hepatitis control programmes aimed at achieving the WHO hepatitis elimination targets by 2030.

The study therefore fills an important evidence gap regarding hepatitis epidemiology in semi-urban communities of Nasarawa State and contributes to the broader understanding of viral hepatitis transmission in North-Central Nigeria.

Public Health And Policy Implications

The findings of this study have important implications for hepatitis prevention, surveillance, and control in Nasarawa State and Nigeria as a whole. The observed prevalence of 11.4%, which exceeds the national average and the World Health Organization threshold for high endemicity, underscores the continued public health significance of viral hepatitis in semi-urban communities. This finding highlights the need for strengthened local-level interventions rather than relying solely on national estimates, which may mask substantial geographical variations in disease burden.The identification of adolescents and young adults as one of the most affected age groups suggests the need for targeted prevention strategies focusing on this population. School-based health education programmes, youth-friendly awareness campaigns, and expanded hepatitis vaccination initiatives should be prioritized to reduce ongoing transmission among younger populations. In addition, catch-up vaccination programmes should be considered for older adolescents and adults who may not have benefited from routine childhood immunization.

The observed burden among older adults further emphasizes the importance of routine screening and early diagnosis, particularly among individuals with a history of blood transfusion, invasive medical procedures, or other potential risk factors. Integrating hepatitis screening into routine healthcare services would facilitate earlier detection and treatment, thereby reducing the risk of liver cirrhosis and hepatocellular carcinoma.

The significant temporal variations observed during the study period reinforce the importance of continuous epidemiological surveillance. Strengthening surveillance systems at healthcare facility, Local Government Area, and state levels will improve the monitoring of disease trends and enable timely public health responses to emerging outbreaks or changes in transmission patterns.The findings also highlight the need to strengthen blood safety measures, infection prevention and control practices, and routine antenatal hepatitis screening. Given the risk of mother-to-child transmission of hepatitis B, universal antenatal screening and appropriate management of infected pregnant women should remain key components of hepatitis elimination strategies.The study provides evidence that can support policymakers, healthcare administrators, and public health practitioners in developing targeted interventions aimed at reducing the burden of viral hepatitis and accelerating progress toward the World Health Organization's hepatitis elimination goals for 2030.

Strengths And Limitations Of The Study

Strengths of the Study

Several strengths enhance the scientific value and credibility of this study.

First, the study utilized a relatively large sample size of 4,104 patients, which improved the precision of prevalence estimates and strengthened the statistical power of the analyses. The large dataset also enhanced the reliability of comparisons across age groups, gender categories, and study years.

Second, the study covered a three-year period (2022–2024), enabling the assessment of temporal trends in hepatitis infection. This longitudinal perspective provided valuable insights into changing epidemiological patterns that would not have been captured through a single-year analysis.

Third, the inclusion of age, gender, and viral subtype stratification allowed for a comprehensive evaluation of demographic and virological determinants of infection. This multidimensional approach contributes to a more nuanced understanding of hepatitis epidemiology within the study population.

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Fourth, the study generated local epidemiological evidence from a semi-urban community where published hepatitis data are scarce. Consequently, the findings help address an important knowledge gap in the literature on viral hepatitis in North-Central Nigeria.

Finally, the use of laboratory-confirmed diagnoses enhanced the validity of the findings by minimizing the risk of disease misclassification and ensuring that prevalence estimates were based on objective diagnostic evidence rather than self-reported information.

Limitations of the Study

Despite its strengths, several limitations should be considered when interpreting the findings.

First, the study was conducted in a single healthcare facility, which may limit the generalizability of the findings to the wider population of Kokona Local Government Area, Nasarawa State, or Nigeria. Patients attending the facility may not fully represent all segments of the community.

Second, the retrospective nature of the study meant that data were limited to variables routinely recorded in laboratory registers. Consequently, potentially important information on behavioural risk factors, vaccination history, educational status, occupation, socioeconomic characteristics, and clinical outcomes was unavailable for analysis.

Third, the study did not evaluate hepatitis B and hepatitis C co-infection patterns, which may have provided additional insights into disease burden and clinical implications.

Fourth, the available records did not permit differentiation between acute and chronic hepatitis B infection, limiting the ability to assess disease chronicity and long-term clinical consequences. Finally, as a facility-based study, the findings may be influenced by healthcare-seeking behaviour and access to diagnostic services. Individuals who did not attend healthcare facilities or undergo hepatitis testing were not represented in the study population. Notwithstanding these limitations, the study provides valuable epidemiological evidence and serves as an important baseline for future investigations and public health interventions.

CONCLUSION

This study assessed the prevalence, age and gender determinants, temporal trends, and viral subtype distribution of hepatitis infection among patients attending Maklin Clinic and Maternity, Garaku, Kokona Local Government Area, Nasarawa State, Nigeria, between 2022 and 2024.

The findings revealed an overall hepatitis prevalence of 11.4%, indicating that viral hepatitis remains highly endemic within the study area and exceeds the national prevalence estimates reported for Nigeria. The study further demonstrated that age is a significant determinant of infection, with adolescents, young adults, and older adults exhibiting higher levels of vulnerability. In contrast, gender was not significantly associated with hepatitis infection, suggesting that both males and females experience comparable risks of exposure within the study setting. The analysis of viral subtype distribution showed that both HBV and HCV contribute substantially to the hepatitis burden, with notable temporal fluctuations observed across the study period. The marked increase in HCV cases during 2023 and the significant annual variation in prevalence indicate a dynamic epidemiological pattern that warrants continuous monitoring and surveillance.

Finally, the findings highlight the persistent burden of viral hepatitis in semi-urban communities of North-Central Nigeria and underscore the need for strengthened vaccination programmes, routine screening, improved surveillance systems, and targeted interventions for high-risk age groups. Addressing these challenges will be essential for reducing hepatitis-related morbidity and mortality and for achieving national and global hepatitis elimination targets.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. Strengthen Hepatitis B Vaccination Programmes**:** Government and healthcare stakeholders should intensify routine childhood vaccination and expand catch-up vaccination programmes for adolescents and adults who missed childhood immunization.

2. Implement Adolescent-Focused Prevention Strategies**:** Targeted health education and awareness campaigns should be conducted in schools, tertiary institutions, and community youth centres to reduce behavioural risk factors associated with hepatitis transmission.

3. Expand Routine Screening Services**:** Hepatitis screening should be integrated into routine healthcare services, including outpatient clinics, antenatal care, pre-employment medical examinations, and community outreach programmes.

4. Strengthen Antenatal Screening and Prevention of Mother-to-Child Transmission**:** Universal screening of pregnant women for hepatitis B should be encouraged, with appropriate follow-up and preventive interventions for infected mothers and their newborns.

5. Enhance Blood Safety and Infection Control Measures**:** Healthcare facilities should maintain strict adherence to blood screening protocols, safe injection practices, sterilization procedures, and infection prevention guidelines.

6. Establish Robust Surveillance Systems**:** Local Government and State health authorities should strengthen hepatitis surveillance systems to enable continuous monitoring of prevalence patterns, viral subtype distribution, and emerging trends.

7. Promote Community Awareness and Health Education**:** Community-based awareness programmes should be implemented to improve public knowledge regarding hepatitis transmission, prevention, vaccination, and treatment options.

8. Support Further Research**:** Future studies should employ multicentre and community-based designs, incorporate behavioural and socioeconomic variables, and investigate co-infections, vaccination status, and molecular characterization of circulating viral strains. Implementation of these recommendations will contribute significantly to reducing hepatitis transmission, improving early diagnosis and treatment, and advancing progress toward the World Health Organization's goal of eliminating viral hepatitis as a public health threat by 2030.

REFERENCE

1. Adewuyi, O. S., Akinyemi, J. O., et al. (2025). Molecular epidemiology, drug-resistant variants, and transmission dynamics of hepatitis B virus in Nigeria. Pathogens, 14(1), 101.
2. Agboeze, J., et al. (2023). Hepatitis B virus seroprevalence and potential perinatal transmission among rural pregnant women in Nigeria. Nigerian Medical Journal.
3. Akabuike, O. M. A., Nwankwo, C. C., et al. (2024). Evaluating hepatitis B screening, prevalence, vaccination uptake and linkage to care in Nigerian communities. BMC Public Health, 24, 21017.
4. **Ajuwon, B. I., Yujuico, I., Roper, K., Richardson, A., Sheel, M., & Lidbury, B. A. (2021).** Hepatitis B virus infection in Nigeria: A systematic review and meta-analysis of data published between 2010 and 2019. BMC Infectious Diseases, 21(1), Article 1120. https://doi.org/10.1186/s12879-021-06800-6
5. Aliyu, A. A. (2024). Prevalence of Hepatitis B infection among patients attending the University Health Clinic, Nasarawa State University, Keffi, Nigeria. African Journal of Clinical and Medical Sciences.
6. Ali, N., Kasali, A. T., Sani, M., Aliyu, I. R., & Abubakar, B. S. (2024). Epidemiology of Hepatitis B Virus among women receiving antenatal care at General Hospital Keffi, Nasarawa State, Nigeria. Journal of Health Systems Research, 6(3).
7. . Angbalaga GA, Shohaimi S, Mohd Nadzir MNH, Ab Rahman AH. Prevalence and Associated Risk Factors of Hepatitis B Virus Infection in Lafia Metropolis, Nasarawa State, Nigeria (2024).
8. Asaolu, O. I., et al. (2024). Hepatitis B virus serology among first-degree relatives and spouses of patients with hepatocellular carcinoma in Lagos, Nigeria. Nigerian Journal of Gastroenterology and Hepatology, 16(1), 1–10.

9. Ashaka, O., et al. (2024). Prevalence and risk implications of hepatitis B and C infections among university students in Lagos State, Nigeria. Babcock University Medical Journal, 7(1), 1–11.
10. Blach, S., Terrault, N. A., Tacke, F., Gamkrelidze, I., Craxì, A., Tanaka, J., Waked, I., Dore, G. J., & Razavi, H. (2023). Global change in hepatitis C virus prevalence and cascade of care between 2015 and 2022. Journal of Hepatology, 79(4), 1040–1052.
11. Bonita, R., Beaglehole, R., & Kjellström, T. (2006). Basic epidemiology (2nd ed.). World Health Organization.
12. Burki, T. (2024). WHO's 2024 Global Hepatitis Report. The Lancet Infectious Diseases, 24(6), e362–e363.
13. Egbe KA, Ike A, Egbe F. Knowledge and Burden of Hepatitis B Virus in Nasarawa State, Nigeria (2023).
14. Federal Ministry of Health. (2022). National strategic plan for viral hepatitis control in Nigeria. Abuja, Nigeria.
15. Federal Ministry of Health. (2022). National viral hepatitis seroprevalence survey report. Abuja, Nigeria.
16. Field, A. (2018). Discovering statistics using IBM SPSS statistics (5th ed.). Sage Publications.
17. Garbati, M., et al. (2024). Sero-prevalence of hepatitis B and C among undergraduate students in North-East Nigeria. Nigerian Medical Journal, 65(2), 115–123.
18. Hiebert-Suwondo, L., et al. (2025). A global report on national policy, programmes and progress towards hepatitis B elimination. The Lancet Gastroenterology & Hepatology, 10(2), 95–107.
19. Levin, K. A. (2006). Study design III: Cross-sectional studies. Evidence-Based Dentistry, 7(1), 24–25. https://doi.org/10.1038/sj.ebd.6400375
20. Lemoine, M., Eholié, S., & Lacombe, K. (2018). Reducing the neglected burden of viral hepatitis in Africa. The Lancet Gastroenterology & Hepatology, 3(4), 275–284.
21. **Mann, C. J. (2003).** Observational research methods: Research design II: Cohort, cross-sectional, and case-control studies. Emergency Medicine Journal, 20(1), 54–60. https://doi.org/10.1136/emj.20.1.54
22. Musa, B. M., Bussell, S., Borodo, M. M., Samaila, A. A., & Femi, O. L. (2018). Prevalence of hepatitis B virus infection in Nigeria, 2000–2017: A systematic review and meta-analysis. Nigerian Journal of Clinical Practice, 21(10), 1230–1238.
23. Mbituyumuremyi, A., et al. (2021). Hepatitis B virus infection and associated factors in Sub-Saharan Africa: A systematic review. BMC Infectious Diseases, 21(1), 1–15.
24. Ndubuisi, J. C., Akinyemi, O., & colleagues. (2022). Prevalence of Hepatitis B Virus among students of Faculty of Applied and Natural Sciences, Nasarawa State University, Keffi, Nigeria. South Asian Journal of Parasitology, 5(2), 1–8.
25. Nwokediuko, S. C. (2020). Chronic hepatitis B in Nigeria: Challenges and future directions. Nigerian Medical Journal, 61(1), 1–6.
26. Owoseni MC, Sani BE, Usman HD. Seroprevalence and Risk Factors of Hepatitis B and C Virus Infection among Inmates in a Correctional Service, Nasarawa State, Nigeria (2023).
27. Olakunde, B. O., et al. (2025). Epidemiology of hepatitis B virus infection in Nigeria: A review of prevalence trends and public health implications. Journal of Tropical Medicine.
28. Olayinka, A. T., Oyemakinde, A., Balogun, M. S., et al. (2016). Seroprevalence of hepatitis B infection in Nigeria: A national survey. American Journal of Tropical Medicine and Hygiene, 95(4), 902–907.
29. Oti VB et al. Hepatitis B Virus Infection Prevalence among Patients in a Local Community Hospital in Nasarawa State, Nigeria (2021).
30. Pallant, J. (2020). SPSS survival manual (7th ed.). McGraw-Hill Education.
31. Polaris Observatory Collaborators. (2022). Global prevalence, treatment and prevention of hepatitis B virus infection in 2022. The Lancet Gastroenterology & Hepatology, 7(9), 796–829.
32. Prevalence and Risk Factors of Hepatitis B Virus Infection among Patients in Tertiary Healthcare Facilities in Nasarawa State, Nigeria (2025).
33. Razavi, H., Blach, S., Terrault, N. A., et al. (2023). Global hepatitis elimination: Progress and remaining challenges. Hepatology, 77(2), 567–579.
34. Riou, J., Aït Ahmed, M., Blake, A., et al. (2016). Hepatitis C virus seroprevalence in adults in Africa: A systematic review and meta-analysis. Journal of Viral Hepatitis, 23(4), 244–255.
35. Rothman, K. J., Greenland, S., & Lash, T. L. (2021). Modern epidemiology (4th ed.). Wolters Kluwer.
36. Shimakawa, Y., Njie, R., Ndow, G., et al. (2020). Prevention of mother-to-child transmission of hepatitis B in Africa. The Lancet Gastroenterology & Hepatology, 5(10), 981–986.

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37. Spearman, C. W., Dusheiko, G. M., Hellard, M., & Sonderup, M. W. (2017). Hepatitis B in Sub-Saharan Africa: Strategies to achieve the 2030 elimination targets. The Lancet Gastroenterology & Hepatology, 2(12), 900–909.
38. Stanaway, J. D., Flaxman, A. D., Naghavi, M., et al. (2016). The global burden of viral hepatitis from 1990 to 2013. The Lancet, 388(10049), 1081–1088.
39. Shuaib, B. I., et al. (2024). Prevalence of overt and occult hepatitis B viral infection among Nigerian populations. BMC Infectious Diseases, 24(1), 1254.
40. Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. Indian Journal of Dermatology, 61(3), 261–264.
41. Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses and recommendations. Chest, 158(1 Suppl.), S65–S71.
42. Wong, G. L. H., Sarin, S. K., Kumar, M., et al. (2025). Updated WHO guidelines for prevention and treatment of hepatitis B and C. Journal of Hepatology, 82(1), 15–30.
43. World Health Organization. (2024). Global hepatitis report 2024. Geneva: World Health Organization.
44. World Health Organization. (2024). Hepatitis B fact sheet. Geneva: World Health Organization.
45. World Health Organization. (2024). Hepatitis C fact sheet. Geneva: World Health Organization.
46. World Health Organization Regional Office for Africa. (2024). Hepatitis in Africa: Epidemiological update. Brazzaville: WHO Regional Office for Africa.
47. World Health Organization Regional Office for Africa. (2023). In Nigeria, boosting viral hepatitis awareness and treatment.