

SEROPREVALENCE OF HEPATITIS B AND HEPATITIS C AMONG RESIDENTS OF AYE-ObA AND AYE-AMODO IN OSUN STATE, NIGERIA

¹Aniaguya, R. N., ¹Olusi, T. A., ¹Simon-Oke, I. A., ²Egbidi, C. A.

DOI 10.51459/jostir.2025.1.2.0148

¹Microbiology Unit,
Department of Biological
Sciences, Micheal and
Cecilia Ibru University,
Agbarha-Otor, Nigeria.

²Parasitology and Public
Health Unit, Department
of Biology, Federal
University of Technology,
Akure PMB 704, Nigeria;
taolusi@futa.edu.ng

²Biomedical Science,
Clinical Microbiology
Unit, Faculty of Medicine,
Health and Life Science,
Swansea University,
Wales, UK.

Correspondence

aniaguyarn@mciu.edu.ng

History

Received: 17/03/2025

Accepted: 16/07/2025

Published: 10/11/2025



<https://www.futa.edu.ng>



<https://www.jostir.futa.edu.ng>

ABSTRACT

Hepatitis commonly known as inflammation of the liver is an infectious viral disease that affects the functioning of the liver leading to liver cirrhosis and fibrosis which if unresolved could result ultimately to death. This research was carried out to determine the prevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) and some of the associated risk factors in Aye-Oba and Aye-Amodo communities of Osun State, South West, Nigeria. A total of 411 individuals made up of 216 males and 195 females; aged between ≤ 10 and ≤ 70 were investigated using blood sampling technique. The result showed a prevalence of 3.9% and 0.0% for hepatitis B virus (HBV) and hepatitis C virus (HCV) respectively (p value 0.082). No mixed infection of HBV and HCV was recorded. The female participants had a higher prevalence of 5.6% than the males with 2.3% with no statistical difference ($p > 0.05$). The result also indicated that participants in the age group 21-30 years had the highest prevalence of 13.8% with a significant difference (p value 0.029). Sharing of shaving (barbing) kits was attributed to be the most common risk factor among the infected population. It showed a statistically significant association with hepatitis B infection (p value 0.009), with an odds ratio of 9.355 indicating that individuals who used shared shaving kits were over 9 times more likely to have hepatitis B compared to those who did not. The results of this study showed that hepatitis B virus is prevalent in Aye-Oba and Aye-Amodo communities of Osun State, and members of the communities should be discouraged from sharing shaving kits for better management and control of the infection.

Keywords: Cancer; Cirrhosis; Hepatitis B Virus; Hepatitis C Virus; Viral hepatitis.

1 | Introduction

Hepatitis is an infectious disease that affects the liver. There are two forms of hepatitis namely viral hepatitis and non-viral hepatitis. Viral hepatitis is caused by virus while non-viral is caused by some other etiologies such as auto-immune, excessive consumption of alcohol, drug abuse and ischemia (Salu *et al.*, 2024). Viral hepatitis caused by hepatitis B virus

(HBV) and hepatitis C virus (HCV) are major global health challenge, commonly referred to as silent killer, as most sufferers are asymptomatic, showing no sign of illness until the liver is completely damaged (Agbesanwa *et al.*, 2023). They are blood borne diseases and the mode of transmission is essentially by coming in contact with blood of an infected person (WHO, 2019). Blood transfusion which was a major mode

of transmission before July 2022 is no longer a major risk factor due to blood screening procedure prior to any blood transfusion (Egbe *et al.*, 2023). HBV is preventable and treatable but HCV is treatable and curable using anti-viral drugs. HBV vaccination which can protect for up to 20 years and probably for life is advocated to all children below 5 years (WHO, 2019). Viral hepatitis is a global burden that has not been given the needed attention until lately and most sufferers not aware of their health status (Ajuwon *et al.*, 2022). The World Health Organization (WHO) thus initiated an annual global event “World Hepatitis Day.” which is celebrated yearly on 28th of July to commemorate the birthday of Dr. Baruch Samuel Blumberg, a Nobel Prize winner who discovered Hepatitis B Virus and its vaccine (WHO, 2019). According to Alberts *et al.*, (2022), the global prevalence of HBV is 42%, with the highest burden in the Western Pacific (59%) and Africa (41%). They further noted that the global prevalence of HCV is 21%, with Eastern Mediterranean having the highest burden of 70% and Africa 13%. Ajuwon *et al.*, (2022) postulated that one out of every twelve (12) persons is living with one type of viral hepatitis or the other. They further noted that 3.6% of the world population is suffering from chronic HBV with estimated deaths of 820,000 reported in 2019. WHO (2020) reported that 170 million people are infected with HCV, with 50 million people suffering from chronic HCV and 1.0 million new cases every year with highest prevalence among 20-39 years and more in males. Endemicity of HBV is categorized into three (3) namely: low endemicity (<2% prevalence); moderate endemicity (2-7% prevalence) and high endemicity ($\geq 8\%$ endemicity). HBV is hyper-endemic (with prevalence $\geq 8\%$) in the Sub-Saharan Africa (Ajuwon *et al.*, 2022). Ajuwon *et al.*, (2022) noted that Nigeria had a prevalence of 9.5% for HBV while the prevalence of HCV ranged from 0.1 to 17.5%, with a pooled

prevalence of 5.3%. Egypt had the highest prevalence of 17.5% while Nigeria had a prevalence of 2.1% (Karoney and Siika, 2015). Alberts *et al.*, (2022) reported a pooled prevalence of 13% for Sub-Saharan Africa with Egypt having the highest prevalence of 88%, while Nigeria had 5% prevalence. The high prevalence reported for Egypt is associated with the use of unsterile injection during the mass treatment of the population against schistosomiasis. Nigeria is hyper-endemic for both HBV and HCV with a prevalence of 11% and 2.2% for HBV and HCV respectively (FMHN, 2016). Nigeria HIV-AIDS Indicator and Impact Survey, (NAIIS, 2018) reported a prevalence range of 8.1% - 11% for HBV and 1.1% - 2.2% for HCV among adults aged 15-64 years. Hence this study was initiated to determine the prevalence of Hepatitis B Virus and Hepatitis C Virus and some associated risk factors among the residents of Aye-Oba and Aye-Amodo in Osun State, Nigeria.

2 | Materials and Methods

This study was carried out in Osun State, South-Western Nigeria. Osun State has a land mass of approximately 8,521 square kilometer and a population density of 520.6 square kilometer. It lies between longitude 04° 00N and 05° 00S and latitude 05° 55 E and 08° 07W. It has a typical rain forest biome with pockets of savannah grassland. It has two seasons, namely the wet season and the dry season. Relative humidity is approximately 86% and 75.8% for wet and dry season respectively. It has an average maximum temperature of 29°C and minimum temperature of 24°C, while the annual rainfall is 1800mm. The indigenes who are mostly farmers, traders or artisans are warm, hospitable, enterprising and industrious people. The land is suitable for cultivation of food crops as well as cash crops such as cocoa and palm oil. They are also noted for making hand-woven textiles and mat

2.1 | Study Locations

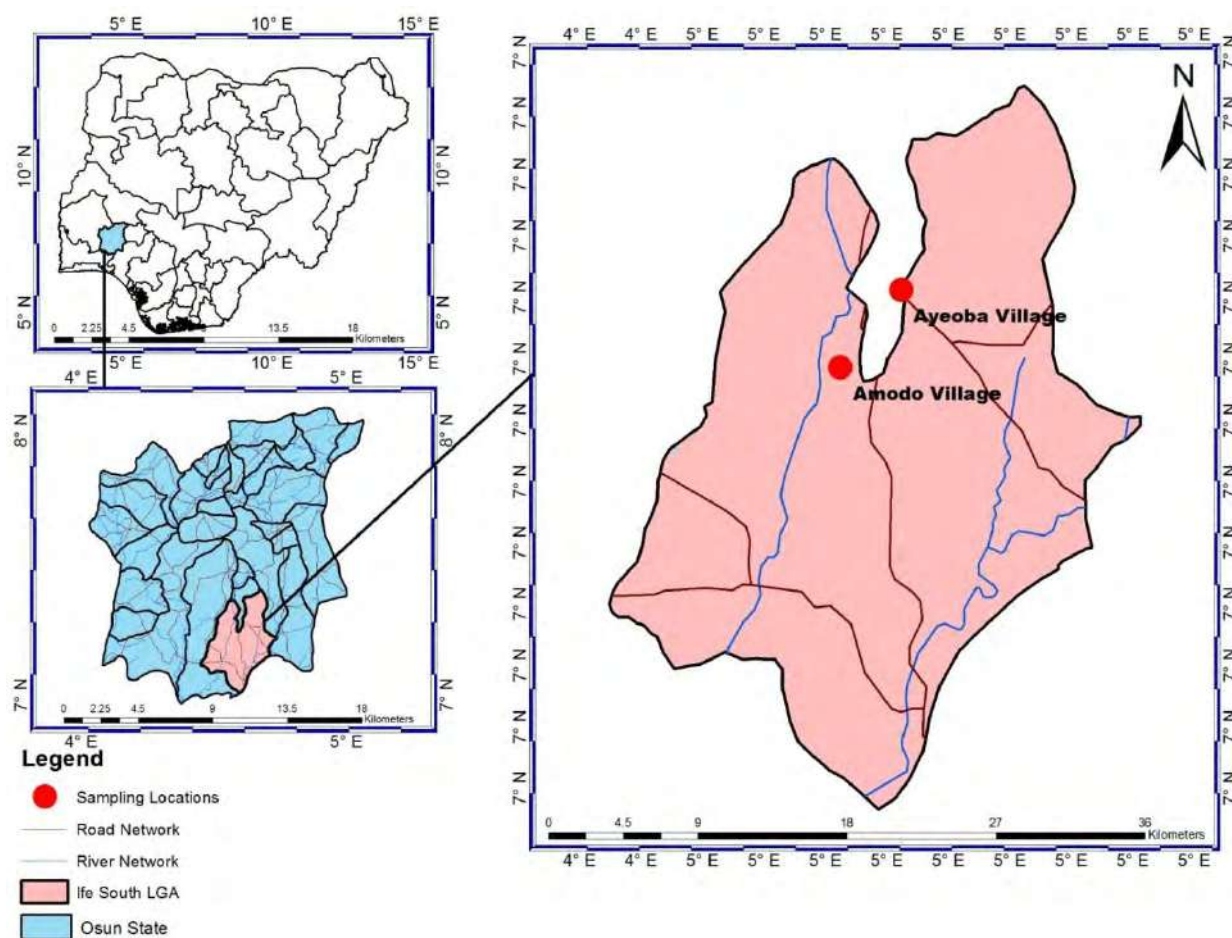


Figure 1 | Map showing Sampling Locations

(Osun, 2023).

2.1 | Study Locations

Figure 1 shows the sampling sites for this study which are Aye-Oba and Aye-Amodo in Ife South Local Government under Osun East Senatorial District of Osun State, Nigeria which is a distance of about forty (40) kilometer from ancient city of Ile-Ife in Ife Central Local Government Area. Aye-Oba lies directly on the left hand side of Ife-Ondo Road, while Aye-Amodo lies on the right hand side. A river “Odo Aye” flows through both villages and it is the major source of water for both drinking and other domestic activities as well as for other agricultural purposes (Gyuse *et al.*, 2010).

Study Design: This study was carried out between March 2024 and August 2024. A total of 411 willing participants were successfully recruited for this study. The sample size comprised of males and females whose ages were between ≤ 10 and ≤ 70 years.

Sample Collection: Blood samples were collected using newly procured sterile needle and syringe for each participant. Each blood was dispensed into a 5 ml EDTA bottle. All samples were taken immediately to the laboratory at the College of Health Sciences, Obafemi Awolowo University, Ile-Ife for hematological analysis. A well-structured questionnaire which had been previously tested was administered to the

participants. A native speaker assisted in interpreting the content of the questionnaire to participants that were not well-read. The questionnaire was administered in strict confidence and analyzed accordingly.

Detection of Hepatitis B Virus and Hepatitis C Virus: A rapid diagnostic test was carried out on the blood samples for the detection of hepatitis B virus using Hepatitis B surface Antigen (HBsAg). The test strip was dipped into each blood sample and observation recorded within 2 minutes. A prominent double strip stains indicates a positive test, while a single stain indicates a negative test. A similar procedure was done for hepatitis C viral infection using Agary Rapid Diagnostic Test HCV (Zhang *et al.*, 2020). The procedure was repeated two more times on each blood sample in order to reduce the percentage error of false results.

Ethical Consideration: Ethical approval with the reference number: OSHREC/PRS/569T/531 was granted by the Osun State Ministry of Health, Health Planning, Research and Statistics Department, Osogbo, Osun State. Approval and the cooperation of the village heads were also solicited for. The aims, objectives and purpose of the research work which was majorly for educational purpose were well explained to the village heads.

Data Analysis: Data obtained from the questionnaire and laboratory results were inputted into an excel sheet and exported into Statistical Package for Social Sciences (SPSS) software version 21 for analysis. Data were presented in frequency and percentage while Pearson Chi square was used to test for correlations between qualitative variables. *P* value for all tests was taken as <0.05 to indicate a level of significance at 95% confidence interval (CL). Results were presented in tables and charts.

3. | Results

Demography of Participants: The total number of participants recruited for this study was four hundred and eleven (411) residents of Aye-Oba and Aye-Amodo in Osun State. The population was made up of 216 males and 195 females representing 52.6% and 47.4% respectively. The residents of Aye-Oba made up 54% of the sample size while Aye-Amodo made up 46% of the sample size. The study population was aged ≤ 10 years to ≤ 70 years as shown in Table 1.

Prevalence of Viral Hepatitis Based on Sex and Age Group: Table 2 shows that the prevalence of hepatitis B virus is 3.9%, with the female having a higher prevalence of 5.6% than the males with 2.3%. The prevalence of hepatitis C virus is 0.0%. The overall prevalence of viral hepatitis in this study is 2.0%. The age based prevalence showed that participants aged 21-30 years had the highest prevalence of 13.8% (*p* value 0.029) as shown in Table 3.

Prevalence of Viral hepatitis based on Associated Risk Factors: Table 4 reveals that exposure to parenteral treatment (drip) and sharing of shaving kits constituted the major risk factor to acquisition of viral hepatitis. Exposure to parenteral treatment had a prevalence of 4.0% with a negative correlation, whereas sharing of shaving kit also had a prevalence of 4.0% with a positive correlation. The risk factors are also illustrated in Figure 3.

4 | Discussion

The findings of this study posited that the prevalence for HBV is 3.9% while that of HCV is 0.0%, giving an overall prevalence of 2.0% and 0.0% for co-infection. Many studies on the prevalence of viral hepatitis had indicated much higher prevalence especially among some sub-

Table 1 | Demography of Sampled Population of Aye-Oba and Aye-Amodo, Osun State, Nigeria

Variables	Frequency	Percentage (%)	<i>P</i> value
Gender			
Male	216	52.6	0.300
Female	195	47.4	
Total	411	100.0	
Age Group			
1-10	113	27.5	0.000
11-20	112	27.3	
21-30	29	7.1	
31-40	24	5.8	
41-50	40	9.7	
51-60	26	6.3	
61-70	67	16.3	
Total	411	100.0	
Location			
Aye-Oba	222	54.0	0.104
Aye-Amodo	189	46.0	
Total	411	100.0	

Table 2 | Table 2: Prevalence of HBV and HCV among the Sampled Population of Aye-Oba and Aye-Amodo of Osun State, Nigeria based on Gender

Gender	Number Examined	Number Positive		Prevalence
		HBV	HCV	
Male	216	5	0	2.31
Female	195	11	0	5.64
Total	411	16	0	3.89

Chi-square (χ^2): 3.030, Degree of freedom (df): 1, *p* value: 0.082

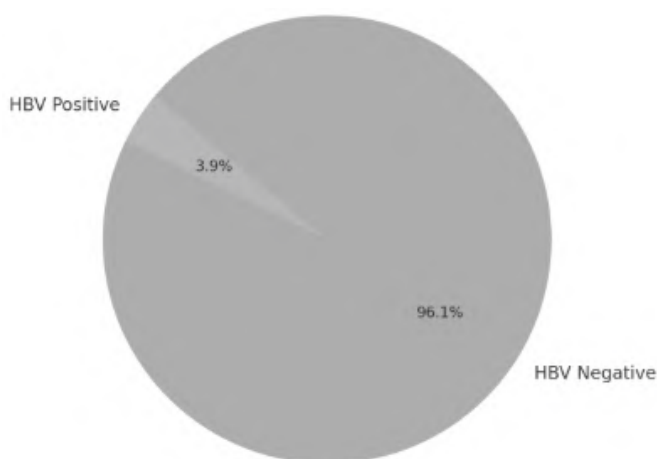
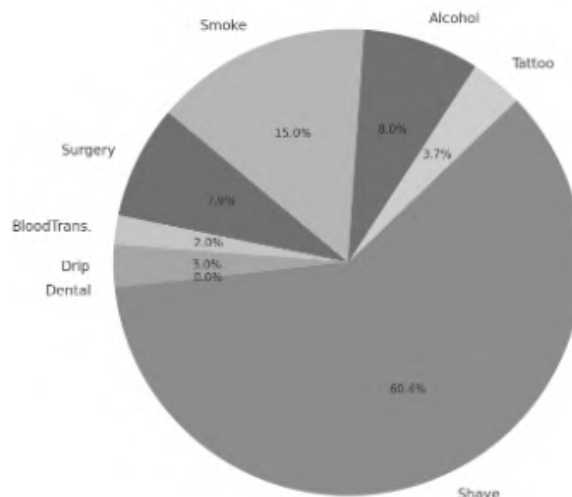
Table 3: Prevalence of HBV and/or HCV among the Sampled Population of Aye-Oba and Aye-Amodo of Osun State, Nigeria based on Age Group

Age group	Number Examined	HBV/HCV Positive	Prevalence
1-10	113	1	0.88
11-20	112	4	3.57
21-30	29	4	13.79
31-40	24	2	8.33
41-50	40	3	7.50
51-60	26	1	3.85
61-70	67	1	1.49
Total	411	16	3.89

Chi-square (χ^2): 14.049, Degree of freedom (df): 6, *p*-value: 0.029

Table 4 | Association between Risk Factors and Viral Hepatitis Status among the Sampled Population of Aye-Oba and Aye-Amodo of Osun State, Nigeria

Risk Factor	Coefficient	S.E.	χ^2	<i>p</i> -value	df	O.R	95% CI
Surgery	0.196	0.975	0.041	0.841	1	1.217	0.180 – 8.229
Blood transfusion.	-1.153	1.302	0.785	0.376	1	0.316	0.025 – 4.048
Drip	-0.776	0.858	0.819	0.365	1	0.460	0.086 – 2.472
Dental	-19.144	11779	0.000	0.999	1	0.000	—
Shave	2.236	0.859	6.767	0.009	1	9.355	1.736 – 50.424
Tattoo	-0.567	0.928	0.374	0.541	1	0.567	0.092 – 3.496
Alcohol	0.215	0.846	0.065	0.799	1	1.240	0.236 – 6.516
Smoke	0.843	1.381	0.372	0.542	1	2.322	0.155 – 34.773
Constant	-3.276	0.325	101.799	0.000	1	0.038	—

**Figure 2 | Pie Chart showing Prevalence Rate of HBV.****Figure 3 | Pie Chart showing Risk Factors Associated with HBV and HCV**

populations. In Ghana, Abesig *et al.*, (2020) noted prevalence of 14.2% and 14.5% for sub-populations of barbers and drivers respectively. Aguh *et al.*, (2023) working among truck drivers in Gusau, Northwest, Nigeria reported a prevalence of 20.8% for HBV. This could be attributed to high mobility rate among drivers and staying long period away from their spouses. Chikwendu *et al.*, (2023) reported a prevalence of 12.6% and 15.2% for HBV and HCV respectively among patients, and prevalence of 6.6% (HBV) and 6.5% (HCV) among health personnel in a tertiary hospital in North-Central, Nigeria. This high prevalence

could be due to the fact that these sub-populations more frequently come in contact with infected blood, which is a major risk factor. The Society for Family Health (SFH) (2020) reported a prevalence of 10% and 13.2% for HBV and HCV respectively in Nasarawa State, North-Central, Nigeria. In South West, Nigeria, Oluremi *et al.*, (2020) reported a prevalence of 32.2%, Ajuwon *et al.*, (2022) reported a pooled prevalence of 9.5%, Adagbasa *et al.*, (2023) reported a prevalence of 43.6% for HBV among police applicants and Salu *et al.*, (2024) reported a prevalence of 10.6%. This high prevalence when compared with 3.9% of this

study could be due to the fact that the participants in this present study are less likely to engage in prostitution and other social vices such as drug abuse. The prevalence of 3.9% obtained for HBV in this study is however higher than the findings of Ologunde *et al.*, (2021); Odukoya *et al.*, (2022) and Egbe *et al.*, (2023) who reported 2.9% in Ekiti; 2.1% in Lagos and 2.8% in Enugu, Nigeria respectively. This contrast could be due to the fact that this present finding was conducted in rural settings where the population is not exposed to adequate health education. The finding of 0.0% prevalence obtained for HCV in this study is in agreement with the findings of Egbe *et al.*, (2023) who reported 0.0% in Enugu, Nigeria. Although, gender based prevalence for viral hepatitis is scarce Ajuwon *et al.*, (2023), the results of this finding indicated that female participants had a higher prevalence of 5.6% compared with 2.3% for the males which is in consonance with the results of Egbe *et al.*, (2023) where the females had a higher prevalence of 61.2% against the males with 38.8%.

This study also indicated that participants in the age group 21-30years had the highest prevalence of 13.8% with a significant difference ($p < 0.05$). This could be because this age group is highly sexually active. This is similar to the report of WHO (2020); and Ajuwon *et al.*, (2023) who reported a prevalence of 12.7% for age group greater than 17 years. Egbe *et al.*, (2023) also noted that participants aged 25-34years had the highest

prevalence. Presumably, these infected adults are participants born before the introduction of compulsory HBV vaccination in 2004 for newborn (Ajuwon *et al.*, 2023). The findings of this present study affirms that exposure to parenteral treatment (drip) and sharing of shaving kits constitute the major risk factors to acquisition of viral hepatitis.

5 | Conclusion

The finding of this study indicates that HBV is of moderate endemicity (2-7%) based on WHO standard. However, its high prevalence of 13.8% among 21-30 years participants is of great public health concern. In line with sustainable developmental goal of health for all by 2030, it is advocated that government and other non-governmental agencies should prioritize mass blood screening, provision of vaccine, health and public awareness on the dangers associated with viral hepatitis. More research work is also advocated especially on gender and age based prevalence of viral hepatitis.

6 | Limitations

The limited sample size and lower sensitivity of rapid diagnostic test kit may affect the accuracy of this finding. However the procedure was carried out three times to reduce the incidence of false readings/ results.

References

- Abesig, J., Chen, Y., Wang, H., Sompo, F.M and Wu, X.Y (2020). Prevalence of viral hepatitis B in Ghana between 2015 and 2019: A systematic review and meta-analysis. *PloS One* 15(6)
- Adagbasa, E., James, A., & Tajudeen, W.A. (2023). Prevalence of Hepatitis B Virus among Applicants for Recruitment into Nigeria Police Force in Osun State, Southwestern Nigeria. *International Journal of Community Medicine and Public Health*, 10(10): 3502–3505.
- Agbesanwa, T.A., Aina, F.O. and Ibrahim, A.O. (2023). Knowledge and Awareness of

- Hepatitis B Infection among Young Adults in Ekiti, Nigeria: Implications for Education and Vaccination. *Cureus*, 15(12)
- Aguh, B. I., Sani, Z. R., Agba, A. A., Mohammed, A. and Ayodele, S. B. (2023). Serological Markers of Hepatitis B Virus Infection among Truckers Transiting Gusau Town, Zamfara State, Northwestern Nigeria. *J. Appl. Sci. Environ. Manage.* 27 (10) 2297-2302
- Ajuwon, B.I., Yujuico, I., Roper, K., Richardson, A., Sheel, M. and Lidbury, B.A. (2022). Hepatitis B Virus Infection in Nigeria: A Systematic Review and Meta-Analysis of Data Published between 2010 and 2019. *BMC Infect Dis*, 21: 1-15
- Alberts, C.J., Clifford, G.M., Georges, D., Negro, F., Lesi, O.A., Hutin, Y.J.F. and de Martel, C. (2022). Worldwide Prevalence of Hepatitis B Virus and Hepatitis C Virus among Patients with Cirrhosis at Country, Region, and Global Levels: A Systematic Review *Lancet Gastroenterol Hepatol*, [https://doi.org/10.1016/S2468-1253\(22\)00050-4](https://doi.org/10.1016/S2468-1253(22)00050-4)
- Chikwendu, A., Unikutelle, H.L. and Olumide, A.T. (2023). Hepatitis B and C Virus Prevalence among Patients and Healthcare Workers' Prevention Practices towards the Viruses in a Secondary Healthcare Facility in Northern Nigeria. *Pan Afr Med J*, 46:82.
- Egbe, K., Ike, A. and Egbe, F. Knowledge and Burden of Hepatitis B virus in Nasarawa State, Nigeria (2023), *Scientific African*, ISSN 2468-2276,
- Federal Ministry of Health Nigeria FMHN (2016). National guidelines for the prevention, treatment and care of viral hepatitis in Nigeria.
- Gyuse, K. I., Ofoezie, E. I. and Ogunniyi, T. A. (2010). The Effect of Urinary Schistosomiasis on the Health of Children in Selected Rural Communities of Osun State, Nigeria. *J. Trop Med Parasitol*, 33 (1): 7-16.
- Karoney M. J. and Siika, A.M. (2015). Hepatitis C virus (HCV) Infection in Africa: A Review *Pan African Medical Journal*, 14:44.
- Nigeria HIV/AIDS Indicator and Impact Survey (NAIIS) 2018: Federal Ministry of Health, Nigeria. Technical Report. Abuja, Nigeria. October 2019.
- Odukoya, O.O., Odeyemi, K.A., Odubanjo, O.M., Isikekpei, B.C., Igwilo, U.U., Disu, Y.M., Roberts, A.A., Olufunlayo, T.F., Kuyinu, Y., Ariyibi, N. and Eze, U.T. (2022). Hepatitis B and C Seroprevalence among Residents in Lagos State, Nigeria: A Population-Based Survey. *Nigerian Postgraduate Medical Journal*, 29(2), 75-81.
- Oluremi, A.S., Opaleye, O.O., Ogbolu, D.O., Alli, A.T., Ashiru, F.T., Alaka, O.O., Ogunleke, O.A. (2020). Serological Evidence of HIV, Hepatitis B, C, and E Viruses among Liver Disease Patients attending Tertiary Hospitals in Osun State, Nigeria. *Journal of Immunoassay and Immunochemistry*, 42(1), 69–81.
- Ologunde, C., Akinruli, F. and Layo-Akingbade, T. (2021). Malaria Co– Infection with Urinary Schistosomiasis, Typhoid Fever, Hepatitis B Virus, and Human Immunodeficiency (HIV) Virus among Students in Three Local Government Areas of Ekiti State, South Western Nigeria. *Asian Journal of Research in Infectious Diseases*, 1-8. Osun State of Nigeria (2023): Nigeria Information and Guide www.nigeriagallery.com.
- Salu, O.B., Akinbamiro, T.F., Orenolu, R.M., Ishaya, O.D., Anyanwu, R.A., Vitowanu, O.R., Abdullah, M.A., Olowoyeye, A.H., Tijani, S.O., Oyedeji, K.S. and Omilabu, S.A., (2024). Detection of Hepatitis Viruses in Suspected Cases of Viral Haemorrhagic Fevers in Nigeria. *PLOS ONE*, 19(6)
- Society for Family Health, Nigeria. (2020) Health

and Social Systems Strengthening. Available online from: <https://www.sfhnigeria.org/health-and-socialsystems-strengthening>.

World Health Organisation (2019). Hepatitis B fact sheet. <https://www.who.int/newsroom/factsheets/detail/hepatitis-b>.

World Health Organization WHO (2020). In Nigeria, boosting viral hepatitis awareness and treatment. WHO/Regional Office for

Africa. <https://www.afro.who.int/countries/nigeria/news/nigeria-boosting-viral-hepatitis-awareness-and-treatment>.

Zhang, Y., Xie, Y., Chen, Q., Chen, X., Dong, Z. and Tan, X., (2020). Prevalence and Co-Infection of Schistosomiasis/Hepatitis B among Rural Populations in Endemic Areas in Hubei, China. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 114(3), 155-161.