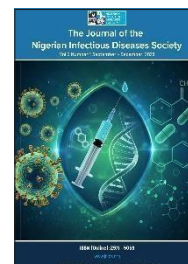




Journal of the Nigerian Infectious Diseases Society



Short Communication

Prevalence of Serological Markers for HBV, HCV, and HIV Infections Among Inmates of a Rehabilitation Home in Kaduna

Manko M^{1*}, Muhammad M², Usman TI³, Mujtaba AM¹

1. Department of Medicine, Faculty of Clinical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria
2. Immunology Unit, Department of Medicine, Ahmadu Bello University, Zaria
3. Department of Medicine, Ahmadu Bello University Teaching Hospital, Zaria

*Corresponding author:

mankomuhammad@yahoo.com

Received: 23 Apr 2025

Revised: 13 Jul 2025

Accepted: 17 Aug 2025

Published: 24 Oct 2025

DOI

10.58539/JNIDS.2025

ABSTRACT

Background: Hepatitis B and C viral and Human Immunodeficiency virus infections represent significant global public health concerns especially within vulnerable populations such as inmates of rehabilitation homes. The aim is to assess the prevalence of serological markers for HBV, HCV, and HIV infections among inmates of a rehabilitation home in Kaduna, Nigeria

Methods: It was a cross-sectional study of inmates of Borstal Home of Nigerian Correctional Services Kaduna. A total of 298 inmates were screened. Interviewer administered questionnaire was used to collect information on demographic data. Blood sample was collected into plain bottles and serological tests for HBsAg and HCV Ab, and HIV were carried out on the samples using point of care test kits. Data were analysed using SPSS 2022 version and presented as percentages and in tables.

Results: Most of the subjects are males with male to female ratio of 20:1. The age range of the participant are 10 – 69 years with modal age of 20years. Percentages of inmates positive for HBsAg, HCV Ab and HIV Ab are (26)8.8%, (9)3.0% and (7)2.4% respectively.

Conclusion: The prevalence of HBsAg, HCV Ab, and HIV among inmates in Kaduna highlights the urgent need for targeted public health interventions in correctional facilities

Keywords: hepatitis, infections, inmates, prevalence

INTRODUCTION

Hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) infections represent significant global public health concerns, especially within vulnerable populations, including individuals in rehabilitation homes and correctional facilities. The World Health Organization (WHO) estimates that approximately 254 million people globally live with chronic HBV infection, while 50 million are infected with chronic HCV, and 39 million are living with HIV as of 2022.⁽¹⁾ These infections contribute substantially to the global burden of liver disease, immune system dysfunction, and overall morbidity and mortality, particularly in settings where healthcare access and preventive measures are limited.

Incarcerated or institutionalized individuals, such as those in rehabilitation homes, are at heightened risk of acquiring these infections due to overlapping risk factors. These include unsafe injection practices, tattooing, sharing of personal hygiene items, unprotected sexual activity, and limited access to healthcare services and preventive interventions.^(2,3) Additionally, the high prevalence of substance-use disorders, mental health conditions, and socioeconomic vulnerabilities within this population further exacerbates their susceptibility,⁽⁴⁾

Hepatitis B and C are primarily transmitted through bloodborne routes, including percutaneous exposure to infected blood, sexual contact, and vertical transmission from mother to child. Similarly, HIV transmission occurs via blood, sexual contact, and perinatal exposure. The shared routes of transmission⁽⁴⁾ between these infections contribute to the frequent occurrence of co-infections, particularly in high-risk populations such as people who inject drugs and those in institutionalized settings. Co-infections of these viruses may lead to increased morbidity and mortality. For instance, coinfection of hepatitis viruses with HIV have been associated with faster progression to liver disease, increased risk of hepatocellular carcinoma.⁽⁵⁻⁷⁾ However, the impact of hepatitis viruses infection on HIV infection appeared to be less pronounced and may depend on factors such as if the patient is being given antiretroviral drugs.⁽⁸⁾ Nigeria, as the most populous country in Africa, bears a significant burden of HBV, HCV, and HIV infections. The prevalence of HBV and HCV among adults is estimated at 8.1% and 1.1%, respectively, while HIV prevalence is approximately 2.1%.^(9,10) However, limited data exist on the burden of these infections among inmates of rehabilitation homes, where the risk factors are compounded, and access to preventive and diagnostic services is often inadequate.

Understanding the epidemiology of these infections in such high-risk settings is essential to inform targeted interventions and public health policies aimed at reducing transmission and improving health outcomes.

This study aims to assess the prevalence of HBV, HCV, and HIV infections among inmates of rehabilitation homes in Nigeria. By identifying the prevalence of these infections in this marginalized population, the findings can provide basis for further research and inform policy decisions that can contribute to the broader goal of achieving viral hepatitis elimination and controlling the HIV epidemic by 2030

METHODOLOGY

The study was a cross-sectional study. The study population were inmates of Borstal Home of Nigerian Correctional Services. A total of 298 inmates were screened. Interviewer admitted questionnaire was used to collect information on demographic data.

Blood sample was collected into plain bottles, allowed to clot, and centrifuged at 3500 rpm for 10 min. The sera was separated, stored at 4°C, and serological tests for HBsAg, HCV Ab, and HIV Ab were carried out using point of care test kits

Data collected were analysed using SPSS 2022 version. Categorical variables were presented as table and percentages

RESULTS

There were 298 inmate that participated in the study out of which 283 (95.3%) were males with male to female ratio of 20:1. The age range of the participant are 10 – 69 years with modal age of 20years. (Table 1). Percentages of inmates positive for HBsAg, HCV Ab and HIV Ab are (26)8.8%, (9)3.0% and (7)2.4% respectively. (Table 2)

Table 1: Age distribution of the participants

Age Group	Frequency	Percentage
10 - 19	87	29.3
20 - 29	146	49.2
30 - 39	21	7.1
40 - 49	21	7.1
50 - 59	18	6.1
60 - 69	4	1.3
Total	297	100

Table 2: Percentages of the viral serology

Serology	Number(n)	Percentage(n/297)
HBsAg	25	8.4
HCV Ab	8	2.7
HIV Ab	5	1.7
HBsAg/HIV Ab	1	0.34
HCV Ab/HIV Ab	1	0.34

DISCUSSION

The findings of this study highlight the burden of blood-borne infections, specifically hepatitis B surface antigen (HBsAg), hepatitis C virus antibodies (HCV Ab), and human immunodeficiency virus (HIV), among inmates in correctional facilities in Kaduna. The prevalence rates observed—8.6% for HBsAg, 3% for HCV Ab, and 2.3% for HIV—underscore the significant public health challenges posed by these infections in correctional settings.

The prevalence of HBsAg at 8.6% in this study is consistent with the classification of Nigeria with a pooled prevalence of 9.5% as a country with high HBV endemicity.⁽¹²⁾ Our study however showed much lower HBsAg seroprevalence compared to studies in Northern Nigeria among prison inmates.^(13,14)

The observed difference in the prevalence may be due to factors such as the differences in the setting of the study and reasons for confinement of the inmates. Comparatively, global estimates of HBV prevalence are approximately 3.5%, with higher rates in Africa.⁽¹⁵⁾ High rates of HBV infection among inmates may be due to practices such as sharing of sharps in addition to factors such as inadequate preventive measures including immunization prevalent in our setting.

The 3% prevalence of HCV Ab observed in this study is higher than the estimated national HCV prevalence of 1.1% among adult in Nigerian population.⁽⁹⁾ Our finding is similar to reports among prison inmates in Sokoto.⁽¹⁴⁾ This finding aligns with global trends, where incarcerated populations often exhibit higher HCV prevalence rates, exceeding 10% in some regions.⁽¹⁶⁾ The higher prevalence among inmates highlights the role of risky behaviors, including sharing of sharp objects and unprotected sexual practices, similar to HBV transmission among inmates of correctional center. Globally, HCV prevalence is estimated at 1.0%⁽¹⁷⁾ indicating that the burden in this study population is notably higher possibly for reasons such as the ones stated above

The HIV prevalence of 2.3% in this study is slightly higher than the national prevalence of 1.5% among adults, as reported by the Nigerian National AIDS Indicator and Impact Survey (NAIIS).⁽¹⁰⁾ Studies in Northern Nigeria has shown varying prevalence.^(14,18) However, it remains higher than the global HIV prevalence of approximately 0.7%.⁽¹⁹⁾ The confined nature of correctional facilities, coupled with limited access to healthcare and high-risk behaviors, creates an environment conducive to HIV transmission. The relatively higher prevalence in this study compared to national figures among adults may reflect the high risky behaviour exhibited by people who indulged in substance abuse similar to risk of HBV and HCV transmission.

Our study revealed low rate of co-infections among the study participants. Authors could not explain the surprising findings considering the fact that these viruses shared common routes of transmission. However, a study in Nasarawa also found low rate of co-infection of HBV/HIV and HBV/HCV among prison inmates.⁽¹⁸⁾

The prevalence of blood-borne infections among inmates in Kaduna underscores the urgent need for comprehensive public health interventions in correctional facilities. Such interventions should include screening and early detection, vaccination, treatment access, education and harm reduction and structural reforms.

Limitation and future research

This study is not without limitations. The cross-sectional design precludes the establishment of causal relationships, and the reliance on serological markers may not capture all active cases of infection. Furthermore, the study was conducted in a single location, which may limit the generalizability of the findings to other correctional facilities in Nigeria. Future studies should explore longitudinal designs to assess infection dynamics over time and expand to multiple facilities to provide a more comprehensive understanding of the burden of these infections among incarcerated populations.

CONCLUSION

The prevalence of HBsAg, HCV Ab, and HIV among inmates in Kaduna highlights the urgent need for targeted public health interventions in correctional facilities. Addressing these infections through a combination of preventive, diagnostic, and therapeutic strategies is critical to improving the health outcomes of incarcerated individuals and reducing the broader public health burden posed by these infections.

Declarations Competing interests: None Declared

Funding: None

Authors' contributions: All authors contributed equally

Acknowledgements: None

Source(s) of support: None

Conflicting Interest: None Declared

REFERENCES

1. World Health Organization. Global progress report on HIV, viral hepatitis and sexually transmitted infections, 2022. Geneva: WHO; 2022.
2. Gough E, Kempf MC, Graham L, Manzanero M, Hook EW, Bartolucci AI, et al. HIV and Hepatitis B and C incidence rates in US correctional populations and high-risk groups: a systematic review and meta-analysis BMC Public Health 2010, 10:777.
3. Kamarulzaman A, Reid SE, Schwitters A, Wiessing L, El-Bassel N, Dolan K, Babak et al. Prevention of transmission of HIV, hepatitis B virus, hepatitis C virus, and tuberculosis in prisoners. *Lancet* 2016; 388: 1115–26
4. Alter MJ. Epidemiology of viral hepatitis and HIV co-infection. *J Hepatol*. 2006;44(S1): S6-9.
5. Singh KP, Crane M, Audsley J, Lewin SR. HIV-Hepatitis B virus co-infection: epidemiology, pathogenesis and treatment. *AIDS*. 2017 September 24; 31(15): 2035–2052
6. Parvez MK. HBV and HIV co-infection: Impact on liver pathobiology and therapeutic approaches. *World J Hepatol* 2015; 7(1): 121-126
7. Hernandez MD, Sherman KE. HIV/HCV Coinfection Natural History and Disease Progression, A Review of The Most Recent Literature. *Curr Opin HIV AIDS*. 2011;6(6): 478–482.
8. Rockstroh JK. Influence of viral hepatitis on HIV infection. *Journal of Hepatology* 44 2006;44: S25–S27
9. Federal Ministry of Health, Nigeria. National AIDS Indicator and Impact Survey (NAIIS) 2018. Abuja: Federal Ministry of Health; 2019.
10. Onovo AA, Adeyemi A, Onime D, Kalnoky M, Kagniniwa B, Dessie M, et al. Estimation of HIV prevalence and burden in Nigeria: a Bayesian predictive modelling study. *eClinicalMedicine*. 2023;62: 102098
11. World Health Organization. Combating hepatitis B and C to reach elimination by 2030: advocacy brief. Geneva: WHO; 2016.
12. Ajuwon BI, Yujuico I, Roper K, Richardson A, Sheel M, Lidbury BA. Hepatitis B virus infection in Nigeria: a systematic review and meta-analysis of data published between 2010 and 2019. *BMC Infectious Diseases* (2021) 21:1120.
13. 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. *Lafia Journal of Scientific & Industrial Research*. 2024;2(1): 65-69
14. Uchechukwu OF, Abdulrahman Y, Aliyu AU, Mustaphar U, Zama I, Charles AT et al. Seroprevalence of HIV, HBV and HCV among Prisoners in Sokoto, Nigeria. *Asian Journal of Medicine and Health*. 2018; 13(3): 1-8.
15. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. *Lancet*. 2015;386(10003):1546-55.
16. Dolan K, Wirtz AL, Moazen B, Ndeffo-Mbah M, Galvani A, Kinner SA, et al. Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees. *Lancet*. 2016;388(10049):1089-102.
17. Polaris Observatory HCV Collaborators. Global prevalence and genotype distribution of hepatitis C virus infection in 2015: a modelling study. *Lancet Gastroenterol Hepatol*. 2017;2(3):161-76.
18. Adoga MP, Banwat EB, Forbi JC, Nimzing L, Pam CR, Gyar SD, et al. Human immunodeficiency virus, hepatitis B virus and hepatitis C virus: sero-prevalence, co-infection and risk factors among prison inmates in Nasarawa State, Nigeria. *J Infect Dev Ctries* 2009; 3(7):539-547.
19. UNAIDS. Global HIV & AIDS statistics—2021 fact sheet. Geneva: UNAIDS; 2021