Strategic Screening and Linkage to Care for Hepatitis B and Hepatitis C in Nigeria

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ABSTRACT

Background

Viral Hepatitis B and C is a major public health concern, leading to 1.1 million deaths globally. The African region accounts for 26% of the global burden and 125,000 associated deaths from hepatitis B and C. Over 20 million Nigerians are living with chronic hepatitis B and C, but more than 80% of the population who are infected do not know their status.

Objective: The study aimed to determine the prevalence of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infections among the general public, pregnant women attending antenatal clinics, healthcare workers, and key populations across three states in Nigeria.

Methods: This was a cross-sectional study conducted across three target states and hospitals in Nasarawa, Taraba, and Kano. Participation in the study was voluntary and consent was obtained from participants. Blood sample collection and testing were carried out in line with the WHO guidelines. Frequencies and simple percentage were utilized with the help of IBM SPSS version 25.

Results: The prevalence of HBsAg ranged from 4.7% to 7.2% across Healthcare Workers, Key Populations, and Pregnant Women, with an overall prevalence of 5.6% across all target populations. Meanwhile, the prevalence of HCV ranged from 1.9% to 2.8% across General Populations, Healthcare Workers, Key Populations, and Pregnant Women, with an overall prevalence of 2.2% across all target populations. Higher prevalence in specific groups, notably Key Populations, underscores the need for focused interventions to mitigate transmission risks.

Conclusion: This study identified HBV and HCV positive patients across target populations/groups in Nigeria. All HBsAg and HBeAg positive pregnant women were identified and enrolled into HBV care to improve Prevention of Mother to Child Transmission of Hepatitis B in Nigeria. All other patients reactive to HBV and HCV were also enrolled into care.

In light of these findings, tailored public health initiatives are recommended, encompassing targeted educational campaigns, increased accessibility to healthcare services, and the integration of hepatitis screening into maternal health programs.

Keywords: Strategic Screening, Linkage, Care, Hepatitis B, Hepatitis C, Nigeria

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INTRODUCTION

Viral Hepatitis B and C is a major public health concern, leading to 1.1 million deaths globally in 2019 (WHO, 2021). Chronic viral hepatitis can progress to life-threatening complications, such as liver-related conditions, cirrhosis, and hepatocellular carcinoma (HCC). (Wang et al., 2023; Picchio et al., 2021). However, with early detection and appropriate treatment, the progression of the disease can be slowed or even stopped. An estimated 354 million people are living with these viral infections globally (WHO 2023).

Chronic viral hepatitis B and C affects over 70 million people in WHO Africa region, resulting to 200,000 deaths annually (WHO). Furthermore, according to WHO 2022 Viral Hepatitis scorecard data on hepatitis B and C for the African region, it shows that in 19 countries, more than 8% of the population is infected with hepatitis B, while in 18 countries, more than 1% of the population lives with hepatitis C. The African region accounts for 26% of the global burden and 125,000 associated deaths from hepatitis B and C. In the same vein, 70% of hepatitis B infections take place in Africa. And it can take decades after an infection from the virus will start showing symptoms. It is worrisome to also say that 4.5 million children younger than 5 years are infected with the virus.

Over 20 million Nigerians are living with chronic hepatitis B and C, but more than 80% of the population who are infected do not know their status (WHO, 2023). This is due to barriers such as low awareness, stigma and out-of-pocket expenses in hepatitis care. For many who are diagnosed, it comes very late when they have developed severe liver condition and, in most cases irreversible liver disease like liver cancer and death (Sharma and Nagalli, 2023; Pinter et al., 2016). In Nigeria and by extension sub-Saharan Africa, a lot of people living with viral hepatitis are diagnosed late resulting to critical consequences and hindering national efforts to reduce the morbidity and mortality associated with liver disease (Lazarus et al., 2019). Hence, the need for increase testing and treatment.

This study, therefore, seeks to contribute towards elimination of viral hepatitis through provision of targeted Hepatitis B and C screening and linkage to care of healthcare workers, pregnant women, general population and key population across three high burden states in Nigeria, namely: Taraba, Kano, and Nasarawa, hence, contributing towards the 2030 hepatitis elimination target of the WHO Global Health Sector Strategy (GHSS).

METHODS

This was a Hospital/Community based cross sectional intervention that was carried out among diverse groups across target states between September, 2022 to December, 2022 in-line with the national/WHO Guidelines on Hepatitis B and C Testing. In each state, **one tertiary hospital was selected as a centre for testing while some communities were also identified for testing.**

Testing and linkage to care for HBsAg and Anti-HCV, and further testing for HBeAg for pregnant women who were tested positive for HBsAg was conducted across all the three (3) states of Nigeria. These states included Taraba, Kano and Nasarawa states.

Data collection

Data from the screening was collected using structured Standardized questionnaires for collection of quantitative data at the health facility and the community levels following the National/WHO guidelines.

Target Groups/Populations:

The target population for the study included a total of 7,191 participants who were reached by the project

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during the period of September, 2022, to December, 2022. The population breakdown included 4,241 general Population, 681 Healthcare Workers (HCWs), 1,457 Pregnant Women: 1,457 individuals and 812 Key Populations respectively.

Methodology and Approach

CFID's intervention adhered to the WHO Guidelines on Hepatitis B and C Testing, which recommended the following approaches:

General Population Testing:

Routine testing was conducted throughout the entire population without attempting to identify high-risk behaviors or characteristics. This approach ensured that all members of the population had potential access to testing services.

Focused or Targeted Testing of Specific High-Risk Groups:

Testing was directed towards specific populations most affected by hepatitis B or C infection. This included individuals belonging to populations with high HBV or HCV seroprevalence, such as certain migrant or indigenous populations, as well as those engaging in high-risk behaviors or exposures. Notable groups targeted for testing included People Who Inject Drugs (PWID) and healthcare workers. Additionally, testing was performed based on clinical suspicion of viral hepatitis, considering symptoms, signs, abnormal liver function tests, or ultrasound scan results.

Routine Antenatal Clinic (ANC) Testing:

Routine testing of pregnant women was implemented, particularly in settings with intermediate or high seroprevalence. This aimed to identify women requiring antiviral treatment for their own health and additional interventions to reduce Mother-to-Child Transmission (MTCT) of viral hepatitis.

Screening and Linkage to Care: Best Practices:

CFID's differentiated model of care for screening and linkage to care utilized evidence-based approaches akin to active case finding strategies employed in other interventions, such as TB control, HIV, and malaria programs. This involved both facility and community-based active case finding to identify undiagnosed patients and facilitate their linkage to the necessary care.

Data Analysis

Data from serological results with their descriptions were entered into a spreadsheet and transferred to statistical package for social science (SPSS) version 25. The seroprevalence of hepatitis B and/or hepatitis C coinfections were expressed as percentages (N (%)).

RESULTS

Table 1. Demographic Variables of Participants

STATE/TARGET POPULATIONS	FREQUENCY
KANO	271
GENERAL POPULATIONS	101
HEALTHCARE WORKERS	62

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GENERAL POPULATIONS	101
HEALTHCARE WORKERS	62
KEY POPULATIONS	2
PREGNANT WOMEN	106
NASARAWA	**1014**
GENERAL POPULATIONS	300
HEALTHCARE WORKERS	16
KEY POPULATIONS	475
PREGNANT WOMEN	223
TARABA	**5906**
GENERAL POPULATIONS	3840
HEALTH CARE_WORKERS	603
KEY POPULATIONS	980
PREGNANT WOMEN	483
Distribution of Target Populations across States	**FREQUENCY**
GENERAL POPULATIONS	4241
HEALTHCARE WORKERS	681
KEY POPULATIONS	1457
PREGNANT WOMEN	**812**
TOTAL POPULATIONS	**7191**

Table 2. Distribution Of Gender Across Target States

Target state/Gender	**Frequency**
KANO	**271**
Female	186
Male	85
NASARAWA	**1014**
Female	642
Male	372
TARABA	**5906**
Female	2877
Male	3029
TOTAL	**7191**

Table 3. Prevalence of HBsAg Based on Target Groups across 3 states

Target Group/HBsAg Status	**Frequency**	**Prevalence**
GENERAL_POPULATIONS	4241	
Negative	**4030**	
Positive	**211**	**5%**
HEALTHCARE WORKERS	681	
Negative	649	
Positive	32	4.7%

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KEY POPULATIONS	1457	
Negative	1352	
Positive	105	7.2%
PREGNANT_WOMEN	**812**	
Negative	760	
Positive	52	6.4%
Grand Total	**7191**	
Overall Prevalence of HBsAg	**400**	**5.6%**

Table 4. Prevalence of HCV across the target populations

Population/Anti-HCV Status	Frequency	Percentage
General_Populations	4241	
Negative	4161	
Positive	80	1.9%
Healthcare workers	681	
Negative	666	
Positive	15	2.2%
Key_Populations	1457	
Negative	1416	
Positive	41	2.8%
Pregnant_Women	**812**	
Negative	791	
Positive	21	2.6%
Overall Prevalence of Anti-HCV	**157**	**2.2%**
Grand Total	**7191**	

Description of Results

In Tables 1 and 2, the demographic characteristics of participants across three target states—Kano, Nasarawa, and Taraba—are exhaustively detailed, encompassing General Populations, Healthcare Workers, Key Populations, and Pregnant Women. The participant distribution per state and population revealed that, in Kano state, 271 participants were sampled from the general populations, 62 from healthcare workers, 2 from key populations, and 106 from pregnant women; a similar trend was applied for other states. Table 1 further disclosed that a total of 7191 subjects were sampled across all target populations, comprising 4241 general populations, 681 healthcare workers, 1457 key populations, and 812 pregnant women. Table 2 presents the gender distribution of participants across target states, with 186 female participants and 85 male participants in Kano, 642 female participants and 372 male participants in Nasarawa, and 2877 female participants and 3029 male participants in Taraba. In summary, the overall gender distribution across the three target states were 3705 female participants and 3486 male participants, Summing to 7191 participants.

Table 3 presents an in-depth analysis of the prevalence of Hepatitis B surface antigen (HBsAg) across target groups in three states. Among the General Populations, representative of the broader community, 4241 individuals were tested, revealing 4030 negative cases and 211 positive cases, a prevalence of 5% was recorded. Among Healthcare Workers (681 individuals sampled), 649 were negative, and 32 were positive, a prevalence of 4.7% was recorded. Based on the Key Populations, 1457 individuals were sampled and a

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prevalence rate of 7.2% was recorded. Based on the Pregnant Women, a total of 812 individuals were sampled, a prevalence rate of 6.4%, with 760 negative cases and 52 positive cases were recorded. The Overall Prevalence of HBsAg, calculated from 7191 individuals tested, stood at 400 cases (5.6%).

In Table 4, the distribution of Hepatitis C Virus (HCV) prevalence across target populations was presented. Among General Populations (4241 individuals), the prevalence of Anti-HCV was 80 cases (1.9%). Healthcare Workers (681 individuals) exhibited a prevalence of 2.2% (15 cases). Key Populations (1457 individuals) recorded a prevalence of 2.8% for Anti-HCV, emphasizing the need for focused interventions due to a heightened risk profile. Pregnant Women (812 individuals) demonstrated a prevalence of 2.6% (21 cases), warranting specialized attention in maternal health programs. The overall prevalence of HCV across all target populations was 157 cases (2.2%). These findings provide a comprehensive picture of the prevalence of both HBsAg and Anti-HCV, offering valuable insights for public health planning and targeted interventions.

DISCUSSION OF THE RESULTS

Results presented in Tables 1, 2, 3 and 4 provide a comprehensive insight into the prevalence of Hepatitis B surface antigen (HBsAg) and Hepatitis C Virus (HCV) across population of interest in three states: Kano, Nasarawa, and Taraba states. These findings have significant implications for public health planning, intervention strategies, and the allocation of resources to address the specific needs of different demographic groups.

Distribution of target Populations: Tables 1 and 2 outline the demographic distribution of participants, emphasizing the representation from General Populations, Healthcare Workers, Key Populations, and Pregnant Women. This detailed breakdown allows for a nuanced understanding of the prevalence of hepatitis viruses within specific segments of the population.

Gender Distribution: The gender distribution across the three states reveals 3705 female participants and 3486 male participants, indicating a balanced representation. This information is crucial for considering gender-specific health needs and designing inclusive health interventions.

Hepatitis B (HBsAg) Prevalence: Table 3 reveals the prevalence of HBsAg across the target groups. Notably, the General Populations exhibit an overall prevalence of 5%, emphasizing the importance of understanding the prevalence within the broader community. Healthcare Workers, with a prevalence of 4.7%, indicate a relatively lower incidence but underscore the occupational risks associated with this group. Key Populations show a higher prevalence at 7.2%, emphasizing the need for targeted interventions. Pregnant Women, with a prevalence of 6.4%, highlight the significance of maternal health programs to address potential vertical transmission risks.

The Overall Prevalence of HBsAg across all target populations was recorded at 5.6%, suggesting a moderate prevalence that warrants ongoing monitoring and public health initiatives. The variations across different target groups emphasize the need for tailored interventions to address the specific risk factors associated with each demographic category.

Hepatitis C (Anti-HCV) Prevalence: Table 4 provides insights into the prevalence of Anti-HCV across the target populations. The prevalence among the General Populations was 1.9%, indicating a relatively lower incidence compared to HBsAg. Healthcare Workers show a prevalence of 2.2%, and Key Populations demonstrate a higher prevalence at 2.8%, requiring focused interventions due to their presumed heightened risk profile. Prevalence among Pregnant Women were 2.6%, highlighting the need for specialized attention in maternal health programs.

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The Overall Prevalence of HCV across all target populations was 2.2% which is higher than the national prevalence rate. These findings underscore the importance of understanding the prevalence of both HBsAg and HCV within different demographic groups, as each virus presents unique challenges and requires tailored public health strategies.

Implications and Recommendations: The variations in prevalence across different target groups emphasize the necessity of targeted public health interventions. High prevalence in certain groups, such as Key Populations, suggests the need for focused educational campaigns, increased testing, and accessible healthcare services. The prevalence rates among pregnant women highlight the importance of integrating hepatitis screening into maternal health programs to prevent vertical transmission.

Results from this study provides a robust foundation for developing and implementing targeted public health strategies to address the varying prevalence rates of HBsAg and HCV within diverse demographic groups. Continuous monitoring, education, and access to healthcare services are essential components of an effective public health response to mitigate the impact of hepatitis viruses across these states and target groups.

CONCLUSION

In conclusion, the prevalence of HBsAg ranged from 4.7% to 7.2% across Healthcare Workers, Key Populations, and Pregnant Women, with an overall prevalence of 5.6% across all target populations while that of HCV ranged from 1.9% to 2.8% across General Populations, Healthcare Workers, Key Populations, and Pregnant Women, with an overall prevalence of 2.2% across all the target populations. The higher prevalence in certain groups, such as Key Populations, highlights the importance of focused interventions to mitigate the transmission risks associated. This study identified HBV and HCV positive patients in Nigeria across target populations/groups. To increase the prevention of mother-to-child transmission of Hepatitis B in Nigeria, all HBsAg and HBeAg positive pregnant women were identified and enrolled in HBV care. All individuals who tested positive for HBV and HCV were also enrolled in HBV/HCV treatment and management. In light of these findings, specialized public health interventions such as focused information campaigns, enhanced access to healthcare services, and the incorporation of hepatitis screening into maternal health programs are recommended.

Conflicts of interest: All authors – none to declare**.**

Acknowledgment: The authors acknowledge all hospitals and Communities across the three states of interest where the project was implemented.

Ethics approval and consent to participate

Ethics approval was received from the National Health Research Ethics Committee with NHREC Protocol Number: NHREC/01/01/2007-12/10/2022 and NHREC Approval Number NHREC/01/01/2007-28/10/2022. Informed consent was obtained from each participants prior to the observation of any consultations. Consent was also obtained from Ministries of Health and Education in all the six target states.

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