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ORIGINAL ARTICLE

Seroprevalence of Hepatitis B and C Virus Infections among Healthcare Seekers at a Tertiary Health Facility in North-Central Nigeria: A Retrospective Study

Séroprévalence Des Infections Par Les Virus De L'hépatite B Et C Parmi Les Demandeurs De Soins De Santé Dans Un Établissement De Santé Tertiaire Du Centre-Nord Du Nigeria: Une Étude Rétrospective

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ABSTRACT

BACKGROUND: Hepatitis B and C viral infections are among the common infectious diseases with global public health importance. Nigeria is among the countries identified to be hyper-endemic for hepatitis B virus (HBV) infection. This study aimed to determine the seroprevalence of HBV and hepatitis C virus (HCV) infections among healthcare seekers at Bingham University Teaching Hospital, Jos, Nigeria, to increase awareness among the populace and sensitize public health stakeholders.

METHODS: A retrospective study that involved data abstraction from the medical laboratory records of patients seeking care at Bingham University Teaching Hospital. The information collected included screening result for HBsAg and anti-HCV. Data were analyzed using SPSS version 24.

RESULTS: A total of 186 patients were screened for HBV infection and 96 were screened for HCV infection. The mean ages and standard deviations were 36.2 ± 15.05 years and 37.2 ± 14.48 years for those screened for HBV and HCV, respectively. The seroprevalence rate of HBV infection was 14.0% while the rate for HCV infection was 10.4%. Males had a higher HBV seroprevalence of 9.1% than females with 4.9%. For HCV seroprevalence, females recorded a higher prevalence of 6.2% compared to their male counterparts who had 4.2%. Among those screened for HBV, the young adult age group had the highest prevalence rate of 10.2%, while for the HCV screen the middle-aged group had the highest prevalence rate of 6.2%. These were, however, not statistically significant ($p > 0.05$).

CONCLUSION: This study has shown that both HBV and HCV infections are hyper-endemic. There is a need to intensify awareness campaigns and improve the implementation of preventive and management strategies for HBV and HCV infections.

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KEYWORDS: Seroprevalence, HBsAg, Anti-HCV, Healthcare seekers, Health facility, Jos.

RÉSUMÉ

CONTEXTE: Les infections virales par les virus de l'hépatite B et C font partie des agents infectieux courants des problèmes de santé mondiale. Le Nigeria fait partie des pays identifiés comme hyper-endémiques pour l'infection par le virus de l'hépatite B (VHB). Cette étude visait à déterminer la séroprévalence des infections par le VHB et le virus de l'hépatite C (VHC) parmi les demandeurs de soins de santé à l'Hôpital Universitaire Bingham, Jos, Nigeria, afin d'accroître la sensibilisation parmi la population et de sensibiliser les intervenants en santé publique.

MÉTHODES: Une étude rétrospective impliquant l'abstraction des données à partir des dossiers de laboratoire médical des patients cherchant des soins à l'Hôpital Universitaire Bingham, Jos. Les données collectées étaient leurs résultats de dépistage de l'AgHBs et de l'anti-VHC. Les données ont été analysées à l'aide du logiciel SPSS version 24.

RÉSULTATS: Un total de 186 patients ont été dépistés pour une infection par le VHB et 96 pour une infection par le VHC. Leur âge moyen et leurs écarts-types étaient respectivement de 36,2 ± 15,05 ans et 37,2 ± 14,48 ans pour ceux dépistés pour le VHB et le VHC. Le taux de séroprévalence de l'infection par le VHB était de 14,0 % et celui pour l'infection par le VHC était de 10,4 %. Les hommes avaient une séroprévalence plus élevée du VHB de 9,1 % que les femmes avec 4,9 %. Pour la séroprévalence du VHC, les femmes ont enregistré une prévalence plus élevée de 6,2 % par rapport à leurs homologues masculins qui avaient 4,2 %. Parmi ceux dépistés pour le VHB, le groupe d'âge des jeunes adultes présentait le taux de prévalence le plus élevé de 10,2 %, tandis que pour le dépistage du VHC, le groupe d'âge des adultes d'âge moyen présentait le taux de prévalence le plus élevé de 6,2 %. Cependant, ces données n'étaient pas statistiquement significatives ($p = > 0,05$).

CONCLUSION: Cette étude a montré que les infections par le VHB et le VHC sont hyper-endémiques. Il est nécessaire d'intensifier les campagnes de sensibilisation et d'améliorer la mise en œuvre de stratégies préventives et de gestion des infections par le VHB et le VHC.

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MOTS-CLÉS: Séroprévalence, AgHBs, anti-VHC, demandeurs de soins de santé, établissement de santé, Jos

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INTRODUCTION

Hepatitis B and C viral infections are among the common infectious diseases of global public health importance.[1,2] These viral infections affect the liver and can result in both acute and chronic diseases.[3-5] The illnesses that are caused by the hepatitis B virus (HBV) and hepatitis C virus (HCV) may range from mild to severe and lifelong conditions such as liver cirrhosis and hepatocellular carcinoma.[3,4] Hepatitis B and C infections can result in a spectrum of symptoms ranging from a sub-clinical state to a primo-infective phase and, subsequently, a chronic state.[1] The clinical features of these viral infections may manifest as subacute, hyper-acute, acute, and icteric hepatitis depending on the phase of the infection. There could also be an asymptomatic carrier state to a chronic phase of hepatic cirrhosis and hepatocellular carcinoma.[1,2] As a chronic infection, HBV may persist in the liver throughout the lifespan of an individual, acting as a reservoir for the virus and resulting in HBV-related sequelae.[1,3]

The common routes of transmission for HBV and HCV are through blood/blood products transfusion, perinatal route/vertical transmission (through mother to child), body fluids such as saliva, vaginal, and seminal fluids, and sexual contact.[1,3,4] As blood-borne viruses, they can also be transmitted via needle stick injury, piercings, tattooing, and the use of contaminated sharp objects.[3,4] These viral infections can be managed if detected early. There is a vaccine against HBV but none is available against HCV.[3]

Hepatitis B and C viruses pose significant risk to health and are associated with high morbidity and mortality.[3,4] Reviewed studies have shown a possible increase in the prevalence of these viral infections.[7,8] The World Health Organization (WHO) in 2019 estimated that, globally, 296 million and 58 million people had HBV and HCV infections, respectively, with 1.5 million new infections each for HBV and HCV annually.[3,4] The WHO has identified the highest burden of HBV infection to be in the Western Pacific region and African region.[3] The prevalence of HBV infection in Africa is estimated to be 6.2%, accounting for about 23% of the global burden of hepatitis B disease.[3,9,10] Sub-Saharan Africa (SSA) is estimated to have the highest global burden of HCV with a 5.3% prevalence rate.[11] Hepatitis B virus is hyper-endemic in SSA with more than 8% of its population infected.[3,12] The carrier rates of HBV in SSA countries range from 9% to 20%.[1]

Globally, viral hepatitis is currently the seventh leading cause of death, accounting for approximately 1.3 million deaths yearly.[9] Hepatitis B and C viral infections constitute an enormous health burden globally.[10] Approximately 820,000 and 290,000 persons died from HBV and HCV, respectively, in 2019 globally, mainly from liver cirrhosis and hepatocellular cancer.[3,4] The World Health Assembly through the *Global health sector strategy on viral hepatitis 2016–2020* and the WHO are working to reduce the disease burden of HBV and HCV.[3,13-16] However, in May 2022 at the 75th World Health Assembly, a new set of integrated global health sector strategies on HIV, viral hepatitis, and sexually transmitted infections for the period of 2022 – 2030 were noted.[3,4] This new WHO's global hepatitis strategy aims to reduce new hepatitis infections by 90% and deaths by 65% between 2016 and 2030.[3,4] Based on the previous and new strategies, a comprehensive approach has been developed by the WHO's member states.[3,4] A study by the WHO reported that an estimated 4.5 million premature deaths due to viral hepatitis can be prevented in low- and middle-income countries (LMICs) by 2030 through vaccination, diagnostic tests, medicines, and education campaigns.[3,4]

In Nigeria, the WHO in 2018 estimated that about 20 million people were chronically infected with HBV and HCV with prevalence rates of 8.1% and 1.1%, respectively.[17] A systematic review by Ajuwon et al. in 2021 reported that Nigeria had an overall pooled prevalence of 9.5% for HBV infection.[9] Nigeria is among the countries identified to be hyper-endemic for HBV infection, which implies >8% of the population having the infection.[3,12] Both HBV and HCV infections constitute a major public health burden.[3,12] In addition, the risk of contracting HBV in Nigeria is substantial due to a low vaccination rate and as many as 75% of the population being exposed to the virus.[12] Therefore, this study aimed to determine the seroprevalence of HBV and HCV infections among healthcare seekers at the Bingham University Teaching Hospital, Jos, Plateau State in North-central Nigeria, to increase awareness among the populace and sensitize healthcare professionals and policy makers, which will ultimately strengthen preventive and control strategies and improve the quality of healthcare to individuals with the infection.

MATERIALS/METHODS

This was a retrospective study that entailed the abstraction of data from the medical laboratory records of Bingham University Teaching Hospital (BHUTH), Jos. This hospital is a private teaching hospital located in Jos, the city capital of Plateau State, Nigeria. The hospital provides primary, secondary, and tertiary care through specialized departments. The Medical Laboratory uses the Skytec™ Rapid Diagnostic Test Kit, USA to screen for hepatitis B surface antigen (HBsAg) and antibodies for HCV (anti-HCV). Data were abstracted from the records of patients who were screened for HBV and HCV between

May 2017 and November 2017. The patients' sociodemographic characteristics such as age and sex were retrieved along with their screening results.

These data were analyzed using IBM SPSS version 24.0 (IBM Corp., Armonk N.Y. USA). Their ages were grouped into categorical data: ≤ 17 years as children; 18 – 39 years as young adults; 40 – 59 years as middle-aged; and ≥ 60 years as elderly. The data for HBV screening had a minimum age of 4 years and that for HCV screening was 17 years, with the maximum age for both being 85 years. Each patient's sex was noted. The screening results were either reactive or non-reactive. The results are presented as frequencies and proportions in tables and figures. A significant level was set at a p-value of < 0.05.

Ethical approval to carry out this study was obtained from the Health and Research Ethics Committee (HREC) of BHUTH, Jos. Permission was obtained from the Departmental Head of the Medical Laboratory of BHUTH to conduct this study.

RESULTS

A total of 186 patients were screened for HBV infection and 96 were screened for HCV infection. Their mean ages and standard deviations were 36.2 ± 15.05 years and 37.2 ± 14.48 years for those screened for HBV and HCV, respectively. The interquartile ranges for the ages of the participants screened for HBV and HCV infection were 26.0 and 27.0 years, respectively. Among the clients screened for HBV and HCV, males constituted 66.1% and 57.3%, respectively. The young adult age group in both data sets had the highest frequency of 53.8% and 61.5% for HBV and HCV, respectively. These are shown in table 1.

The seroprevalence rate of HBV infection was 14.0% while the rate for HCV infection was 10.4%. This is shown in figure 1. There was no case of co-infection with HBV and HCV among the study participants. From table 2, among those screened for HBV, the young adult age group had the highest prevalence rate of 10.2%. For the HCV screening, the middle-aged group had the highest prevalence of 6.2%. However, there was no significant association between age group and HBV/HCV infections as shown in table 3.

The males recorded a higher HBV seroprevalence of 9.1% compared to 4.9% for females as shown in table 2. However, within the gender subset, females recorded a slightly higher HBV seroprevalence (14.3%; 9 out of 63) than their male counterparts (13.8%; 17 out of 123) as shown in table 3. Among those screened for HCV, the females had a higher seroprevalence of 6.2% as against 4.2% for males (Table 2). This was also reflected within the gender subset; the females had a much higher seroprevalence (14.6 %; 6 out of 41) than the males (7.3%; 4 out of 55) as shown in table 3. There was no significant association between gender and HBV/HCV infection as reflected in table 3.

DISCUSSION

This study recorded high seroprevalence rates for HBV and HCV infections. The high rate found in this study for HBV

Table 1: Demographic variables of the study participants

Variable	Frequency	Percentage
HBsAg (n = 186)		
Age Group (years)	Mean = 36.24 ± 15.05	
≤ 17	14	7.5
18 – 39	100	53.8
40 – 59	55	29.6
≥ 60	17	9.1
Total	186	100.0
Gender		
Male	123	66.1
Female	63	33.9
Total	186	100.0
Anti-HCV (n = 96)		
Age Group (years)	Mean = 37.19 ± 14.48	
17 – 39	59	61.5
40 – 59	29	30.2
≥ 60	8	8.3
Total	96	100.0
Gender		
Male	55	57.3
Female	41	42.7
Total	96	100.0

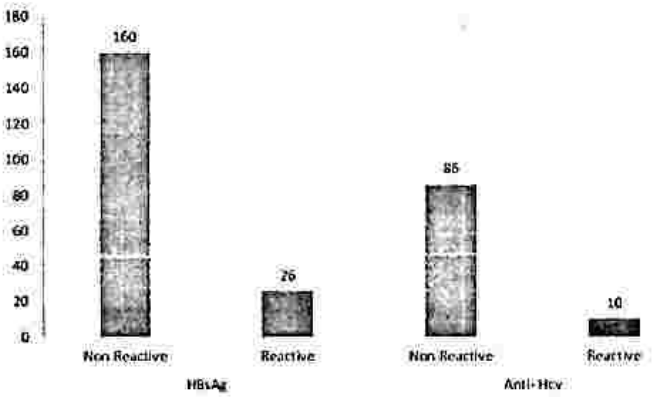

Figure 1: Bar chart showing the seroprevalence of HBsAg and Anti-HCV

Table 2: Distribution of the study participants' demographic variables with HBV and HCV infection

Variable	Screening Result	
	Non-reactive (%)	Reactive (%)
HBsAg (n = 186)		
Age group (years)		
≤ 17	13 (7.0)	1 (0.5)
18 – 39	81 (43.5)	19 (10.2)
40 – 59	50 (26.9)	5 (2.8)
≥ 60	16 (8.6)	1 (0.5)
Total	160 (86.0)	26 (14.0)
Gender		
Male	106 (57.0)	17 (9.1)
Female	54 (29.0)	9 (4.9)
Total	160 (86.0)	26 (14.0)
Anti-HCV (n = 96)		
Age group (years)		
17 – 39	55 (57.3)	4 (4.2)
40 – 59	23 (24.0)	6 (6.2)
≥ 60	8 (8.3)	0 (0.0)
Total	86 (89.6)	10 (10.4)
Gender		
Male	51 (53.1)	4 (4.2)
Female	35 (36.5)	6 (6.2)
Total	86 (89.6)	10 (10.4)

% = percentage

Table 3: Bivariate analysis between the study participants' demographic variables and HBV with HCV infection

Variable	Screening Result			Chi-square χ^2	p-value
	Non-reactive f (%)	Reactive f (%)			
HBsAg					
Age group			Total	4.660	0.198
≤ 17	13 (92.9)	1 (7.1)	14 (100.0)		
18 – 39	81 (81.0)	19 (19.0)	100 (100.0)		
40 – 59	50 (90.9)	5 (9.1)	55 (100.0)		
≥ 60	16 (94.1)	1 (5.9)	17 (100.0)		
Total	160	26	186		
Gender			Total	0.007	0.931
Male	106 (86.2)	17 (13.8)	123 (100.0)		
Female	54 (85.7)	9 (14.3)	63 (100.0)		
Total	160	26	186		
Anti-HCV					
Age group			Total	5.046	0.080
17 – 39	55 (93.2)	4 (6.8)	59 (100.0)		
40 – 59	23 (79.3)	6 (20.7)	29 (100.0)		
≥ 60	8 (100.0)	0 (0.0)	8 (100.0)		
Total	86	10	96		
Gender			Total	1.364	0.240
Male	51 (92.7)	4 (7.3)	55 (100.0)		
Female	35 (85.4)	6 (14.6)	41 (100.0)		
Total	86	10	96		

f = frequency, % = percentage

infection (14.0%) is in line with the hyper-endemic rate recorded for Nigeria and some other sub-Saharan countries by the WHO.[3,17] The prevalence rate for HBV infection recorded in this study is similar to a national survey by Olayinka et al in 2016 that reported a seroprevalence of 12.2% for HBV infection.[17] Similarly, a systematic review and meta-analysis by Musa et al (2015) reported a pooled prevalence rate of 13.6% for HBV infection in Nigeria.[12] Another study by Omote et al (2018) conducted in the Northeastern region of the country among patients attending a tertiary hospital also found a seroprevalence rate of 13.6% for HBV infection.[18] Some other recent equivalent studies among hospital attendees also reported prevalence rates of 12.4% and 11.0% for HBV infection.[19,20] However, a higher prevalence rate of 23.3% for HBV was reported by Nwokedi et al (2006) among patients in a hospital in Northwest, Nigeria.[21] This extremely high prevalence may be due to the time when the study was done. The time of that study, 2006, was barely two years after the HBV vaccine was incorporated into the National Program on Immunization in Nigeria.[17] The lack of awareness and low vaccination rate may have accounted for the high prevalence of HBV infection reported by Nwokedi et al in their study. Lower prevalence rates of 8.5% and 7.4% were reported in North-central Nigeria.[22,23] These low rates may be attributed to the study population, as one was conducted among selected febrile patients and the other was among pregnant women. In contrast to these hospital-based studies, Alkali et al, from a community-based study conducted in 2018 in North-central Nigeria, reported a seroprevalence rate of 20.7% for HBV infection.[24]

The seroprevalence of HCV infection from this study was also high at 10.4%. A higher prevalence rate of 16.6% was reported by Omote et al in a similar study conducted among patients attending a tertiary hospital in Northeast Nigeria.[18] Another study conducted in the Northeast but among patients attending a State Specialist Hospital reported a lower HCV infection rate of 6.0%.[25] A much lower rate of 3.1% was reported by Damola et al in a study done in South-

west Nigeria among blood donors.[26] However, a hospital-based study among patients with diabetes in the Southwest found a similar prevalence rate of 13.3% for HCV infection.[27] These findings are in contrast to those of a study conducted among prison inmates by Okafor et al where the prevalence rate of HCV infection was 29.6%.[22] The very high rate of HCV found among the inmates may be due to the study population being at a higher risk for HCV infection. Whereas a community-based study reported a seroprevalence of HCV of 3.1%,[24] much lower rates have been reported from other studies.[29-32]

From this study, a higher seroprevalence rate for HBV infection was found among males (9.1%) than their female counterparts (4.9%). Comparably, several other studies reported a higher prevalence of HBV among males.[2,8,20,22,24] The young-adult age group (18 – 39 years) recorded the highest prevalence rate of 10.2% for HBV infection in this study. Ajayi et al in their study also reported that the age group of 19 – 39 years had the highest prevalence of HBV infection.[20] Equivalently, Omatola et al also reported the highest rate of HBV infection among the 24 – 44 years' age group.[22] Another study reported that the peak age group for HBV infection was between the ages of 20 and 30 years.[8] There was no significant association between the age group/gender and HBV infection in this study.

Findings from this study also showed a higher HCV infection prevalence rate of 6.2% among females than males who had a rate of 4.2%. This finding was similar to the reports from other studies.[25-27,31] From this study, the middle-aged (40 – 59 years) subjects had the highest HCV infection prevalence rate of 6.2%. Similar findings were reported by Ndako et al and Damola et al with the highest rates of HCV infection among people aged 41 – 50 years and > 50 years, respectively.[26,27] In contrast, the age group of 21 – 30 years had the highest prevalence rate of HCV infection and appeared to be the most vulnerable age group in some other studies.[31,32] However, there was no significant association between age group/gender and HCV infection in this study.

As a limitation, the generalizability of the results from this study may be limited as it was hospital-based, and only clients seeking health care were screened.

CONCLUSION

This study has shown that both HBV and HCV infections are hyper-endemic in this part of the world. The seroprevalence of HBsAg was higher among males while the seroprevalence of anti-HCV was higher among females. Both HBV and HCV infections are significant health issues. There is a need to intensify awareness campaigns on HBV and HCV among the populace. Effective strategies to improve HBV vaccination coverage should be stepped up. It is also necessary to improve the implementation of preventive and management strategies for HBV and HCV infections. It is therefore imperative to alert all stakeholders including healthcare professionals and policymakers on the urgent need to curtail this menace.

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