



Serological Screening of HBV and HCV among Patients with Suspected Liver Diseases Seen at a Tertiary Hospital in Bauchi, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors AM and OKO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author AT managed the analyses of the study. Authors YBJ and UMS managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Epidemiological data of HBV and HCV in Bauchi state is still relatively limited, thus creates an epidemiological information gap in evaluating the public health problem, its negative clinical sequelae and high morbidity and mortality rate. This retrospective study evaluated the seroprevalence of HBV and HCV infections among patient with suspected liver disease cases presented over the study period.

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Methodology: The retrospective study was conducted among patients admitted to the Medical wards and Pediatric wards of ATBUTH, Bauchi between January 2012 and August 2017. Data on serological screening were extracted and analysed.

Results: A total of 2099 cases were serologically screened and analysed for Hepatitis B and C. Overall seroprevalence was 21.7%, HBsAg was detected in 16.7% cases and Anti-HCV in 4.4% of cases. Peaked seropositivity was observed in 2013 and 2016. Male preponderance and statistical significance difference were found between the seropositivity, gender and age group in 2013($p<0.001$) and 2016(<0.0001).

Conclusion: The findings revealed the endemicity of HBV and emerging increase in HCV in the study area. Though this data might not be a true representation of viral hepatitis infection in the study area but had provided an insight to the epidemiological picture and need for infection control and preventive measures.

Keywords: HBV; HCV; seroprevalence; liver disease; Bauchi.

1. BACKGROUND

Globally HBV and HCV infections remain a major cause of liver diseases as a public health problem and its diverse clinical sequelae are responsible for high morbidity and mortality rate. It continues to pose serious clinical challenges in low-income countries because a significant proportion of the populace is unaware of the infections and the cost implication and logistics to undertake large population screening. There are also reports of late serodetection and check up at hospital, and lack of basic facilities for effective diagnosis and management strategies are responsible for stemming down the increasing prevalence.

In developing countries, with a high prevalence of HBV and HCV infections, there are shared route of transmission and risk factors - contact with infected blood /products, sharing of sharp objects in local surgical procedures, sexual contact and vertical transmission responsible for mother to child transmission, are common in most sub-Saharan African community setting [1]. In addition, coinfection of HBV and HCV pose a high risk of liver cirrhosis and hepatocellular carcinoma [2], while coinfection with HIV complicates patient's treatment and management approach [3].

Available epidemiological data has shown that 370 million and 137 million individuals are infected globally by HBV and HCV, with high prevalence in sub-Saharan Africa and Asia. This accounts for the high prevalence of liver diseases, cirrhosis and hepatocellular carcinoma [4,5] and varies with geographical location, urban and rural difference, genotypes, demographic variable and predisposing risk factors. The report of WHO global HBV2017, estimates the

prevalence of 6.1% (4.6%-8.5%) [6]. There is a varied prevalence depending on sex, ethnicity, urban or rural, and economic status. The risk of chronic HBV infection is inversely related to the age of infection [6]. In Nigeria, the prevalence of HBV ranged from 4.0 to 46.8% [7]. Demographic variables like age and gender influenced the seroprevalence of HBV and HCV. In Nigeria, the introduction of HBV vaccine into the Expanded Immunization Program in 2004, had changed the epidemiological picture of viral hepatitis infection, with a resultant reduction in mother to child transmission [8]. Global prevalence of HCV ranged between 2- 3%. High prevalence is recorded in Egypt, West African countries, and Pakistan [9-13]. In Nigeria, the estimated prevalence of HCV is 2.2% (2.1%-2.5%), but prevalence difference depends on the geographical location, studied population and methodology employed [13].

Serological screening of HBsAg and anti- HCV serves as early serodetection necessary for identifying individuals requiring prompt management. However, the sensitivity and specificity of the serological test compared to Enzyme-Linked Immunosorbent Assay (ELISA) are limited in detection of infection stage and immune status.

In Bauchi and its neighbouring states, epidemiological information of HBV and HCV had been carried out on selected population, such as -blood donors, nomadic Fulani tribe and pregnant women [14-17], but none had looked at a hospital-based population with suspected liver diseases. Therefore, the findings of this study help to complement the seroprevalence of other studies and provide epidemiological information and understanding of viral infection. These are also necessary for infection control and plan the

prevention strategy of reducing morbidity and mortality rate. Based on this information, this study retrospectively evaluated the seroprevalence of HBV and HCV infections among patients after admission in the medical and pediatric wards with suspected cases of liver disease in the study centre.

2. METHODOLOGY

The retrospective study was conducted at the Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria between January 2012 to 30th August 2017. The 650-bed hospital serves as a major referral centre in northeastern Nigeria and provides multi-specialty services and training of healthcare professionals. The serological data of HBsAg and anti-HCV of patients with suspected liver disease as indicated in the laboratory request form by attending the physician were extracted from the laboratory book and taken as study data. The data were classified into adult and paediatrics groups depending on the age of the patient. The Rapid diagnostic latex kits (Biotest Hangzhou (Biotech CO Ltd China) kit) for the serodetection of HBsAg and anti-HCV was used according to the manufacturer instruction. A total of 2099 patients with suspected liver diseases were serologically screened for HBsAg and Anti-HCV over 5 years period, and their results were extracted and analysed (2076 adults and 23 children).

2.1 Data Analysis

Demographic variables and laboratory data were entered into the study database and analysed using SPSS version 20.0. Values were expressed in mean and percentages. Comparison of categorical variables was determined by the Chi-square test, with significance difference expressed at $p < 0.05$.

3. RESULTS

A total of 2099 in-patients with suspected liver disease cases were serologically screened for HBsAg and anti-HCV. Overall seroprevalence was 21.7% (n=447), with gender distribution of 72.5% (n=324) males, and 27.5% (n=123) females (M:F ratio of 1:2.6). Peaked seropositivity of HBsAg and Anti-HCV as depicted in Fig. 1, was observed in 2013, 16.4% (n=76) vs 3.9% (n=18) and 2016 16.9% (n=123) vs 5.5% (n=40). Statistically significant difference was observed between HBsAg and Anti-HCV and gender/age of patient, in 2013 ($p < 0.0001$) and 2016 ($p < 0.002$) with HBsAg and 2016 ($p < 0.01$) and 2017 ($p < 0.002$) with HCV respectively. HBsAg was detected in 16.7% (n=354) cases, 72.0% (n=255) males to 28% (n=99) female (M:F of 1:3.6), 99.2% (n=351) were from adult unit and 0.8% (n=3) from pediatric units. Anti-HCV was detected in 4.4% (n=93) cases, with gender distribution of (n=69) males, (n=24) females and 2 cases from the pediatric unit (M:F ratio of 1:2.9).

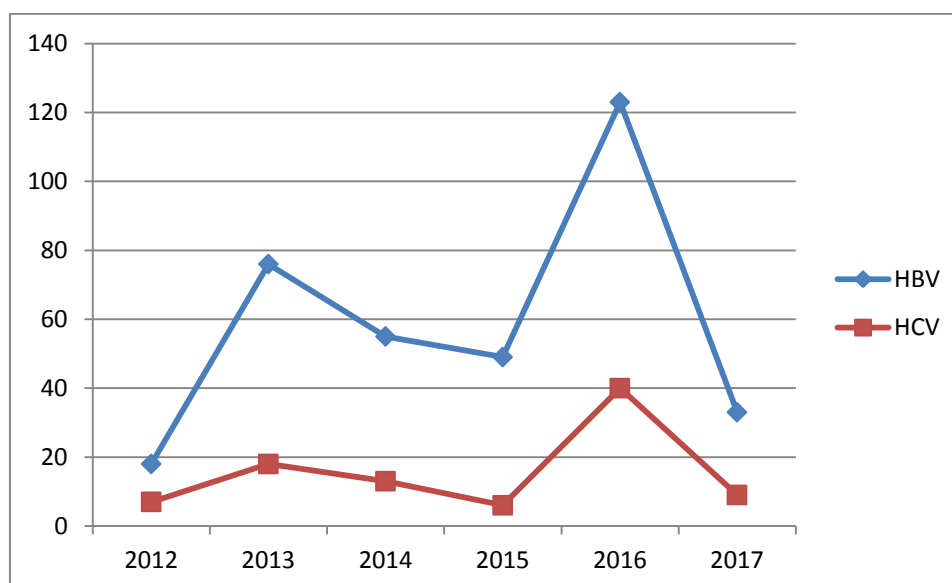


Fig. 1. Trend of seropositivity of HBV and HCV over 6 years study period

Table 1. Seropositivity of HBV and HCV according gender and source of specimens

Total number of cases		HBsAg					Anti-HCV				
		Adult		Children		p-value	Adult		Children		p-value
		Male	Female	Male	Female		Male	Female	Male	Female	
2012	112	9(2.5)	9(2.5)	-	-	-	5(5.4)	2(2.2)			0.8
2013	463	45(12.7)	31(8.8)	-	-	0.0001	15(16.1)	3(3.2)			0.2
2014	207	45(12.7)	10(2.8)			0.09	12(12.9)	1(1.1)			0.3
2015	338	37(10.5)	12(3.4)			0.06	5(5.4)	1(1.1)			0.8
2016	720	88(24.8)	32(9.0)	2(0.6)	1(0.3)	0.002	25(26.8)	13(14.0)	1(1.1)	1(1.1)	0.01
2017	251	29(8.2)	4(1.1)			0.2	6(6.5)	3(3.2)			0.002

4. DISCUSSION

As HBV and HCV constitute a public health concern with attendant clinical sequelae, epidemiological information becomes imperative for public health awareness, education, infection control and preventive measures. In this study, the overall seroprevalence of both HBsAg and Anti-HCV among patients with suspected liver diseases was 20.7%, which is comparable to 20.9% reported in a hospital-based serological screening in Ethiopia [18]. The level reported in Ethiopia may be attributed to employed methodology, enzyme immunosorbent assay (ELISA), which is sensitive and specific in nature. The findings of the present study are lower than the level reported in other similar studies, 27.0% in Ouagadougou, Burkina Faso [19], and 30.1% [20]. However, the level was higher than the level reported among the blood donors in the same study centre (8.0%) [14]. The observed difference may be due to several variables associated with such study, such as study population, geographic location, demographic variables, and methodology employed. The asymptomatic status of viral hepatitis infection allows for progression with diverse clinical signs and symptoms resulting in late hospital presentation. Regarding the breakdown of serological screening data versus year of study, peaked seropositivity was observed in 2013 (16.4% vs. 3.9%) and 2016 (16.9% vs. 5.5%). Such observed difference may not be unconnected with temporary withdrawal of services at that period by health workers as well as health-seeking behaviour of patients in the area. Similarly, statistically significant difference was observed between the seropositivity, gender and age group in 2013 ($p < 0.00$) and 2016 ($p < 0.0001$) which further confirmed the influenced of demographic variables on the seropositivity.

In Nigeria, the endemicity of HBV and its association with liver diseases have been documented [1,21,7,11,12,15,16,17], with recent national HBV seroprevalence of 12.2% [1]. In this study, the prevalence of HBV of 16.7% was higher than the levels reported in studies conducted in Bauchi state and its neighbourhood, with the recorded values of 7.0% among the blood donor [14], 14.6% [15] and 12.4% [16] among the pregnant women and 12.2% among the nomadic Fulani [17] tribe. However, the result was lower than similar studies conducted in other part of Nigeria, such as 50.0% in Maiduguri [22], 49% in southeastern

Nigeria [23] and 45% in Lagos [24]. While the seroprevalence confirmed the endemicity of HBV in Bauchi state, the observed difference in studies may be due to the methodology employed, as some studies employed Enzyme-Linked Immunosorbent Assay which is more sensitive and specific than serology employed in the current study. The male predominance of HBV and HCV as observed in this study is consistent with the findings of other studies [18,19]. The socio-cultural and religious practice of polygamy performed by couples in the study region, and other unhygienic practices that facilitate the spread of viral infection contributes significantly to the level reported. Besides, the immune status of female to clear HBsAg in the system contributes to the low seroprevalence.

The HBV prevalence of 0.9% recorded among the studied pediatric patients may be low, but it is of public health concern considering the clinical implication of HBV acquisition at childhood. Perhaps, the level of immunisation coverage and populace perception may be responsible for the level recorded in this study. Nevertheless, a higher level (12.2%) was reported among the pediatric population in southwestern Nigeria [25].

In this study, anti-HCV prevalence of 4.4%, is comparable to 4.39% reported among the outpatients attending the general hospital in southeastern Nigeria [26]. However, the value is lower than the level reported in other similar hospital-based studies, i.e., 22.5% and 12.4% among the chronic liver disease patients in Ethiopia [18,27], 10.8% 23.5% in Pakistan [20,28] and 13.2% and 10% in rural communities in Jos and Calabar [10,11]. The HCV prevalence of 2.2% among paediatrics patients of public health interest. Though it falls within the HCV prevalence in Nigeria, it is still of public health concern especially that it is relatively newer than HBV infection. Higher prevalence of 10% was reported among children attending the tertiary hospital in Maiduguri [29].

We believe, though it is a retrospective study, the findings had re-affirmed the endemicity of HBV and the emerging trend of HCV in the study area which is of public health concern, requiring a prompt response in terms of policy formulation of stemming down morbidity and mortality rate. But, the drawback is that the data are not sufficient enough to serve as a good representation and to draw conclusions due to some limitations. The limitations include, non-completion and poor documentation of laboratory request forms, with

lack of detailed demographic and clinical information of the patients.

5. CONCLUSION

This can be concluded that the high seroprevalence of HBV and HCV among the suspected liver disease cases are of major public health and clinical concern. Further comprehensive studies are required to provide the epidemiological information for public health education and awareness in our community.

CONSENT

It is not applicable.

ETHICAL CLEARANCE

The protocol of the study was approved by the Abubakar Tafawa Balewa Teaching hospital institutional review board.

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CONFLICT OF INTERESTS

All authors declare that there were no conflicts of interest in relation to the work described in this paper.

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