

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

Abstract

Background

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

Methodology

The retrospective study was conducted among patients admitted in Medical wards and Pediatric wards of ATBUTH, Bauchi between January 2012 and August 2017. Data of serological screening were extracted and analyzed.

Result

15 A total of 2099 cases were serological screened and analyzed for Hepatitis B and C. Overall seroprevalence was 21.7%,
16 HBsAg was detected in 16.7% cases and Anti-HCV in 3.0% cases. Peaked seropositivity was observed in 2013 and 2016,
17 with male preponderance and statistical significance difference was observed between the seropositivity, gender and age
18 group in 2013($p < 0.001$) and 2016(< 0.0001).

19 **Conclusion**

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

23 Keywords-HBV, HCV, seroprevalence, liver disease, Bauchi

24 **Background**

25 HBV and HCV infections remains major cause of liver diseases with its public health problem globally and diverse clinical
26 sequelae responsible for high morbidity and mortality rate. It continued to pose serious clinical challenges in low-income
27 countries, because significant proportion of the populace are unaware of the infections and the cost implication and logistics

28 to undertake large population screening. There is also late serodetection and presentation at hospital, and lack of basic
29 facilities for effective diagnosis and management strategies in stemming down the increasing prevalence.

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

35 Available epidemiological data has shown that 370 million and 137 million individuals are infected globally by HBV and
36 HCV, with high prevalence in sub-saharan Africa and Asia, accounts for high prevalence of liver diseases, cirrhosis and
37 hepatocellular carcinoma [4,5] and varies with geographical location, urban and rural difference, genotypes, demographic
38 variable and predisposing risk factors. The WHO global HBV 2017, reports the prevalence estimate of 6.1%(4.6%-8.5%)
39 [6]. There is varied prevalence depending on sex, ethnicity, urban and rural, economic status. The risk of chronic HBV
40 infection is inversely related to the age of infection [6]. In Nigeria, the prevalence of HBV ranged between 4.0 to 46.8% [
41 8]. Demographic variables like age and gender influenced seroprevalence of HBV and HCV. In Nigeria the introduction of

42 HBV vaccine into the Expanded Immunization Program in 2004, had changed the epidemiological picture of viral hepatitis
43 infection, with resultant reduction in mother to child transmission [9]. Global prevalence of HCV ranged between 2% and
44 3, High prevalence is recorded in Egypt and West African countries, Pakistan [10-14]. In Nigeria, the estimated prevalence
45 of HCV was 2.2% (2.1%-2.5%), but prevalence difference depends on geographical location, studied population and
46 methodology employed [14]

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

50 In Bauchi state and its neighboring states, epidemiological information of HBV and HCV had been carried out on selected
51 population -blood donors, nomadic fulani and pregnant women [15-18], but none had looked at hospital-based population
52 with suspected liver diseases. Therefore, the findings of this study are to complement the seroprevalence of other studies
53 and provide epidemiology information and understanding of viral infection, necessary for infection control and prevention
54 strategy of reducing morbidity and mortality rate. Based on this information, we retrospectively evaluated seroprevalence of

55 HBV and HCV infections among patients on admission in the medical and pediatric wards with suspected cases of liver
56 disease in the study centre

57 **Methodology**

58 The retrospective study was conducted at the Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria
59 between January 2012 to 30th August 2017. The 650-bed hospital serves as major referral centre in the northeastern Nigeria
60 and provides multi specialties services and training of health care professionals. The serological data of HBsAg and anti-
61 HCV of patients with suspected liver disease as indicated in the laboratory request form by the attending physician were
62 extracted from laboratory book and entered into study data. The data was classified according to the age of the patient into
63 adult and pediatrics. The Rapid diagnostic latex kits (Biotest Hamgzhou (Biotech CO Ltd China) kit) for serodetection of
64 HBsAg and anti- HCV was used according to manufacturer instruction. A total of 2099 inpatients with suspected liver
65 diseases serologically screened for HBsAg and Anti-HCV over the 5 years period, their results were extracted and
66 analyzed (2076 adults and 23 children)

67 **Data analysis**

68 Demographic variables and laboratory data were entered into the study database and analyzed using SPSS version 20.0.
69 Values were expressed in mean and percentages. Comparison of Categorical variables were determined by the chi-square
70 test, with Significance difference expressed as $p < 0.05$.

71

72

73 **Result**

74 A total of 2099 inpatients with suspected liver diseases cases were serologically screened for HBsAg and anti- HCV.
75 Overall seroprevalence was 21.7%(n=,447), with gender distribution of 72.5%(n=324) males, and 27.5%(n=123) females,
76 M:F ratio of 1:1.3. Peaked seropositivity of HBsAg and Anti- HCV as depicted in figure I, was observed in 2013,
77 16.4%(n=76) vs 3.9%(n=18) and 2016 16.9%(n=123) vs 5.5%(n=40). Statistical significant difference was observed
78 between HBsAg and Anti-HCV and gender/age of patient, in 2013($p < 0.0001$) and 2016($p < 0.002$) with HBsAg and
79 2016($p < 0.01$) and 2017($p < 0.002$) with HCV respectively. HBsAg was detected in 16.7%(n=354) cases, 72.0% (n=2550
80 males to 28% (=99) female M; F of 1:1.3, majority from adult patients, 99.1(n=351) and 4(0.9) from pediatric units. Anti-

81 HCV was detected in 4.4%(n=93) cases, with gender distribution of (n=69) males, (n=24) females and 2 cases from the
82 pediatric unit and M:F ratio of 1.1.3.2

83 **Discussion**

84 As HBV and HCV constitute a public health concern with attendant clinical sequelae, epidemiological information become
85 imperative for public health awareness, education, infection control and preventive measures. In this study, overall
86 seroprevalence of both HBsAg and Anti-HCV among patients with suspected liver diseases was 20.7%, which is
87 comparable to 20.9% reported in a hospital-based serological screening in Ethiopia [19]. The level reported in Ethiopia
88 may be attributed to methodology employed , enzyme immunosorbent assay(ELISA), that is sensitive and specific. The
89 finding in our study was lower than the level reported in other similar studies, 27.0% in Ouagadougou, Burkina Faso [20],
90 and 30.1% [21]. However, the level was higher than level reported among the blood donors in the same study center (8.0%)
91 [15]. The observed difference may be due to several variables associated with such study, study population, geographic
92 location, demographic variables, and methodology employed. The asymptomatic status of viral hepatitis infection allows for
93 progression with diverse clinical signs and symptoms resulting in late hospital presentation. The breakdown of serological
94 screening data versus year of study, peaked seropositivity was observed in 2013(16.4% vs 3.9%) and 2016(16.9% vs

95 5.5%). Such observed difference may not be unconnected with temporary withdrawal of services at that period by health
96 workers as well as health seeking behavior of patients in the area. Similarly, there was statistical significant difference
97 observed between the seropositivity, gender and age group in 2013($p<0.00$) and 2016($p<0.0001$) which further confirmed
98 the influenced of demographic variables on seropositivity.

99 In Nigeria, the endemicity of HBV and its association with liver diseases have been documented [1,7,8,12,13,16-18], with
100 recent national HBV seroprevalence of 12.2% [1]. In this study, the prevalence of HBV of 16.7% was higher than levels
101 reported in studies conducted in Bauchi state and its environ, 7.0% among blood donor [15], 14.6% [16] and 12.4% [17]
102 among pregnant women and 12.2% among nomadic Fulani [18]. But lower than similar studies conducted in other part of
103 Nigeria, 50.0% in Maiduguri [22], 49% in southeastern Nigeria [23] and 45% in Lagos [24]. While the seroprevalence
104 confirmed the endemicity of HBV in Bauchi state, the observed difference in studies may be due to methodology employed,
105 as some studies employed Enzyme Linked Immunosorbent Assay which is more sensitive and specific than serology
106 employed in our study. The male predominance of HBV and HCV as observed in this study, is consistent with the findings
107 of other studies [19,20]. The socio-cultural and religious practice of polygamy practice by couples in the study region, and

108 unhygienic practice that facilitates spread of viral infection which contribute significantly to the level reported. In addition,
109 the immune status of female to clear HBsAg in the system contribute to the low seroprevalence.

110 The HBV prevalence of 0.9% recorded among our pediatric patients may be low, but of public health concern considering
111 clinical implication of HBV acquisition at childhood. Perhaps, the level of immunization coverage and populace perception
112 may be responsible for the level recorded in our study. Nevertheless, higher level of 12.2% among pediatric population was
113 reported in southwestern Nigeria [26].

114 In this study, anti-HCV prevalence of 4.4%, is comparable to 4.39% reported among outpatients attending general hospital
115 in southeastern Nigeria [27] but lower than level reported in other similar hospital-based studies, 22.5% and 12.4% among
116 chronic liver disease patients in Ethiopia [19, 27], 10.8% 23.5% in Pakistan [21, 29] and 13.2% and 10% in rural
117 communities in Jos and Calabar [11,12].Of public health interest, is the HCV prevalence of 2.2% among pediatrics patients
118 .Though it falls within the HCV prevalence in Nigeria, it is still of public health concern especially that it is relatively newer
119 than HBV infection. Higher prevalence of 10% was reported among children attending tertiary hospital in Maiduguri [30].

120 We believe, though it is a retrospective study, the findings had re-affirmed the endemicity of HBV and emerging trend of
121 HCV in the study area which is of public health concern. requiring prompt response in term of policy formulation of

122 stemming down morbidity and mortality rate. But, the drawback is that the data is not sufficient enough to serve as a good
123 representation and to draw conclusions due to some limitations. The limitations includes, non-completion and poor
124 documentation of laboratory request forms, with lack of detailed demographic and clinical information of patient.
125 In conclusion, the high seroprevalence of HBV and HCV among suspected liver disease cases are a major public health
126 and clinical concern. Further comprehensive studies are required to provide epidemiological information for public health
127 education and awareness in our community.

128 **Acknowledgement**

129 We acknowledged assistance and support of staff in the internal medicine , pediatric units, and medical laboratory services
130 for patients management and analysis of clinical specimens that provided the data used in this study

131 **Ethical Clearance**

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

133 **Conflict of Interest**

134 All the authors declared no conflict of interest

135

136

137

138 **References**

- 139 1- Olayinka AT, Oyemakinde A, Balogun MS, Ajudua A, Nguku P, Aderinola M et al Seroprevalence of Hepatitis B
140 Infection in Nigeria: A National Survey, 2016, Am. J. Trop. Med. Hyg., 95(4), 902–907
- 141 2-. Liu Z, Hou J: Hepatitis B virus (HBV) and hepatitis C virus (HCV) dual infection. Int J Med Sci 2006, 3(2):57–62.
- 142 3- Maud Lemoine Serge Eholié Karine Lacombe. Reducing the neglected burden of viral hepatitis in Africa: Strategies for a
143 global approach Journal of Hepatology 201. 62 j 469–476
- 144 4-WHO 2014-update World Health Organization (WHO). Hepatitis B Factsheet;2014, April.
145 <http://who.int/mediacentre/factsheets/fs204/en/> [accessed 16.11.14].
- 146 5- World Health Organization (WHO). Hepatitis C Factsheet;2014, April. <http://who.int/mediacentre/factsheets/fs164/en/>
147 [accessed 16.11.14].
- 148 6- WHO. Global hepatitis report, 2017. Geneva: World Health Organization, April 2017.
149 www.who.int/hepatitis/publications/globalhepatitis-report2017/en/ (accessed July 24, 2017)

150 7-Eke AC, Eke UA, Okafor CI, Ezebialu IU, Chukwuanugo: Prevalence, correlates and patterns of hepatitis B surface
151 antigen in a low resource setting. Virol J 2011, 8:12.

152 8- Musa MB, S Bussell S, Borodo MM, Samaila AA, FemiOL. Prevalence of hepatitis B virus infection in Nigeria, 2000-
153 2013: A systematic review and meta-analysis Nigerian Journal of Clinical Practice 2015 Vol 18
154 Issue 2

155 9-World Health Organization: Hepatitis B vaccines. Wkly Epidemiologic Re 2004, 79:255–263.

156 10- Shepard CW, Finelli L, Alter MJ. Global epidemiology of hepatitis C virus infection. Lancet Infect Dis 2005; 5(9):558-
157 67.

158 11- Kouassi-M'Bengue A., Ouattara Abdoulaye, Allah-Kouadio Emile, Sevede Daouda, Doumbia Moussa and Dosso M.
159 A very high frequency of hepatitis B and C virus infections during an active screening campaign in Abidjan. AJMR 2016,
160 Vol 11(1), 8-15

161 12- Okonkwo UC, Okpara H, Otu A, Ameh S, Y Ogarekpe, Osim H, Inyama M, Prevalence of hepatitis B, hepatitis C and
162 human immunodeficiency viruses, and evaluation of risk factors for transmission: Report of a population screening in
163 Nigeria S Afr Med J 2017;107(4):346-351.

164

165 13- Pennap GR, Aliyu Y, Odula O, Joseph F: Prevalence of hepatitis B and C virus infection among people of a local
166 community in Keffi, Nigeria. Afr J Microbiol Res 2010, 4:274–278

167 14- National Survey of Viral Hepatitis B and C Infection in Nigeria. Abuja, Nigera: Nigerian Center for Disease Control;
168 2013

169 15- Alkali M, Jibrin BY, Okon K O and Umar MS. Seroprevalence of HBV, HCV and HIV among voluntary blood donors
170 at a tertiary hospital in Bauchi, northeastern Nigeria. ejpmr, 2017,4(3), 80-85.

171 16- Jibrin YB, Kolo PM, Mohammed A, Sanya EO, Aliyu LD. Burden of hepatitis B and C infections among pregnant
172 women in Bauchi, Northeastern Nigeria. Sub-Saharan Afr J Med 2016;3: 188-93.

173 17-Ndako JA, Georgebest ON. Echeonwu, Nwankiti OO, Onovoh EM, Jah AU Shidali NN Ikani PA Sero-survey of
174 Hepatitis B surface antigen amongst pregnant women attending Infectious Disease Hospital Bayara, Bauchi State, Nigeria
175 Microbiology Research 2012; volume 3: e10

176 18- Gambo, I.M. Rabi, A.M. Muhammad, M.B. Shugaba, AI Seroprevalence of HBsAg among Fulani nomads in Toro,
177 North-Eastern Nigeria Global Advanced Research Journal of Medicine and Medical Sciences 2012

178 Vol. 1(8) pp. 214-217

179 19- Tesfa H, Biadgo B, Getachew F, Tegegne K, YismawG, and Muluye D, Seroprevalence of hepatitis B and C virus
180 infection among patients attending serology laboratory of Gondar University Hospital BMC Research Notes 2013, 6:164

181 20- Zeba MTA, Ouattara CAT, Karou SD, Bisseye C, Ouermi D, Djigma FW, Sagna T, Pietra V, Moret R, Nikiema J,
182 Simpore J: Prevalence of HBV and HCV Markers among patients attending the Saint Camille Medical center in
183 Ouagadougou. Pak J Biol Sci 2012, 10:484–489.

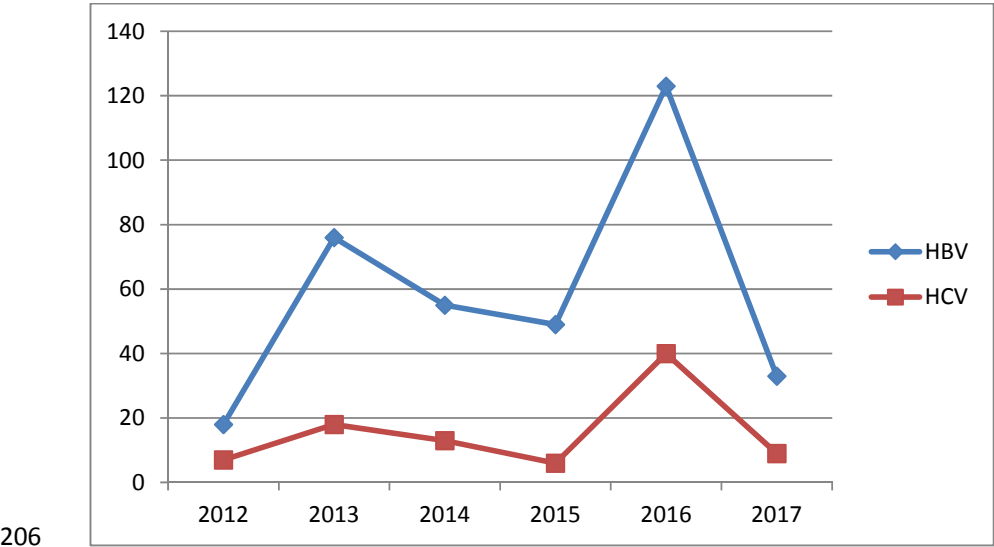
184 21- Khan J, Shafiq M, Mushtaq S, Ayaz S, Ullah R, AbdEI-Salam, H. Fouad, and AbdulWasim M. Seropositivity and
185 Coinfection of Hepatitis B and C among Patients Seeking Hospital Care in Islamabad, Pakistan. BioMed Research
186 International Volume 2014, 4 pages

187 22- Baba M.M, Ajayi BB, and Ekanam IA. Prevalence of Hepatitis B surface antigenemia among patients suspected of liver
188 diseases in a Nigeria hospital. Niger Postgrad. Med J 2000;7(3);91-5

189 23- Iloh, GU, Ikwudinma, AO. Sero-epidemiology of hepatitis B surface antigenemia among adult Nigerians with clinical
190 features of liver diseases attending a primary-care clinic in a resource-constrained setting of eastern Nigeria. N Am J Med
191 Sci 2013; 5: 293–300

- 192 | 24- Ajide AB, Adogo LY and Omilabu SA. Prevalence of Hepatitis B Viral Markers among Suspected Liver Disease
193 | Patients Attending Lagos University Teaching Hospital, Nigeria. *British Microbiology Research Journal* 2016; 12(5): 1-5
- 194 | 25- Ayele AG, Gebre-Selassie S. Prevalence and Risk Factors of Hepatitis B and Hepatitis C Virus Infections among
195 | Patients with Chronic Liver Diseases in Public Hospitals in Addis Ababa, Ethiopia. *ISRN Trop Med* 2013; e56: 3821.
- 196 | 26- Donbraye E, Japhet MO, Adesina AO, Abayomi OA (2014). Prevalence of asymptomatic Hepatitis B virus surface
197 | antigenemia in children in Ilesha, Osun state Southwestern Nigeria. *AJMR* 8(23), 2329-2331
- 198 | 27- Obienu O, Nwokediuko S, Malu A, and Lesi OA. Risk Factors for Hepatitis C Virus Transmission Obscure in
199 | Nigerian Patients *Gastroenterology Research and Practice* Volume 2011, Article ID 939673, 4 page
- 200 | 28- Ayele AG, Gebre-Selassie S. Prevalence and Risk Factors of Hepatitis B and Hepatitis C Virus Infections among
201 | Patients with Chronic Liver Diseases in Public Hospitals in Addis Ababa, Ethiopia. *ISRN Trop Med* 2013; e56: 3821.
- 202 | 29- Ishtiaq A, Chaud H, Shah Sattar K, Muhammad A, Shraf M, Pak J: Seroprevalence of hepatitis-B and C among the
203 | patients reporting in surgical OPD at Fauji Foundation Hospital. *J Med Sci* 2007, 4:514–517.

204 30- Isa MA, Kolo BS, Ibrahim A, Bulakarima A and Dawud H. Prevalence of Hepatitis C Virus among Children Attending
205 University of Maiduguri Teaching Hospital, Nigeria Ijsrm.Human, 2015; Vol. 2 (2): 14-21.



207 **Figure 1-Trend of seropositivity of HBV and HCV over 6 years study period.**

208
209

210

211 **Table 1-Seropositivity of HBV and HCV according gender and source of specimens**

		HBsAg					Anti-HCV				
		Adult		Children		p-value	Adult		Children		p-value
Total number of cases		male	female	male	female	-	male	femal e	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
