Original Research Article

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 gap in evaluating the public health problem, its attendant negative clinical sequalae and high morbidity and mortality rate. The retrospective study serological screened for HBV and HCV 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

A total of 2099 cases were serological screened and analyzed for Hepatitis B and C. Overall seroprevalence was 21.7%, HBsAg was detected in 16.7% cases and Anti-HCV in 3.0% cases. Peaked seropositivity was observed in 2013 and 2016,

with male preponderance and statistical significance difference was observed 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- study area. Though this data might not be true representation of viral hepatitis infection in study area but had provided an insight to epidemiological picture and need for infection control and preventive measures.

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

Background

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

In developing countries, with high prevalence of HBV and HCV infections there is 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 posed 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, accounts for 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 WHO global -HBV 2017, reports the prevalence estimate of 6.1%(4.6%-8.5%) [6]. There is varied prevalence depending on sex, ethnicity, urban and rural, economic status. The risk of chronic HBV infection is inversely related to the age of infection [6]. In Nigeria, the prevalence of HBV ranged between 4.0 to 46.8% [8]. Demographic variables like age and gender influenced 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 resultant reduction in mother to child transmission [9]. Global prevalence of HCV- ranged between

2% and 3, High prevalence is recorded in Egypt and West African countries, Pakistan [10-14]. In Nigeria, the estimated prevalence of HCV was 2.2%(2.1%-2.5%), but prevalence difference depends on geographical location, studied population and methodology employed [14]

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

In Bauchi state and its neighboring states, epidemiological information of HBV and HCV had been carried out on selected population -blood donors, nomadic fulani and pregnant women [15-18], but none had looked at hospital based population with suspected liver diseases. Therefore, the findings of this study is to complement the seroprevalence of other studies and provide epidemiology information and understanding of viral infection, necessary for infection control and prevention strategy of reducing morbidity and mortality rate. Based on this information, we retrospectively evaluated seroprevalence of HBV and HCV infections among patients on admission in the medical and pediatric wards with suspected cases of liver disease in the study centre

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 major referral centre in the northeastern Nigeria and provides multi specialties services and training of health care professionals. The serological data of HBsAg and anti- HCV of patients with suspected liver disease as indicated in the laboratory request form by the attending physician were extracted from laboratory book and entered into study data. The data was classified according to the age of the patient into adult and pediatrics. The Rapid diagnostic latex kits (Biotest Hamgzhou (Biotech CO Ltd China) kit) for serodetection of HBsAg -and anti- HCV was used, and analysis carried out according to manufacturer instruction. A total of 2099 cases were analyzed over the 5 years period, with 2076 adults and -23 children.

Data analysis

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

Result

A total of 2099 inpatients with suspected liver diseases 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 1:1.3. Peaked seropositivity of HBV and HCV as depicted in figure I, was observed in 2013, 16.4%(n=76) vs 3.9%(n=18) and 2016 16.9%(n=123) vs5.5%((n=40).Statistical significant difference was observed between viral hepatitis and gender/age of patient, in 2013($p<0.0001$) and 2016($p<0.002$) with HBV 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=2550 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-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.

Discussion

As HBV and HCV constitute a public health concern with attendant clinical sequalae, epidemiological information become imperative for public health awareness, education, infection control and preventive measures. In this study, overall seroprevalence of both HBV and HCV among patients with suspected Liver disease was 20.7%, which is comparable to 20.9% reported in a hospital-based serological screening in Ethiopia [19]. Though the study in Ethiopia was not limited to

patients with suspected liver disease, the findings in this study showed that prevalence may be higher if the subjects are not limited to patients with suspected liver disease. However, the findings are lower than the level reported in other studies, 27.0% in Ouagadougou, Burkina Faso [20], and 30.1% [21]. The level was higher than level reported among the blood donors in the same study center (8.0%) [15]. The observed difference may be due to study population, geographic location, demographic variables, and methodology employed. The asymptomatic status of viral hepatitis allows for progression with diverse clinical signs and symptoms resulting in late hospital presentation. 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 behavior of patients in the area. Similarly, there was statistical significant difference 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 seropositivity.

In Nigeria, the endemicity of HBV and its association with liver diseases have been documented [1,7,8,12,13,16-18], with recent national HBV seroprevalence of 12.2% [1]. In this study, the prevalence of HBV of 16.7% was higher than level in studies conducted in Bauchi state and its environ, 7.0% among blood donor [15], 14.6% [16] and 12.4% [17] among

pregnant women and 12.2% among nomadic Fulani [18]. But lower than similar studies conducted in other part of Nigeria, 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 methodology employed, as some studies employed Enzyme Linked Immunosorbent Assay which is more sensitive and specific than serology employed in our study. The male predominance of HBV and HCV as observed in this study, is consistent with the findings of other studies [19,20]. The socio-cultural and religious practice of polygamy practice by couples in the study region, and unhygienic practice that facilitates spread of viral infection may contribute significantly to the level reported. In addition, the immune status of female to clear HBsAg in the system contribute to the low seroprevalence.

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

In this study, anti-HCV prevalence of 4.4%, is comparable to 4.39% reported among outpatients attending general hospital in southeastern Nigeria [27] but lower level than other similar hospital-based studies, 22.5% and 12.4% among chronic liver

disease patients in Ethiopia [19, 27], 10.8% 23.5% in Pakistan [21, 29] and 13.2% and 10% in rural communities in Jos and Calabar [11,12]. The HCV prevalence of 2.2% among pediatrics patients though 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 tertiary hospital in Maiduguri [30].

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

In conclusion, the high seroprevalence of HBV and HCV among suspected liver disease cases are a major public health and clinical concern. Further comprehensive studies are required to provide epidemiological information for public health education and awareness in our community.

References

1- Olayinka AT, -Oyemakinde A, -Balogun MS, Ajudua A, Nguku P, Aderinola M et al Seroprevalence of Hepatitis B Infection in Nigeria: A National Survey, 2016, Am. J. Trop. Med. Hyg., 95(4),- 902–907

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.

3- Maud Lemoine Serge Eholié Karine Lacombe. Reducing the neglected burden of viral hepatitis in Africa: Strategies for a global approach Journal of Hepatology 201 . 62 j 469–476

4-WHO 2014-update World Health Organization (WHO). Hepatitis B Factsheet;2014, April. http://who.int/mediacentre/factsheets/fs204/en/ [accessed 16.11.14].

5- World Health Organization (WHO). Hepatitis C Factsheet;2014, April. http://who.int/mediacentre/factsheets/fs164/en/ [accessed 16.11.14].

6- WHO. Global hepatitis report, 2017. Geneva: World Health Organization, April 2017. www.who.int/hepatitis/publications/globalhepatitis- report2017/en/ (accessed July 24, 2017

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

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

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

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

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

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

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

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

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

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

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

18- Gambo, I.M. Rabiu, A.M. Muhammad, M.B. Shugaba, AI- Seroprevalence of HBsAg among Fulani nomads in Toro, North-Eastern Nigeria Global Advanced Research Journal of Medicine and Medical Sciences 2012 Vol. 1(8) pp. 214-217

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

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

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

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

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

24- Ajide AB, -Adogo LY and -Omilabu SA. Prevalence of Hepatitis B Viral Markers among Suspected Liver Disease Patients Attending Lagos University Teaching Hospital, Nigeria. British Microbiology Research Journal 2016; 12(5): 1-5

25- Ayele AG, Gebre-Selassie S. Prevalence and Risk Factors of Hepatitis B and Hepatitis C Virus Infections among Patients with Chronic Liver Diseases in Public Hospitals in Addis Ababa, Ethiopia. *ISRN Trop Med* 2013; e56: 3821.

26- Donbraye E, Japhet MO, Adesina AO, Abayomi OA (2014). Prevalence of asymptomatic Hepatitis B virus surface antigenemia in children in Ilesha,Osun state Southwestern Nigeria. AJMR 8(23), 2329-2331

27- Obienu O, Nwokediuko S, Malu A, and- Lesi OA. Risk Factors for Hepatitis C Virus Transmission Obscure in Nigerian Patients Gastroenterology Research and Practice Volume 2011, Article ID 939673, 4 page

28- Ayele AG, Gebre-Selassie S. Prevalence and Risk Factors of Hepatitis B and Hepatitis C Virus Infections among Patients with Chronic Liver Diseases in Public Hospitals in Addis Ababa, Ethiopia. *ISRN Trop Med* 2013; e56: 3821.

29- Ishtiaq A, Chaud H, Shah Sattar K, Muhammad A, Shraf M, Pak J: Seroprevalence of hepatitis-B and C among the patients reporting in surgical OPD at Fauji Foundation Hospital. J Med Sci 2007, 4:514–517.

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

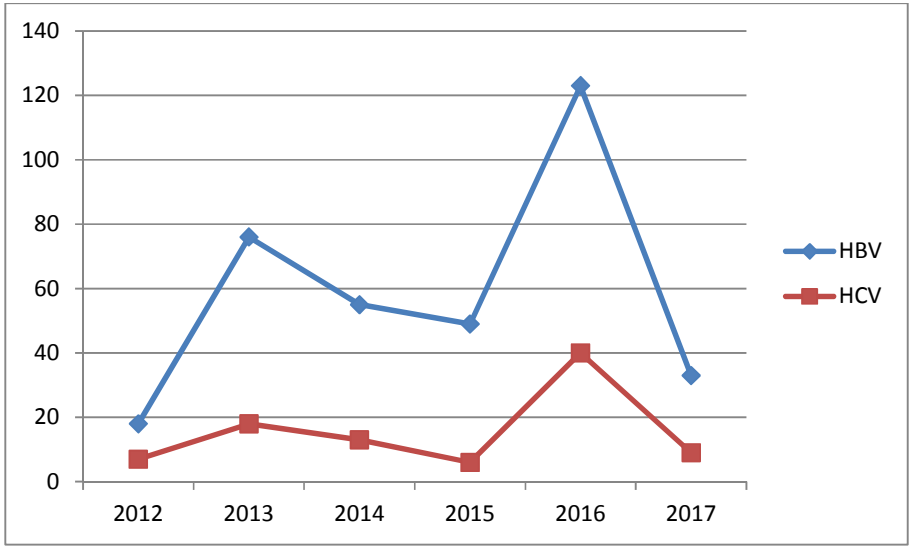

Figure 1-Trend of seropositivity of HBV and HCV over 6 years study period.

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

		HBV					HCV				
	Total number of cases	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

Table 2: Percentage of Distribution of Patient Screened for HbSAg and HCV

Year	No. Screened	No. HbSg Positive	No. HVC Positive
2012	112	18 (16.07%)	7 (6.25%)
2013	463	76 (16.41%)	18 (3.89%)
2014	207	55 (26.57%)	13 (6.28%)
2015	338	49 (14.50%)	6 (1.77%)
2016	728	123 (16.90%)	40 (5.49%)
2017	251	33 (13.15%)	9 (3.59%)
Total	**2099**	**354 (16.87%)**	**93 (4.43%)**

Seroprevalence of 447(21.3%)

HBV=354(16.9%)

HCV=93(4.4%)

Gender distribution-M=324, F=123, M;F =1:1.26

HBV-M=255, F=99, M;F =1;1;2.6, adult-354, Peadiatric -3

HCV-M=69, F=21, M;F =1.1.3.2, adult=78, Peadiatric=2