Journal of Hepatitis Research

Open Access

Austin Publishing Group

Research Article

Prevalence of Hepatitis B Surface Antigen and Hepatitis C Antibody in Abuja Municipal Area Council Fct-Nigeria the North-Central Geopolitical Zone

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Received: April 05, 2015; **Accepted:** July 18, 2016; **Published:** August 01, 2016

Abstract

Hepatitis B and C viruses are growing worldwide public health issue today. Their pathology is responsible for considerable increase in healthcare expenses despite the widely recognized public health authority to keep them under control.

Aim: The present study was done to estimate the prevalence of hepatitis B virus surface antigen (HBsAg) and hepatitis C (HCV) antibody amongst 1650 respondents residing in Abuja Municipal Area council comprising the eleven wards

Method: The CTK Biotech HBV /HCV rapid test kits were used. The media age was 34 years. Working class people constituted 31.0% of those sampled.

Result: Of the 1650 blood samples tested, 63 respondents were positive to both HCV and HBV with 32.3% and 67.6% male and female respectively giving a cumulative percentage of 3.8 out of which 3.1% and 0.7% were for hepatitis B and C respectively.

Conclusion: No mixed infection of both viruses was observed in the residents of Abuja municipal Area council tested. No significant relationship was seen between HBV and HCV sero-positivity and demographic factors.

The prevalence of Hepatitis B virus and hepatitis C Virus is moderate among the resident of Abuja municipal Area council, FCT-North central geopolitical zone of Nigeria

Keywords: Hepatitis B surface antigen; Sero-positivity; Liver; Hepatocytes; Hepatocellular carcinoma

Background

Hepatitis B and C is a growing worldwide public health issue today. The pathologies there cause are responsible for a considerable healthcare expenses despite the widely recognized public health authority to keep then under control.

Almost **2 billion** people are infected with this disease worldwide; more than **350 million** people are chronic carriers of HBV. Fifteen-**40%** of infected patients will develop cirrhosis, liver failure or hepatocellular carcinoma [1].

Worldwide, infections with hepatitis B and C viruses cause an estimated 57% of cases of liver cirrhosis and 78% of cases of primary liver cancer [2]. The availability of a vaccine that confers lifelong protection against infection with the hepatitis B virus and the current cure for hepatitis C in around 70% of people who take treatment give public health a rare opportunity to prevent a leading cause of cancer, especially in low- and middle-income countries [3].

Hepatitis B Virus infection accounts for **500,000** to **1.2 million** deaths each year and is the 8th leading cause of death worldwide [4].

Introduction

Hepatitis basically is a disease of the liver and is a serious public health issue today. The five viruses that cause infections of the liver are responsible for a widely prevalent and growing disease burden. No country, rich or poor, is spared. These viruses are important as they cause infectious diseases in their own right [5].

In particular, types B and C lead to chronic disease in hundreds of millions of people and, together, are the most common cause of liver cirrhosis and cancer [6]. Hepatitis B is a DNA virus; hepatitis C is an RNA virus. These viruses invade liver cells in their attempt to replicate. The hepatitis C virus hijacks the cell and reprograms the cell's RNA and DNA, causing the liver cells to begin reproducing more viruses.

Hepatitis A and E viruses otherwise called infectious hepatitis are major foodborne and waterborne infections. Hepatitis A and E are typically caused by ingestion of contaminated food or water, which cause millions of cases of acute illness every year, with several months sometimes needed for full recovery. Hepatitis B, C and D also known as serum hepatitis, usually occur as a result of parenteral contact with infected body fluids, also make a substantial contribution to the burden of chronic diseases and the premature mortality they cause.

Serum hepatitis (hepatitis B and C) is present in the blood, saliva, semen, vaginal secretions, and menstrual blood and to a lesser extent perspiration, breast milk, tears and urine of infected individuals [7].

Citation: Itodo SE, Otu-Bassey IB and Cecil K. Prevalence of Hepatitis B Surface Antigen and Hepatitis C Antibody in Abuja Municipal Area Council Fct-Nigeria the North-Central Geopolitical Zone. J Hepat Res. 2016; 3(1): 1034.

Table 1: Number of respondents in each ward in Abuja Municipal Area council.

Ward	n	%
City Centre	281	17.2
Wuse	180	10.9
Gwarinpa	200	12.1
Garki	180	10.9
Kabusa	120	7.3
Gui	70	4.2
Jiwa	80	4.8
Gwagwa Karshi	97	5.9
Orozo	118	7.2
Karu	152	9.2
Nyanya	172	10.4
TOTAL	**1650**	**100**

Table 1 shows the characteristics of the respondents according to the eleven wards. Two hundred and eighty one (17.0%) recorded the highest number of respondents in the city Centre while Kabusa and Gui recorded the lowest turnout with 4.2% and 4.8% respectively.

Table 2: Mean age of respondents (years).

Designations	Mean	Std. Deviation
Civil servants	38.6	14.3
Farmers	43.1	14.9
Students	26.8	5.7
Business	39.8	19.6
Total (Mean)	**37.08**	**13.6**

As shown in table 2, overall, the mean age was 37.08 years. At the designation level, the mean age of the respondents ranged from 26.8 years among the students to 43.1 years among the farmers.

Table 3: Sex of respondents.

Designation	Female N (%)	Male N (%)
Civil servants	390 (23.63)	122(7.39)
Farmers	300(18.18)	127(7.70)
Students	210(12.72)	208(12.61)
Business	216(13.09)	77(4.67)
Total	**1116(67.64)**	**534(32.36)**

Table 3 shows that the majority of the respondents were females 1116 (67.64%). The highest numbers of females were found among the civil servants and the least among the students.

Hepatitis B virus is a highly resilient virus, resistant to breakdown, can survive outside the body and easily transmitted through contact with infected body fluids [7]. By and large, serum hepatitis can be transmitted when fluid from an infected person enters the body of another person, this can happen through the following ways: Unprotected sexual intercourse with an infected person, unscreened blood transfusion or blood components collected during window period, when using unsterilized or contaminated skin piercing instruments e.g. Needles/syringes, razor blades, circumcision and other skin piercing instruments, From an infected mother to her baby during childbirth or after birth during breast-feeding.

Although a lot of work has been done on hepatitis, information on the frequency of hepatitis B and C infection in Abuja municipal Area council, FCT is lacking (Table 1).

The purpose of the study carried out by Hajo Non Communicable Diseases Prevention Initiative led by its president was to:

- Determine the rate of hepatitis B and C infections among the different respondents in Abuja municipal Area council, FCT.
- Determine and identify the age group frequently infected with hepatitis B and C infections.
- In order to establish the high risk group in Abuja municipal Area council, FCT.

Material and Methods

Study design

The study was a descriptive cross-sectional survey.

Study Area: Abuja Municipal Area Council is located on the eastern wing of the Federal Capital Territory. It is bounded on the east of Nasarawa State, on the West by Kuje Area Council, North-West by Gwagwalada and on the North by Bwari Area Council.

The last demographic report by the national population commission in 2006 indicated that the population of the Area Council stood at 309, 306 people.

Abuja Municipal Area Council has the following ethnic groups: Gbagyi settlements in Abuja Municipal Area Council include the following: Karu, Nyanya, Durumi, Garki, KettiKabusa, Mabushi, Jabi, Lugbe, Idu, Toge, Hulumi, Pyakasa, JikwoyiKurudu, Orozo, Maitama and Asokoro Areas.

Besides that the Area Council has twelve (12) political wards namely; City Centre, Wuse, Gwarinpa, Garki, Kabusa, Gui, Jiwa, Gwagwa, Karshi, Orozo, Karu and Nyanya. Each of these wards has a comprehensive healthcare Centre where the mobilization, awareness and screening were carried out.

The main occupation of the people is civil service. There are however farmers, traders and few hunters. The climate is tropical with two main seasons from April to October covering the rainy season where transmission of the hepatitis B and C virus is most likely and from November to March covering the dry season (Table 2).

Study Population: A total of one thousand six hundred and fifty (1650) **respondents** were **s**creened of hepatitis C and the surface antigen of hepatitis B within the age bracket of 9 to 60 years from April 2014 to May 2015. Analysis of the sample was done in each of the comprehensive health care Centre visited.

Datal collection

Social-demographic data including age, sex and presenting complaints were obtained from the clients (Table 3).

Sample size determination

The minimum sample size estimation for each selected 2 local governments is based on the formula for calculating sample size for cross-sectional studies with simple random sampling:

$n = Z2 \times (p) \times (1\text{-}p)/c2$

Where Z= Standard normal deviation at 1.96 which corresponds

Table 4: Respondents who have had a sexual partner who was not their spouse.

Designations	No N (%)	Yes N (%)
Civil servants	18(1.09)	494(29.9)
Farmers	200(1212)	227(13.8)
Students	87(5.27)	331(20.1)
Business	241(14.61)	52(3.15)
Total	**546(33.1)**	**1104(66.9)**

All in all as shown in table 4, 1104 (66.9%) of the respondents have had a sexual partner who was not their spouse. This was highest among the civil servants (29.9%), followed by the students (20.1%) and farmers (13.8%). The least was among the business (3.15%).

Table 5: Respondents who have ever done work that had contact with blood.

Designations	No N (%)	Yes N (%)
Civil servants	410(24.8)	102(6.2)
Farmers	110(6.7)	317(19.2)
Students	189(11.5)	229(13.9)
Business	177(10.7)	116(7.0)
Total	**886(53.7)**	**764(46.3)**

Coming in contact with blood in the course of one's work is a risk factor. As shown in table 5, among the respondents, those who have ever come in contact with blood in the course of their work were 46.3%. Among these, farmers had the highest number with 19.2% followed by the students 13.9% and the business people 7.0%. The civil servants had the least being 6.2%.

Table 6: Hepatitis B surface antigen and antibody to hepatitis C prevalence.

Designations	Negative N (%)	Positive N (%)
Civil servants	494(29.9)	18(1.1)
Farmers	417(25.3)	10(0.6)
Students	391(23.7)	27(1.6)
Business	285(17.3)	8(0.5)
Total	**1587(96.18)**	**63(3.8)**

Table 6 Shows that the prevalence of Hepatitis B and C in the sampled population is 3.8%, with 3.09% and 0.73% for B and C respectively. The prevalence varies from designation to designation. The highest prevalence of Hepatitis B and C was found among the students (1.6%). This was followed by the civil servants (1.1%), Farmers (13.4%). The least was among the business people (0.5%).

to 95% confidence level

P= Prevalence rate

C= Confidence interval =0.05

Using prevalence 11% [**Nigerian Centre for Disease Control/ Epidemiology Division; 2013) as the percentage rate**

Where Z_{α}=1.96, p=0.11 (from a previous survey), and c=0.05

Therefore, sample size, n=1.96^2 X 0.11 (1-0.11)/0.05^2= 150 per local government

Allowing for nonresponse of 10% = 165 per local government

Final sample size for the 2 local governments =2 X 165 =330

Specimen collection

After obtaining the relevant information and explaining to the respondents the aim of the study and the test procedures 2ml of blood was collected aseptically through venepuncture using sterile syringe and needle following application of tourniquet. The surface of the skin

Table 7: Hepatitis C & B Prevalence.

Designations	Anti-C Positive N (%)	HBsAg Positive N (%)
Civil servants	2(3.2)	15(23.8)
Farmers	2(3.2)	8(12.7)
Students	3(4.8)	22(34.9)
Business	5(7.9)	6(9.5)
Total	**12(19.0)**	**51(80.9)**

Table 7 shows that the prevalence of Hepatitis B and C in the sampled population is 3.8%, with 3.09% and 0.73% for B and C respectively. The prevalence varies from designation to designation. The highest prevalence of Hepatitis B and C was found among the students (1.6%). This was followed by the civil servants (1.1%), Farmers (13.4%). The least was among the business people (0.5%).

Table 8: Hepatitis C & B Prevalence according to sex of respondents.

	Anti-C		HBsAg	
Designations	**Female N (%)**	**Male**	**Female N (%)**	**Male**
Civil servants	1(8.3)	1(8.3)	10(19.6)	5(9.8)
Farmers	0(0)	2(16.7)	2(3.9)	6(11.8)
Students	1(8.3)	2(16.7)	10(19.6)	12(23.53)
Business	2(16.7)	3(25)	1(1.7)	5(9.8)
Total	**4(33.3)**	**8(66.7)**	**23(45.1)**	**28(54.9)**

Table 8 Shows that the male respondents had the highest prevalent rate 66.7% and 54.9% for both anti-HCV and HBsAg respectively. The highest prevalence rate of HBsAg was recorded among the students and the least among the business men.

was disinfected with methylated spirit on cotton wool and allowed to dry. The blood was transferred to an EDTA container and allowed to clot at room temperature. The clot was dislodged and centrifuged at 1000rpm for 5 minutes. The serum was harvested using a Pasteur pipette and transferred into serum container with caps and properly labeled. The test was performed immediately, unless stated otherwise in which case, the samples were kept frozen at -20^0C (Table 4).

The test was done using a highly specific and sensitive CTK Biotech HBV /HCV rapid test kits. These tests strips were manufactured by CTK Biotech. Inc. San Diego, USA, and the principles were based on the immune chromatographic sandwich.

Procedures adopted for all the tests and the interpretations of the results were in accordance with the manufacturers' Specification.

Results & Discussion

Hepatitis basically is a disease of the liver and is a serious public health issue today.

A total of 1650 respondents were screened for both hepatitis B and C with 1116 (67.04%) and 534 (32.36%) females and males respectively. Five hundred and twelve (512) were from the civil service, four hundred and twenty seven from the students and two hundred and ninety three were from the business people.

A total of 63 (3.8%) were reactive to both the surface antigen of hepatitis B and the hepatitis C antibody with 3.0% for hepatitis B and 0.7% for hepatitis C.

Comparatively, 12 and 51 respondents were reactive to both hepatitis C and B, 2 (3.2%) were from the civil service and farmers

respectively compare with the 15 (23.5%) and 8 (12.7%) for hepatitis B respectively. However, highest prevalence was recorded among the students 22 (34.9) for hepatitis B compare to the 3 (4.8%) recorded for hepatitis C. Business class had 5 (7.9%) and 6 (9.5%) for hepatitis C and B respectively.

The study shows that 3.8% of the total people tested were positive to hepatitis B and C infections. This trend could have extensive implications for our national growth and development since the serum hepatitis affect people in their prime age of productivity (Table 7).

The 3.1% reactive to HBsAg shows it as a moderate endemicity of HBV infection according to WHO criteria [8]. Uneke classified high endemicity from HBV infection and defined it as HBsAg greater than 7% in an adult population [9]. This also supports the WHO report for Nigeria as highly endemic area with prevalence greater than 8% [10]. The prevalence of HBsAg found in children and adult population in Abuja Municipal Area council is however in tandem with the range of reports given in other studies carried out in other parts of Nigeria, Africa and the rest of the world. In reported studies for hepatitis B carried out in some parts of Nigeria, there were higher prevalence's rates of 12.8% in Minna [11], 15.8% in Maiduguri [12], 11% in Makurd [13]. Lower reports reported include 2.19 % in Benin City [14]. 8.3% in Zaria [15] and 5.7% in Ilorin [16]. In some African countries, there were high prevalence rates of 17.3% in Burkino Faso [17]. Lower reports were 5.3% in Ethiopia [18], 6.3% in Tanzania [19]. In comparison to other findings from the rest of the world were 2.11% in Northern Turkey [20]. 12% in Taiwan [21]. These variations, noticed may be related to the peculiarities in the modes of transmission of HBsAg and HCV dictated by socio-cultural practices, the level of promiscuity among the general population especially the students and the environmental factors. The 0.7% prevalence of HCV in the tested population was found to be low when compared to other studies carried out in Nigeria. Paul reported a 12% in South-Western Nigeria [22] and the 2.5% in Maiduguri [12]. When compared to findings from other African countries, there were higher rates of 17-26% in Egypt [23], 2.6% Côte d'Ivoire [24]. It was found to be the same as the research carried in Sudan [25]. There was a lower prevalence rate of 0.01% in the United Kingdom [23].

Overall 32.36% of the people infected were males with about 67.64% females. It can be inferred here that the male folks serve as the major reservoir for the transmission of the infection. This is in contrast with Baruch which says that the females are more likely than males to develop anti-HBs in response to infection [26].

Coming in contact with blood in the course of one's work is a risk factor, among the respondents; those who had ever come in contact with blood in the course of their work were 46.3%. Among these, farmers had the highest number with 19.2% followed by the civil service with 13.9%. This can be explained as the result of their low level of education and the illegal use of intravenous drugs. Aseptic measures are not always adhered to leading to an increase in transmissible infection among the farmers (Table 5 & 6).

Those within the prime age of 26.8 years made up the most frequent group infected with chronic hepatitis B infection among the students. This is in contrast to the age group of 35 years reported by Forbi [27]. The mean age of the farmers and civil servants frequently infected with chronic hepatitis B and C were 43.1 and 38.6 years respectively. This is in tandem with the 36 years reported by Daneshmand in Iran (Table 8).

Conclusion

There should be a need to formulate a national policy on screening, vaccination and management of Hepatitis B and C among the at- risk groups and those within the prime age of productivity. This would increase public awareness, while strengthening efforts to reduce the prevalence of the disease. Immunization is the most effective means of controlling HBV world-wide. The vaccine has an outstanding record of safety and efficacy, and it is 95% effective in preventing development of the chronic carrier state.

Discouraging communal sharing of blade/sharp instruments used for shaving, barbing, manicure and body piercing/cutting and high level sexual networking.

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Citation: Itodo SE, Otu-Bassey IB and Cecil K. Prevalence of Hepatitis B Surface Antigen and Hepatitis C Antibody in Abuja Municipal Area Council Fct-Nigeria the North-Central Geopolitical Zone. J Hepat Res. 2016; 3(1): 1034.