

Prevalence of Hepatitis B virus (HBsAg) among Apparently Healthy Inhabitants of Hildi Adamawa State, Nigeria

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Abstract

Hepatitis B viral infection is a major global health problem which can cause chronic infection and responsible for high risk of death from cirrhosis and liver cancer. This study determines the prevalence of hepatitis B viral infection in apparently healthy population in Hildi. A total of 1,920 participants' whole blood was screened for HBsAg using HBsAg strip. Blood sample was collected *in-vitro* from the subjects direct onto HBsAg stripe, a drop of buffer solution was added onto the blood on the strip and allowed to stay for 15-20 minutes before the result was interpreted. Results obtained showed that 7.1% (137/1920) of the participants were positive for HBsAg and 134 out of the 137 infected participants had no prior knowledge of their status. Females were more infected than males and age group 11-20 years expressed the highest rate of infection followed by age group 21-30 years. The high prevalence of infection particularly among inhabitant that had no knowledge that they were infected is capable of increasing disease burden in the community. This highlights the need to improve on vaccination, conduct of periodic screening and treatment of infected person.

Keywords: Hildi, HBV, HBsAg, virus, hepatitis.

Introduction

Hepatitis B virus (HBV) infection is a potentially life-threatening liver infection caused by a double stranded DNA virus of the family hepadnaviridae (Kolawale *et al.*, 2012). It is a major global health problem accounting for approximately 257 million chronic HBV infection and 887000 deaths, predominantly from cirrhosis and hepatocellular carcinoma (W.H.O., 2019). It causes short-term illness that could result to immanent damage in adult; however 2 to 6% of adults infected usually develop chronic infection that can potentially lead to liver cancer (W.H.O., 2019). About 90% of infants infected with HBV could develop chronic HBV infection while less than 10% of those infected after the age of five do (C.D.C., 2011). On initial infection with HBV, it may take 30 to 180 days for onset of symptoms. Although many people particularly immunocompetent adults and older children may have no symptoms during the initial infection, some develop a rapid onset of sickness with vomiting, yellowish skin, tiredness, dark urine and abdominal pain (W.H.O., 2019). Often these symptoms last a few weeks and rarely does the initial infection result in death (C.D.C., 2011). Most of those with chronic disease have no symptoms; however, cirrhosis and liver cancer may

eventually develop (Chang, 2007). These complications result in the death of 15 to 25% of those with chronic disease (W.H.O., 2019)

Hepatitis B virus (HBV) infection spread by mucosal exposure to infected blood and various body fluids, as well as through saliva, menstrual, vaginal, and seminal fluids. Sexual transmission of HBV may occur, particularly in unvaccinated men who have sex with men and heterosexual persons with multiple sex partners (W.H.O., 2017). It may also occur iatrogenic or horizontally through long time household, interfamilial; especially child to child contact with no sexual involvement in region of high endemicity (Gupta *et al.*, 2008) and through the reuse of needles and syringes either in health-care settings or among persons who inject drugs. In addition, infection can occur during medical, surgical and dental procedures, through tattooing, or through the use of razors contaminated with infected body fluid and during delivery by infected mother (Yi *et al.*, 2016; W.H.O., 2017; W.H.O., 2019).

Hepatitis B virus possesses the propensity to spur "silent epidemic" because most people do not express symptoms when newly or chronically

infected. Thus, they unknowingly continue the silent spread of HBV to others (Sereno *et al.*, 2012; Ian, 2018). For people who are chronically infected but do not have any symptom, their liver is being silently damaged and this can develop into serious liver disease such as cirrhosis or liver cancer (Sereno *et al.*, 2012; Ian, 2018).

Studies in Nigeria have shown that HBV is the major aetiologic agent for cirrhosis and hepatocellular carcinoma. Reports of serum carrier rate of the surface antigen of hepatitis B virus (HBsAg) show that infection by the virus is prevalent in Nigeria (Musa *et al.*, 2015). Because of the asymptomatic carrier state of HBV, the infection remains largely underreported especially in Nigeria. In view of the fact that HBV infection is preventable and treatable through safe vaccine and effective drug therapies (W.H.O., 2019) and the advantage of decreasing the chronic carrier rate of HBV within the population, this study was carried out to determine the prevalence and distribution of HBV infection in apparently healthy population in Hildi community, Hong local government.

Materials and Methods

Study Area

Hildi is the second largest town in Hong local government, Adamawa State, Nigeria. The inhabitants are predominantly farmers while few are civil servants and business men. The population of Hildi is 10,674 and it is located at an elevation of 566 meters above sea level. Its coordinates are 10°24'0" N of the equator and 13°10'0" E of the prime meridian (Lat. Long.) (Getamap.net, nd)

Study Design

The study was initiated by a seminar organised by the Church of Brethren in Nigeria across all the local churches in the study area to mark health day. The subject discussed was 'Hepatitis B; a potential threat to life'. This seminar triggered members of

the community regardless of their religion to voluntarily subject themselves for screening. Consecutive sampling technique was employed. Informed consent was obtained from each individual that indicated interest to be screened. Consent was provided by self for 18 years and older, while consent was provided by parent and caregiver for participant below 18 years. Three of the participants reported that an earlier test conducted on them showed they were positive for HBsAg but wanted reconfirmation. All participants received their test result after the survey, and those who were found to be positive for HBsAg were contacted and referred to the nearest government hospital for further evaluation and management as deemed appropriate by the consulting physician.

Sample Collection and Analysis

A total of 1,920 participants' whole blood samples were collected and screened for hepatitis B surface antigen (HBsAg). The whole blood samples were collected *in vitro* from the subjects directly onto HBsAg strip (Standard diagnostic Inc.), a drop of buffer solution was added onto the blood on the strip, and allowed to stay for 15-20 minutes before the result was interpreted according to the manufacturer's instruction. Simple percentage was used to describe proportion and prevalence.

Result

The results obtained from the study showed that of a total of 1,920 blood samples, an overall seropositivity rate of 137(7.1%) was recorded. A higher rate of HBV infection was recorded in females 89(8.7%) than males 48(5.4%). Vulnerability to HBV infection was highest in the age group 11-20 years followed by 21-30 years and was least in 51 years and above (Table 1). The status of the three participants that wanted reconfirmation was positive.

Table 1: Prevalence of hepatitis based on age and gender

Age	Male		Female		Total	
	No. examine	No. positive (%)	No. examine	No. positive (%)	No. examine	No. positive (%)
1-10	239	9 (3.8)	300	14(4.6)	539	23(5.9)
11-20	300	23 (4.6)	379	40(5.9)	679	63(9.3)
21-30	279	15(3.1)	237	32(4.6)	516	47(9.1)
31-40	56	00(0.0)	69	3(4.4)	125	03(2.4)
41-50	17	01(5.9)	39	00(0.0)	56	01(1.8)
> 50	05	00(0.0)	00	00(0.0)	05	00(0.0)
Total	896	48(5.4)	1024	89(8.7)	1920	137(7.1)

Discussion

Hepatitis B virus infections constitute a significant cause of liver disease morbidity and mortality worldwide. Although the prevalence of the infection in Nigerian as a whole is not known, the country has been considered among the highly endemic countries in sub-Saharan Africa (Musa *et al.*, 2015). In this study a total prevalence of 7.1% was observed among apparently healthy individuals screened for HBsAg, and of the 137 participants positive for HBV, 134(97.8%) reported that they had no knowledge their status. The high incidence of hepatitis B virus infection observed in this community particularly among apparently healthy subjects infer silent transmission of HBV infection within the community and calls to question the effectiveness of HBV control programme in Nigeria. This finding is in line with a study conducted in Abuja where 1,891 people were sampled and a prevalence of 6% was reported (Adoga *et al.*, 2010). In the same vein, a systematic review and meta-analysis on prevalence of HBV infection in Nigeria reported a pooled prevalence of 13.6% (Musa *et al.*, 2019) while national survey on prevalence of HBV infection reported a prevalence of 12.2% (Olayinka *et al.*, 2016).

The prevalence of HBV infection observed in this study is higher in female compared to males. This observation corroborated the findings in a study on the prevalence of HBV infection in Nigeria which reported that HBV prevalence was hyper endemic (prevalence > 8%) in women (Musa *et al.*, 2015). However the reason for the high vulnerability of female than male to HBV infection could not be postulated. Contrary to our observation, studies conducted elsewhere in Nigeria, Abuja and a national survey on seropositivity of HBV infection

in Nigeria revealed higher prevalence in male than female, however, the differences reported were not statistically significant, implying that HBV infection is not related to sex (Olayinka *et al.*, 2016; Adoga *et al.*, 2010; Musa *et al.*, 2015).

When prevalence rate was compared across age groups, a relatively high prevalence was observed within age group 11-20 years and 21-30 years. The prevalence across the age groups increased from age 1-10 years to 21-30 years after which it declines as the age increases. This observation corroborated well with the study of Olayinka *et al.* (2016), who in a study conducted in North West Nigeria reported that young adults within the 11 - 20 years age group were the most vulnerable members of the community. In a similar studies conducted by Adoga *et al.* (2010), the most vulnerable age groups were 11-20 and 21-30 years. Given the sexual transmission of HBV infection, we hypothesize that the high sexual activity within the age groups could be responsible for the high rate of infection observed in this study.

Although a systematic review and meta-analysis on prevalence of HBV infection in Nigeria over a 13 years period (2000 to 2013) observed a sustained decline in the prevalence, findings by same study reveal that approximately 14% of Nigerians were exposed to HBV from 2000 to 2013 (Musa *et al.*, 2015). This estimate placed Nigeria as one of the most affected countries in Africa and indeed the world (Musa *et al.*, 2015). The rate of infection recorded in this study particularly among asymptomatic participants that had no prior knowledge that they were infected underscore the need to embark on a wide scale survey in order to understand the extent of the threat.

Conclusion

Studies from several communities in Nigeria have shown that Hepatitis B viral infections are on the increase with new cases reported among healthy population. The number of new asymptomatic cases reported in this study is alarming. Therefore incremental effort in the area of health education, treatment of positive cases and vaccination by the primary health care authority are likely to yield great result in HBV prevention and control.

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Reference

- Adoga, M. P., Gyar, S. D., Pechulano, S., Bashayi, O. D., Emiasegen, S. E., Zungwe T, *et al.* (2010). Hepatitis B virus infections in apparently healthy urban Nigerians: Data from pre-vaccination tests. *J Infect Dev Ctries.* 4:397-400
- CDC 2011 Hepatitis B FAQs for the Public. Retrieved from <https://www.cdc.gov/hepatitis/hbv/bfaq.htm> on 16 July 2019
- Chang, M. H. (2007). "Hepatitis B virus infection". *Semin Fetal Neonatal Med.* **12** (3): 160–167. doi:10.1016/j.siny.2007.01.013. PMID 17336170.
- Getamap.net (nd) Hildi/Adamawa State. Retrieved from [http://www.getamap.net/maps/nigeria/nigeria_\(general\)/_hildi/](http://www.getamap.net/maps/nigeria/nigeria_(general)/_hildi/) on 14/09/2019
- Gupta, S., Gupta, R., Joshi, Y. K. & Singh S. (2008). Role of horizontal transmission in hepatitis B virus spread among household contacts in north India. *Intervirol.* 51(1):7–13.
- Ian, Graber-Stiehl (2018). The silent epidemic killing more people than HIV, malaria or TB *Nature.* 264: 24-26
- Kolawole, O. M., Wahab, A. A., Adekande, D. A., Sibanda, T. & Okah, A. (2012). Seroprevalence of hepatitis B surface antigenemia and its effects on hematological parameters in pregnant women in Osogbo, Nigeria. *Virol. J.* 9: 317.
- Musa, B., Bussell, S., Borodo, M. M., Samaila, A. A. & Femi, O. L. (2015). Prevalence of hepatitis B virus infection in Nigeria, 2000-2013: A systematic review and meta-analysis. *Niger J Clin Pract* 18:163-72
- Olayinka, A. T., Oyemakinde, A., Balogun, M. S., Ajudua, A., Nguku, P., Aderinola, M., et al. (2016). Seroprevalence of hepatitis B infection in Nigeria: a national survey. *Am J Prop Med.* 95(4):902–907.
- Sereno, L., Mesquita, F., Kato, M., Jacka, D., Nguyen, T.T.V. & Nguyen, T.N. (2012). Epidemiology, Responses, and Way Forward: The Silent Epidemic of Viral Hepatitis and HIV Coinfection in Vietnam. *J. Int. Assoc. Physicians AIDS Care (Chic).* 11(5):311–20.
- W.H.O (2019). Hepatitis B key facts <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b>
- W.H.O (2017) WHO Guidelines on Hepatitis B and C Testing. ISBN-13: 978-92-4-154998-1 retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK442272/> on
- Yi, P., Chen, R., Huang, Y., Zhou, R. R. & Fan, X. G. (2016). Management of mother-to-child transmission of hepatitis B virus: propositions and challenges. *J Clin Virol.* 77:32–9