

Original Research Article

Sero-prevalence of Hepatitis B Surface Antigen (HBsAg) among apparently healthy Students of a Tertiary Institution in North-Eastern Nigeria.

ABSTRACT

Aims: This study was carried out to ascertain the prevalence of hepatitis B virus infection and its relationship to gender and sex among apparently healthy Students of a tertiary institution in North-eastern Nigeria.

Study design: Sero-prevalence of HBsAg in relation to gender and sex.

Place and Duration of Study: Federal Polytechnic Mubi, North-eastern Nigeria, between August 2013 and September, 2014.

Methodology: In this study, 200 apparently healthy students of a tertiary institution in North-eastern Nigeria were screened randomly to determine the prevalence of Hepatitis B surface antigen (HBsAg). To achieve this, 200 blood samples were screened in a step wise order using One Step Strip Style HBsAg test.

Results: The result showed an overall HBsAg seroprevalence of 31.5%. The seroprevalence of HBsAg among males (43%) was higher than that of females (27%) but with no statistically significant difference ($p=0.62$). The age specific distribution of HBsAg among subjects in this study showed higher HBsAg prevalence rate among the age group 35 & above (50%), closely followed by the age group 30-34 (48%) with no statistically significant difference between all the age groups ($p=0.353$).

Conclusion: The result of this study confirmed the high endemicity of HBsAg among apparently healthy individuals in North-eastern Nigeria which is alarming. It is therefore recommended that as a matter of urgency Nigerian government should extend HBV vaccination programme to the adult folks and not just limited to the national childhood immunization programme.

Keywords: Hepatitis B surface antigen, sero-prevalence, apparently health

1. INTRODUCTION

Hepatitis B is an infectious illness caused by hepatitis B virus (HBV) (1, 2) an enveloped double-stranded circular DNA virus of complex structure. The virus is a major cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). HBV is highly contagious and relatively easy to transmit from one infected person to another by blood contact, during childbirth, unprotected sexual intercourse, intravenous drug abuse, ear piercing, tattooing, barbers razor and by sharing needles (3, 4 and 5).

Based on the prevalence of HBV chronic carriers (individuals positive for hepatitis B surface antigen, HBsAg) amongst adults in the general population, countries are classified as having low endemicity (< 2%), intermediate endemicity (2%–5%), or high endemicity (> 5%) of infection (6). In Nigeria, several reports have established the endemic nature of HBV by the presence of HBsAg in different population groups from different parts of the country, including doctors (7), intending blood donors in Benin City (8), in Jos, Nigeria (9), in UCH,

Ibadan, Nigeria (10), blood donors attending Ahmadu Bello University Teaching Hospital (ABUTH) Zaria, Nigeria (11). HBV infections constitute a major public health concern in Nigeria and about 75% of the population reported likely to have been exposed to the virus at one time or the other (3).

This study therefore was carried out to ascertain the prevalence of hepatitis B virus infection and its relationship to gender and sex among apparently healthy Students of a tertiary institution in North-eastern Nigeria.

2. MATERIAL AND METHODS

2.1 Study Area

The study area is Federal Polytechnic Mubi, located at Mubi metropolis, comprising of two Local Government Areas- Mubi north and Mubi south. Federal Polytechnic Mubi was established by decree No. 33 of 1979. As at the 2009/2010 academic session, the institution had a student's population of well over 14, 000 and 36 accredited programmes.

2.2 Ethical consideration

Verbal informed consent of each participant was obtained prior to testing. Ethical approval was also obtained from the institutions' Research and Seminar Committee Board. The individual laboratory results were kept confidential and given to the participants at the completion of the project.

2.3 Inclusion Criteria

All subjects who gave informed consent were included in the study.

2.4 Exclusion Criteria

Subjects who had once been vaccinated with the required three doses of the vaccine and those who declined to offer consent were excluded from the study. Also, apparently unhealthy students were excluded.

2.5 Assay for detection of HBsAg

DiaSpot® HBsAg Test strips manufactured by DiaSpot Diagnostics, USA), was used in a stepwise order for the detection of HBsAg in the blood. Five millilitres of venous blood was collected from the antecubital vein of each donor. The blood was allowed to retract and then centrifuged at 2500 rpm for 10 mins. The sera were stored at -20°C until tested. These methods which are immunochromatographic and qualitative in nature, detect the presence of HBsAg in human blood and can be read in-vitro having more than 99.9% sensitivity and 99.75% specificity. The test device was dipped into the serum sample for 3 sec and read after 10 min. Sample positive for HBsAg showed colour band at the test and control lanes while negative sample showed colour band at the control but none at the test lane. Invalid result was read when there was either colour.

2.6 Data analysis

The prevalence for HBV infection was calculated. The data generated was subjected to statistical analysis using analysis of variance (Duncan multiple range test). All statistical analyses were carried using SPSS computer software version 16.0 for Windows to determine any significant relationship between infection rate, age and gender.

3. RESULTS

A total of 200 students participated in this study. Of these, 61(30.5%) were males and 139(69.5%) were females. On the overall, 63(31.5%) were positive for HBV, while 137(68.5%) were not reactive to HBV. Of the 61 males and 139 females participants, 26(43%) and 37(27%) respectively were infected (Table 1). The result however, showed no significant difference in prevalence rate between males and females ($p=0.462$).

The result in Table 2 showed the overall and the age-sex matched prevalence rate. The result showed that the age group 20-24 (43.5%) was the most sampled population, followed by 25-29 (18%), while the least was the age group 35 & above (5%). The result further showed that the age group 35 & above has highest prevalence rate of HBsAg (50%), closely followed by 30-34 (48%). While the least age group with HBsAg were 20-24 and 25-29 with 25% prevalence rate each. Using Duncan multiple range test (DMRT), the result showed that all the age groups were likely to be infected at the same rate ($p=0.353$). In addition, among males, the age group 30-34 (39%) has the highest prevalence rate while the least were age group 20-24 and 25-29 (6% each). Among females, the age group 35 & above has the highest prevalence rate (30%), while the least was 30-34 (9%).

Table 1: Detection of HBsAg in relation to sex

Sex	No. Positive (%)	No. Negative (%)	Total (%)
Male	26(43)	35(57)	61(30.5)
Female	37(27)	102(73)	139(69.5)
Total	63(31.5)	137(68.5)	200(100)

Table 2: Age-Sex match prevalence rate

Age group	No. Tested	Male	Female	Total positive (%)
		No. Positive (%)	No. Positive (%)	
15-19	34(17)	4(12)	7(21)	11(32)
20-24	87(43.5)	5(6)	17(19)	22(25)
25-29	36(18)	2(6)	7(19)	9(25)
30-34	33(16.5)	13(39)	3(9)	16(48)
≥35	10(5)	2(20)	3(30)	5(50)
Total	200(100)	26(13)	37(18.5)	63(31.5)

4. DISCUSSION

The result of this study showed 31.5% HBsAg prevalence rate among apparently healthy students. This observation is lower (42.7%) than the one reported among Afro-descendent community of Brazil (12). 42.3% prevalence rate was reported among cohort of students in Bangui, Central Africa Republic (13). Similarly, higher prevalence rate of 44.7% was also reported among apparently healthy primary school pupils in Borno, North-eastern Nigeria (14). Contrary to the findings of this study, lower prevalence rate have been reported by some authors in Nigeria. Lower prevalence rate of 18.6% and 19.9% have been reported in Osogbo Osun State (15, 3). In addition, 14.5%, 14.5% and 12.0% prevalence rate respectively were reported by Lawal *et al* among blood donors in Ibadan, Agbaji (16) in Jos University Teaching Hospital and Ophori *et al* (17) among pregnant women attending antenatal clinic at central hospital, Warri, Delta State. Also, the HBsAg prevalence rate of 31.5% as shown in this study is by far higher than those reported by various authors in Nigeria. These include Okonko *et al* (18) who reported 2.5% HBsAg in University College

Hospital Ibadan, 2.4% and 1.2% prevalence rate were reported in North-eastern Nigeria (19 and 20), 4.3% among pregnant women in Harcourt (21) and 5.4% in Benin city (8). Also, 1.5% and 1.1% HBsAg prevalence rate were reported in Niger-Delta Region (22, 23).

Studies from other African and Asian countries have reported lower prevalence rate comparable to the finding of this study. Such studies include those of Muktar *et al* (24) and Matee *et al* (25) who reported 8.3% and 8.8% HBsAg respectively in Tanzania. Prevalence rate of 2.2% was reported in Pakistan donors (26), 4.0% was reported in Kenyan donors (27), 10% prevalence was reported by Elfaki *et al* (28) in Sudanese blood donors while 8.7% and 8.8% were reported in MNH in Dar es salaam (29). It is noteworthy to note that the difference in prevalence in these studies could be due to difference in geographical locations, exposure to risk factors and difference in population selection.

The result of this study based on gender distribution showed that males (43%) are more likely to be infected with HBV than females (27%), although the difference was not significant ($p=0.462$). The finding of this study can be comparable with previous report that showed HBsAg prevalence rate of 7.4% and 4.6% respectively among males and females with no statistical difference ($p>0.05$) (30). This report is consistent with previous studies that reported higher infection rate among male than females with no statistical difference (31, 32, 4). The lack of statistically significant difference in HBsAg seroprevalence between males and females as shown in the present study however implies that the difference might be due to chance which suggests that both sexes were equally susceptible to HBV infection and that gender might not be an important significant epidemiological tool to determine HBV infection among study population. This suggestion and opinion is strongly upheld and reported previously (18 and 30).

The observation of this study went contrary to the findings of some authors in Nigeria who reported that females had higher seropositivity for HBsAg than their male counterpart (33 and 34). Although, Arwa *et al* (35) reported significant higher seropositivity ($p<0.0001$) in females than in males among patients with liver complaints; they however, showed that there is no association between HBV seropositivity and gender among apparently healthy individuals which is consistent with the present study. Although Okonko *et al* (18) in their study showed that males had prevalence rate of 10.2% while females had 5.9% prevalence rate, their results however, disagree with the present study in that the difference between males and females was significant statistically. Contrary to the finding of this study also, higher prevalence rate of HBsAg in males than females in both rural and urban areas with observation that male sex was an important risk factor for HBsAg positivity has been reported (36). Other studies in Nigeria in which higher HBsAg prevalence rate among males than females were reported include those of Inyama *et al* (37) and Uneke *et al* (9) in Jos, Balogun *et al* (38) in Lagos, Lawal *et al* (10) in Ibadan. No concrete explanations can be attributed for the higher vulnerability of males to the infections than females (30). Other authors however identify and attributed certain factors as reasons which include shorter HBsAg carrier rate in females than in males (18, 10 and 39), multiple sexual partnership and polygamy (10). Other reason for proportionate high prevalence among males than females though not significant as shown in this study might not be unconnected with care free attitude which might be reflected in sharing of cups and eating utensils, sharing of sharp objects like nail cutter, shaving from barbers, unprotected sex which is rampant among male students.

When compared prevalence rates across age groups, there was a relatively high infection rates across all age brackets, though those aged 35 and above were more likely to be infected followed by those aged 30-34, with the difference not statistically significant. This observation was consistent with previous studies (30) who reported in their study that HBsAg prevalence rate was not correlated with age brackets. Motta-Castro *et al* (12) reported in their study that age was not significantly associated with HBsAg seropositivity among Afro-descendent community in Brazil which was also consistent with previous study in Nigeria (18). Considering the higher prevalence rate of HBV among these age brackets in

this study, one may speculate that most of these students may have acquired the infection through sex and transfusion of unscreened blood in their life time. However, this hypothesis may require further investigations.

Preventive strategies for HBV infection include healthy blood transfusion services along with safe sex (40), vaccination against HBV (41 and 42) and better training of healthcare workers (43). Paid blood donation should be prohibited (44). All patients needing surgery should be screened for viral hepatitis and there should be separate operating theatre facilities for these patients (45). In addition use of razors in many barber shops that may spread hepatitis in a substantial number of individuals (46) must be discouraged.

5. CONCLUSION

The discovery of such a high HBV prevalence of 31.5% shown in this study among students of tertiary institution in an urban population which supposedly should have a low prevalence rate – due to their supposed level of awareness on risk factors- is alarming! It is therefore suggested that a national survey be conducted which will help in understanding the present situation in the general population and in the planning of intervention initiatives including vaccination policy. The Nigerian government should also as a matter of urgency extend HBV vaccination programme to the adult folks and not just limited to the national childhood immunization programme.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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