



## **Viral Hepatitis B Screening among Asymptomatic Patients of Liver Pathology in a Secondary Health-care Facility in Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors SOA and ED designed the study. Author SOA performed the statistical analysis and wrote the first draft of the manuscript. Authors BIA and OBO managed the analyses and the literature searches. Author ED wrote the protocol and revised the draft. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** HBV infection is a serious ailment which damages the liver yet not well known and hence not given adequate attention. Many are infected but are not aware because they do not manifest any sign and symptom.

**Aim:** The purpose of this study was therefore to evaluate the prevalence of HBsAg among asymptomatic hospital attendees.

**Study Design:** A cross sectional study.

**Place and Duration of Study:** St Mary's Catholic Hospital, Ibadan, Nigeria, between November 2017 and August 2018.

**Methodology:** 1328 consecutive patients who attended the hospital were enrolled into this study after obtaining their consent. Their blood samples were aseptically collected and assayed for HBsAg using conventional method.

**Results:** A total of 1,328 participants were enrolled, out of which 421 (31.7%) were male and 907 (68.3%) were female with a gender ratio of 1:2.2 - male to female. 5.9% (25/421) of the males tested positive to HBsAg while 5.4% (49/907) of the females tested positive to HBsAg ( $p=0.692$ ). Of the overall 1328 individuals screened, 5.6% tested positive to HBsAg. The age group with the highest prevalence of HBsAg were those between 51 and 60 years with 13.1% followed by 41 - 50 years (7.2%) while > 70 years had the lowest prevalence.

**Conclusion:** This study showed that HBsAg infection is high among asymptomatic hospital attendees in Ibadan, Nigeria. More public sensitization and awareness programmes are strongly advocated for.

*Keywords: Hepatitis B; HBsAg; asymptomatic; liver; Nigeria.*

## 1. INTRODUCTION

Hepatitis B surface antigen (HBsAg) infection is an ailment of the liver attributable to a virus known as hepatitis B virus, HBV [1,2]. The virus is about 42nm in diameter and has a polyhedron shape. It belongs to the family of Hepadna (hepatotropic DNA) [3]. The whole virion is referred to as the Dane particle. HBsAg fills up the outer coat of the HBV structure. This HBsAg is as well found as twenty two nanometer rods and spheres in the blood of those infected. The length of the rods is between 40 and 400nm. The rods and spheres indicate excess HBsAg in the serum of the diseased liver cells. The quantity of the surplus HBsAg can be as high as  $10^{14}$  particles per milliliter in people with acute infection. The approximately 3.2 kb genome of the DNA is located at the centre of the virus which is an incomplete double strand. The structurally complex virus is circular and enveloped [4].

The persistence of the virus often causes chronic hepatitis, cirrhosis of the liver and hepatocellular carcinoma (HCC). This virus is highly infectious and transmission is from an infected individual to others through unprotected sexual activities, blood contact, parturition, abuse of intravenous drug, piercing of ear, body tattoos, barbers' razor as well as needle sharing [5-7].

The number of infected people worldwide has steadily increased over the past few years. Over 129 million people tested positive to hepatitis B surface antigen in year 2013 [8]. About 257 million individuals were reported to be chronically infected with hepatitis B virus in year 2015 while over 292 million was reported in 2016 [9]. According to World Health Organization, WHO in

2017, no fewer than 360 million had the infection and about 700,000 die annually. A large number of these infected people reside in Africa. Infected people may be asymptomatic. Those with clear symptoms present with feeling unwell, tired, nauseated, anorexia, dark urine, yellowness of eyes and skin (jaundice), pain in the abdomen etc [9].

Different countries have been classified into various levels of endemicity based on chronic hepatitis carrier prevalence rate among the general population. Countries having less than 2% are considered to be of low endemicity; 2-5% intermediate endemicity and highly endemic when prevalence is > 5% [10].

Surprisingly, approximately 90% of the chronically infected people are yet to be diagnosed while just about five percent of treatment-eligible patients receive adequate medical attention [9]. The focus of this study was therefore to evaluate HBsAg infection prevalence and its association with age and sex among asymptomatic hospital attendees in a secondary health care facility in Ibadan, Nigeria.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

This study was performed among asymptomatic hospital attendees of St Mary's Catholic General Hospital (SMCGH), Eleta, Ibadan. Ibadan city lies 3°5' E and 7°23' N. The city is characterised with poor environmental sanitation and housing with neither potable water nor adequate waste management particularly in core regions of the city which is highly populated with a number living below two dollars a day.

## 2.2 Study Population

1328 consecutive patients who visited the hospital between November 2017 and August 2018 were recruited into this study.

## 2.3 Sample Collections

Blood samples of all the participants (both male and female) were collected. Five milliliters of venous blood was aseptically withdrawn from all participants. The sera were carefully separated and preserved in the freezer until time for analysis.

## 2.4 Detection of HBsAg

The separated sera were assayed for HBsAg using a qualitative immunochromatographic test kit produced by Micropoint Rapid Diagnostic (Italy) in a stepwise approach following the manufacturer's specifications. The presence of HBsAg in the collected blood was detected by the monoclonal antibody sandwiched into the test strips. The sensitivity and specificity of the test strips were 99% and 97% respectively with an accuracy of 98.5%. The result interpretation was done following the manufacturer's guidelines.

## 2.5 Data Analysis

Data obtained were analysed using descriptive statistics. Significance of relationship between groups was determined with the Epidemiological information (epi info™) 2005 software package of Centre for Disease Control and Prevention (CDC) using Chi square test.  $P < 0.05$  was set as the level of statistical significance (confidence interval = 95%).

## 3. RESULTS

This study, as shown in Table 1, recruited 1,328 participants, out of which 421 (31.7%) were male and 907 (68.3%) were female making the gender ratio of participants to be 1:2.2 - male to female. 5.9% (25/421) of the males tested positive to HBsAg while 5.4% (49/907) of the females tested positive to HBsAg ( $p=0.692$ ). Of the overall 1328 individuals screened, 74 (5.6%) tested positive to HBsAg.

As shown in Table 2, the predominant age groups in this study were 21 - 30 years (32.8%) and 31 - 40 years (29.4%) while the least studied were those more than eighty (> 80) in age

(0.5%). The age group with the highest prevalence of HBsAg fell between 51 and 60 years with 13.1% followed by 41 - 50 years (7.2%). Age groups 0 - 10 years, 11 -20 years, 21 - 30 years, 31 - 40 years, 61 - 70 years, 71 - 80 years and > 80 years had 1.4% (2/144), 4.9% (5/102), 6.4% (28/436), 5.9% (23/390), 2.9% (1/34), 0% (0/38) and 0% (0/7) respectively. The female aged 41 - 50 years had the highest HBsAg prevalence rate with 9% followed by the female between 51 - 60 years (8%). The male between 51 - 60 years had the highest prevalence rate with 23.1% followed by male in 61 - 70 years age group (11.1%). Males at the extreme age groups (0 - 10 & 70 and above) in this study had zero cases (0%) of hepatitis B surface antigen infection.

## 4. DISCUSSION

Hepatitis B infection is a serious health concern globally and especially in Nigeria where approximately 75% of her citizens, have at one point or the other, been exposed to HBV [5]. In this study, HBsAg prevalence rate among asymptomatic hospital attendees was 5.6%. This positions Nigeria as an highly endemic country [10]. The report of this work is similar to 5.4% reported in Benin City among pregnant women [11] and 5.0% reported by Adetunji et al. among apparently healthy hospital attendees [12]. The report of this study is however lower than 6.8% and 12% documented in Ibadan, Oyo State [13] and Warri, Delta State [14] among pregnant women respectively. Furthermore, it is below 14.5% among blood donors in Ibadan [15].

The 5.6% HBsAg prevalence rate as reported in this study is however higher than 4.3% in Port Harcourt [16], 2.5% reported in University College Hospital by Okonko et al. [17], 2.4% [18] and 1.2% [19] documented in the North East region of the country. It is also higher than 1.5% [20] and 1.1% [21] found in the Niger-Delta States. This finding is further different from 31.5% gotten by Tula & lyoha [22] in Adamawa State amongst apparently healthy polytechnic students, 44.7% in Borno State among primary school pupils apparently healthy both in the Northeastern part of the country [23]. This difference maybe due to polygamy common in this part of the country. An infected husband easily transmits the virus not just to his wives but also to all the children of the women. Unprotected sexual activities common among students may also be responsible for the difference.

Table 1. HBsAg prevalence rate according to gender

Gender	Total tested (%)	HBsAg negative	HBsAg positive	Prevalence rate (%)
Male	421 (31.7)	396	25	5.9
Female	907 (68.3)	858	49	5.4
Total	1328 (100)	1254	74	5.6

Table 2. Age group distribution of HBsAg prevalence among asymptomatic hospital attendees

Age groups	Total tested			HBV negative			HBV positive		
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)	Male	Female	Total
0 - 10	67 (5)	77 (5.8)	144 (10.8)	67 (100)	75 (97.4)	142 (98.6)	0 (0)	2 (2.6)	2 (1.4)
11 - 20	64 (4.8)	38 (2.9)	102 (7.7)	59 (92.2)	38 (100)	97 (95.1)	5 (7.8)	0 (0)	5 (4.9)
21 - 30	79 (5.9)	357 (26.9)	436 (32.8)	73 (92.4)	335 (93.8)	408 (93.6)	6 (7.6)	22 (6.2)	28 (6.4)
31 - 40	122 (9.2)	268 (20.2)	390 (29.4)	114 (93.4)	253 (94.4)	367 (94.1)	8 (6.6)	15 (5.6)	23 (5.9)
41 - 50	50 (3.8)	89 (6.7)	139 (10.5)	48 (96)	81 (91)	129 (92.8)	2 (4)	8 (9)	10 (7.2)
51 - 60	13 (1)	25 (1.9)	38 (2.9)	10 (76.9)	23 (92)	33 (86.9)	3 (23.1)	2 (8)	5 (13.1)
61 - 70	9 (0.7)	25 (1.9)	34 (2.6)	8 (88.9)	25 (100)	33 (97.1)	1 (11.1)	0 (0)	1 (2.9)
71 - 80	13 (1)	25 (1.9)	38 (2.9)	13 (100)	25 (100)	38 (100)	0 (0)	0 (0)	0 (0)
> 80	4 (0.3)	3 (0.2)	7 (0.5)	4 (100)	3 (100)	7 (100)	0 (0)	0 (0)	0 (0)
Total	421 (31.7)	907 (68.3)	1328 (100)	396 (94.1)	858 (94.6)	1254 (94.4)	25 (5.9)	49 (5.4)	74 (5.6)
		1328			1254			74	

Other countries like Brazil reported 42.7% among the group of people with African lineage [24]. Bangui in Central Africa Republic reported 42.3% among students [25]. Various prevalence rate of hepatitis B surface antigen have been documented in different parts of Asia and Africa such as 8.3% [26] and 8.8% [27] in Tanzania, 2.2%, 4% & 10% among blood donors in Pakistan [28], Kenya [29] and Sudan [30] respectively. In Dar es salaam Muhimbili National Hospital, the prevalence rate recorded was 8.7% [31]. The differences in HBsAg infection prevalence rate might be a result of distinct study groups, different geographical locations, varied risk factor exposures and differences in analytical techniques.

The sex distribution of HBsAg infection prevalence rate according to this study showed that 5.9% (25/421) of the males were HBsAg positive while 5.4% (49/907) of the females were HBsAg positive ( $p=0.692$ ). No significant relationship was established between gender and HBV infection. This is similar to 7.4% and 4.6% found among males and females respectively [31] and 43% in male and 27% among female [22]. This study is in line with earlier research works which recorded more rates of HBsAg infection among the male sex than female [32,33,6] with no significant difference.

Reports of 10.2% and 5.9% prevalence rate was documented by Okonko et al. [19] for male and female respectively but with a significant difference between the male and female. Similarly, urban and rural studies on the prevalence rate of HBsAg demonstrated higher HBsAg prevalence among the male gender indicating an association of sex with HBV infection [34]. Several authors from different parts of Nigeria had similar reports. In Jos, Uneke et al. [35] and Inyama et al. [36], in Ibadan, Lawal et al. [15], in Lagos, Balogun et al. [37] found male preponderance with HBV infection.

This susceptibility pattern among male is yet to be fully explained [31]. However, polygamy, having more than one sexual partner [15], shortness of rate of carriage among females compared to male [15,22,38] have been pointed out by some researchers as responsible factors for higher HBsAg prevalence among male. Other explanations for this pattern by other authors include male carelessness in handling and sharing sharps such as nail cutter, knife, shaving

blades, etc. Casual sex among male could also be attributed to the high prevalence.

The study revealed that HBsAg infection was highly prevalent among age group 21 – 60 years and those between 51 – 60 years had the highest rate of infection (13.1%) followed by age group 41 – 50 years (7.2%). Those between 71 – 80 years had the least HBsAg prevalence followed by age group 0 – 10 years. This finding is consistent with previous work [22] where people more than 35 years had higher HBsAg prevalence rate than those below 35. Marriage infidelity and sexual pressure now common in work places may account for this. There is however no significant relationship between age groups and HBV infection. This report agrees with earlier findings [15,22,31]. Other authors documented similar reports [14] in Brazil among the community of descendants of Africa which agrees with earlier works in Nigeria [22].

#### **4.1 Study Limitations**

Other markers of hepatitis B virus infection such as anti-HBs, HBeAg, anti-HBe and anti-HBc could not be assayed for due to lack of funds as the chronicity, convalescent and immune status of the patients could have been further determined.

#### **5. CONCLUSION**

This study showed that HBsAg infection is high among asymptomatic hospital attendees in Ibadan, Nigeria. More public sensitization and awareness programmes are strongly advocated for.

#### **CONSENT**

Those who gave informed consent and permitted sample collection were included in the study while those who declined consent and/or did not allow sample collection were excluded.

#### **ETHICAL APPROVAL**

Ethical permission was sought from the Oyo State Ethics Research Committee (AD13/479/793).

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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