

Relatively High Seroprevalence of Hepatitis B Surface Antigen in Female Civil Servants in Enugu State of Nigeria

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ABSTRACT

Background/Objective: Hepatitis B virus (HBV) infection has remained a global public health challenge. Nigeria is in the high endemicity group with a prevalence of 8% or higher. The authors seized the opportunity of the 2010. World Hepatitis Day to mount a public enlightenment campaign and also screen civil servant in Enugu State of Nigeria for the infection.

Materials and methods: In this cross-sectional study, civil servants attached to Government House, Enugu, Nigeria, were administered a structured questionnaire containing the putative risk factors for HBV transmission. They also underwent screening for hepatitis B surface antigen (HBsAg) in blood.

Results: Out of 395 civil servants (206 males and 189 females) who participated in the screening, 36 were positive for HBsAg giving a seroprevalence of 7.6%. Majority of the seropositive subjects (86.7%) were females ($p < 0.001$).

Among the risk factors examined, past history of native uvulectomy, sharing of toothbrush, sharing of razor blades and hair clippers were significantly more prevalent in the HBsAg positive group compared to the HBsAg negative subjects.

In the females who had circumcision, the HBsAg seroprevalence was significantly higher than in the uncircumcized group ($p = 0.014$, odds ratio = 3.13).

Conclusion: The seroprevalence of HBsAg in civil servants of Enugu State of Nigeria was 7.6%. More females than males were HBsAg seropositive and this may be related to previous circumcision in the females.

Abbreviations: HBV—Hepatitis B virus; Apo—Apolipoprotein; Tg—Transgenic; HBsAg—Hepatitis B surface antigen; HCV—Hepatitis C virus; WHO—World Health Organization.

Keywords: HBsAg, Female Nigerians, Circumcision.

INTRODUCTION

Approximately one-third of the world's population has serological evidence of past or present infection by hepatitis B virus (HBV) and 350 million people are chronically infected.^{1,2} The natural history of HBV infection and spectrum of liver disease it causes are diverse and variable, ranging from a low viremic inactive carrier state to a progressive chronic hepatitis, which may evolve to cirrhosis and hepatocellular carcinoma.³

Clinical observations and death statistics support the view that chronic hepatitis B appears to progress more rapidly in males than females.⁴⁻⁷ One of the reasons that has been proposed for this observation is the production of more vigorous cellular and humoral immune reactions by females compared to males.^{8,9} In the same vein, male sex is one of the predictors associated with a non-response to HBV vaccination.¹⁰ These and other studies^{11,12} hinge the

explanation on sex hormones; there is a favorable role of estrogen in HBV-related chronic liver diseases.¹³ More recently, Chinese researchers came up with a landmark discovery to explain the long-standing mystery of why hepatitis B virus sexually discriminates, hitting men harder than women. In that study, they showed that apolipoprotein A1 (Apo A1) expression is down-regulated in male and female HBV transgenic (HBV-Tg) mouse liver, and that there is disordered expression pattern of Apo A1 isoforms in male HBV-Tg mouse liver. This finding was also verified in chronic hepatitis B patient serum.¹⁴

In this seroprevalence study, the authors seized the opportunity of 2010 World Hepatitis Day to mount a public enlightenment campaign and screening of civil servants of Enugu State of Nigeria, for HBV infection using the surrogate marker, hepatitis B surface antigen (HBsAg). Selected risk factors for HBV transmission were also determined.

MATERIALS AND METHODS

This was a cross-sectional seroprevalence study in which civil servants attached to Government House, Enugu, constituted the study population. Informed consent was obtained from all the participants and a structured questionnaire containing the putative risk factors for HBV infection was administered to them. Venous blood was obtained and tested for HBsAg using a 3rd generation enzyme immunoassay (Cobas Core HBsAg EIA) manufactured by M/S Roche Diagnostics GmbH Werk Penzberg, Germany. This kit uses polystyrene microwell strips precoated with monoclonal antibodies specific to HBsAg. The results were analyzed using the computer software SPSS version 15 and expressed as means and proportions. Differences between means and proportions were determined by using student's t-test and χ^2 . A p-value of < 0.05 was considered significant. Strength of association was determined using relative risk and odds ratio.

RESULTS

A total of 395 civil servants participated in the study. This was made up of 206 males (52.2%) and 189 females (47.8%). Thirty-six civil servants were positive for HBsAg, giving a seroprevalence of 7.6%. Out of this number, four were males (13.3%) and 26 were females (86.7%). The difference between the seroprevalence in males and females was statistically significant ($p < 0.001$). Around 395 civil servants who participated in the study were made up of 172 senior staff (43.5%) and 223 junior staff (56.5%). Among the senior staff, four were HBsAg positive (3.5%) while 24 junior workers were HBsAg positive (10.8%). The difference between the two prevalences was statistically significant ($p = 0.0117$). Table 1 illustrates the HBsAg serostatus of the civil servants. The ages of the civil servants ranged between 19 and 77 years (mean = 43.65 ± 10.77 years). The ages of the males ranged between 19 and 66 years (mean = 46.18 ± 10.42 years). The age of the females ranged between 20 and 70 years (mean = 40.67 ± 10.21 years). The difference between the two means was not statistically significant ($p = 0.9142$).

Table 1: Hepatitis B surface antigen serostatus of the civil servants

Group	HBsAg positive	HBsAg negative	Total
Junior workers	24 (10.8%)	199 (89.2%)	223 (100%)
Senior workers	6 (3.5%)	166 (96.5%)	172 (100%)
Total	30 (7.6%)	365 (92.4%)	395 (100%)

The mean age of the HBsAg positive subjects was 43.0 ± 9.91 years while the mean age of the HBsAg negative subjects was 43.7 ± 10.87 . The difference between the two means was not statistically significant ($p = 0.9748$). The risk factors for HBV infection were determined in the subjects. Past history of native uvulectomy, sharing of toothbrush and sharing of razor blades/hair clippers were significantly more prevalent in the HBsAg positive subjects compared to the HBsAg negative subjects ($p = 0.0297, 0.0297$ and 0.0077 respectively). Table 2 illustrates the risk factors.

Out of the 189 female civil servants who participated in the study, 65 gave a history of having undergone circumcision (34.4%). Sixteen of them were HBsAg positive (24.6%) while 49 (75.4%) were HBsAg negative. Eighty-nine had no circumcision (47.1%). Seven of them (7.9%) were HBsAg positive while 82 (92.1%) were HBsAg negative. Thirty-five females (18.5%) were not sure if they were circumcised or not (Table 3). The difference between the HBsAg seroprevalence in the circumcised group and HBsAg seroprevalence in the uncircumcised group was statistically significant ($p = 0.014$, relative risk = 0.4593, odds ratio = 3.13).

DISCUSSION

The medical literature is replete with studies on the seroprevalence of HBsAg in different cohorts in Nigeria.¹⁵⁻²⁰ Most of the studies were carried out on blood donors, pregnant women or hospital patients. In this study, apparently healthy civil servants were used and the seroprevalence was 7.6%. This figure is above the upper limit for regions with intermediate prevalence (2-7%).

Among the risk factors studied, only native uvulectomy performed for sore throat, sharing of toothbrush and sharing of razor blades/clippers were significantly more prevalent among those who tested positive for HBsAg compared to those who were seronegative. This suggests that there is a significant contribution to disease burden by those unhealthy practices. The chance of transmitting infection through sharing of sharp body piercing objects and toothbrush is likely to be substantial considering the fact that such practices are likely to have occurred over prolonged periods.

Uvulectomy is practiced in most African communities, including Nigeria. It is usually carried out by local practitioners in less than optimal hygienic conditions. Apart from the risk of transmitting infections, like HBV, hepatitis C virus (HCV) and human immunodeficiency virus (HIV), it carries other risks, like bleeding, anemia, sepsis, tetanus and death.²¹

The seroprevalence of HBsAg in this study was significantly higher among the junior staff compared to the

Table 2: Risk factors for HBV infection in HBsAg seropositive and HBsAg seronegative subjects

Risk factor	HBsAg positive (%)	HBsAg negative (%)	χ^2	p-value	Relative risk	Odds ratio
Jaundice	10	6.2	0.5684	0.4509	1.544	1.618
Transfusion	6.7	9.8	0.2626	0.6083	0.6991	0.6819
Injection from quacks	29.6	18.8	1.1720	0.2791	1.514	1.579
Scarification	13.3	20.0	0.5549	0.4563	0.6842	0.6667
Family history of liver disease	0	1.015	1.0150	0.3137	0.0000	0.4644
Multiple sex partner	22.2	19.0	0.1145	0.7351	1.158	1.173
Occupational exposure	0	2.9	0.7878	0.3748	0.0000	0.5931
Toothbrush	28.0	10.6	4.7260	0.0297*	2.373	2.648
Razor/Clipper	38.5	13.6	7.1090	0.0077*	2.500	2.826
Surgery	37.0	36.7	0.000548	0.9813	1.008	1.009
Uvulectomy	28.0	10.6	4.7260	0.0297*	2.373	2.648

*Statistically significant

Table 3: Circumcision in female civil servants in relation to HBsAg serostatus

Circumcision status	HBsAg positive	HBsAg negative	Total
Circumcised	16 (24.6%)	49 (75.4%)	65 (100%)
Not circumcised	7 (7.9%)	82 (92.1%)	89 (100%)
Not sure	3 (8.6%)	32 (91.4%)	35 (100%)
Total	26 (13.8%)	163 (86.2%)	189 (100%)

senior staff ($p = 0.0117$). This is not surprising because most of the unhealthy practices and behaviors that constitute the risk factors for the spread of HBV are likely to be more prevalent in people in the lower socioeconomic cadre of the society. If more efforts are directed at public enlightenment and health education, this trend can be checked.

In this study, the gender-specific seroprevalence of HBsAg was significantly higher in females than males. All over the world, including Nigeria, most studies have reported a greater tendency for HBV progression in males than females.⁴⁻¹⁴ The higher seroprevalence in females demonstrated in this study may be explained by the circumcision history of most of the HBsAg positive females. Even though only 34.4% of the females had a history of circumcision, 16 of them (24.6%) were HBsAg seropositive. The difference between the HBsAg seroprevalence in the circumcised group and the seroprevalence in the uncircumcised group was statistically significant ($p = 0.014$).

Female circumcision has remained a public health concern in Nigeria. According to information from the Federal Ministry of Health, Abuja,^{15,22} the practice is widespread covering practically every state of the federation though in varying magnitude from infancy to childhood.

The prevalence is highest in the South-West and South-East and lowest in the North-West and North-East. Though there is no legislation in Nigeria against female circumcision, the World Health Organization (WHO) has continually and unequivocally advised that female circumcision must not be institutionalized, nor should any health professional in any setting, including hospitals or in the home setting. This is why in places where it is done, it is an illicit act, carried out in very unhygienic settings with all the attendant risks. Female circumcision is fundamentally different from male circumcision. The latter is more culturally and socially accepted and, therefore, is often done in hospitals where standards of hygiene are usually ensured.

The eventual outcome of the HBV infection in those females who tested positive for HBsAg in this study will require a follow-up which is beyond the scope of this study.

In conclusion, this study has demonstrated a seroprevalence of 7.6% for HBsAg in civil servants of Enugu State of Nigeria, with a higher seroprevalence in females compared to males. The female preponderance may be related to previous female circumcision.

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