

# Prevalence of Hepatitis B Surface Antigen among Women of Childbearing Age in Lagos, Nigeria

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## ABSTRACT

This study documents the seroprevalence of hepatitis B surface antigen (HBs Ag) among women of childbearing age attending various family planning clinics in Lagos, Nigeria. A total of 501 women were screened with Wellcozyme ELISA technique, of which 45(8.9%) were seropositive. Women in occupations related to needle work and secretarial jobs were at increased risk of being seropositive ( $P < 0.005$ ). The high prevalence of HBs Ag among women of childbearing age suggests that vertical transmission of hepatitis B virus may be a public health problem in Nigeria. It is recommended that hepatitis B vaccination be incorporated into the childhood immunisation programme in the country. (*Afr J Reprod Health* 1999; 3[1]:45-50)

## RÉSUMÉ

La Prévalence des Antigènes de Surface de l'Hépatite B parmi les Femmes en Âge de Procréer dans l'Etat de Lagos. Cette étude documente la séroprévalence de l'antigène de surface de l'hépatite B (AgsHB) parmi des femmes en âge de procréer fréquentant plusieurs cliniques de planification familiale de Lagos au Nigéria. Un total de 501 femmes avaient été sélectionnées à travers la technique Wellcozyme ELISA, et 45 d'entre elles (8.9%) avaient été décelées séropositives. Les femmes dont les occupations impliquaient l'utilisation d'aiguilles ou des tâches secrétaires étaient exposées à un risque accru de séropositivité ( $p < 0,005$ ). La forte prévalence de l'AgsHB parmi les femmes en âge de procréer suggère que la transmission verticale du virus de l'hépatite B est vraisemblablement un problème de santé publique au Nigéria. La recommandation est faite d'inclure l'hépatite B dans les programmes de vaccination pour enfants au Nigéria. (*Rev Afr Santé Reprod Health* 1999; 3[1]:45-50)

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KEY WORDS: HBs Ag, women, childbearing age

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## Introduction

Of the hepatotropic viruses (hepatitis A, B, C and D), hepatitis B virus (HBV) is the most virulent and most versatile. It is probably also the most prevalent of all viruses that infect humans, the WHO having estimated that about 300 million people are carriers worldwide.<sup>1</sup> Infection with this virus manifests in a number of clinical syndromes, namely,<sup>2</sup> acute hepatitis, chronic non-progressive hepatitis, progressive disease ending in cirrhosis, fulminant hepatitis with massive liver necrosis, asymptomatic carrier and hepatocellular carcinoma (HCC).

The most feared of all the complications of HBV infection is HCC. The global distribution of this cancer is strongly linked with the prevalence of HBV infection particularly among chronic carriers.<sup>3</sup> In regions of low endemicity (Europe, America and Canada), transfusion of blood and its products, dialysis, needle stick accidents among health workers, intravenous drug abuse and homosexual activity constitute the primary sources of infection and as such neonatal infection is uncommon.<sup>2</sup> In endemic regions such as Africa, south of the Sahara, Southeast Asia and South America, most adult carriers are said to have acquired the infection perinatally.<sup>4</sup> It has been said that the mechanism associated with the establishment of persistent infection is strongly age-related. Infants infected with HBV have a 90% chance of becoming chronic carriers,<sup>5</sup> with this decreasing to 30% at the age of five<sup>2</sup> while adults have a 6-10% chance of developing a persistent infection.<sup>6</sup>

Vertical transmission of HBV from infected mothers is said to confer a 200-fold increased risk of HCC by adulthood.<sup>3</sup> Thus, prevention of neonatal infection has been acclaimed as a major way of eliminating chronic infection and that primary hepatocellular cancer is believed to have the potential of being eliminated through the use of hepatitis vaccine.<sup>2</sup>

The realisation that inactivated HBs Ag would serve as immunogen, and that anti-HBs was protective against infection led to the de-

velopment of prototype hepatitis B vaccines.<sup>7</sup> Licensure of HB vaccines around the world has begun a new era in which the establishment of vaccination programmes should lead to the interruption of this most important pathogen.

Efficacy of hepatitis B vaccine in the neonate with<sup>8</sup> and without<sup>9,10</sup> hepatitis B immune globulin prophylaxis has been demonstrated in a number of studies.<sup>8,9,10</sup> For this reason, the use of hepatitis B vaccine is now being advocated in universal immunisation programmes aimed at preventing perinatal and early childhood infection in countries with high endemicity.<sup>11</sup> In areas of low endemicity, universal immunisation of all neonates is not cost effective. The policy of universal screening of all pregnant women is rather advocated so that babies born to carrier women only are vaccinated.<sup>12</sup> Thus, the decision to adopt universal immunisation of neonates or universal screening of pregnant women is dependent on the carrier rate of HBV among pregnant women in a given community. As such, prevalence study of HBV among pregnant women has been carried out in many developed countries<sup>13</sup> and in some parts of Africa.<sup>14</sup> In Nigeria, most studies have concentrated on prevalence rates in blood donors.<sup>15,16</sup> To our knowledge, the present communication is the first prevalence study of HBV among women of reproductive age in Nigeria.

## Subjects and Methods

Women of childbearing age, between ages 18 and 35 years were drawn from the following family planning clinics in Lagos: Lagos Island Maternity Hospital; primary health centres of Surulere, Mushin, Shomolu and Eti-Osa Local Government Areas of Lagos State; Epe and Badagry General Hospitals. Each of the subjects completed a questionnaire after informed consent had been sought. Data obtained included the age, occupation, histories of jaundice, transfusion of blood or blood products, intravenous drug abuse and sexually transmitted disease(s).

Intravenous blood samples of about 5mls was collected from each of the women in plain tubes and allowed to clot. The serum was separated and stored at -20°C for less than one month. The specimens were screened for HBs Ag in five batches using Wellcozyme ELISA technique — a method considered to be one of the best with respect to sensitivity and specificity.<sup>17</sup>

### Statistical Analysis

Fishers Exact Probability and Chi-square were used to test the significance of association be-

tween HBs Ag and some risk factors.

### Results

#### *Prevalence of HBs Ag in the reference population*

A total of 501 women of childbearing age were studied. Their ages ranged between 18 and 35 years with a mean of 29.2 years. Of these, 45 tested positive for HBs Ag with an overall prevalence of 8.9%.

*Table 1: Occupational distribution of 501 women of childbearing age and their HBs Ag status*

Occupation	HBs Ag Status		Total	Occupation Specific Prevalence (%)
	Positive	Negative		
Worker in 'a' finance institution	0	16	16	1
Civil servant	4	54	58	6.9
Lecturing*	0	2	2	0
Auxiliary nursing*	0	4	4	0
Catering*	0	7	7	0
Secretary/typist	4	15	19	21.1
Teaching	3	26	29	10.3
Trading	16	166	182	8.8
Artist*	0	1	1	0
Goldsmith*	0	1	1	0
Housewife	5	76	81	6.2
Nursing*	0	7	7	0
Photography*	0	1	1	0
Needlework (e.g., fashion designing and sewing)	10	6	16	62.5%
Soldier*	0	5	5	0
Student*	0	9	9	0
Hairdressing	1	10	11	9.1
Unemployed*	0	1	1	0
Undeclared occupation	2	49	51	3.9
Total reference population	45	456	501	8.9

\*N is too small for statistical deductions

*Influence of risk factors on the prevalence of HBs Ag*

The occupational distribution of the women is as shown in Table 1. The occupation which is strongly associated with HBs Ag positivity is that related to needle work (e. g., fashion designing, seamstress work, sewing, and tailoring); they were 16 in number. Of these 16, 10 (62.5%) were positive for HBs Ag. This is significantly higher than the overall prevalence of 8.9%. Fisher's Exact Probability is  $<0.001$ . Secretaries/typists are also more at risk than the reference population ( $P < 0.05$ ). None of the secretaries/typists or fashion designers that were HBs Ag positive had received blood

transfusion in the past.

The prevalence of HBs Ag with respect to other risk factors considered is presented in Table 2. Sixty-four of the 501 women studied had received blood transfusion in the last 15 years. Six of these 64 (9.4%) women were positive for HBs Ag. This prevalence (9.4%) is not significantly different from the overall prevalence (8.9%) in the reference population ( $P > 0.05\%$ ).

No one admitted to the use of intravenous drugs. In this survey, past history of sexually transmitted diseases, jaundice and surgical procedures including traditional tattooing constituted no increased risk of being HBs Ag positive.

**Table 2:** Influence of some risk factors on the prevalence of HBs Ag

Risk Factor	Total Number Positive for the Risk Factor	Number Positive for HBs Ag in the Risk Group	Prevalence within the Risk Group (%)	P-Value on Comparison with Population Prevalence 8.9%	Fishers Exact Probability
Past history of jaundice	55	6	10.9	$>0.05\%$	
Traditional surgery (tattooing)	60	3	5.0	$>0.05\%$	
Multiple sexual partners (more than one partner)	23	1	4.3	$>0.05\%$	
Past history of STD	23	1	4.3	$>0.05\%$	
History of transfusion	64	6	9.4	$>0.05\%$	
Occupation related to needlework	16	10	62.5	$<0.05\%$	$6 \times 10^{-8}$

## Discussion

A seroprevalence level of 9% in this study is in conformity with the established fact that HBs Ag is endemic in countries of Africa south of the Sahara.<sup>14,18</sup> It also corroborates the seroprevalence level in the blood donors,

which has been variously reported to vary between 5 and 10% in different parts of Nigeria.<sup>15,16</sup> This level of carrier state in reproductive age women will suggest that there is a high risk of mother to infant transmission in Nigeria.

However, HBs Ag carrier state alone in a pregnant woman does not put the foetus at risk of being infected. Women who are positive for both HBs Ag and HBe Ag are more likely to infect their babies.<sup>4,19</sup> A WHO-sponsored study in Tonga reported that on the average, 41% of HBs Ag positive pregnant women were also HBe Ag positive.<sup>20</sup> If this is applicable to Nigeria, the risk of vertical transmission of HBV to newborn Nigerians will still be high.

Although WHO recommendation<sup>20</sup> for incorporation of HBs Ag vaccine in EPI is supported by our present data, calculation of real risk of mother to child transmission will require a study of HBs Ag and HBe Ag levels in pregnant Nigerians.

Most of the risk factors assessed in this study correlates very poorly with positivity for HBs Ag. This is not an uncommon phenomenon. Other studies have indicated that the sensitivity of CDC risk factors for screening pregnant women for HBs Ag ranges between 35 and 65.<sup>21</sup> Fashion designing as an occupation constitutes a great risk of being HBs Ag positive. Every fashion designer tested in this series was positive. The possible explanation for this observation may be due to stability of HBV on environmental surfaces<sup>22</sup> such as razors, needles, toys, toothbrushes, baby bottles, eating utensils and possibly, in this instance, clothes and dresses. Transmission of HBV from such environmental surfaces has been shown to occur through contact with mucous membrane or open skin breaks.<sup>22</sup> Microscopic skin breaks may be an occupational hazard amongst fashion designers as a result of frequent use of needles. There is the need to study a larger population of fashion designers to substantiate our present observation. In fact, negativity for HBs Ag amongst the six women claiming needle work other than fashion designing (tailoring, and sewing) may mean that there is as yet undefined factor(s) which may predispose the group of those who refer to themselves as fashion designers to be unusually susceptible.

The increased prevalence of HBs Ag among secretaries and typists may be difficult to explain. It may, however, be due to unproven societal bias that they may be more sexually exposed. Sexual transmission of HBV is well-documented.<sup>22</sup>

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