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ORIGINAL ARTICLE

Seroepidemiology of Hepatitis-B Surface Antigenaemia in HIV Positive Patients

Les patients séro-épidémiologie de l'hépatite B-antigénémie de surface du VIH positifs

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ABSTRACT

BACKGROUND: **Hepatitis B virus (HBV) co-infection with HIV is a potential and significant cause of mortality and morbidity in HIV-positive patients.**

OBJECTIVE: **This study was undertaken to determine the prevalence of hepatitis B surface antigen (HBsAg) among HIV positive patients and to identify the risk groups for HIV/ HBV co-infection among these patients.**

METHODS: **The diagnosis of HIV infection was made using Determine® rapid screening kits and reactive samples were confirmed by enzyme linked immunosorbent assay (ELISA). The marker for HBV was HBsAg which was detected using an ELISA technique.**

RESULTS: **HBsAg was repeatedly detected in 29 (28.4%) of HIV-positive patients. Ninety-eight percent of the subjects were confirmed positive for HIV–1 and 1.9% for HIV–2. There were 32(31.4%) males and 70(68.6%) females aged 20 to 75years (mean +SD: 40+.11.7) .HIV/ HBV co-infection rate was highest in the age group 31–40 years.More males [12 (37.58%)] than female subjects 17/70 (24.3%) were HIV/HBV co-infected, (p >0.05).**

CONCLUSION: **There is a high prevalence of HBsAg in HIVpositive patients. WAJM 2010; 29(3): 169–173.**

Keywords: **Hepatitis B; seroepidemiology; HIV-positive patients.**

RÉSUMÉ

CONTEXTE: *L'hépatite B (VHB) co-infection avec Le VIH est une cause potentielle et significative de la mortalité et la morbidité chez les patients VIH-positifs.*

OBJECTIF: *Cette étude a été entreprise pour déterminer la la prévalence de l'antigène de surface de l'hépatite B (HBsAg) chez les VIH patients positifs et d'identifier les groupes à risque pour le VIH / VHB co-infection chez ces patients.*

MÉTHODES: *Le diagnostic d'infection à VIH a été faite à l'aide Déterminer des kits de dépistage rapide et ® échantillons réactifs ont été confirmée par dosage immunoenzymatique (ELISA) Le marqueur du VHB a été HBsAg a été détecté en utilisant un technique ELISA.*

RÉSULTATS: *HBsAg a été détecté à plusieurs reprises dans 29 (28,4%) des patients VIH-positifs. Quatre-vingt-huit pour cent des sujets ont été confirmés positifs pour le VIH-1 et 1,9% pour le VIH-2. Il y avait 32 (31,4%) hommes et 70 (68,6%) femmes âgées de 20 à 75 années (Moyenne + SD: 40 + .11.7). VIH / VHB co-infection taux le plus élevé a été dans le groupe d'âge 31-40 ans.plus hommes [12 (37,58%)] que 17/70 sujets féminins (24,3%) étaient VIH / VHB co-infectés, (P> 0,05).*

CONCLUSION: *Il existe une forte prévalence de l'HBsAg dans séropositifs patients.* ***WAJM 2010; 29 (3): 169–173.***

Mots-clés: *hépatite B; séroépidémiologie, le VIH-positive patients.*

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Abbreviations: AIDS, Acquired Immunodeficiency Syndrome; **ELISA,** Enzyme Linked Immunosorbent Assay; **HBsAg,** Hepatitis B Surface Antigen; **HBV,** Hepatitis B Virus; **HIV,** Human Immunodeficiency Virus;

INTRODUCTION

HBV infections occur worldwide but are endemic in south East Asia and sub-Saharan Africa including Nigeria.[1] Both Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) infections are a serious global public health problem and significant causes of morbidity and mortality in Nigeria and many parts of the world. Epidemiologic studies indicate an HBV prevalence rate of 1–2% in the western world and 10–20% in the endemic regions of South East Asia and sub Saharan Africa.[2] Hepatitis B surface antigen (HBsAg) is the hallmark and the most sensitive antigenic marker for the presence of HBV infection.[3] Previous studies in Nigeria have documented prevalence rates of 7–21% for HBsAg in blood donors who may be taken to represent the population at large.[4–7]

In Lagos, prevalence rate of HBV among the normal population has been reported as 4.4–9.2 %. [8–10]

Of the 2 billion people who have been infected with HBV, more than 350 million have chronic infections.[11] These chronically infected persons are at high risk of death from cirrhosis of the liver and liver cancer, diseases that kill about one million persons each year.[11]

HBV major routes of transmission are shared with HIV; exchange of infected body fluids through sexual contact-homosexual and heterosexual, injection drug use, contaminated needles, instruments and sharp objects, transfusion of blood and blood products and vertical from mother to child.[12]

Nowadays, the transmission of HBV, secondary to the administration of blood or blood products can be largely excluded due to blood screening programmes.[13]

Chronic HBV infection appears to have its natural progression modified by HIV co-infection with significantly increased mortality attributable to liver disease in co-infected patients compared with HBV infection alone.[14] Patients with dual infections of HBV and HIV are increasingly being recognized. Among HIV infected individuals, HBV co-infection prevalence is approximately ten times higher than in the general population due to shared epidemiologic modes of transmission.[15] Studies conducted in western countries show that 90–95% of patients with AIDS had serological evidence of present or past HBV infection.[16] Previous epidemiological surveys suggest that 9.2 to 70.5% of HIV-positive patients have HBV co infection in Nigeria. [17–21]

HBV co-infection in HIV infected patients has been associated with a reduced survival rate, an increased risk of progression to liver disease, decreased quality of life, increase health care cost to patients and an increased risk of hepato-toxicity associated with antiretroviral therapy. Recent evidence that HBV can infect lymphocytes and produce a protein X capable of activating HIV-1 replication in vitro has supported the speculation about concurrent HBV as a co-determinant for infection with HIV-1.[22]

In Nigeria, the national sero-prevalence rate of HIV infection based on sentinel group is still high with an increase of 129% from 1.8% in 1991 to 5.4%in 1999, 5.8% in 2001and decline with a prevalence of 5.0% in 2003 and 4.4% in 2005.[23]

Based on the current HIV prevalence in the country, it is estimated that 2.9 million Nigerians are presently living with HIV.[24] In Lagos state, the sentinel prevalence of HIV increased from 1.9% in 1991 to 6.7% in 1999 with a slight inconsistent decline to 3.5% in 2001, went up to 4.7% in 2003 and a reduction to3.3% in 2005.[24]

This current study aimed to assess the magnitude and risk of HBV co-infection in HIV positive patients in the urban population of Lagos and also provide a baseline for the conceptualization of larger studies.

SUBJECTS, MATERIALS, AND METHODS

One hundred and two consecutive adult Nigerian patients confirmed for HIV and attending the antiretroviral therapy clinics, Lagos State University Teaching Hospital in Lagos, South west area of Nigeria between March and August2006 were studied. The inclusion criteria were; age greater than 18 years and HIV positivity. After informed consent was obtained from the subjects, structured questionnaires were administered to obtain information on demographic data of age, sex, marital status, occupation and exposure to risk factors which predispose to acquisition of HBV co-infection. The study protocol was approved by LASUTH Ethical Committee.

About five milliliters of whole venous blood was collected from each of the subjects into serum bottle. Serum samples were separated by centrifugation and stored at –20°C until analyzed. Each

Table 1: Distribution of HBsAg Positivity in HIV-positive Patients by Sex and Age

	Number (%)		
Age Group (Years)	**HBsAg Positive**	**HBsAg Negative**	**Total Screened (%)**
Distribution Age*			
20 – 29	6 (33.3)	12 (66.7)	18 (17.6)
30 – 39	13 (34.2)	25 (65.8)	38 (37.2)
40 – 49	4 (17.4)	19 (82.6)	23 (22.5)
50 – 59	4 (26.7)	11 (73.3)	15 (14.7)
60 – 69	2 (28.6)	5 (71.4)	7 (6.9)
70 – 79	0 (0.0)	1 (100%)	1 (0.9)
Total	**29 (28.4)**	**73 (71.6)**	**102 (100.0)**
	p-value = 11.07 χ^2 = 36.5		
Distribution by Sex†			
Male	12 (37.5)	20 (62.5)	32 (31.4)
Female	17 (24.3)	53 (75.7)	70 (68.6)
Total	**29 (28.4)**	**73 (71.6)**	**102 (100.0)**
	χ^2 = 3.84 p-value = 0.83		

*, Chi-squared = 36.5; p = 0.07; †, Chi-squared = 3.84, p = 0.83

Table 2: Distribution of HBsAg Positivity in HIV positive Patients Based on Marital Status and Occupation

	Number (%)		
	HBsAg Positive	**HBsAg Negative**	**Total Screened (%)**
Marital Status*			
Married	17 (25.0)	51 (75.0)	68 (66.7)
Single	6 (40.0)	9 (60.0)	15 (14.7)
Divorced	1 (8.3)	11 (91.7)	12 (11.8)
Widowed	5 (71.4)	2 (28.6)	7 (6.9)
Total	**29 (28.4)**	**73 (71.6)**	**102 (100.0)**
	χ^2=19.42; 7.8		
Occupation†			
Trader/Business	13 (28.3)	33 (71.7)	46 (45.1)
Civil Servants	8 (33.3)	16 (66.7)	24 (23.5)
Artisan	4 (23.5)	13 (76.5)	17 (16.7)
Applicants	2 (28.6)	5 (71.4)	7 (6.9)
Drivers	2 (100.0)	0 (0.0)	2 (2.0)
Housewife	0 (0.0)	6 (100.0)	6 (5.8)
Total	**29 (28.4)**	**73 (71.6)**	**102(100.0)**
	χ^2 =24.33; p-value =11.07		

Table 5: Distribution of HBsAg Positivity in HIV Positive Patients based on History of Multiple Sex Partners and Drug Use

	Number (%)		
	HBsAg Positive	**HBsAg Negative**	**Total Screened (%)**
Multiple Sex Partner			
Yes	11 (32.4)	23 (67.6)	34 (33.3)
No	18 (26.5)	50 (73.5)	68 (66.7)
Total	**29 (28.4)**	**73 (71.6)**	**102 (100)**
	p-value = 3.84	χ^2 =1.68	
Drug Injection			
Yes	3 (21.4)	11 (78.6)	14 (13.7)
No	26 (29.5)	62 (70.5)	88 (86.3)
Total	**29 (28.4)**	**73 (71.6)**	**102 (100.0)**
	p-value = 3.84	χ^2=18.24	

serum sample was analyzed for the presence of HBsAg using commercially available fourth generation ELISA kits (Dialab, Austria) which had 99.87% specificity and100%sensitivity. Positive samples were repeatedly reactive._All subjects were initially screened by WHO approved Determine® very rapid kit which has 100% sensitivity and 99.6% specificity for HIV 1 and 2. Positive serostatus was confirmed with ELISA based Immunocomb I &II combfirm kits (Orgenics, Israel).

The data were analyzed using the Statistical Package for Social Sciences (Version 9, SPSS). Chi-square test was used to assess the significance of differences among groups. A p-value of less than or equal to 0.05 was considered significant in all statistical analysis.

RESULTS

Subjects studied consisted of 32 (31.4%) males and 70 (68.6%) females. Of this, 29 were HBsAg positive giving an overall prevalence of 28.4%. The age range of subjects was 20–70 years (mean= 38 years)

Seroprevalence of HBsAg among males was 12(37.5%) and 17(24.3%) among females. Ninety eight percent of the patients were confirmed for HIV-1 and 1.9% for HIV-2.

Table 1 also shows that there were more female subjects and that more males12 (37.5%) are HIV/HBV co-infected than females 17(24.3%).

Table 1 shows that HIV/HBV co-infection was highest in the 30–39-year age group with 13(34.2%), closely followed by 20–29 years with 6(33.3%), the lowest prevalence occurred in 70–79 years group in which had no case.

Table 2 shows that in relation to marital status, widowed patients had the highest HIV/HBV co-infection rate of five (71.4%) followed by single/unmarried subjects with six (40.0%) and married subjects 17(25.%), while the divorced group showed the lowest co infection rate of one 8.3%. Also shown in Table 2 is that there were variations in the HIV/HBV co-infection rate among the different occupational groups with the highest rate occurring among drivers two (100%), followed by civil servants eight (33.3%), and applicants two (28.7%).

Table 3 shows that HIV/HBV co infection rate was higher among patients who admitted to multiple sex partners 11(32.4%), than without 18(26.5%) and that patients with history of injection drug use were fewer and also have lower HIV/HBV co-infection rate of three (21.4%) than those with no history of injection drug use with 26(29.5%).

DISCUSSION

In this study, we observed HBsAg positivity of 28.4% in HIV positive patients. Our finding in this study is in agreement with previous reports of 28.7% co-infection rate from North Central Nigeria[17] and 33.8% in India.[25]The value obtained in this study is however higher than15% by Baba *et al,*[18] 9.2% by Lesi *et al,*[19] 9.7%[20] in the Niger Delta region of Nigeria, and Thailand 8.7 %[26] but lower than a report of 70.5% in Kano,[21] Nigeria and a prevalence of 41% in Johannesburg, South Africa.[27] Variations in prevalence rates may be due to the differences in sensitivity and specificity of various

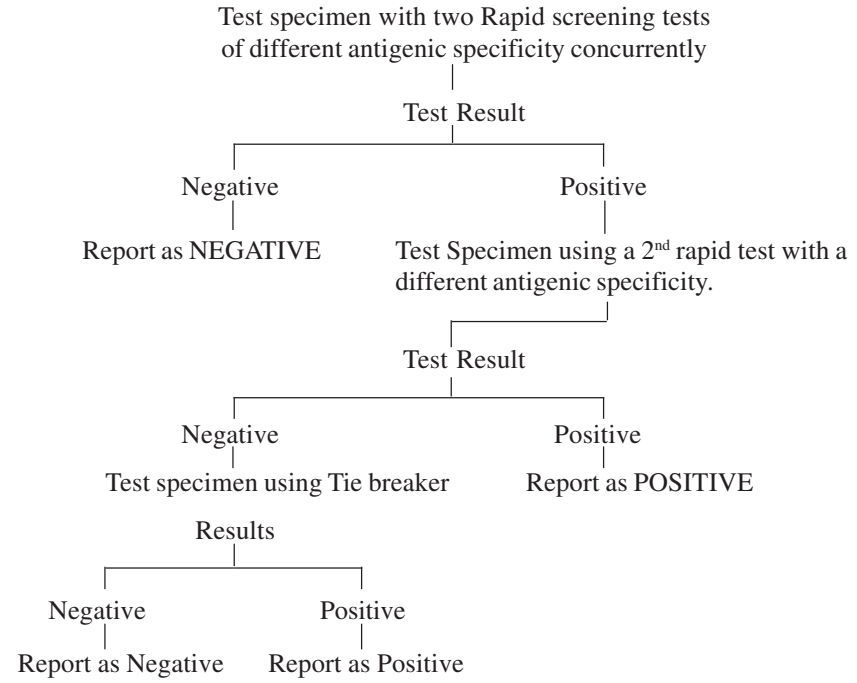

Fig. 1: Serial Algorithm for Rapid HIV Testing

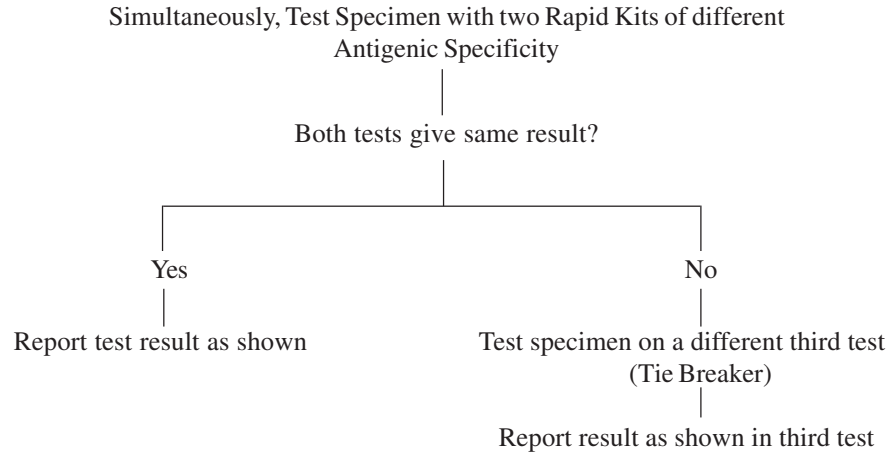

Fig. 2: Parallel Algorithm for Rapid HIV Testing

kits.There seems a significant association between HIV and HBV and this could be explained by the fact that both infections have common modes of transmission which is predominantly sexual and parenteral.

Males had a higher rate (37.5%) of co-infection with HIV /HBV compared to females with (24.3%) in this study, p>0.05. This finding is comparable with previous reports such as from Jos, North Central Nigeria.[18] and India.[25] However, our finding is at variance with the finding in the Nigeria's Niger Delta region[20] and Kano[21] where females were found to have a higher rates of HIV /HBV co infection.

The prevalence of HIV/ HBV co-infection was found in this study to be higher among widowed and single unmarried subjects. The difference was however, not statistically significant p>0.05. Among the occupational groups, long distance drivers and applicants had the highest co infection rates with HIV/ HBV, p> 0.05

The results of this study shows that co-infection with HIV and HBV affects all professional groups. The prevalence of HIV/ HBV co-infection was higher among subjects with positive history of multiple sex partners than those without, although the difference was not statistically significant.

In conclusion, our study indicates an HBsAg prevalence of 28.4% in HIV infected patients in a Lagos hospital and identifies the age group, gender and occupational groups more at risk. We recommend that the results obtained in this study be used as a working data on the prevalence of HBsAg among HIV infected individuals in Lagos, Nigeria and for the estimation of chronic liver disease burden due to HBV among HIV infected patients. Emphasis should be on interventions for the prevention of HIV and HBV transmission. All HIV infected people should be screened for HBVcoinfection and those found negative would be immunized against hepatitis B virus. Physicians managing people living with HIV infection should assess the HBV status in all patients prior to the initiation of antiretroviral therapy as this would guide correct choice of therapy, and reduce morbidity and mortality from anti-retroviral drug hepatotoxicity. Adherence to antiretroviral therapy would also increase since the patients are more likely to adhere on less toxic regimen.

Future studies should assay other serological markers of HBV infection in these patients as HIV/HBV co-infection rate may probably be higher than the rates observed in this study using only one marker.

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Duality of Interest

This study is sponsored by Strides Vital Nigeria Ltd. Neither profit nor financial gain is attached to the conduct of this study/research.

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