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PREVALENCE OF HEPATITIS B VIRUS INFECTIONS AMONG HIV INFECTED INDIVIDUALS IN NAIROBI, KENYA
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ABSTRACT

***Objectives*: To determine the prevalence and characteristics of HBV infections among HIV infected individuals in Nairobi, Kenya**
***Design*: A cross-sectional study.**
***Setting*: Kenya Medical Research Institute HBV Laboratory, Nairobi, Kenya**
***Subjects*: A total of four hundred HIV infected patients randomised from a Nairobi HIV comprehensive care centre between June and October 2015.**
***Results*: Of the 400 subjects screened; (27.75%) had HBV immunisation, (3%) had acute disease, (4.75%) were on recovery, (2.5%) were in chronic stage, (1.75%) were asymptomatic and (2.25%) had occult HBV. Statistical analysis showed that age and gender were not significantly associated with the risk of HBV or occult HBV infections.**
***Conclusion*: HIV/HBV co-infections is still >5.5% but the rates could be higher than reported here. Utility of HBV sero-markers especially in infection staging is therefore very important in disease diagnosis and surveillance.**

INTRODUCTION

Human immunodeficiency virus (HIV) and Hepatitis B virus (HBV) infections are the two most important infectious diseases throughout the world particularly in developing countries (1) . These viruses often share routes of transmission (perinatal, sexual and parenteral) with high cases being reported among high risk populations (1,2) . In sub-Saharan Africa, it is estimated that 8–20% of HIV infected individuals are co-infected with hepatitis B virus (HBV) (2,3). Therefore in this region, most individuals are often infected at early childhood (due to close contact with household members) or in the perinatal period (from mother to baby at birth). In addition, between 70–90% of individuals in this region have previously been exposed to or are chronic carriers of HBV (4). These rates are high compared to low endemicity areas, such as in western countries, where most transmission occurs during adolescence and young adulthood due to high risk behaviours like unprotected sexual contact and injection drug use (5).

With the up scaling of ART among HIV infected individuals, its impact on surviving patients has revealed chronic liver disease from viral hepatitis B or C as a leading cause of morbidity and mortality (7). HIV accelerates the progression of liver disease in HIV/HBV co-infection (6) with patients showing an increased risk of hepatotoxicity of anti-retroviral drugs (7). Despite these concerns, the burden of HIV/HBV co-infection among Kenyans has not been fully characterised. Although important information could be gained from studying HBV virological markers, such as hepatitis (HBeAg, HBsAg, HBVcAb and HBV-IgM) status, this information is missing from published Kenyan cohorts. This study was therefore carried out to determine the prevalence and infection stages of HBV infection in HIV cohort.

MATERIALS AND METHODS

Study population: HIV infected patients seeking treatment at Mama Lucy Hospital comphrensive health clinic in Nairobi, were considered for recruitment after giving consent. Patients who were drug naive and those who declined to consent were excluded from the study. However, those who consented were consecutively sampled and a structured questionnaire was administered. This demographic data were obtained during the study period between September and October 2015.

Five (5) militres of blood was collected from each participant and screened for AntiHBs, AntiHBc, AntiHBe, HBsAg and HBe sero-status using Lumiquick HBV 5 panel kit (LumiQuick Diagnostics, Inc. California, USA), according to manufacturer's instructions. Ethical clearance was obtained from Kenyatta University/National Ethical Review committee.

Data analysis: All generated data was entered into a database, cleaned and analysed using SPSS version

20. The sero-prevalence for HBV was expressed in percentages for the entire study group. Simple linear correlation analysis was used to determine the association with age, gender and HBV infection or occult hepatitis infections.

RESULTS

A total of four hundred (400) patients consisting of 293 (73.25%) female and 107 (26.75%) males were enrolled into this study. The mean age was 33.4 with females avaraging 34.1 years and 31.7 years for males. Majority of the recruited participants were on first-line treatment for HIV 390 (97.5%) with only 2.5% (10) on second-line (Table 1). Those who were at acute HBV disease were 12 (3%), those at recovery 19 (4.75%) while those at chronic stage were 10 (2.5%). However, those found immunised were 111 (27.75%), asymptomatic 7 (1.75%) and occult were 9 (2.25%) (Table 2). Majority of the co-infected patients were those aged between 3 and 49 years of age.

Of the 400 subjects under study, those detected to be infected were found to be at different stages of HBV infection (Table 2). Approximately, (27.75%) were found to have been vaccinated, those on acute phase were 3%, on recovery were 4.75%, chronic 2.5%, asymptomatic or inactive 1.75% while those on occult HBV were 2.25%

Age or gender had no significant influence that led to HBV infections. In Pearson correlation analysis, infection ith HBV was found to increase with age r=0.054; p=0.283 while gender was not found to be a risk factor to infection even though males were the most affected r=-0.62; p=0.213.

Table 1

Demographic characteristic of the study participants visiting HIV care clinics of Mama Lucy Hospital, Kayole

Gender	All N (400)	Females n(293)	Males n(107)	P-value
Mean Age in years	33.4 ± 0.01	34.1 ± 0.49	31.7 ± 2.89	
HIV Mean Viral load (log10 copies/ ml)		8,866.52	9,806.55	7,072.9
Mean Duration of treatment (years)		4.75 ± 0.02	4.6 ± 0.23	5.1 ± 0.12
Regimen				
AZT/3TC/NVP	209	162	47	
TDF/3TC/EFV	168	112	57	
TDF/3TC/LPr	13	11	2	
AZT/3TC/LPr	9	8	1	
Age categories (Age (years)				
>10	48	0.429		
11-19.	41			
20-29	29			
30-39	110			
40-49	104			
50-59	50			
60-69	9			
70-79	9			

KEY:

AZT: Zidovudine

3TC: Lamivudine

NVP: Nevirapine

TDF: Tenofovir Disoproxil Fumerate

LPV/r: Lopinavir/Ritonavir

Table 2
Hepatitis B virus sero-reactivities, infection stages among HIV infected individuals visiting HIV care clinics of Mama Lucy Hospital, Kayole

sero-logical test	HBV immunisation	Acute HBV	HBV recovery	HBV chronic	inactive or asymptomatic carrier	occult HBV
antiHBs	+	-	+	-	-	-
AntiHBc	-	+	+	+	+	+
AntiHBe	-	-	+	-	+	-
HBsAg	-	+	-	-	+	-
HBeAg	-	+	-	-	-	-
n= (400)	111	12	19	10	7	9
Prevalence Rates (%)	27.75	3	4.75	2.5	1.75	2.25

DISCUSSION

In this study, we determined the prevalence of HBV among HIV infected patients seeking health service at Mama Lucy Hospital, Nairobi, Kenya. From the findings, the prevalence of HBV/HIV co-infections (5.5%) was found to be consistent with those previous obtained in Kenya, 6% (2), 5% (9), and elsewhere in Malawi (5.7%) (10,11), Nigeria (4.8%) (12) and Rwanda (4.9%) (13). However, they were also found to be higher than those obtained from regions in the country 1.1% (14) 0.7% (15), and those from Zambia (2.2%) (16), Cote d'voire (1.2%) (17), Gambia (0.6%) (18), Senegal (1.6%) (19) 1.8% (20) Uganda (0.6%) and Zimbabwe (0.8%) (21)

In comparison to other populations, the rates of HBV/HIV co-infection were varied. This findings ere similar to those that have been detected in other studies 4.7% (22) and elsewhere in Ethiopia 3.9% (23,24), S. Africa 4.8% (25, 26) and Uganda 4.9% (13). However, these results were also found to be low compared to those previous obtained in Kenya 55.8% (22,27) and other sub-Saharan countries; Tanzania (11,28,29), Zambia (31), Botswana (30), Malawi (11), Nigeria (12,30-33), Ethiopia (6), Argentina (34) South Africa (11,35).

Nevertheless, our findings were also found to be higher than some studies conducted in Ethiopia (25), South Africa (25,26), Uganda and Rwanda (13). The observed varied rates were associated with diverse populations, sample size as well as the methods used. The observed increase in HIV/HBV co-infection rates could be associated with an increase in access to free antire-troviral therapy that leads to prolonged life period and diverse study subjects (2). From these observation rates for general population, it shows that HBV/HIV co-infections could be higher than expected especially for high risk populations (2,36). The HIV-co-infections rates based on gender, were found to be significantly higher among male patients compared to their female counterparts. This could be associated with the risk of infection due to their sexual behaviour with multiple partners, drug use or alcohol consumption (24). Confirmation of HBV infection in most situations has been relied upon for screening HBsAg. However, the single use HBsAg as marker for infection is insufficient for categorising patients according to various HBV infection stages of the disease or status. This limitation, has led to most people going undiagnosed which poses a challenge in disease detection and monitoring.

Despite 5 panel HBV (HBsAg, HBsAb, HBeAg, HBeAb and HBcAb) being the key for guiding in accurate diagnosis and infection staging of hepatitis B virus, only HBsAg status is often used hence risking missing detection of occult hepatitis (1,37). To our knowledge, this is the second study to apply this utility tool for HBV geno-typing and infection staging. The high recorded rates of vaccine respondents and resolved infections cases could be associated with low viral loads hence high CD4 counts among the participants. These findings concur with previously conducted studies in Kenya and elsewhere (1, 38, 39).

In the observed rates of asymptomatic carrier and occult Hepatitis, the findings were slightly higher but low among those at chronic stages compared to those previously obtained in Kenya (1,40-42). Those detected to be at chronic stage of infection, could be experiencing liver cirrhosis and therefore risking developing hepato-cellular carcinoma (2). From utility of the five HBV sero-markers, this study shows that there could be a possibility of accumulative high rates of HIV/HBV co-infections which could be at different stages of the disease (1).

This study had limitations. The study utilised IgM in classifying some of the infection stages like acute and chronic infections which could persist for several years. Secondly, this study did not determine HBV viral load and CD4/CD8 counts that could have

guided immune response and confirmation of occult HBV. In addition, this study utilised rapid serological tests which are often associated with low sensitivity and specificity in their application (1,43). Nevertheless, the utility of 5 HBV panel has demostrated the utilisation of this technique in HBV infection response.

In conclusion, the prevalence of HBV is still remains low in the general population but this rate could be high in high risk populations. In addition, this study also confirms that HBV 5 panel sero-marker test is an important tool in guiding infection staging and geno-typing of HBV infections and therefore faster implementation of intervention measures.

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