ISSN: 2279 - 0594

Available Online at www.jbpr.in

Journal of Biomedical and Pharmaceutical Research 2 (6) 2013, 78-81

RESEARCH ARTICLE

SERO-PREVALENCE OF HEPATITIS B VIRUS (HBsAg) AND HEPATITIS C VIRUS (Anti-HCV) AMONG HIV-INFECTED IN SUDAN

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Received 15 November 2013; Revised 20 November 2013; Accepted 21 November 2013

ABSTRACT

Background: Human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) were three most common chronic viral infections all over the world, they shares similar routes of transmission. Hepatitis co-infection with HIV is associated with increased serious life threatening complication, morbidity and mortality.

Aim: To determine the seroprevalence of HBV (HBsAg) and HCV (Anti-HCV) co-infection in HIV-positive patients and to detect the shared and significant factors in the co-infection.

Methods: This cross sectional study, 88 blood samples were collected from confirmed HIV positive patients (ELISA and Western blot), 52 (59.1%) and 36 (40.9%) of them were males and females, respectively; All samples were tested for HBV (HBsAg) and HCV (Anti-HCV) by Enzyme Linked Immunosorbent Assay (ELISA).

Results: Among HIV infected patients HBV (HBsAg) infection were detected in 11.4% and HCV (anti-HCV) were detected in 5.7% respectively.

Keywords: ART, CD4, ELISA, Hepatitis B, C, HIV Sudan, Sero-prevalence

INTRODUCTION:

Infection with human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are among the 10 leading causes of death from infectious disease [1]. Worldwide, it is estimated that there are 40 million people living with HIV, 370 million people with chronic HBV infection and 130 million with chronic HCV infection [2,3]. Among HIV patient populations, HBV and HCV are more prevalent due to overlapping transmission routes [4]. Diseases of the hepatobiliary system are a major problem in patients with human immunodeficiency virus (HIV) infection. An estimated one-third of deaths in HIV patients are directly or indirectly related to liver disease. Liver diseases in HIV infected persons can occur due to HBV and HCV co-infections, chronic alcoholism, hepatic tuberculosis, or due to the effects of anti retroviral therapy (ART) [5,6]. Since the principal routes for HIV transmission (by sexual intercourse or drug use by parenteral injection) are similar to that followed by the hepatotropic viruses, as a consequence, infections with HBV and HCV are expected in HIV infected patients. Co-infections of HBV and HCV with HIV have been associated with reduced survival, increased risk of progression to liver disease and increased risk of hepatotoxicity associated with anti-retroviral therapy. HIV-HBV co-infected patients are at risk of increased morbidity and mortality. Early recognition of dual infection is a critical factor in directing appropriate therapy and HBV screening should therefore be undertaken at the time of HIV diagnosis. Vaccination against HBV should be considered for all HIV patients who are not yet infected with HBV. Antiretroviral therapy containing two antiretrovirals active against HBV should be started if the patient either has symptomatic liver disease or is asymptomatic with a CD4 count of <350 cells/µl [7]. HIV-infected patients with chronic hepatitis B commonly has high viral load and positive HBeAg. Both markers have recently been shown to be associated with the development of hepato-cellular carcinoma [8,9]. The objective of the current study was to determine the sero-prevalence of HBV (HBsAg) and HCV (Anti-HCV) co-infection in HIV-positive patients and to detect the shared and significant factors in the co-infection.

METHODS:

Blood samples were randomly collected from 88 HIV positive patients (ELISA and Western blot). Approval consent were taken from all participants and data such as patients' ages, gender, route of HIV transmission, ART administration, duration of HIV infection and CD4 count were collected using a questionnaire. Serum samples were separated and stored at -20 °C until testing.

The serum samples were tested for the presence of HBsAg using (HBsAg ELISA, Biorex diagnostics, UK) and anti-HCV antibodies (Anti-HCV fourth generation ELISA, Biorex

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diagnostics, UK). All methods were done according to manufacturer's instruction, the results were evaluated after cutoff value calculation as mentioned by manufacturer and the results were being positive if it more than the cutoff point and negative if it less than it. Data analysis was done using SPSS, Chi square test were done and P value was detected.

RESULTS:

Among 88 HIV-positive patients, 52 (59.1%) and 36 (40.9%) were males and females, respectively. The prevalence rates of HBV co-infection with HIV was 11.4%, and the prevalence of HCV coinfection with HIV was 5.7% (Table 1).

Table 1: HBsAg, AntiHCV, and both HBsAg/AntiHCV among HIV patients:

	HBsAg	AntiHCV	HBsAg/AntiHCV
HIV Patients; No 88	**10**	**5**	**1**
%	11.4	5.7	1.1

The prevalence of HIV/HBV co-infection was 15.4% in male and 5.6% in female respectively there is no statistical significance P value >0.05 (Table 2). The prevalence of HCV coinfection with HIV was (7.7%) in male and (2.8%) in female (P value >0.05) (Table 2).

In addition, to detect the significant relation following results from chi-square tests were obtained by investigating various variables including age, gender, method of HIV transmission, using of ART, and CD4 count and the results were shown in Table (2).

Age: There was an insignificant relationship between age group and co-infection with HBV and HCV (P value >0.05).
HIV transmission route: The co-infection with HBV and HIV transmission route were by sexual 9/62 (14.52%) more than transmission by mother to infant 1/13 (7.7%) and transmission by blood 0/13 (0.0%) (P value >0.05).

Co infection with HCV in HIV is higher among transmission by blood 1/13 (7.7%) than sexual transmission 4/62 (6.5%) and transmission from mother to infant 0/13 (0.00%), (P value >0.05).

ART: Prevalence of infection with HBV in HIV patients taking ART is higher than in patients didn't take ART 7/50 (14.0%), 3/38 (7.9%), (P value >0.05).

Prevalence of infection with HCV in HIV patient taking ART is lower than in patients did not take ART 1/50 (2.0%) 4/38 (10.5%) respectively (P value >0.05).

CD4 count: The prevalence of HCV infection in HIV patients with CD4 count more than 350 cells/µl is lower than in patients with CD4 count less than 350 cells/µl 1/43 (2.3%), and 4/45 (8.9%) respectively P value >0.05, in HBV co-infection with HIV it is quite similar in patients with CD4 count more than 350 cells/µl and the less than 350 cells/µl 5/43 (11.6%) and 5/45 (11.11% respectively.

Table 2: Demographic, Clinical data and HBsAg, Anti HCV ELISA result among HIV patients:

		HBsAg	Anti HCV
Gender	Male: **52** (59.1%)	**8** (15.4%)	**4** (7.7%)
	Female: **36 (**40.9%)	**2** (05.6%)	**1** (2.9%)
		P value >0.05	P value >0.05
Age Groups (Years)	01 - 19: **16** (18.2%)	**1** (06.3%)	**1** (6.3%)
	20 - 39: **35** (39.8%)	**4** (11.4%)	**3** (8.6%)
	40 - 59: **31** (35.2%)	**4** (12.9%)	**1** (3.2%)
	60 - 79: **06** (06.8%)	**1** (16.8%)	**0** (0.0%)
		P value >0.05	P value >0.05
HIV Transmission	Sexual: **62** (70.4%)	**9** (14.5%)	**4** (6.5%)
	Vertical: **13** (14.8%)	**1** (07.7%)	**0** (0.0%)
	Blood: **13** (14.8%)	**0** (0.00%)	**1** (7.7%)
		P value >0.05	P value >0.05
HIV Duration (Years)	< 1: **39** (44.3%)	**3** (7.7%)	**5** (12.8%)
	1 - 3: **14** (15.9%)	**3** (21.4%)	**0** (0.0%)
	3 - 5: **06** (06.8%)	**0** (0.00%)	**0** (0.0%)

	> 5:	**29** (33.0%)	**4** (13.8%) P value >0.05	**0** (0.0%) P value >0.05
CD4 Count (Cells/µl)	> 350:	**43** (48.9%)	5 (11.6%)	1 (2.3%)
	< 350:	**45** (51.1%)	5 (11.1%) P value >0.05	4 (8.9%) P value >0.05
ART	Yes:	**50** (56.8%)	7 (14.00%)	1 (2.00%)
	No:	**38** (43.8%)	3 (7.89%) P value >0.05	4 (10.53%) P value >0.05

DISCUSSION:

The prevalence of HBsAg and anti-HCV co-infection with HIV is (11.4%) and (5.7%) respectively. One HIV patient (1.1%) was positive for both HBsAg and Anti HCV.

Our result is consistent with results of studies carried out by Otegbayo, A. *et al* [10] in Nigeria conducted in 1779 HIV-positive patients and revealed that the rates for HBsAg, HCV, and HBV/HCV coinfections were 11.9, 4.8, and 1%, respectively, also it agrees with Silva, W. *et al* [11] study done in Brazil, their results showed that the rates of 6.4 and 5% for HBsAb and HCV-Ab co-infection in HIV-positive patients.

The observed HIV/HBV co-infection prevalence (11.4%) in this study is relatively comparable with previous studies done by Lodenyo, H. *et, al.,* in South Africa 9.6% [12], Baba, M. *et, al.,* Nigeria 12% [13], Ejele, A. *et, al.,* Niger 9.7% [14] and Sungkanuparph, S. *et, al.,.* in Thailand 8.7% [15]
Otherwise some previous reports of HIV/HBV co-infection from Nigeria; Forbis, C., *et, al.,* [16], Olatunji, P., *et, al.,* Nigeria [17] and India by Stud, A., *et, al.,* [18] shows high rate as 20.6%, 30.4%, and 33.8% respectively. Varying endemicity and sample size may be responsible for the differences in prevalence between these studies.

The prevalence of HBV/HIV co-infection was found to be higher among male study subjects (15.38%) than females (5.56%). The difference is not statistically significant (P value >0.05). This finding is similar to previous reports from Irisena, D. *et, al.,* [19] and Stud, A. *et, al.,* in India [18].

As this screening should be undertaken at the time of diagnosis of HIV to allow for early decisions on specific treatments for HBV and HIV, as well as vaccination of HBV-uninfected individuals.

This observed high prevalence (5.7%) of HCV/HIV co-infection among HIV patients is comparable with reports of previous studies in Abuja by Otegbayo, A. 8.2% [20], In Brazil by Silva, W. *et, al.* (5%) [11]. The prevalence of HCV/HIV co-infection was found to be higher among male study subjects (7.69%) than females (2.78%).

We have observed that 1 (1.1%) of the study patients have a triple co-infection with HIV/HBV/HCV in this study. Previous prevalence reports of triple co-infection in this group of study subjects vary from Forbis C, e*t, al.* [16] Nigeria 7.2%, Otegbayo, A. 1% [20] Nigeria and Laren, C. *et, al.,* [21] France 1.6%.

CONCLUSION:

The prevalence of viral hepatitis (HBV, HCV) among HIV positive individuals was higher than the prevalence of the respective viruses in the general population. Thus screening of HBV and HCV before initiation of antiretroviral treatment is mandatory for strict monitoring and a regular evaluation of liver enzyme levels and CD4 status in order to minimize the complication of the liver and for effective HIV treatment.

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