

Viral hepatitis (A, B and C) and Human Immunodeficiency Virus (HIV) co-infection Seroprevalence in a Tertiary Care Hospital in Saudi Arabia

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Abstract Background/Objectives: Viral hepatitis is still causing a great undesirable impact on the health systems worldwide as a major etiological agent of liver diseases and chronic evolution affecting millions of people, especially among HIV-infected patients. This study was carried out to determine the prevalence of viral hepatitis among HIV-infected patients in a tertiary care hospital in Saudi Arabia. **Material/methods:** Retrospective study was conducted among all of HIV seropositive patients in King Abdulaziz Medical City-Riyadh from January 2005 to November 2015, data was collected and recorded from patients' charts, electronic health record system and HIV data base for age, gender, nationality, CD4 count, hepatitis A virus (HAV) serology, hepatitis B virus (HBV) serology and hepatitis C virus (HCV) serology. **Results:** A total of 22/61 patients out of 61 HIV infected patients involved in this study were positive for hepatitis (A,B and C) serology (36.1%), 15/61 patients were positive for HBV serology (24.6%), 3/61 patients were positive for HCV serology (4.9%) and 8/61 patients were positive for HAV serology (13.1%). 7/61 patients were positive for HBV surface antigen (HBsAg) (11.5%), 8/61 patients were positive for HBV surface and core antibodies with negative HBsAg (13.1%), 1/61 patient was positive for HBV/HCV serology (1.6%) and 3/61 patients were positive for HAV/HBV serology (4.9%). **Conclusions:** One third of our HIV positive patients were found to be suffering from viral hepatitis, this significant prevalence in HIV infected patients in SA would encourage health care workers to do a routine surveillance for viral hepatitis in all new HIV positive cases.

Keywords: Viral hepatitis, HIV, Saudi

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1. Introduction

Viral hepatitis is a group of infectious diseases that affects hundreds of millions of people worldwide, causing serious illness and death from acute hepatitis infection, liver cancer and liver cirrhosis [3], worldwide an estimated 350 million people are chronically infected with HBV while 185 million are chronic carriers of HCV [2]. People infected with human immunodeficiency virus (HIV) are at a greater risk of co-infection with either hepatitis B virus (HBV) and/or hepatitis C virus (HCV) compared to the general population [1]. Up to 33% of those with HIV may be co-infected with HBV and/or HCV Co-infection and this is likely to result in chronic liver disease with potential for rapid progression to liver fibrosis, cirrhosis, end-stage liver disease, hepatocellular carcinoma (HCC) and mortality due to liver pathology among this group of patients [2,23]. HIV/HCV co-infected individuals are

three times more likely to develop these complications than those with HIV infection alone [2].

Few data are available on the clinical and biological features of hepatitis A virus (HAV) in patients with HIV infection [1], the infection may be asymptomatic or symptomatic, self-limiting, or it may cause an acute hepatitis syndrome of varying degrees of severity; however, it does not lead to chronic disease [1]. In developed countries, the seroprevalence of hepatitis A in the adult population is estimated to be 40%–70% [1], in patients with HIV infection HAV increased severity of hepatitis if there is pre-existing liver disease [4]. Recent studies showed that HAV viraemia in HIV-infected patients could be present for a much longer period than was previously estimated in patients not infected with HIV [5].

In the Middle East there are very rare reports regarding prevalence of viral hepatitis in HIV infected individuals, there is only one published report in SA in 2014 for the prevalence of HBV and HCV infections in HIV infected

individuals [7] and no report for HAV seroprevalence in HIV infected individuals in SA. Among 341 HIV-infected patients, hepatitis C infection was found in 41 patients 12% and Hepatitis B surface antigen was found in 11 patients 3% in study from SA [7].

According to the Saudi Ministry of Health (MOH), viral hepatitis in general population was ranked the second most common reportable viral disease after chickenpox in 2007 [6], 74662 individuals undergoing premarital screening between January and May of 2008, 1.31% subjects tested positive for HBsAg in SA [8] also blood donor statistics suggest prevalence rates between 1.5% and 2.6% within the adult population [8]. Between 2000 and 2007 the surveillance system at King Abdulaziz Medical City in Riyadh received a total of 14224 seropositive cases of viral hepatitis, HBV was the most frequent viral hepatitis type reported (n = 7572, 53%), followed by HCV (n = 5675, 40%) and HAV (n = 981, 7% [6]. HCV seroprevalence was conducted on 15,323 Saudi nationals the overall anti-HCV antibodies were detected in 7.3%, the HCV seropositive percentages over 4 years were ranged from (6.9–9.0%) in males and (5.3–8.5%) in females [16].

2. Methods

2.1. Ethics Statement

This study was approved by King Abdullah International Medical Research Centre at King Saud bin Abdulaziz University for Health Sciences, National Guard Health Affairs, Riyadh - SA, before starting data collection as the study does not disclose patient identity, and poses no risks to patients (Reference N. RC13/217).

2.2. Study Design and Analysis

Retrospective study was conducted with a total of 61 HIV seropositive patients, who was admitted and followed up in KAMC-Riyadh. Data was collected and recorded from patients' charts and from the electronic health record system in hospital and HIV data base for age, gender, nationality, CD4 count, hepatitis A virus (HAV) serology

(anti-HAV immunoglobulin G), hepatitis B virus (HBV) serology (HBV surface antigen (HBsAg), anti-HBV surface antibodies and anti-HBV core antibodies) and hepatitis C virus (HCV) serology (anti-HCV antibody). Absolute CD4 count was measured by using Flow Cytometry all obtained data was analyzed by using SPSS analytic system.

KAMC-Riyadh is a distinguished healthcare provider in Saudi Arabia as a part of National Guard Health Affairs, with a capacity of more than 800 beds located in Riyadh city.

3. Result

A total of 22/61 patients were positive for hepatitis (A, B and C) serology 36.1%, 15/61 patients were positive for HBV serology 24.6%, 3/61 patients were positive for HCV serology 4.9% and 8/61 patients were positive for HAV serology 13.1%. 7/61 patients were positive for HBV surface antigen (HBsAg) 11.5%, 8/61 patients were positive for HBV surface and core antibodies with negative HBsAg 13.1%, one patient was positive for HBV/HCV serology (1.6%) and 3/61 patients were positive for HAV/HBV serology (4.9%) (Table 1) (Figure 2).

Gender distribution for patients with positive hepatitis serology (A, B and C) was, 16/22 patients were male 72.7%, 6/22 patients were female 27.3%. Positive HBV serology patients 11/15 were male 73.3% and 4/15 was female 26.7%. Positive HCV serology patients 3/3 were male 100% and positive HAV serology patients 6/8 were male 75% and 2/8 patients were female 25%. HBsAg positive patients 7/7 were male 100% (Table 1).

HBV positive serology patients, mean age was 48.13 (22-76 years) Std 13.255, age from 19-29 years was 1/15 (6.7%), 30-49 years were 8/15 (53.3%) and more than 50 years were 6/15 (40%), HBsAg positive patients age from 19-29 years was 1/7 (14.2%), age 30-49 years were 3/7 (42.8%) and age more than 50 years was 3/7 (42.9%). HCV positive patients age from 30-49 years were 2/3 (66.7%) and age more than 50 years was 1/3 (33.3%). HAV positive patients age 30-49 years were 2/8 (25%) and age more than 50 years were 6/8 (75%) (Table 1).

Table 1. General Hepatitis serology characterization of participants

Characteristics	HBsAg+ (%)	HB Abs+ (%)	HCV Ab+ (%)	HAV Ab+ (%)
Tn 61	7(11.5%)	8(13.1)	3(4.9%)	8(13.1%)
Sex				
Male	7/7(100%)	4/8(50%)	3/3(100%)	6/8(75%)
Female	0	4/8(50%)	0	2/8(25%)
Age				
19-29	1/7 (14.2%)	0	0	0
30-49	3/7(42.8%)	4/8(50%)	2/3(66.7%)	2/8(25%)
>50	3/7(42.9%)	4/8(50%)	1/3(33.3%)	6/8(75%)
CD4 Count				
<200cells/ μ	4/7(57.1%)	7/8(87.5%)	33.3%	37.5%
200-500 cells/ μ	1/7(14.3%)	1/8(12.5%)	0	25%
>500cells/ μ	2/7(28.6%)	0	66.7%	37.5%
Nationality				
Saudi	7/7(100%)	8/8(100%)	1/3(33.3%)	7/8 (87.5%)
Non-Saudi	0	0	2/3(66.7%)	1/8(12.5%)

Tn total number, HBsAg, Hepatitis B surface antigen, HCV-Ab Antibodies to hepatitis C, HBAb, hepatitis B surface and core antibodies, HVA hepatitis A immunoglobulin G.

Patients with positive hepatitis serology 19/22 were Saudi 86.4% and 3/22 were non-Saudi 13.6%, all HBsAg positive patients 7/7 were Saudi 100% , 1/3 HCV patients was non-Saudi 33.3% and 2/3 were Saudi 66.7% , HAV positive patients 7/8 were Saudi 87.5% and 1/8 was non-Saudi 12.5% (Table 1).

CD4 count for patients with positive HBV serology, mean CD4 count was 274.13 Std 373.301(10-1140 cells/mm3), Less than 200 was 60%, 200-500 was 20%

and more than 500 cells/mm3 was 20%, CD4 count for patients with HCV, mean was 553.33 Std 497.427 (30-1220 cells/mm3), less than 200 33.3% and more than 500 cells/mm3 was 66.7% .Patients with positive HAV serology, mean was 348.43 Std 364.171 (10-900 cells/mm3), less than 200 was 37.5%, 200-500 was 25% and more than 500 cells/mm3 was 37.5% (Table 1) (Figure 1).

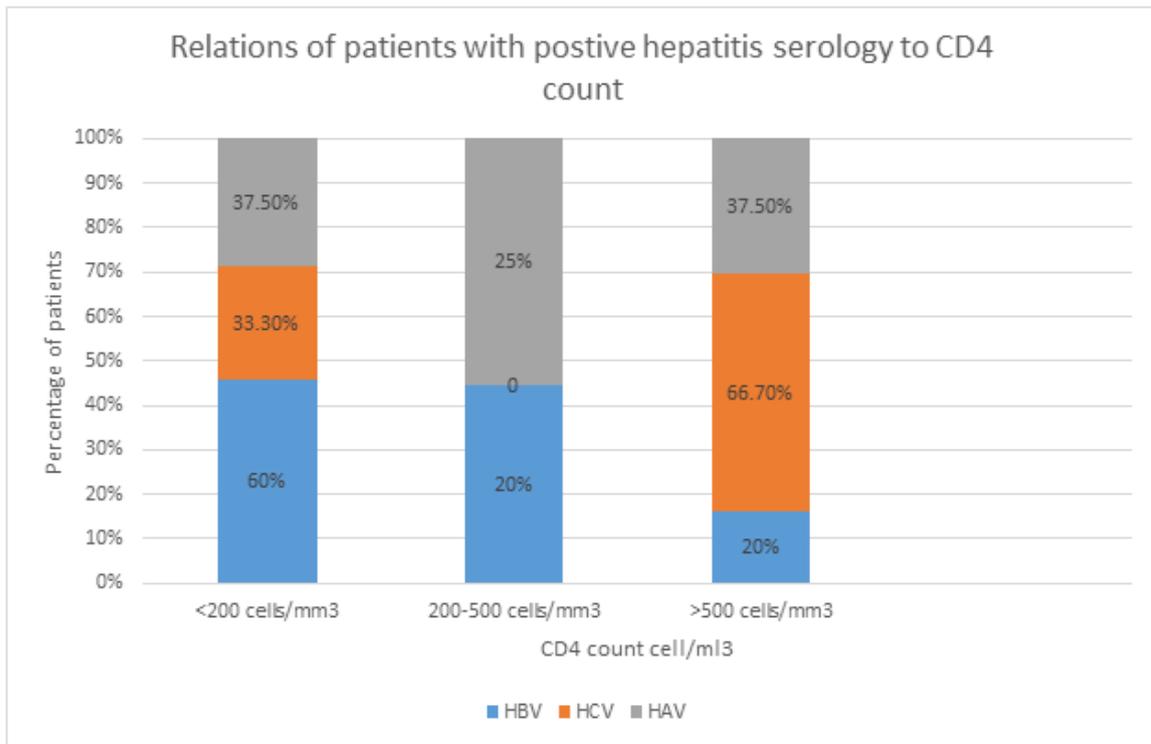


Figure 1. CD4 count distribution among patients with positive hepatitis serology

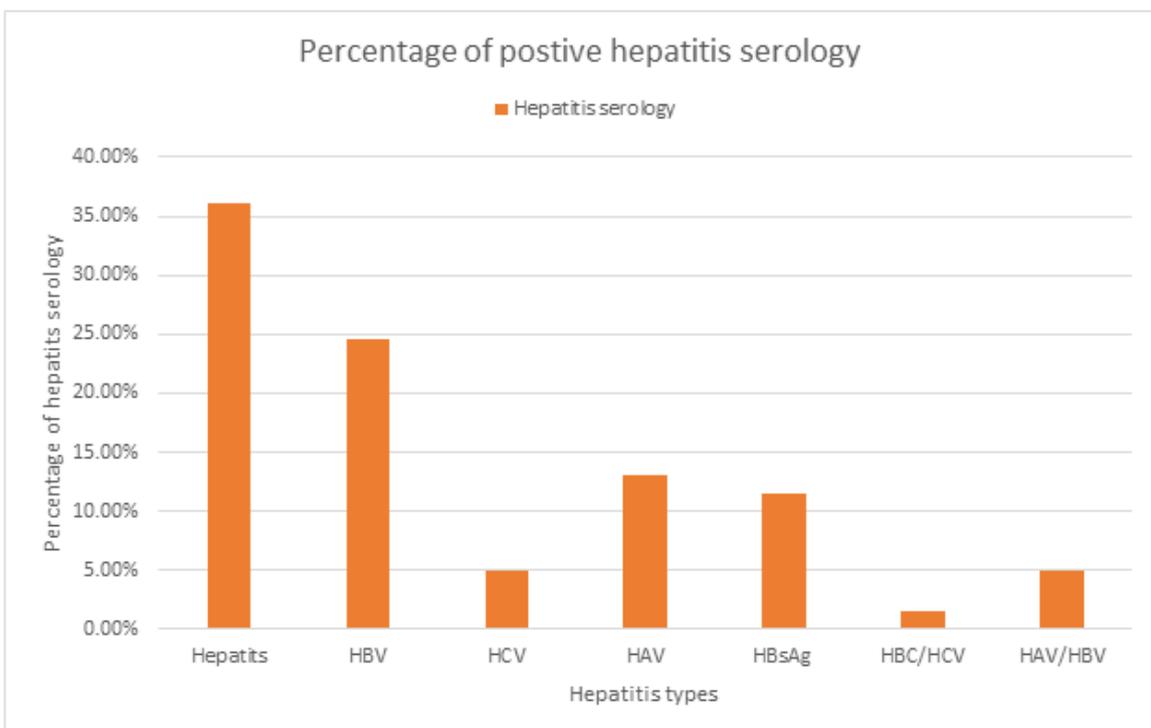


Figure 2. showed percentage distribution of different type of positive hepatitis serology in HIV infected patients (HBV(hepatitis B virus) , HCV (hepatitis C virus), HAV (hepatitis A virus), HBsAg (hepatitis B surface antigen))

Table 2. Prevalence of Positive Hepatitis Serology in all HIV Subjects

Variables	Positive serology (%)	Negative serology (%)
Total No 61	22 (36.1)	39 (63.9)
HBV	15 (24.6%)	-
HCV	3 (4.9%)	-
HAV	8 (13.1%)	-
HBV/HCV	1 (1.6%)	-
HAV/HBV	3 (4.9%)	-

HBV hepatitis B virus, HCV hepatitis C virus, HAV hepatitis A virus.

4. Discussion

Recently there is a notable increase in the number of people living with HIV in SA, according to Saudi Ministry of Health, the cumulative number of all detected cases since the beginning of 1984 and up to the end of 2013 amounted to 20,539 cases, in 2013, 1,777 new Acquired Immunodeficiency Syndrome (AIDS) cases were detected [15], but a little data are available for HBV, HCV co-infection and HAV seroprevalence status in this group of patients in SA.

The purpose of this study was to determine the prevalence of viral hepatitis (A,B and C) infections in HIV infected individuals in SA, there are very few data regarding the prevalence of viral hepatitis in HIV infected subjects in the Middle East, in SA there is only one published report for the prevalence of HBV and HCV infections in HIV infected patients [7], the study was done for the age 18 years and older between January 1985 and December 2010, that showed the rate of HCV infection of 12% and HBV infection of 3% (HBsAg) [7].

We found in our study the prevalence of HBV infection was 11.5% (HBsAg) which was higher than the rate in previous study 3% in HIV infected patients in SA [7], also the rate is higher than in the blood donors individuals in SA, a total of 29949 blood units were collected from healthy voluntary and replacement native Saudi blood donors HBsAg was positive in 3.8% [9]. The rate of HBV infection in our study is also higher than among heroin injectors in SA, from sample of 357 inpatients Saudi male heroin users the prevalence of HBsAg was 7.7% [10], also it was found to be higher in compare to the general population, across 300 Saudi students aged 18 to 25 years overall seroprevalence of HBsAg was 1.7%, the same study included 300 Health Care Workers HBsAg was positive in 0.3% [11] and also it was higher than in premarital screened subjects, a total of 755 pregnant females who attended the antenatal clinic from June 2005 to June 2006 for the first time - before 38 weeks of gestation the prevalence of sero-positive HBsAg was 1.6% [17], in our study the rate of patients with positive HBV surface and core antibodies with negative HBsAg was 13.1%.

The incidence of HCV infection in HIV infected patients is found to be 4.9% in our study which is lower than the local study result in HIV positive group 12% [7], but it is relatively higher than among blood donors in SA, anti-HCV seropositivity was 0.41% [9] but it is far lower than among heroin injectors in SA it was 77.8% [10]. In compare to the general population it is relatively lower, the HCV seroprevalence was conducted on 15,323 Saudi

nationals the overall anti-HCV antibodies were detected in 7.3% [16].

We found the rate of HBV/HCV infection in HIV infected patients (triple infection) was 1.6%, which is relatively higher than among heroin injectors in SA 1.1% [10], but there is no reports from SA regarding triple infection in HIV infected individuals up to our knowledge and literature review, but the prevalence was lower than triple infection rate in other studies 7.2%, 19.1% and 10.4% [12].

HCV co infection with HIV has a deleterious effect on the natural history of chronic hepatitis C and accelerated liver disease and are more likely to develop liver enzyme abnormalities and clinical liver toxicity when treated with HAART [18], on the other hand, HCV may take advantage of the lowering of viral specific CD8+ T cell responses [2]. It has also adverse effect on immune recovery of HIV infected patients initiating HAART, especially of those with initially impaired immunologic status, although this effect diminishes over time [19].

HAV infection among HIV infected patients was 13.1% according to our findings in this study, and triple seropositive (HAV/ HBV/HIV) rate was 4.9%, there is no local data or reports regarding HAV seroprevalence in HIV infected peoples in SA, but it was lower than in other studies 60.9% and 35% [13,14]. Figures released from Saudi epidemiology studies consistently identify HAV as the most prevalent form of hepatitis among the three most common viral types in general population [8]. The anti-HAV prevalence rate in the SA was recently estimated at 18.6% [8], an evaluation of 14,224 cases of viral hepatitis documented between 2000 and 2007 at King Abdulaziz Medical City-NGHA in Riyadh demonstrated a significantly lower annual incidence of seropositivity for HAV 13.6 compared with HCV 78.4 or HBV 104.6 per 100,000 served population [8].

Gender distribution in this study showed predominant male infection in compare to the female for HBV, HCV and HAV were 73.3%, 100% and 75% respectively, which was higher than incidence among general population and the highest rate was HBV infection, in King Abulaziz Medical City-Riyadh conducted study, the majority of HBV and HAV, but not HCV cases, were male 60.0%, 55.2% and 49.9% respectively [8] and Saudi nationality was 97.6%, 98.4%, 95.0% respectively [8].

In our study, age of most of patients with positive HBV serology were between 30-49 years 53.3%. Current prevalence of HBV markers among male Saudi blood donors was assessed in the Northwest region of Saudi Arabia in a study by El-Beltagy et al, the prevalence of HBsAg generally increased with age, showing the highest rate in those more than 46 years of age 7.7%. The prevalence of anti-HBc also increased with age, showing the lowest rate in those aged 17-26 years 2.6% and the highest rate in those more than 46 years of age 21.4% [9]. Majority of HCV positive patients in our study were aged 30-49 years old 66.7%, the majority were also aged, the difference in the prevalence rate for anti-HCV between the age groups is minimal and not statistically significant (P = 0.064) [9] this study showed the predominant age of HAV patients were more than 50 years old 75%, in other study in Jeddah City it was 49.2% in adult more than 35 years old [24].

A direct benefit of knowing ones HIV/HBV or HIV/HCV co-infection status or HAV seroprevalence is our study or in other studies is in the initiation of Antiretroviral Therapy (ART) and possible vaccination. WHO recommended that HIV infected patients co-infected with HBV should commence ART irrespective of their CD4 cell-counts [20], in HIV/HCV coinfecting persons, there is more rapid progression of HCV-related liver disease, and treatment for HCV may slow the progression of hepatic fibrosis and/or delay the onset of clinical consequences of decompensated cirrhosis [21]. Therefore, treatment of HCV is a priority for persons with HIV/HCV coinfection as WHO in 2014 [21].

Vaccination against the hepatitis A virus (HAV) in HIV infected subjects is recommended for health care workers, men who have sex with men, injection drug users, people with chronic liver disease (including chronic hepatitis B or C), haemophiliacs, and people traveling to certain parts of the world according to a service to United States of Health and Human Services (USPHS) and Infectious Diseases Society of America (IDSA) and Centres for Disease Control (CDC) [22].

5. Limitations

This study has a limitations of small sample size and being only descriptive of an original data.

6. Conclusion

One third of our HIV positive patients were found to be suffering from viral hepatitis, this significant prevalence in HIV infected patients in SA would encourage health care workers to do a routine surveillance for viral hepatitis in all new HIV positive cases. More epidemiological studies are needed in this high-risk group of patients in SA.

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