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Research Article

Hepatitis B and C Co-Infection among HIV-Positive Patients Attending Art at General Hospital Kaltungo, Gombe State, Nigeria

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Abstract

Background: HBV and HCV infection, have been found to worsen the health of PLWAS, thereby impairing treatments and management. HIV, HBV, and HCV are transmitted through similar routes and hence the presence of infection with any of them could be a risk factor for the others.

Objective: Determine the prevalence of HBV/HCV co-infection in persons with HIV.

Method: This was a serological study in persons with HIV. For HBV, the Hepatitis B surface antigen was investigated and the antibodies to HCV for HCV. The study included HIV-positive patients registered with the ART clinic at General Hospital Kaltungo, irrespective of age. Ethical approval was gotten, consent was received from patients, and patient's information was kept confidential. Prevalence was determined by comparing the total positive test, to the overall study population tested.

Results: A total of 170 HIV-positive individuals took part in the study. The study had 59 (34.7%) males with mean age (standard deviation) of 40.9 (11.4) years and 111 (65.3%) females, having a Mean (Standard Deviation) of 37.1 (11.0) years.

The result revealed a statistically significant, high negative association between the viral load values of HIV, HBV and HCV co-infection and marital status (rs=-0.812, rs=-0.812, n=170, p=0.000, at α=0.001 significant

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level) with a 66% degree of variability. Also, the study observed a high positive, significant association within the viral loads of HIV\HBV co-infection and HIV\HCV co-infection (rs=-0.762, n=170, p=0.000, at α=0.001 significant level) with a 58% degree of variability using the Spearman correlation.

Conclusion: Co-infection for HBV was higher than that of HCV. No co-infection with all three viruses was found in this study. This can improve the health and treatment of PLWAS, then screening them for both HBV and HCV, must become a part of the guidelines.

Keywords: Co-infection; Hepatitis B; Hepatitis C; Human immunodeficiency virus; Nigeria; Antiretroviral therapy.

Abbreviations: HIV:Human immunodeficiency virus; HBV:Hepatitis B virus; HCV:Hepatitis C virus; ART:Antiretroviral therapy; PLWHA: People living with HIV/AIDs; AIDS:Acquired immunodeficiency syndrome.

Introduction

Human Immunodeficiency Virus (HIV) is a viral disease that infiltrates the Immune (CD_4) cells of the body hence, destroying them, lowering immunity, and creating room for opportunistic pathogens and infection [1]. HIV is said to have first been discovered around 1920 in Kinshasa (Democratic Republic of Congo).

Humans became infected with HIV from chimpanzees (Simian immunodeficiency Virus) [2,3]. As of 2021, 38.4 million (39.9 million to 43.8 million) people were living with HIV globally. Those who were assessing Antiretroviral therapy (ART) as of December 2021 were about 28.7 million. Since the start of the HIV epidemic, 79.3 million individuals have been exposed to and infected by the virus. About 36.3 million persons have died from AIDs related illnesses since the epidemic started.

Women and Girls make up 53% of persons living with HIV [4]. The second largest HIV burden/epidemic is in Nigeria [5]. In March 2019, a prevalence of 1.4% was said to be among individuals aged 15-19 years. An estimated prevalence of HIV infection in Nigeria by UNAIDS and NACA shows 1.9 million persons to be living with HIV [6]. Studies have shown a rapid progressiveness in HIV infection in persons infected with either the Hepatitis B virus (HBV) or Hepatitis C virus (HCV). Hence, it has become an added burden, impairing management and treatment [7].

Hepatitis B is an active infection that is continuous throughout one's life. Increased risk for end-stage liver disease and hepatocellular carcinoma increases with increased inflammation.

Persons who might require treatment include individuals with HIV, Chronic Hepatitis, Cirrhosis, and Hepatocellular Carcinoma. Also, Patients receiving immunosuppressive therapy and pregnant women with high Hepatitis B virus DNA levels [7].

In 2019, an estimate of people living with Hepatitis B was 296 million, with new infections of 1.5 million each year. Globally the prevalence of HBV infection in persons infected with HIV is at 7.4% [8]. In the United States, Hepatitis C Virus infection is said to be

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a frontline cause of Liver-related deaths, Hepatocellular carcinoma, and Cirrhosis [9]. 71.1 million persons are said to have prolonged-lasting HCV infection [10,11]. Persons with HIV and individuals with other sexually transmitted diseases tend to have an increased HCV risk through sexual transmission [12].

Worldwide, Human Immunodeficiency Virus with Hepatitis B and Hepatitis C co-infection is a critical problem for public health. Viral Hepatitis chronic infection has risen as a significant cause of morbidity and mortality among persons living with HIV [13,14]. The WHO recommends that High active antiretroviral therapy (HAART) be started immediately in HIV-positive individuals showing co-infection with HBV and HCV independent of their CD4 T-lymphocyte count. However, the treatment choice should also consider which of these viruses is present to curtail hepatotoxicity [15].

Achieving the WHO global hepatitis strategy to end viral hepatitis as a public health threat by 2030 is dependent by 80% on the treatment of persons with HBV and HCV infection. Hence, diagnosis is of great importance. Prevention also must be given priority [16,17].

Materials and method

Study area

This study was carried out at General Hospital Kaltungo, along Yola Road, Gombe State. Latitude 9.830102, longitude 11.320251.

This is a secondary Hospital that provides services to individuals around, as well as People Living with HIV and AIDs. The hospital provides care to PLWHA by collaborating with CDC through the Center for Integrated Health Programme (CIHP).

Study population

The study population was all HIV-positive individuals who presented at the ART clinic during the study period.

Ethics

Ethical Approval was obtained from the Ethics committee of General Hospital Kaltungo.

Data and sample collection

Data were obtained with patients' consent from their files when they came to their ART clinic, and blood samples were taken afterward. These samples were then screened for Hepatitis B surface Antigens and Antibodies for the Hepatitis C virus.

Data analysis

Data analysis was carried out with SPSS version 26.

Result

A total of 170 HIV-positive individuals took part in the study. The study had 59 (34.7%) males with mean age (standard deviation) of 40.9 (11.4) years and 111 (65.3%) females, having a Mean (Standard Deviation) of 37.1 (11.0) years. The age and sex distribution of Positive HIV patients are shown in Table 1.

The viral load count was available for all 170 patients. Serology results distribution, according to age group and viral load, was shown in Tables 2 and 3, respectively. The

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Also, the study observed a high positive, significant association within the viral loads of HIV\HBV co-infection and HIV\HCV co-infection (rs=-0.762, n=170, p=0.000, at α=0.001 significant level) with a 58% degree of variability using the Spearman correlation.

Total number=170		
Age group (years)	**Females**	**Males**
≤ 10	2	2
20-Nov	6	1
21-30	22	4
31-40	40	22
41-50	27	22
51-60	12	5
≥ 61	2	3
Total	111 (65.3%)	59 (34.7%)

Table 1: Age and sex distribution of HIV positive patient.

Total number=170			
Age group (years)	**HIV/HBV+Only**	**HIV/HCV+Only**	**HIV+HBV+HCV**
≤ 10	-	-	-
11-20	1	2	-
21-30	6	2	-
31-40	7	9	-
41-50	7	5	-
51-60	4	2	-
≥ 61	-	1	-
TOTAL	25	21	-

Table 2: Age Distribution of Positive Serology result.

Viral Load (Cells/ µL)			
HIV+HBV+HCV	**HIV/HBV+Only**	**HIV/HCV+**	**Only**
<200	23	19	-
200-499	-	-	-
≥ 500	2	2	-
TOTAL	25	21	-

Table 3: Distribution of positive serology results according to HIV viral load.

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Table 4 shows 25/170 (14.7%) Tested positive for HBsAg (HIV/HBV+only), 21/170 (12.4%) for anti-HCV (HIV/HCV+only), and none positive for HBsAg and Anti-HCV (HIV/HBV/HCV).

Discussion

While the European guidelines for AIDs state that all persons infected with HIV should also be screened for both HBV and HCV annually and at Each diagnosis, low income-and middle-income countries still face challenges in carrying out this. In Nigeria, the national guidelines to prevent, treat, and care for HIV patients only recommends the baseline testing of Patients for HBV and HCV before the commencement of their Highly active antiretroviral therapy (HAART) [18,19].

	Total n=170	**Females**	**Males**
	No. (%)	**No. (%)**	**No. (%)**
HIV/HBV+Only	25 (14.7%)	15/25 (60%)	10/25 (40%)
HIV/HCV+Only	21 (12.4%)	12/21 (57%)	9/21 (43%)
HIV+HBV+HCV	-	-	-

Table 4: Prevalence of positive serology test and its sex distribution.

It was recorded as an HIV/HBV prevalence of 14.7% higher than the 7.8% HIV/HBV prevalence recorded by another study, in 2020, on 4663 HIV-positive patients in Southeast Nigeria [20]. Another study had an HIV/HBV prevalence of 11.9% in 2252 patients [21].

While our prevalence was higher, the sample size was smaller than the others. HIV/HBV infection was said to be higher in European and American countries, compared to Asia and Africa, because of advanced diagnostic techniques, which have heightened sensitivities. It was observed as an HIV/HCV co-infection of 12.4%, higher than the 4.7% of Ifeyinwa et al. in 2020 and 4.8 % of Jesse et al. [21].

However, there was no persons with HIV/HBV/HCV while Ifenyinwa et al. recorded 0.58% prevalence, and Jesse et al.1% in their study. One thing common to these studies was the higher prevalence of HIV/HBV compared to HIV/HCV. These findings answer the question of differences in the transmission of these viruses, although they have similar routes for transmission [22]. HIV/HBV and HIV/HCV infections were higher in the Age group 31-50 years. A lot of factors could be contributing to this [21].

Limitations

There are several limitations to this study. First was the difficulty in getting adequate records of some patients, hence a low sample size. Also, the cost and Materials for HBV DNA and HCV RNA Nucleic acid testing weren't available. This would have boosted the study by having positive HBsAg and Anti-HCV serological results confirmed. CD4 T-lymphocytes results could not be accessed because it wasn't something that was

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routinely carried out due to cost and reagent availability.

Conclusion

This study showed more prevalence of HIV/HBV (14.7%) than HIV/HCV (12.4%). It was observed as a higher prevalence of Overall HIV infection and subsequently HBV and HCV in more females than Males.

No triple infection was observed from this study. HIV, HBV, and HCV all pose significant health challenges. If their prevention cannot be achieved, a tsunami is coming that will shake the global economy and bringing a subsequent burden of Hepatocellular Cancer with it. It is recommended that all HIV-positive individuals be screened for HBV and HCV, following the European Guidelines; this will help boost treatment.

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