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The Prevalence of Hepatis E, Hepatitis C and Hepatitis B Surface Antigenemias in HAART Experienced People Living with Human Immunodeficiency Virus (HIV) in Rivers State, Nigeria

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Abstract

Aim: However, advances in Human Immunodeficiency Virus (HIV) biology, pharmacology and clinical medicine made it possible for Human Immunodeficiency Virus (HIV)-infected persons to live longer; they also experience long-term adverse side effects and toxicity due to treatment and age-associated co-morbidity.

Materials and methods: The study population included experienced patients (≥ 3 months). All eligible samples that met inclusion criteria: Confirmed positive by Human Immunodeficiency Virus HIV-1/HIV-2 at time of enrolment via same study draw or historically from medical record or at least 1.2 mL leftover EDTA plasma or serum sample from p24 Ag positive patients. Human Immunodeficiency Virus (HIV) (1+2) quick test strip (Determinee, Alere Co, LTD, Japan) for screening analysis; while Stat-Pak (Chembio Diagnostic Systems, Inc., New York, NY, USA). Immunochromatographic assay for the detection of antibodies to Hepatitis C, Hepatitis B Surface Antigen while Enzyme-Linked Immunosorbent Assay (ELISA) technique was used to detect Hepatitis E.

Results: This study result showed that Hepatitis B surface antigen (HBsAg)-HIV co-infection was 2% and HCV-HIV co-infection being 1%. At the same time, there was 0% co-infection with the Hepatitis E virus (HEV).

Conclusion: However, the research reaffirms our understanding of the coinfection of HIV with Hepatitis B surface antigen (HBsAg), Hepatitis C Virus (HCV) among people living with Human Immunodeficiency Virus (HIV) in Rivers State.

Keywords: Hepatitis c virus; Human immunodeficiency virus; Hybrid electric vehicles; Hepatitis b surface antigen; Highly active antiretroviral therapy; Prevalence; Medicine

Introduction

Despite improving Highly Active Antiretroviral Therapy (HAART) use among Human Immunodeficiency Virus (HIV)-infected subjects in Nigeria, morbidity and mortality attributable to the disease remains a significant burden and of public health concern. Previous studies have shown that regardless of age, persons with Human Immunodeficiency Virus (HIV) infection experience co-morbidity associated with race, ethnicity, and socioeconomic status [1]. Hepatitis B, C and E are a causative agent of hepatitis disease, is a fundamental problem of public health, and it is the most severe type of hepatitis. Viral hepatitis, a precursor to chronic liver disease, is more likely to cause liver cirrhosis and cancer of the liver. Approximately two billion people infected with Hepatitis B Virus (HBV) and more than 350 million with chronic liver infection [2-4]. Therefore, the global estimate of the burden of HIV-HCV co-infection is 2.75 million, and for HBV-HCV coinfection of 2.6 million. More significantly, immunosuppressed patients in substitution therapy for kidney and diabetics present a greater risk of chronicity of Hepatitis B Virus (HBV) infection. The burden of these coinfections is most significant in the African and south-east Asia Regions [4]. However, advances in Human Immunodeficiency Virus (HIV) biology, pharmacology and clinical medicine made it possible for HIV-infected persons to live longer; they also experience long-term adverse side effects and toxicity due to treatment and age-associated co-morbidity [1]. Globally, one other factor that is considered to predispose individuals to Antiretroviral Therapy (ART) resistance is the issue of co-infection. These co-infections may include is Hepatitis B Virus (HBV) coinfection with Human Immunodeficiency Virus (HIV). Singularly, Hepatitis B virus infection accounts for an estimated 370 million chronic infections, Hepatitis C Virus (HCV) for an estimated 130 million, and Human Immunodeficiency Virus (HIV) for an estimated 40 million. In HIV-infected persons, an estimated 2-4 million have chronic Hepatitis B Virus (HBV) co-infection and 4-5 million have HCV co-infection [5]. Hepatitis B Virus (HBV), HCV and Human Immunodeficiency Virus (HIV) share common routes of transmission, but they differ in their prevalence by geographic region and the efficiency by which certain types of exposures transmit them [1]. Among HIV-positive persons studied from

Western Europe and the USA, chronic Hepatitis B Virus (HBV) infection has been found in 6%-14% overall, including 4%-6% of heterosexuals, 9-17% of men who have sex with men (MSM), and 7%-10% of injection drug users. HCV infection has been found in 25%-30% of Human Immunodeficiency Virus (HIV)-positive persons overall; 72%-95% of injection drug users, 1%-12% of MSM and 9%-27% of heterosexuals [5]. The characteristics of HIV infected persons differ according to the co-infecting hepatitis virus, their epidemiologic patterns may change over time, and surveillance systems are needed to monitor their infection patterns in order to ensure that prevention measures are targeted appropriately [5]. Therefore, this study is aimed at analysis of HIV co-infection prevalence with Hepatitis B, C and E infections. Confirmed positive by HIV-1/HIV-2 antibody differentiation test either at time of enrolment via same study draw or historically from medical record or at least 1.2 mL leftover EDTA plasma or serum sample from p24 Ag positive patients. Five (5) mL of enrolled subjects' sample is aseptically put into a cryovial and freeze at <-20°C for serological analysis. This study result showed that HBsAg-HIV co- infection was 2% and HCV-HIV co-infection being 1%. At the same time, there was 0% co-infection with the Hepatitis E virus.

Materials and Methods

The study population included experienced patients (≥ 3 months). All eligible samples that met inclusion criteria: Anonymized or pseudonymized leftover samples from males or females of all ages belonging to confirmed Human Immunodeficiency Virus (HIV)-1 antibody-positive patients. Confirmed positive by HIV-1/HIV-2 antibody differentiation test either at time of enrolment via same study draw or historically from medical record or at least 1.2 mL leftover Ethylenediamine Tetraacetic Acid (EDTA) plasma or serum sample from p24 Ag positive patients. Five (5) mL of enrolled subjects' sample is aseptically put into a cryovial and freeze at <-20°C for serological analysis. Plasma was tested at the Virus Research Unit, Department of Microbiology, University of Port Harcourt, for the presence of antibodies to HIV-1 (ELISA; HIV-1/2/P24/O; Dia. Pro, Milano, Italy), following the respective manufacturer's instructions. Positive and negative standard sera accompanying the kit were included in each assay. HIV testing was done using Rapid HIV tests: Human Immunodeficiency Virus (HIV) (1+2) quick test strip (Determinee, Alere Co, LTD, Japan) for screening analysis; while Stat-Pak (Chembio Diagnostic Systems, Inc., New York, NY, USA) was used to affirm actual positive cases; and Uni-Gold™ (Trinity Biotech Plc, Bray, Ireland) and HIV-1/2/P24/O ELISA kit as a tie-breaker test (recommended by the Federal Ministry of Health of Nigeria). All samples with non-reactive results to Human Immunodeficiency Virus (HIV) kits were considered negative. Immunochromatographic assay for the detection of antibodies to Hepatitis C, Hepatitis B Surface Antigen while ELISA technique was used to detect Hepatitis E. Statistical analysis was conducted using IBM SPSS version 21.

Results

This study recruited 200 persons, with 64.0% of that population being females while 36.0% were males in the ratio male: female ratio was 1:1.8. The results are as follows **Table 1**. The study showed that participants were more secondary school graduates, 94 (47%), tertiary school graduates were 84 (42%), while 22 (11%) participants were primary school graduates. The distribution of participants in this study across marital lines, most participants was married 126 (63%), singles 48(24%) and widows 26 (13%). The study also showed that participants in this study were more religiously inclined towards Christianity, 172 (86%), than Islam 28 (14%). Age distribution of study participants revealed that 66 (33%) were between the age group 40-49 years old, 53 (26.5%) were between the age group 30-39 years old, 40 (20%) were between the age group 20-29 years old, while those participants that were 60 years and above were 15 (7.5%) and those less than 20 years old recorded the least population, 5 (2.5%), in the study **(Table 1)**. This study result showed that Hepatitis B Surface Antigen (HBsAg)-HIV co-infection was 2% and HCV-HIV co-infection being 1%. At the same time, there was 0% co-infection with the Hepatitis E Virus (HEV).

Table 1: Frequency distribution of socio-demographics of this study.

Variables	Category	Frequency (%)	N=200
Gender	Females	128 (64.0)	
	Males	72(36.0)	
Religious inclination	Christianity	172(86.0)	
	Islam	28(14.0)	
Marital status	Married	126(63.0)	
	Single	48(24.0)	
	Widow/widower	26(13.0)	
Education	Primary	22(11.0)	
	Secondary	94(47.0)	
	Tertiary	84(42.0)	
Agegroup	Less than 20 years	5(2.5)	
	20-29 years	40(20.0)	
	30-39 years	53(26.5)	
	40-49 years	66(33.0)	
	50-59 years	21(10.5)	
	60 years above	15(7.5)	

As shown in **Table 2** we can know about the frequency distribution of Human Immunodeficiency Virus (HIV) and Co-infections, Prevalence.

Table 2: Frequency distribution of Human Immunodeficiency Virus (HIV) Co-infections with HCV, HBsAg and HEV.

HIV Co-infections	Prevalence % (Total positive)
HBsAg+HIV	2 (4/200)
HCV+HIV	1 (2/200)

HEV+HIV	0 (0/200)
HBsAg+HIV+HCV	0 (0/200)
Key: HIV: Human Immunodeficiency Syndrome; HCV: Hepatitis C Virus; HEV: Hepatitis E Virus; HBsAg: Hepatitis B Virus.	

Discussion

It was estimated at the close of 2020, that 38 million people globally are alive with HIV/AIDS currently with an unequal gender distribution of Human Immunodeficiency Virus (HIV). It has a more substantial proportion of the globe's HIV subsection of worldwide populace occupied by the female gender. This cross-sectional experimentation randomly recruited 200 persons, with female gender accounting for 64.0% of the over-all sampled population while the male gender was only 36.0%. This result agreed with the UNAIDS report, where more women lived with HIV.

Gender inequality and men's perceived sexual and economic superiority over women, according to, are pivotal to Human Immunodeficiency Virus (HIV) dissemination in tropical economically impoverished societies like Nigeria. The African community in where the study participants live operates along with such traditional mindset and lines of responsibility where the male gender is accorded great regards and privileges, which ultimately impacts family members. This opinion was held by and who added that poverty, among other things, is rooted in feminine subordination [7]. This constraint predisposes females to be victimized in the civic world. According to Avert.com, women and young girls continued to be disproportionally in fected by Human Immunodeficiency Virus (HIV) through-out the globe, but particularly in sub-tropical Africa, owed to overabundance of factors to include all mentioned above and income disparities, power imbalances and intimate partner violence in relationships that permanently prevents the female from having the will power to bargain for condom use and protect herself from Human Immunodeficiency Virus (HIV).

Also, this study randomly evaluated more married subjects than singles with no order or interest before the study and observed that age group 40-49 years were more predominant (33%), which was in total agreement. Followed by age group 30-39 years (28.5%) and 20-29 years (20%) in the research [6]. However, the present report corroborates with United Nations Programme on HIV and AIDS and National Advisory Committee for Aeronautics.

A Port Harcourt research report targeted at evaluating the Human Immunodeficiency Virus (HIV) progression predominance among people of 16-40 years bracket in Rivers State, showed a peak in 2009 (36.6%), followed by 2008 (32.8%), 2011 (16.6%), 2012 (8.3%) and 2010 (5.7%). Consequently, a 3.8% upsurge in HIV occurrence from 32.8% in 2008 to 36.6% in 2009 was observed. Also, a 30.9% decrease in HIV frequency existed from 36.6% in 2009 to 5.7% in 2010, and this decrease was attained due to proper awareness and policies implementation [6]. Nevertheless, these achievements can be sustained with continuous enlightenment.

However, this study result showed that Hepatitis B Surface Antigen (HBsAg)-HIV co-infection was 2% and HCV-HIV co-infection being 1%. At the same time, there was 0% co-infection with the Hepatitis E virus. This result does not corroborate with that of that worked on people in Port Harcourt but comparable with showed that in 146 patients Human Immunodeficiency Virus (HIV)-positive, 8.2% were positive for HCV, with genotypes one prevailing (nine out of 12) [7,8]. Apparently, it correlates with WHO report who had observed that in industrialized nations, 7-10% of Human Immunodeficiency Virus (HIV) patients have a chronic coinfection by Hepatitis B Virus (HBV) Hepatitis B Virus (HBV) while it is not in comparison with observed in their study recently that co-infection rates of HBV/HIV, HCV/HIV and HBV/HCV/HIV were 20.6%, 11.1%, and 7.2%, respectively. This study result is short of the UNAIDS estimate (>20%) for Nigeria.

This investigation revealed that HBsAg-HIV co-infection was 2% and HCV-HIV co-infection was 1%. No co-infection with the Hepatitis E virus existed. This result differs from the previous one by [7]. All positive Hepatitis B Surface Antigen (HBsAg) tests should be regularly tested for Hepatitis B Virus (HBV) Deoxyribonucleic Acid (DNA) before starting Antiretroviral Treatment (ART). This study's finding falls short of the United Nations Programme on HIV and AIDS (UNAIDS) estimate for Nigeria (>20 percent).

Some ARVs usually produce a transaminase increase, and these changes were more in HBV/HIV co-infection than in Human Immunodeficiency Virus (HIV) mono-infectio. Following the disappearance of Hepatitis B Surface Antigen (HBsAg), Low Hepatitis B Surface Antigen (HBsAg) levels at baseline or a more substantial drop post-treatment have been linked to Hepatitis B Surface Antigen (HBsAg) loss following HIV-HBV co-infection treatments. In 146 Human Immunodeficiency Virus (HIV)-positive individuals, found that 8.2% seropositivity for Hepatitis C Virus (HCV), with genotype one predominating (nine out of 12), whereas recently found that co-infection rates of HBV/HIV, HCV/HIV, and HBV/HCV/HIV were 20.6 percent, 11.1 percent, and 7.2 percent, respectively [8]. This was greater than the current research's study findings and did not accord with them.

Hepatitis C Virus (HIV) does not exist independently sometimes, and cases of co-infection with other viruses were encountered [9]. In Niger Delta, Nigeria, Hepatitis B Virus (HBV) was found in 9.7% among 342 HIV-positive persons, the highest among single somebody aged between 33 and 39. It was similarly higher in commercial sex workers (13.3%), as published [10].

Some ARV agents always cause a rise in the transaminase levels, and these alteration rates peak with HBV/HIV co-infection more than in Human Immunodeficiency Virus (HIV) mono-infection. Hepatitis B Surface Antigen (HBsAg) loss following treatment of HIV-HBV co-infection has also been associated with low Hepatitis B Surface Antigen (HBsAg) levels at baseline or with a more significant decline post-treatment. This was higher than the study findings of this present research and did not agree with them. Human Immunodeficiency Virus (HIV) does not exist independently sometimes, and cases of co-infection with other viruses have been encountered [9]. In Niger Delta, Nigeria, Hepatitis B Virus (HBV) was found in 9.7% among 342 HIV-

positive persons, the highest among single somebody aged between 33 and 39 years. It was similarly higher in commercial sex workers (13.3%), as published [10]. This was attributed to the transmission route (sexual contact and injection drug use).

However, it is worthy of note that the transmission routes of Human Immunodeficiency Virus (HIV) and the risk factors associated with the infection do not differ significantly from that of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infection, but each has a different biology and natural history of chronic disease [11-20]. Hepatitis B and C prevalence among Human Immunodeficiency Virus (HIV)-infected individuals are higher than what we have in this study population? [21-41]. Also, it is estimated that HCV affects 2%-15% of people living with Human Immunodeficiency Virus (HIV) worldwide and up to 90% of those who inject drugs and that chronic Hepatitis B Virus (HBV) infection affects an estimated 5-20% of people living with Human Immunodeficiency Virus (HIV) [4,42-59]. This study prevalence of coinfection with HIV falls within the WHO estimate and conforms with the prevalence of Hepatitis B Virus (HBV)-HCV coinfection seen to be 6.1% in a small single-center study and 8.4% for a retrospective analysis of the Chilean AIDS cohort [3,60-83].

Conclusion

Coinfection with Hepatitis C Virus (HCV), Hepatitis E Virus (HEV) and Hepatitis B surface antigen (HBsAg) with Human Immunodeficiency Virus (HIV) is affirmed among the studied group. However, the research reaffirms our understanding of the coinfection of Human Immunodeficiency Virus (HIV) with Hepatitis B Surface Antigen (HBsAg), HCV among people living with HIV in Rivers State, where, Hepatitis B Surface Antigen (HBsAg)-HIV co-infection was 2.0% and Hepatitis C Virus (HCV)-Human Immunodeficiency Virus (HIV) co-infection was 1.0%.. Therefore, it is advisable for implementation of the policy on HIV positive patients to be tested for these possible coinfections with Hepatitis C Virus (HCV), Hepatitis E Virus (HEV) and Hepatitis B surface antigen (HBsAg) Hepatitis B Virus (HBV) and also Deoxyribonucleic acid (DNA) before initiation of Antiretroviral Therapy (ART) in health facilities within the Niger delta area of Nigeria. This will help bring about better patient management and put a better perspective to epidermiology of this group of infectious diseases.

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