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Seroprevalence of Hepatitis B and C Infections Among HIV/AIDS Patients Attending Aminu Kano Teaching Hospital, Kano State, Nigeria

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Abstract
This study was carried out to determine the prevalence of hepatitis B and C infections among HIV/AIDS patients attending Aminu Kano Teaching Hospital, Kano, Nigeria. A hundred and fifty HIV patients attending the HIV Clinic at the hospital were screened for hepatitis B surface antigens (HBsAg) and anti HCV. Twenty four out of the one hundred and fifty patients tested positive to hepatitis, giving an overall prevalence of 16%. There was no record of Hepatitis B and C co-infection among the HIV patients, however, 19(12.67%) and 5(3.33%) of the patients tested positive to hepatitis B and C respectively. Hepatitis B was more prevalent than hepatitis C, and the limited knowledge about hepatitis among the respondents, was a predisposing risk factor (p= 0.001) to the infection. HIV- hepatitis co-infection increases the risk of life threatening complications and may also complicate HIV treatment and management. As a result, it is important to routinely screen HIV patients for hepatitis B and C in order to improve quality of life through early detection and proper treatment/management using appropriate drug regimens.
***Keywords**: HBV, Liver Infection, Immunodeficiency, HCV, Kano*

INTRODUCTION

Hepatitis can be referred to as any infection resulting in inflammation of the liver, which couldoriginatefrom either infectious or non-infectious sources (Perez *et al.*, 2005). Infectious sources of hepatitis include viruses and parasites, while certain drugs and toxins have been implicated as non-infectious agents of hepatitis (Odusanya, 2008). Quite a number of viruses are reported to give rise to liver inflammation, some of which include Cytomegalo virus, Yellow fever virus, Epstein - Barr virus, and a number of hepatitis viruses which are A, B, C, D, E and G (Cheesebrough, 2006). Of all these viruses, hepatitis B virus (HBV) is reported to be the most common cause of liver infection, and is keenly followed by hepatitis C virus (HCV). The most common causes of viral hepatitis are therefore HBV and HCV (Cheesebrough, 2006). Ballah *et al.* (2011) reported that one of the greatest global, public healthchallenges is infections with HBV, HCV, and human Immunodeficiency virus (HIV). Hepatitis B virus is the most common cause of serious liver infection in the world, with an estimate of more than two billion infected people and 360-400 million chronic cases (Drosten *et al.*, 2004; Baseke *et al.*, 2015).

Hepatitis B is highly contagious and relatively easy to transmit, through contact with infected blood, during birth from infected mother to child, unprotected sex, and by sharing of sharp objects such as needles exposed to infected blood (Tremeau-Bravard*et al.*, 2012). Nigeria has been classified as highly endemic for HB infection, due to exposure of a large proportion to the virus at some point in their life (Serisena*et al.*, 2002). Not much has been documented about HCV in Nigeria, in contrast to HBV, however, globally, chronic HCV infection affects about 170 million people (Chmielewska*et* al., 2014).

There is a good chance of occurrence of, HBV and HCV co-infection with HIV, since all three diseases share similar transmission routes (Chen *et al.*, 2009; CDC, 2014).Human immunodeficiency virusis also said to have significant impact on the natural history of viral hepatitis. Studies have shown that HBV infection may play a role in lowering the CD4 counts of HIV patients, thereby further complicating immunity challenges in the patients (Adesina *et al.*, 2010; Idoko *et al.*, 2009).Human immunodeficiency virus, HBV and HCV constitute a major public health challenge in sub-Saharan Africa, with evidencesuggesting that there is faster progression of HIV in those co-infected with either HBV or HCV. Liver damage can be accelerated by HIV and HBV co-infection, resulting in prolonged elevation of ALT, shortening the period before cirrhosis and increasing the risk of developing hepatocellular carcinoma(Thio, 2003; CDC, 2014). Thomas *et al.* (2000) also reported such similar results of HCV-HIV co-infection.HCV has also been shown to play a role in increase of HCV/HIV related mortality (Tremeau-Bravard*etal.*, 2012).

Bonacini*et al*. (2004) documented that there is a higher liver-related mortality rate among HIV patients with HBV and HCV co-infections, compared to HIV mono-infection. Mono or co-infections in individuals with an already compromised immunity, could cause quick progression of liver disease, thereby resulting in catastrophic consequences (CDC, 2014). Studies on hepatitis prevalence and awareness among HIV patients may impacton prevention and control of complications which may ultimately increase life expectancy and also inform choices of less toxic therapeutic combinations. This study was therefore aimed at determining the prevalence of HBV and HCV among HIV patients attending Aminu Kano Teaching Hospital, Kano, Nigeria.

MATERIALSANDMETHODS

ETHICAL APPROVAL

Ethical approval for the study was obtained from the Management Board, Aminu Kano Teaching Hospital, Kano Nigeria. The Consent of each participant included in the study was also sought.

STUDY AREA AND STUDY POPULATION

The study was carried out at Aminu Kano Teaching Hospital, Kano State, Nigeria. The hospital is a tertiary health care center offering in and out-patient services. The hospital also has a HIV Clinic situated at Prof. S.S. Wali Center, supported by President Emergency Plan for AIDS Relief (PEPFAR) through the Institute of Human Virology in Nigeria (IHVN). Consenting HIV patients already diagnosed of HIV and enrolled into the treatment program at the HIV Clinic were selected for the study.

QUESTIONNAIRE ADMINISTRATION

Questionnaires were administered to the participants while collecting their blood samples. Each questionnaire was designed to obtain relevant information from the respondent about risk and socio-demographic factors associated with HBV and HCV.

COLLECTION AND ANALYSIS OF BLOOD SAMPLES

One hundred and fifty blood samples were collected by venipuncture from the patients and centrifuged to obtain the serum. The sera obtained were screened for HBsAg and anti-HCV using specific, rapid diagnostic test strips manufactured by Sole AgentSwa-Life Resources Ltd., China. Test results were interpreted in line with the manufacturer's protocols.

RESULTS

Twenty four out of 150 patients tested positive to hepatitis, giving an overall prevalence of 16%. Figure 1 shows the prevalence of HBV and HCV infections among HIV/AIDS patients. Out of 150 samples analyzed, 19(12.67%) were positive for HBsAg, 5(3.33%) were positive for anti-HCV and 126 (84%) tested negative to both HBV and HCV. There was no HBV-HCV co-infection among the patients.

Table 1 shows the socio-demographic factors in relation to HBV and HCV among HIV patients. Marital status, age and sex were not risk factors of hepatitis among the HIV patients, however, there was a higher prevalence of HBV among the married patients (15.5%) than the single (11.8%). Similarly, more HCV cases were detected among the married (3.6%) than single patients (2.9%). A low prevalence of HBV and HCV was detected in age groups 15-25 (4.3%) and 26-35 (5.0%) respectively. A high prevalence of both HBV and HCV was detected among the age group 36-45 years (18.8%, 4.3% respectively), and this was followed by age group 46- 55 years. There was no HBV or HCV detected among the age group 56-65 years. Prevalence of HBV and HCV were higher among male than female, with 15 and 5% respectively for both diseases.

Table 2 summarizes the prevalence of HBV and HCV with respect to awareness of hepatitisamong the HIV patients. The knowledge of hepatitis was associated with HBV status of the HIV patients (p=0.001). The odds ratio of 1.14 implies that patients who were not knowledgeable about HBV were 1.14 times more at risk of the disease than those who were knowledgeable. Majority of the patients (83/150) had poor knowledge of hepatitis, out of which 12.0% and 3.6% tested positive to HBV and HCV respectively. A higher prevalence of HCV was detected among patients who had poor knowledge (3.6%) about the disease, than among those whose knowledge was good (3.0%). There was no HCV prevalence among those who were aware of their hepatitis status, prior to the study. However, HCV prevalence of 4.6% was detected among those who were unaware of their status, prior to this study; accounting for all the positive HCV cases detected in the study. A HBV prevalence of 10.5% was detected among those who had no prior knowledge of their hepatitis status. Majority of the patients (119/150) had never been vaccinated against HBV, and this group had a higher HBV prevalence (14.3%), compared to those who had been vaccinated at some point in their lifetime (6.5%). There was no anti HCV detected among those who had been vaccinated for HBV in their lifetime, whereas, all 5 cases of HCV detected had never been vaccinated against HBV. There was a lower HBV and HCV prevalence observed among patients who had been transfused at some point in their lifetime compared to those who had never received a blood transfusion before.

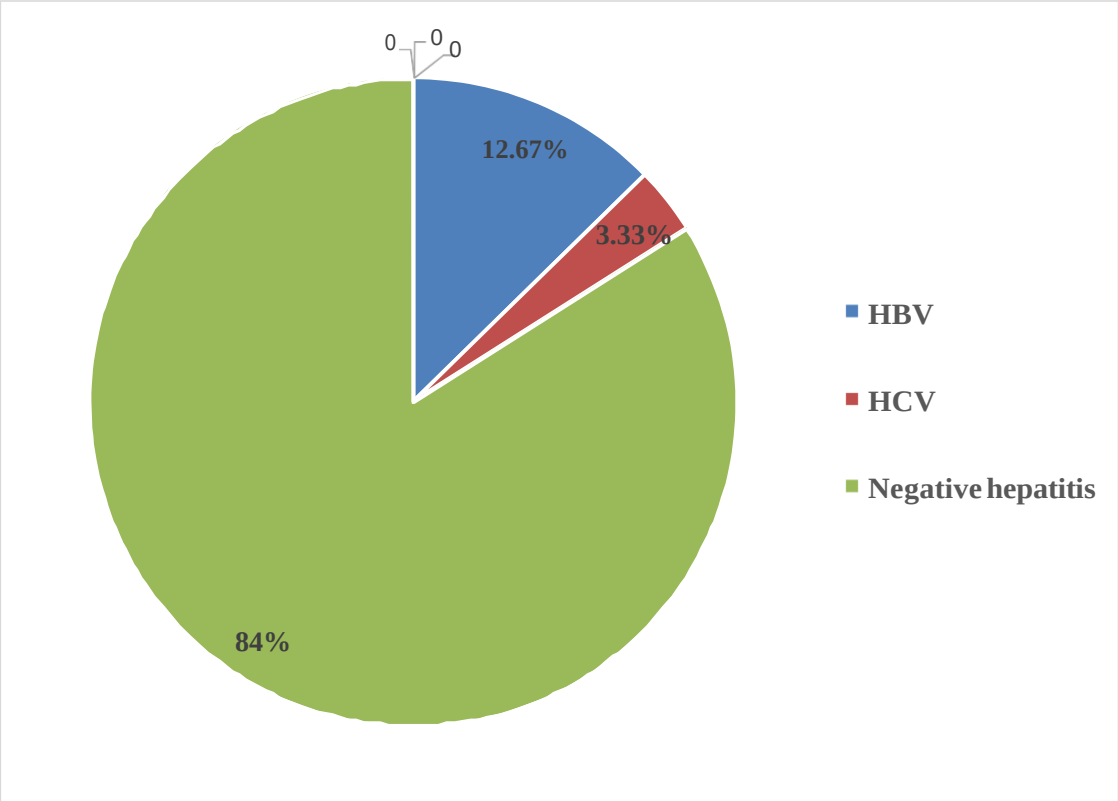

Fig.1: Prevalence of HBV and HCV infection among HIV/AIDS patients attending Aminu Kano Teaching Hospital, Kano, Nigeria.

Table 1: Sociodemographic factors observed among HIV patients co-infected with HBV/HCV in Aminu Kano Teaching Hospital, Kano

Demographic Factors	Number Examined	HBSAg positive (%)	x^2	p	Anti HCV positive (%)	x^2	p
Marital status							
Divorced	32	2 (6.2)			1 (3.13)		
Married	84	13 (15.5)	1.815	0.403	3 (3.6)	0.561	0.755
Single	34	4 (11)			1 (2.9)		
Age Group							
15-25	7	1 (4.3)			1 (4.3)		
26-35	20	1 (5.0)	5.492	0.240	0 (0)	3.480	0.428
36-45	69	13 (18.8)			3 (4.3)		
46-55	43	4 (9.3)			1 (2.3)		
56-65	11	0 (0)			0 (0)		
Sex							
Male	60	9 (15)	0.699	0.705	3 (5.0)	0.327	0.849
Female	90	10 (11.1)			2 (2.22)		

Key: p value = probability value, x^2 = Chi-square value

Table 2.Prevalence of HBV and anti HCV with respect to hepatitis awareness and risk exposure among HIV patients attendingAminu Kano Teaching Hospital, Nigeria

Factors N(150)	Total No. examined (%)	**HBSAg** positive (%)	x^2	p	OR	**Anti HCV** positive (%)	x^2	p	OR
Hepatitis knowledge	67 (44.7)	9 (13.4)	13.158	0.001*	1.14	2 (3.0)	0.072	0.789	0.82
Good	83 (55.3)	10 (12.0)				3 (3.6)			
Poor									
Hepatitis awareness	7 (4.7)	4 (57.1)	0.640	0.800	11.38	0 (0.0)	0.768	0.681	0
Aware	143 (95.3)	15 (10.5)				5 (3.5)			
Unaware									
HBV vaccination	31 (20.7)	2 (6.5)	1.364	0.243	0.41	0 (0.0)	0.061	0.805	0
Vaccinated	119 (79.3)	17 (14.3)				5 (4.2)			
Not vaccinated									
Blood transfusion	40 (20.6)	3 (7.5)	1.316	0.251	0.48	1 (2.5)	0.100	0.920	0.68
Received	110 (73.3)	16 (14.5)				4 (3.6)			
Never received									
Family history									
Yes	22 (14.7)	2 (9.1)	0.459	0.795	0.65	0 (0.0)	0.060	0.970	0
No	128 (85.3)	17 (13.3)				5 (3.9)			

Key: p = probability value, x^2 = Chi-square value, OR= odds ratio
***Significant association (p<0.05)**

DICUSSION

The overall prevalence of hepatitis among HIV patients reported in this survey was 16%, implying that hepatitis is prevalent among HIV patients. This relatively high prevalence could be attributed to the similarity in transmission routes of hepatitis B, C and HIV viruses; therefore infection with any one of the three viruses is suggestive of a likely exposure to the other two. People with HIV are disproportionately affected by viral hepatitis and this is quite evident in different prevalence reported in different studies.The prevalence reported here is relatively higher than 10.8% prevalence reported by Tremeau-Bravard*et al*. (2012) among HIV patients in Abuja, Nigeria. The findings of this study reveal that the prevalence of HBV and HCV infection among the patients is 12.67% and 3.33% respectively, implying that they are at risk of developing life threatening complications. This is because, liver related health problems attributed to viral hepatitis progresses faster among HIV patients than non HIV patients. The prevalence of HBV and HCV in this study corroborates similar findings by Hamza*et al*.(2013) which revealed prevalence of 12.3% and 1.6% for HBV and HCV infections respectively. These results also corroborate findings of Ballah *et al*. (2011) in Maiduguri, Borno State, which reported prevalence of 12.3% and 0.5% for HBV and HCV respectively.Tremeau-Bravard*et al*. (2012) also reported a higher HBV prevalence of 7.9% than HCV prevalence of 2.3% among HIV patients in Abuja, Nigeria. In a recent survey conducted among blood donors in some selected hospitals in Kano state Nigeria,Bala*etal*. (2012) reported HCV prevalence of 3.4%. Otegbayo*etal*. (2008) equally reported a lower HCV prevalence of 4.8% as against 11.9% HBV prevalence in a study among HIV patients in Nigeria. A common finding with these highlighted studies is that the prevalence of HBV is a lot higher than that of HCV.In contrast to studies in Nigeria reporting low prevalence of HCV, Haliru and Ajayi (2000) reported a relatively high HCV prevalence of 12.3% among blood donors in Nigeria. A possible reason for the low HCV prevalence against a relatively high HBV prevalence in the same study group in the studies highlighted here, could be attributed to the fact that, HCV transmissionis basically through contact with infected blood, while, in addition to exposure to infected blood, HBVcan also be transmitted through semen and other body fluids such as saliva (Daw and El Bouzedi, 2014), giving it a wider risk exposure.

There was no statistically significant difference (p>0.05) in the prevalence of both hepatitis typesamong the married and unmarried patients in this current study. This suggests equal exposure risks of HBV and HCV among the HIV patients, and corroborates the common similarity in route of transmissionbetween the three infections which is contact with infected blood. The findings of this study also asserts that males and females were equally predisposed to risks of acquiring both diseases, as there was no statistically significant difference in prevalence of both diseases by gender (p>0.05). This agrees with findings of Otegbayo*et al*. (2008), which revealed close prevalence rates of 6.7% and 5.2% in males and females respectively for HCV/HIV category, and 15.4% and 10.1% in males and females respectively for HBV/HIV category.

In terms of age distribution,there was no statistical difference in the prevalence of hepatitis and age distribution,however, the lowest prevalence for HBV was found among those within the age group of 56-65 years, while, the highest prevalencefor both HBV and HCV was among the age group of 36-45 years. The difference in lifestyle could contribute to this variance in prevalence, as the age group of 36-45 years is considered to have a more boisterous and adventurous lifestyle which could expose them to more risks than the quiet lifestyle of the aged.There was no record of HCV seropositivity in the age group 56-65 years, again this may be as a result of the mature lifestyle of this age group.

Although currently, there isno available licenced vaccine for HCV infection (Abdelwahab et al., 2016), none of those with the history of hepatitis B vaccination tested positive for HCV infection. Few of those who previously received HB vaccine tested positive toHBsAg; this can either be due to improper administration of the vaccine, presence of HBV mutants that can escape the vaccination or impaired immunity of the patients. Perhaps, these patients were actually HBV positive before vaccination. Blood transfusion was not found to be a significant factor for HIV/HBV as well as for HIV/HCV co infections in this survey (p>0.05). This could be due to the fact that there is an increased awareness on screening and provision of safe blood in blood banks in Nigeria, and so prior to transfusion, blood is beingproperly screened for hepatitis virus's markers. Regarding the history of hepatitis in the family, some of the patients having the history of the infections in their family tested positive for HBsAg, whereas none of them tested positive for anti-HCV. This may be due to the fact that HC is not as common as HB in our settings and vertical transmission of the virus through sharing of utensils with infected family members has not been established as in the case of HB.

The knowledge of hepatitis among the study population in this survey was poor. The number of positive cases recovered among individuals with poor knowledge of hepatitis was more in both HBV and HCV cases, than among those with a good knowledge of the disease. Knowledge and behavioural practices of individuals could influence occurrence and spread of diseases and this could account for the significant association (p = 0.001) between knowledge of HBV and its occurrence among the HIV patients in this study. A good knowledge about prevention and control could actually inform a healthy lifestyle, and reduce overall disease burden, if applied. Knowledge of one's hepatitis status also informs choice of less toxic and safer drug combinations, particularly among HIV patients with an already compromised immunity.

Though, quite a number of studies in Nigeria have revealed low or almost negligible HCV cases, there is still an urgent need for further prevalence studies on HCV infection involving different study groups in Nigeria. This will be in order to establish associated risky behavior and practices peculiar to the Nigerian setting, and other key factors which may be responsible for the prevalence patterns observed so far by different researchers.

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