



Seroprevalence of Hepatitis B and C Viruses among Human Immunodeficiency Virus Infected Patients Accessing Healthcare in Federal Medical Centre, Keffi, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMB/2017/34284

Editor(s):

(1) Dr. Naim Deniz Ayaz, Department of Food Hygiene and Technology, Kirikkale University, Kirikkale, Turkey.

Reviewers:

(1) Ajide Bukola, Bingham university Abuja, Nigeria.

(2) Vicente Estrada, Universidad Complutense, Spain.

Complete Peer review History: <http://www.sciencedomain.org/review-history/19507>

Original Research Article

Received 22nd May 2017
Accepted 6th June 2017
Published 13th June 2017

ABSTRACT

Infections of Hepatitis B and C viruses among seropositive Human immunodeficiency virus patients are a growing public health problem in Sub Saharan Africa characterized by unaffordable treatment, severe morbidity and associated mortality. This study was aimed at evaluating the seroprevalence of Hepatitis B and C viruses among HIV infected patients accessing health care at Federal Medical Centre, Keffi, Nigeria. The cross-sectional study took place between May-July 2016. A total of 200 blood samples were collected from HIV patients after informed consent and self-administered questionnaires were completed. The samples were centrifuged and the serum screened for HBV and HCV using the immunochromatographic technique. A general prevalence of infection with hepatitis B and C viruses in the study population was 17.5%. The prevalence of HBV infection was 12.5% while HCV was 5.0%. Females have higher infection rates for both viruses ($p > 0.05$). HBV infection was highest among those aged 20-29 years (14.3%) and lowest among those aged 30-39 years (6.5%). HCV infection was highest among those aged > 40 years (8.7%)

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and least among those aged 30-39 years (0.0%). Infection rates with blood transfusion, smoking habit, scarification marks and alcohol intake as risk factors were more for HBV than HCV ($p > 0.05$). The HIV/HBV and HIV/HCV coinfection prevalence of 12.5% and 5.0% respectively is a cause for concern. This finding underscores the urgent need for more proactive HBV immunization programs and screening of HIV patients for HBV and HCV before and even during antiretroviral therapy. Health education against these silent killers should also be advocated.

Keywords: HBV; HCV; HIV; Keffi; seroprevalence.

1. INTRODUCTION

Human immunodeficiency Virus (HIV), Hepatitis B virus (HBV), and Hepatitis C virus (HCV), are the three most common chronic viral infections all over the world [1]. They share similar transmission routes including sexual, blood-blood contact, and injecting drug usage [1,2]. Co-infection with HIV and HCV and/or HBV is very common in certain populations, such as intravenous drug users (IDUs) who often share the contaminated needles/syringes for intravenous drug injection. It has been reported that the world prevalence of HIV-HCV co-infection among IDUs can surpass 90% in certain populations [3].

Both hepatitis B virus and hepatitis C virus are equally endemic across Africa. The prevalence of mono-infection for hepatitis B infection in the general population in Nigeria ranges from 9% to 39%, and being above 7% considered hyperendemic [4]. HCV infection rate in Nigeria is also considerably high ranging from 5.8% to 12.3% [4]. Due to the endemic nature of these viruses in the sub-Saharan region and the shared routes of transmission, co-infections of HIV-HBV or HIV-HCV or even HIV-HBV-HCV are not uncommon. Prevalence of co-infection varies depending on the population studied [5].

With the introduction of highly active retroviral therapy (HAART), more people are living longer. However, this gain is being threatened by the emerging challenges posed by co-morbidity with other viral infections like HBV and HCV and unfortunately while HBV is vaccine preventable, HCV is not yet [5].

Expert guidelines developed in the United States and Europe recommend screening of all HIV-infected persons for infection with HCV and HBV and appropriate management of those found to be chronically infected [2]. In Nigeria, however, HIV-infected patients are not routinely screened for hepatitis viruses. Screening for HBV and HCV is only considered following observed deranged

liver enzymes. Thus, there is no room for early detection of co-infections and institution of proper management of cases. Again, data on the prevalence of co-infection in our environment are still relatively scarce. This study is, therefore, aimed at evaluating the seroprevalence of Hepatitis B and C viruses in HIV infected patients accessing healthcare in Federal Medical Centre, Keffi, Nigeria.

2. MATERIALS AND METHODS

2.1 Study Area and Population

The area of study for this research was Keffi. It is approximately 68 Km from Abuja, the Federal Capital Territory and 128 Km from Lafia, the capital of Nasarawa State. Keffi is located between latitude 8 5'N of the equator and longitude 7 8'E and situated on an altitude of 850 M above sea level [6].

The study population was made up of 200 consenting patients accessing ART clinic at Federal Medical Centre, Keffi, Nigeria who were randomly selected from both sexes. Socio-demographic information of the confirmed HIV participant was obtained through oral interview. Such information included; age, sex, occupation and history of blood transfusion.

2.2 Sample Collection

About 5 ml of blood was collected from each confirmed HIV participant by venipuncture into a sterile plain universal container. The blood was allowed to clot for 30 minutes and centrifuged at 3000 rpm for 5 minutes. A Pasteur pipette was used to harvest and dispense each serum into a new, labeled plain tube and stored at -20°C until ready for use.

2.3 Ethical Approval

Approval for this study was obtained from the Ethical Review Committee on Human Research, Federal Medical Centre, Keffi, Nigeria.

2.4 HBsAg Detection

A rapid in vitro which is a qualitative sandwich immunoassay diagnostic kit was used to screen the sera for HBsAg. The test kit (Healgen one step strips, Zhejiang Orient Gene Biotech Ltd, China) utilizes a combination of monoclonal and polyclonal antibodies to detect HBsAg in serum. The test procedure and result interpretation were carried out according to the manufacturer's instructions.

2.5 Anti-HCV Detection

A rapid in vitro diagnostic kit (HCV one step strip, Zhejiang Orient Gene Biotech Ltd, China) was used for the detection of anti-HCV in serum. This kit uses recombinant proteins and synthesized peptides derived from core and structural regions of HCV for the detection of anti-HCV in serum. The test procedure and result interpretation were carried out according to the manufacturer's instructions.

2.6 Statistical Analysis

The data obtained were subjected to descriptive statistical analysis using SPSS version 17.0.

Chi-square statistical test was used to determine associations and values obtained were considered statistically significant at $p \leq 0.05$.

3. RESULTS

Two hundred HIV infected patients were recruited for this study. Among them were 104 (52.0%) males and 96 (48.0%) females. The overall prevalence of hepatitis in these HIV patients was 17.5%. Of these, 5.0% were reactive to anti-HCV and 12.5% to HBsAg. Females had higher infection rates for both viruses ($p > 0.05$).

HBV infection was highest among those aged 20-29 years (14.3%) and lowest among those aged 30-39 years (6.5%). For HCV infection, it was highest among those aged > 40 years (8.7%) and least among those aged 30-39 years (0.0%). Infection rates with blood transfusion, smoking habit, scarification marks, alcohol intake as risk factors were more for HBV than HCV ($p > 0.05$).

4. DISCUSSION

With the increased access to antiretroviral therapy in resource limited settings, people living with HIV infection will continue to live longer. However, morbidity and mortality due to co-infections with other viruses will increasingly become important. Although co infections with HBV and HCV among HIV positive patients is well documented in developing countries, the demographics and impact of these infections are not well defined in low resource countries like Nigeria. The need for new data on hepatitis coinfection to guide health policy on management of HIV coinfecting patients is very important [7].

The prevalence of hepatitis carriage among HIV infected patients in this study was 17.5%. This is higher than findings of 15.5% in a similar study [8], 3.9% among patients [9] in Nigeria, 13.9% in Kano [10], 0.6% in Benin [2].

HBsAg the seromarker used for the detection in this study was found in 12.5% of the HIV infected patients. This prevalence was lower than findings of 15.5% in Benin [2], but higher than findings of 3.0% in Lafia [5], 7.9% in Abuja [11], 3.9% in Lagos [9] and 12.3% in Kano [10] among HIV patients. Similar studies from other countries found 30.9% in Cote d'voire [12], 6.0% in Kenya [7] 1.16% in Pakistan [13], 10.3% in Brazil [1]. These differences in prevalence might be as a result of geographical location, population and sensitivity of tests used for screening.

Similarly, the HCV/HIV coinfection in the present study was 5.0% i.e more than 2 times less than that of HBV among these patients. This is higher than reports of 1.6% in Kano [10], 2.3% in Abuja [11] but lower than 7.0% in Benin [2], 14.7% in Lagos [9]. Similar studies from other countries recorded 4.6% in Brazil [1], 10.3% in Kenya [7] and 1.42% in Pakistan among pregnant women [13]. The high prevalence recorded in the study especially with no obvious efficient risk factor as reported by other researchers might be connected with the fact that the transmission efficiency is determined by the amount of virus in a body fluid and the type and extent of the contact [14]. Unfortunately unlike HBV, HCV does not have vaccine yet.

On the whole, the prevalence of HIV/HBV and HIV/HCV in these HIV patients might be a reflection of the viral prevalence in the community and thus risk factors is same for every member of the community.

Table 1. Prevalence of Hepatitis B and C viruses among HIV Infected patients accessing healthcare in Federal Medical Centre, Keffi, Nigeria with respect to some demographic variables

Risk factors	No. examined	No. positive			
		HBV (%)	p value	HCV (%)	p value
Gender					
Male	104	12(11.5)	0.7059	4(3.8)	0.4587
Female	96	13 (13.5)		6(6.3)	
Age (Years)					
10-19	29	7 (24.1)	0.2437	2 (6.9)	0.2167
20-29	56	8 (14.3)		2 (3.6)	
30-39	46	3 (6.5)		0 (0.0)	
>40	69	7 (10.1)		6 (8.7)	
Marital status					
Single	91	15 (16.5)	0.2731	3 (3.3)	0.5823
Married	98	8 (8.2)		6 (6.1)	
Divorced	11	2 (18.2)		1 (9.1)	
Occupation					
Students	40	10 (25.0)	0.1011	1 (2.5)	0.3195
Farmers	57	5 (8.2)		1 (1.8)	
Unemployed	39	1 (2.6)		4 (10.3)	
Artisans	45	6 (13.3)		2 (4.4)	
Civil servants	19	3 (15.8)		2 (10.5)	
Educational level					
Primary	14	4 (28.6)	0.1954	0 (0.0)	0.0970
Secondary	95	13 (13.7)		2 (15.4)	
Tertiary	91	8 (8.8)		8 (8.8)	
Scarification marks					
Tribal marks	20	3(15.0)	0.6163	0 (0.0)	0.3552
Tattoo	7	0 (0.0)		1 (14.3)	
No Scarification mark	173	22 (12.7)		9 (5.2)	
Smoking habit					
Yes	8	0(0.0)	0.3085	1 (12.5)	0.3605
No	192	25 (13.0)		9 (4.7)	
History of blood transfusion					
Yes	49	3 (6.1)	0.1621	2 (4.1)	0.7460
No	151	22 (14.6)		8 (5.3)	
Locality					
Rural	121	20 (16.5)	0.0573	3 (2.5)	0.0555
Urban	79	5 (6.3)		7 (8.9)	
History of alcohol intake					
Yes	77	12 (15.6)	0.3597	3 (3.9)	0.5890
No	123	13 (10.6)		7 (5.7)	

Gender was not found to be associated with the viral prevalence although both infections were higher among females than males ($P > 0.05$). This was contrary to observation reported from a study in Brazil [1] and in Kenya [7]. However, a similar study in Kano reported HBV higher in males [10] and in Lagos [9]. This is connected to the fact that females are more promiscuous in the study area and also practice unprotected sex with their partner in a polygamous setting.

The age stratification in this study shows no statistical significance with age in HBV and none in HCV prevalence. HBsAg was detected more among HIV patients that were below aged 19 years old while anti-HCV was more among those aged above 40 years old. This might be suggestive that those in such age are more active and likely to engage in unprotected sex and are also not aware of immunization. This was also reported in a similar study in Kano [10].

The infections were not associated with marital status ($p > 0.05$). It was highest in divorced for both virus. This might be unconnected that both viruses are mainly sexually transmitted and risky behavior is likely to have predisposed the divorcee to infection by the viruses. This was also reported in a similar study in Brazil [1].

With reference to occupation, students recorded the highest seroprevalence (25.0%) for HBV infection while HCV prevalence was highest (10.5%) among civil servants. There was no statistically significant association between the viral infections and occupation. In a related development, the viral seroprevalence was highest among those with the lowest level of education and lowest among those with a tertiary education for HBV infection while for HCV infection, it was highest in secondary education level and least in primary education participants ($p > 0.05$). Education has long been acknowledged to be of great value in our life. It helps in making useful decision and sourcing of information concerning health and healthy living. Flores et al., [1] also reported same outcome in his study.

Scarification marks in HBV and HCV infections was highest among those with a tribal mark and tattoo mark respectively. There was no statistically significant difference between viral infections and scarification marks ($p > 0.05$). Such was also reported in a similar study in Cote d'ivoire [12]. There was no statistically significant association between locality and the viral infections ($p > 0.05$). It was higher in rural than urban for HBV infection and vice versa for HCV infection. It is similar to studies in Nasarawa state [8,15].

Smoking habit, history of blood transfusion and history of alcohol intake are not possible risk factors for hepatitis B and C viruses among the study population ($p > 0.05$). It was higher for HBsAg among those without a history of smoking habit, history of blood transfusion and a history of alcohol intake, while for anti-HCV, it was higher among those that smoke [12. 5%], those with no history of blood transfusion and those with no history of alcohol intake. Pennap et al. [16] in Nigeria, KouassiM'Bengue et al. [12] in Cote d'ivoire and Agyeman and Ofori-Asenso, [17] in Ghana reported same in a similar study.

5. CONCLUSION

The present study has shown a high burden of HBV (12.5%) and HCV (5.0%) among HIV

infected patients in the study area. Gender, age, marital status, occupation, education level, scarification marks, smoking habit, history of blood transfusion, locality and history of alcohol intake were not possible risk factors for HBV and HCV infections. This finding underscores the urgent need for more proactive HBV immunization programs and screening of HIV patients for HBV and HCV before and even during antiretroviral therapy. Public awareness campaigns against the infections should be advocated.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Flores GL, Almeida AJD, Miguel JC, Cruz HM, Portillo MM, Scalioni LDP, et al. A cross section study to determine the prevalence of antibodies against HIV infection among Hepatitis B and infected individuals. *International Journal of Environmental Research and Public Health*. 2016;13:314.
2. Ojide CK, Kalu EI, Ogbaini-Emevon E, Nwadike VU. Co-infections of hepatitis B and C with human immunodeficiency virus among adult patients attending human immunodeficiency virus outpatient clinic in Benin City, Nigeria. *Nigeria Journal of Clinical Practice*. 2015;18:516-21.
3. Rao VB, Johari N, Du Cros P, Messina J, Ford N, Cooke GS. Hepatitis C seroprevalence and HIV coinfection in Sub Saharan Africa: A systematic review and meta-analysis. *Lancet Infectious Disease*. 2015;15:819-824.
4. Abera B, Zenebe Y, Malu W, Kibret M, Kahsu G. Seroprevalence of hepatitis B and C virus and risk factors in HIV infected children at the Felgehiwot referral hospital, Ethiopia. *BMC Research Notes*. 2014;7: 838.
5. Pennap GR, Yahuza AJ, Abdulkarim ML, Oti VB. Prevalence of hepatitis B and C viruses among human immunodeficiency virus infected children attending an antiretroviral therapy clinic in Lafia, Nigeria. *The Asia Journal of Applied Microbiology*. 2016;3(4):38-43.
6. Akwa VL, Binbol NL, Samaila KL, Marcus ND. Geographical perspective of

- Nasarawa state. Onaivi printing and Publishing company, Keffi. 2007;3.
7. Muriuki BM, Gicheru MM, Wachira D, Nyamache AK, Khamadi SA. Prevalence of hepatitis B and C viral coinfections among HIV-1 infected individuals in Nairobi, Kenya. BMC Research Notes. 2013;6:363.
 8. Okwori AEJ, Alabi SS, Ngwai YB, Makut MD, Obiekezie SO, Ishaleku D, Gabo S, Akogwu NG, AnejoOkopi J, Ameh J, Adikwu TI. The seroprevalence of hepatitis B and C virus coinfection among HIV-1 infected patients in Keffi, North Central, Nigeria. Journal of Dental and Medical Sciences. 2013;9(5):70-75.
 9. Balogun TM, Emmanuel S, Ojerinde EF. HIV, Hepatitis B and C viruses' coinfection among patients in a Nigerian Tertiary Hospital. The Pan African Medical Journal. 2012;12:100.
 10. Hamza M, Samaila AA, Yakasai AM, Babashani M, Borodo MM, Habib AG. Prevalence of hepatitis B and C virus infections among HIV infected patients in a tertiary hospital in Northwest, Nigeria. Nigeria Journal of Basic and Clinical Sciences. 2013;10(2):76-81.
 11. Tremeau-Bravard A, Ogbukagu IC, Ticao CJ, Abubakar JJ. Seroprevalence of hepatitis B and C infection among the HIV-positive population in Abuja, Nigeria. African Health Sciences. 2012;12(3):312-317.
 12. Kouassi -M' Bengue A, Abdoulaye O, Emile AK, Moussa D, Dosso M. A very high frequency of Hepatitis B and C virus infections during an active screening campaign in Abidjan. African Journal of Microbiology Research. 2017;11(1):8-15.
 13. Ahmad I. Prevalence of hepatitis B and C viral infection among pregnant women in Peshawar, Pakistan. Hepatitis Monthly. 2016;16(6):e36383.
 14. Eze JC, Ibeziako NS, Ikefuna AN, Nwokoye IC, Uleanya ND, Ikechukwu GC. Prevalence and risk factors for hepatitis and HIV coinfection among children in Enugu, Nigeria. African Journal of Infectious Diseases. 2014;8:5-8.
 15. Akyala IA, Obande G, Ishaleku D. Seroprevalence of hepatitis B and C coinfection among cohort seropositive HIV patients accessing healthcare in Nasarawa State, North Central, Nigeria. British Journal of Psychological Research. 2013; 1(1):15-24.
 16. Pennap GRI, Yakubu A, Oyige O, Forbi J. Prevalence of Hepatitis B and C virus infection among people of a local community in Keffi, Nigeria. African Journal of Microbiology Research. 2010; 4(4):274-278.
 17. Agyeman AA, Ofori-Asenso R. Prevalence of HIV and Hepatitis B coinfection in Ghana: A systematic review and meta-analysis. AIDS Research and Therapy. 2016;13:23.

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The peer review history for this paper can be accessed here:
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