

Abstract

Infections of Hepatitis Band 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 serumscreened 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%) 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

29 transmission routes including sexual, blood-blood contact, and injecting drug usage [1,2]. Co-
30 infection with HIV and HCV and/or HBV is very common in certain populations, such as
31 intravenous drug users (IDUs) who often share the contaminated needles/syringes for
32 intravenous drug injection. It has been reported that the world prevalence of HIV-HCV co-
33 infection among IDUs can surpass 90% in certain populations [3].

34 Both hepatitis B virus and hepatitis C virus are equally endemic across Africa. The prevalence of
35 mono-infection for hepatitis B infection in the general population in Nigeria ranges from 9% to
36 39%, and being above 7% considered hyperendemic [4]. HCV infection rate in Nigeria is also
37 considerably high ranging from 5.8% to 12.3% [4]. Due to the endemic nature of these viruses in
38 the sub-Saharan region and the shared routes of transmission, co-infections of HIV-HBV or
39 HIV-HCV or even HIV-HBV-HCV are not uncommon. Prevalence of co-infection varies
40 depending on the population studied [5].

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

45 Expert guidelines developed in the United States and Europe recommend screening of all HIV-
46 infected persons for infection with HCV and HBV and appropriate management of those found
47 to be chronically infected [2]. In Nigeria, however, HIV-infected patients are not routinely
48 screened for hepatitis viruses. Screening for HBV and HCV is only considered following
49 observed deranged liver enzymes. Thus, there is no room for early detection of co-infections and
50 institution of proper management of cases. Again, data on the prevalence of co-infection in our
51 environment are still relatively scarce. This study is, therefore, aimed at **evaluating** the
52 **seroprevalence of Hepatitis B and C viruses in HIV infected patients accessing healthcare in**
53 **Federal Medical Centre, Keffi, Nigeria.**

54

55 **2. Materials and Methods**

56 **2.1 Study Area and Population**

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

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

65 **2.2 Sample Collection**

66 About 5ml of blood was collected from each confirmed HIV participant by venipuncture into a
67 sterile plain universal container. The blood was allowed to clot for 30 minutes and centrifuged at
68 3000rpm for 5 minutes. A Pasteur pipette was used to harvest and dispense each serum into a
69 new, labeled plain tube and stored at -20⁰ C until ready for use.

70 **2.3 Ethical Approval**

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

73 **2.4 HBsAg Detection**

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

79 **2.5 Anti-HCV Detection**

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

85 **2.6 Statistical Analysis**

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

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

89

90 3.0 Results

91 Two hundred HIV **infected** patients were recruited for this study. Among them were 104 (52.0%)
92 males and 96 (48.0%) females. The overall prevalence of hepatitis in these HIV patients was
93 17.5%. Of these, 5.0% were reactive to anti-HCV and 12.5% to HBsAg. Females had higher
94 infection rates for both viruses ($p > 0.05$).

95 HBV infection was highest among those aged 20-29 years (14.3%) and lowest among those aged
96 30-39 years (6.5%). For HCV infection, it was highest among those aged > 40 years (8.7%) and
97 least among those aged 30-39 years (0.0%). Infection rates with blood transfusion, smoking
98 habit, scarification marks, alcohol intake as risk factors were more for HBV than HCV ($p > 0.05$)

99 **Table1: Prevalence of Hepatitis B and C **viruses** among HIV **Infected** patients accessing healthcare in Federal**
100 **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 (0.0)	
Secondary	95	13 (13.7)		2 (15.4)	

Tertiary	91	8 (8.8)	0.1954	8 (8.8)	0.0970
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)		3 (2.5)	
Urban	79	5 (6.3)	0.0573	7 (8.9)	0.0555
History of Alcohol intake					
Yes	77	12 (15.6)	0.3597	3 (3.9)	0.5890
No	123	13 (10.6)		7 (5.7)	

101

102 4.0 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 HIVinfected 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 HIVinfected 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.

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'voire [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. Pennapet *al.* [16] in Nigeria, Kouassi M' Bengue *et al.* [12] in Cote d'voire and Agyeman and Ofori-Asenso, [17] in Ghana reported same in a similar study.

5.0 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.

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