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Prevalence of Hepatitis C virus and HIV among adults presenting for health screening in Lagos

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Abstract:

Background: Hepatitis C virus is an important cause of chronic liver disease with 71 million people worldwide living with chronic HCV infection as at 2015. Nigeria has the second largest burden of HIV in Africa, with 3.2 million Nigerians living with HIV/AIDS in 2016. Most people infected with the hepatitis C virus are asymptomatic and often unaware of their infection. This study was conducted to determine the prevalence of and risk factors for HCV and HIV infections among apparently healthy individuals in Lagos.

Materials and methods: This was a retrospective study in which the prevalence of hepatitis C virus antibodies and HIV was determined among apparently healthy individuals who presented for health screening at a private laboratory facility in Lagos from May 2014 to June 2016. The health records of those who met the inclusion criteria were systematically reviewed to extract demographic and clinical information including age, sex, history of blood transfusion, alcohol use, surgery and results of serological tests for antibodies to hepatitis C virus and HIV.

Results: Out of 1379 apparently healthy individuals included in the study, 60.1% were male. The prevalence rate of hepatitis C virus (HCV antibody) and HIV were 0.7% and 2% respectively. Hepatitis C virus infection was not significantly associated with history of blood transfusion, alcohol use, prior surgery and age. HIV infection was significantly associated with only prior history of surgery (OR 4.72, $p=0.02$).

Conclusion: In this study of apparently healthy Nigerians, the prevalence rates of HCV and HIV were low, no documented HCV-HIV co-infection and surgery was a risk factor for HIV infection. Screening of healthy individuals for HIV and HCV infection is very important to determine those who are infected and need to access treatment.

Keywords:

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Prévalence du virus de l'hépatite C et du VIH chez les adultes se présentant pour un dépistage médical à Lagos

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Abstrait:

Contexte: Le virus de l'hépatite C est une cause importante de maladie hépatique chronique avec 71 millions de personnes dans le monde vivant avec une infection chronique au VHC en 2015. Le Nigéria est le deuxième fardeau du VIH en Afrique, avec 3,2 millions de Nigériens vivant avec le VIH/sida en 2016. La plupart des personnes infectées par le virus de l'hépatite C sont asymptomatiques et ignorent souvent leur infection. Cette étude visait à déterminer la prévalence et les facteurs de risque d'infection par le VHC et le VIH chez des individus apparemment en bonne santé à Lagos

Matériels et méthodes: Il s'agit d'une étude rétrospective dans laquelle la prévalence des anticorps anti-virus de l'hépatite C et du VIH a été déterminée chez des individus apparemment en bonne santé qui se sont présentés pour un dépistage médical dans un laboratoire privé à Lagos de mai 2014 à juin 2016. Les dossiers médicaux de ces personnes les personnes répondant aux critères d'inclusion ont été systématiquement examinées pour extraire des informations démographiques et cliniques, notamment l'âge, le sexe, les antécédents de transfusion sanguine, la consommation d'alcool, la chirurgie et les résultats de tests sérologiques pour la recherche d'anticorps anti-virus de l'hépatite C et du VIH

Résultats: Sur les 1 379 individus apparemment en bonne santé inclus dans l'étude, 60,1% étaient des hommes. Le taux de prévalence du virus de l'hépatite C (anticorps anti-VHC) et du VIH était respectivement de 0,7% et 2%. L'infection par le virus de l'hépatite C n'était pas associée de manière significative aux antécédents de transfusion sanguine, à la consommation d'alcool, à une intervention chirurgicale antérieure et à l'âge. L'infection par le VIH était associée de manière significative aux antécédents d'opération (OR = 4,72, p = 0,02).

Conclusion: Dans cette étude portant sur des Nigériens apparemment en bonne santé, les taux de prévalence du VHC et du VIH étaient faibles. Aucune co-infection documentée VHC-VIH et la chirurgie ne constituaient un facteur de risque d'infection par le VIH. Le dépistage de l'infection par le VIH et le VHC chez les personnes en bonne santé est très important pour déterminer les personnes infectées qui ont besoin d'un traitement

Mots clés:

Introduction:

Hepatitis C virus is a hepatotropic virus well known to lead to chronic liver disease such as chronic hepatitis, liver cirrhosis and hepatocellular carcinoma. In 2015, 71 million people were estimated to be living with chronic HCV infection and the global prevalence of HCV was 1% (1). Viral hepatitis was said to be responsible for 1.3 million deaths in 2015. Worldwide, 2.3 million persons living with HIV were also infected with hepatitis C virus. The burden of hepatitis constitutes a global public threat which made the World health assembly in 2016 to approve a global strategy for the elimination of viral hepatitis by the year 2030 (3). Therefore if people living with hepatitis b and hepatitis c infection are not diagnosed and treated, the number of deaths will continue to rise (1).

In 2016, the prevalence rate of HIV infection in Nigeria was 2.9% which translates into 3.2 million people living with HIV/AIDS. There were 220,000 new HIV infections and an estimated 160,000 adult and children died of AIDS (2).

The prevalence of hepatitis C in Nigeria from a population based screening is 0.9% (4). In Nigeria, its prevalence is higher among populations at high risk such as patients who are positive for the human immuno deficiency virus with 2.3% (5), mentally ill individuals 12.6% (6), intravenous drug users 7.7% (7) and patients with sickle cell anaemia 5% (8).

Most people with chronic HCV infections are asymptomatic and those infected most often have no knowledge of their infection. Testing for HCV is poor as shown in a 2015 study by the World health organisation that reported that only 20% of those living with HCV infection knew their status (1). In Nigeria only 34% of people living with HIV infection know their status (2). Therefore testing for both HIV and HCV is very important to know the burden of infection and know those who need to access care and treatment.

One of the strategies for the elimination of viral hepatitis is testing and treatment. Most of the studies on

hepatitis C in Nigeria have tested few individuals and subgroups of the population. This study was conducted to determine the prevalence and risk factors of HCV and HIV among apparently healthy individuals in Lagos from data collected from a health screening programme.

Materials and methods:

Study design

This was a retrospective study to determine the prevalence of hepatitis C virus antibodies and HIV among apparently healthy individuals who presented for health screening from May 2014 to June 2016 at a private medical diagnostic centre in Lagos. The health records of those who met the inclusion criteria were systematically reviewed to extract the demographic and clinical information including age, sex, history of blood transfusion, alcohol use, surgery and results of serum liver enzymes and serological tests for antibodies to hepatitis C virus and HIV. The detail of the identity of the subjects was kept confidential with all identifiers removed except for the demographic and clinical information mentioned above.

The centre is a leading medical diagnostic centre in Lagos state. It has a health assessment clinic with different health check-up plans consisting of a range of laboratory and radiological tests and clinical examination to detect lifestyle diseases early (when chances of treatment and cure are better) or prevent their occurrence.

The eligibility criteria included individuals aged 18 years and above who registered for health check-up plans within the study period that included screening tests for Hepatitis C virus antibody or HIV.

Laboratory procedures

Antibody to Hepatitis C virus was tested on samples collected from the

clients using the Roche Elecsys HCV Antibody (Roche Diagnostics Ltd, Mannheim, Germany) assay. This is an electrochemiluminescence immunoassay "ECLIA" performed on Cobas e 411 immunoassay analyser. Antibodies to Human immunodeficiency virus were tested for using the Alere Determine HIV 1/2 test kit (Alere, USA). The tests were done according to manufacturer's instructions. Ethical approval was obtained from the Lagos University Teaching Hospital Health Research and ethics committee.

Data analysis

Data was analysed using SPSS version 20. Discrete variables were analysed using the Chi-square test while Student's t-test was used to evaluate differences between means. Odds ratio (OR) was used as a measure of the strength of association and p value <0.05 was considered statistically significant.

Results:

Sociodemographic characteristics of study participants

Out of 1379 apparently healthy individuals included in the study, over half of them were male (829, 60.1%). Of the 1379 participants, 1356 individuals were tested for hepatitis C antibody, 1280 individuals tested for HIV. The mean age was 47.1 ± 12 years and 795 (57.6%) of them were in the age group 31 – 50 years. There was no significant difference between the mean ages of male (47.5 ± 11.7 years) and females (46.6 ± 12.4 years). Majority (1190, 87.4%) of the participants were married, while 8.8% were single. Most of the participants had no history of blood transfusion (1318, 95.6%) or prior history of surgery (987, 71.6%), see Table 1.

Table 1: Socio-demographic and clinical characteristics of the study participants

Variables	Frequency (n = 1379)	Percentage (%)
Gender		
Female	550	39.9
Male	829	60.1
Age		
<=30	91	6.6
31-50	795	57.6
>50	493	35.8
Blood Transfusion		
Yes	61	4.4
No	1318	95.6
Surgery		
Yes	987	71.6
No	392	28.4
Alcohol		
Yes	582	42.2
No	796	57.8
Marital status		
Married	1190	87.4
Single	120	8.8
Widow	40	2.9
Separated	8	0.6
Divorced	3	0.2

Prevalence of hepatitis C virus

The prevalence of hepatitis C virus (HCV antibody) was 0.7% (n=9, 95% CI 0.3 – 1.1%). The prevalence of hepatitis C virus in females was 0.4% and 0.9% in males but the difference was not statistically significant. The mean age of participants who tested positive for HCV antibody was 42.6 ± 12years. The prevalence of HCV antibody was highest in the age group 30 years or younger (1.1%) but the difference was not statistically significant ($p = 0.68$).

Risk factors for hepatitis C virus infection

In the bivariate analysis, 0.7% of the married participants tested positive for HCV antibody but there was no statistical significance between hepatitis C virus infection and marital status ($p = 1$). Hepatitis C virus infection was not significantly associated with history of blood transfusion, alcohol use, prior surgery and age ($p > 0.05$) (Table 2).

Table 2: Risk factors associated with hepatitis C virus infection

Variable	Hep C positive N (%)	Hep C negative N (%)	P value
Gender			
Female	2 (0.4)	538 (99.6)	0.33
Male	7 (0.9)	809 (99.1)	
Age-group			
<=30	1 (1.1)	88 (98.9)	0.68
31 -50	4 (0.5)	782 (99.5)	
>50	4 (0.8)	477 (99.2)	
Transfusion			
Yes	0	60 (100)	1
No	9 (0.7)	1287 (99.3)	
Alcohol			
Yes	1 (0.2)	575 (99.8)	0.09
No	8 (1.0)	771 (99)	
Surgery			
Yes	2 (0.5)	383 (99.5)	0.68
No	7 (0.7)	964 (99.3)	
Marital status			
Married	8 (0.7)	1160 (99.3)	1.0
Single	1 (0.8)	118 (99.2)	
Widow/Divorced/Separated	0	51 (100)	

Table 3: Risk factors associated with HIV infection

Characteristic	HIV positive N (%)	HIV negative N (%)	OR (CI)	P value
Gender				
Female	6 (1.2)	500(98.8)	1	0.11
Male	19 (2.5)	755 (97.5)	2.09 (0.83 – 5.29)	
Age group				
<30	3 (3.4)	84 (96.6)	3.1(0.73 – 13.22)	0.13
31-50	17 (2.3)	737 (97.7)	2.0 (0.73 – 5.46)	0.17
>50	5 (1.1)	434 (98.9)	1	
Transfusion				
Yes	1 (1.8)	54 (98.2)	1	0.94
No	24 (2)	1201 (98)	1.08 (0.14 – 8.13)	
Alcohol				
Yes	13 (2.4)	537 (97.6)	1.45 (0.65 – 3.19)	0.36
No	12 (1.7)	717 (98.3)	1	
Surgery				
Yes	2 (0.6)	365 (99.4)	1	0.02
No	23 (2.5)	890 (97.5)	4.72 (1.11 – 20.11)	
Marital Status				
Married	21 (1.9)	1080 (98.1)	1.13 (0.26 – 4.87)	0.80
Single	2 (1.7)	116 (98.3)	1	
Widow/Divorced/Separated	2 (4.3)	43 (95.7)	2.7 (0.37 – 19.75)	0.31

OR = Odd Ratio; CI = Confidence Interval

Prevalence of HIV

In this study, the prevalence of HIV was 2% (n = 25, 95% CI 1.3 – 2.7%). The prevalence of HIV in females was 1.2% and 2.5% in males. The difference was not statistically significant. The mean age of participants who tested positive for HIV was 43.4 ± 12.4 years. The prevalence of HIV was highest in the age group 30 years or younger (3.4%) but the difference was not statistically significant (p = 0.24). None of the participants was co-infected with both HCV and HIV.

Risk factors for HIV infection

In the bivariate analysis, HIV infection was significantly associated with prior history of surgery. Prior history of surgery increased the risk of HIV infection by 5 times (OR 4.72, 95% CI 1.11–20.11, p=0.02). HIV infection was not significantly associated with history of blood transfusion, alcohol use, age and marital status (See Table 3).

Discussion:

This study represents the results of health screening for hepatitis C virus infection and HIV in asymptomatic Nigerians. The prevalence of HCV in this study was low at 0.7%. This is similar to findings of 0.4% among University under-graduates in Ogbomoso (9), a population based screening in Lagos 0.9% (4), and among first time blood

donors in Abeokuta 1.5% (10). It is also similar to findings in studies from other African countries such as Eritrea 0.7%, Somalia 0.9% and Sudan 1% (11 – 12). However, the prevalence of HCV antibody in this study is lower than that reported among healthy blood donors in Port Harcourt 5%, Calabar 10%, a rural population in Cameroon 6.3% and the WHO estimated African regional HCV prevalence of 5.3% (13 – 16). The differences in prevalence across the studies may be due to differences in demographics, socioeconomic status, risk behaviour, and the method of testing employed. The low prevalence in this study may also be due to the fact that the subjects live in Lagos which is an urban area, because the prevalence of HCV has been reported to be higher in rural versus urban areas (17).

The prevalence of HIV infection in this study was found to be 2%, which is similar to studies from Burkina Faso with 1.8%, and Tanzania 2.2% (18, 19). It is lower than the Nigerian national prevalence of 2.9% (2), other studies from Nigeria such as 3.1% from Osogbo (20) and 6.2% from Abeokuta (10), and studies from other African countries such as Ethiopia 3.8%, and Cameroon 4.1% (21–22). The prevalence of 2% is higher than the reported rates of 0.3% in Eritrea and 1.2% in Mauritania among blood donors (11, 23). Differences in demographic factors, socioeconomic status, level of education and exposure

to risk factors may account for these differences.

Many studies have demonstrated co-infection with the hepatitis C virus and HIV. However, no co-infection was demonstrated in this study, and this is similar to other studies from Benin-city and Ethiopia (24 – 25). In this study, older age was not found to be a risk factor for hepatitis C virus infection as it has been previously described. Those who were 30 years or younger had the highest prevalence of HCV antibody but age was not statistically significant. Males had a higher rate of HCV infection in this study but gender was not a significant risk factor. Unsafe blood supply has contributed to HCV transmission in developing countries but in this study previous history of blood transfusion was not significantly associated with risk of HCV infection. Marital status, previous history of surgery, and alcohol use, were not significantly associated with the risks of HCV infection. In as many as one third of subjects with HCV, a risk factor could not be identified for their infection (26 – 28).

In this study, those with no previous history of surgery were 5 times more likely to be infected with HIV. No history of previous history of surgery was significantly associated with the risk of HIV infection. This is surprising because surgical procedures which are invasive offer opportunity for transmission of HIV through poor infection control practices such as use of contaminated surgical instruments, equipment and injections. It may also be due to a confounding factor. The reason for this is not clear. Transfusion of infected blood and blood products contribute to transmission of HIV infection and these products are routinely screened for HIV. However, prior history of blood transfusion was not significantly associated with risk of HIV infection in this study.

The highest rate of HIV was found in subjects younger than 30 years, as is reported in other studies however age was not significantly associated with the risk of HIV infection. Noteworthy is our finding that the highest rates of HIV occurred in those who had been

previously married (divorced or separated or widowed) even though this was not statistically significant. Men were 2 times more likely to be HIV infected in this study but gender was not significantly associated with HIV infection in this study. Some studies have shown that women have significantly higher HIV prevalence rates than men across countries and age groups (29).

In conclusion, this study among apparently healthy Nigerians shows that prevalence rates of HCV and HIV were lower than earlier documented and there was no documented HCV-HIV co-infection. Previous history of surgery was the only significant risk factor for HIV infection. Screening of healthy individuals for HIV and HCV infection is very important to determine those who are infected and therefore need to access treatment.

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