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Seroprevalence of anti-HCV antibody among Students of Kogi State University, Anyigba, Nigeria

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ABSTRACT: Hepatitis C virus (HCV) infection alongside its associated sequelae is a disease of major public health concern worldwide. This research aims to detect the sero-prevalence of anti-HCV antibody and risk factors of HCV infection amongst students of Tertiary institution in Kogi State, Nigeria. Blood samples were collected from 200 consented students and assayed for anti-HCV antibody using the ABON® HCV-Ab ELISA test kit manufactured by Abon Biopharm, China. Student's socio-demographic data and information considered as risk factors were collected from each participant using a structured questionnaire. The overall sero-positivity rate was found to be 4.5%. HCV prevalence was highest among students that were aged 21-25 years and analysis by sex showed that more females 5(4.7%) than the males 4(4.3%) students were infected with HCV. There was no statistically significant association between HCV infection and age as well as gender (P>0.05). However, HCV infection was found to be statistically associated with history of blood transfusion (P=0.004). The sero-prevalence rate of 4.5% in this study is alarming considering the fact that this is the group that is most sought when there is need for blood donation. Hence, adequate public awareness is advocated in order to educate students of tertiary institutions on ways of preventing and controlling the spread of the virus.

KEY WORDS: HEPATITIS C VIRUS, RISK FACTORS, SERO-PREVALENCE, STUDENTS

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INTRODUCTION

Hepatitis C caused by Hepatitis C virus (HCV), is one of the major public health problems globally. HCV is a blood-borne pathogen and has long been recognized as one of the leading causes of liver cancer worldwide [1]. Infection with HCV is widely acknowledged as a 'silent epidemic' since majority of infected individuals are asymptomatic or unaware of their infection and have not been tested for HCV [2], [3]. HCV infection can lead to viral persistence in approximately 85% of those infected with an attendant risk of subsequent development of chronic irreversible liver damage [4].

The predominant route of transmission of HCV is by blood-to-blood contact associated with intravenous drug use, sharing of contaminated sharp objects, and transfusions [5], [6]. Although, the introduction of routine screening of blood, blood products and organ tissues especially in developed countries has significantly reduced transmission, unscreened blood and blood products are still being used in many developing countries like Nigeria today [7].

Worldwide, an estimated 170 million people are carriers of HCV most of whom are from developing countries [8]. The prevalence of HCV infection is on the increase in Nigeria and it ranges from 4.7-5% in Ilorin [9], to 5.3-6.6% in Enugu [10] to 8.4% in Abuja [11] to 11% in Ibadan [12] and 20% in Benin [13, 14]. Children and adults are all at risk of being infected especially those who are exposed to common factors like Blood transfusion, hemodialysis, recycling of syringes and needles, and sexual promiscuity. The endemicity of HCV infection in Nigeria has been corroborated by various studies from different parts of the country among selected groups [15], [16], [17]. The current burden of HCV infection and its attendance risk of causing complications such as hepatocellular carcinoma, liver cirrhosis and diabetes mellitus makes HCV infection a disease of major public health importance worldwide and in Nigeria in particular [18],[19].At present, the information on the epidemiology of HCV infection is limited in Nigeria. This study sought to determine the presence of anti-HCV antibodies among students of Kogi State University and to assess the risk factors likely to predispose students to HCV infection. This study is important as it will generate information that may be used to monitor the trend of the disease in this area and emphasize the need for intense Health education campaign of the general public.

MATERIALS AND METHODS

Study Area/Population: Study was carried out at Kogi State University situated in Anyigba, a city under Dekina local government in the Northeastern part of Kogi State which is located in North Central region of Nigeria. Anyigba is found on latitude $7^0$15'- $7^0$29'North of the Equator and longitude 7^0 11'- 7^0 32' East of Greenwich meridians and with an average altitude of 420m above sea

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level [20]. This study is a cross-sectional sero-survey of HCV antibody among students of Kogi State University. Consented students were consecutively recruited for the study. Serum sample was collected from each student whose informed consent was obtained after thorough explanation of the study aim. Overall, a total of 200 students were recruited into the study.

Specimen Collection and Processing: About 5ml blood sample was aseptically collected by veinepuncture from each student into an EDTA bottle. This was centrifuged after which the serum was then transferred into sterile Eppendorf tubes and stored at -20℃ until ready for use. Overall, a total of 200 sera samples were collected from consented students of Kogi State University. Students' demographic variables and information considered as risks factors for contracting HCV were obtained using a structured questionnaire.

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volume of specimen has been added and membrane wicking has occurred. External control was also done with known serum pool to ascertain accuracy and detect batch to batch variation. The test has 99.9% sensitivity and 98.6% specificity correlation with ELISA test. The test and interpretation of the results were done in accordance with the manufacturer's specification

Statistical analysis: Here we present data generated with descriptive statistics. Differences in proportion were compared using chi square and P_value < 0.05 was set as statistical significance. The analysis was performed with SPSS 20.0 for Windows (SPSS Inc., Chicago, IL).

RESULTS

A total of 200 sera samples collected from students were screened for HCV antibody out of which 9 (4.5%) were positive for HCV infection (Table1). Students within the age bracket of 21-25 years had the highest rate of infection (5.3%). The prevalence of HCV antibody in the other age groups were as follows; 31-35 years (0.0%), 15-20 years (3.9%) and 26-30 years (4.5%) (Fig.3). No statistical association was found between student age and HCV infection (P>0.05).Out of the 200 sera samples tested, 93 were males and 107 were females. A male to female ratio of 1:1.2 was observed in this study. Four (4.3%) and 5(4.7%) of the males and females respectively were positive for HCV antibody but the association was however not statistically significant (P>0.05) (Table 2). Of all the risk factors examined in this study, only history of blood transfusion was found to be significantly associated with the carriage of HCV in students screened (P<0.05) (Table 4).

Ethical Consideration: Ethical approval for the study was granted by Kogi State Ministry of Health after all due process were followed.

Assay for Anti-HCV antibody: A one step tests was carried out to detect anti-HCV antibodies in the serum using ABON® HCV-Ab rapid test kit manufactured by Abon Biopharm, China. The test is a qualitative, membrane based immunoassay for the detection of antibody to HCV in serum. The membrane is coated with recombinant HCV antigen on the test line region of the strip. During testing, the serum specimen reacts with the coloured conjugate of protein A antigen to HCV antibody. An immune complex is formed when HCV antibody is present in the sample. The mixture migrates upward in the membrane chromatographically to reacts with recombinant HCV antigen immobilized on the membrane and generates a colored line. Presence of this colored line indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a colored line will always appear at the control line region indicating that proper

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Table 1: Seroprevalence of HCV among students of Kogi State University

HCV status	Frequency	Percentage
Positive	9	4.5
Negative	191	95.5
Total	200	100

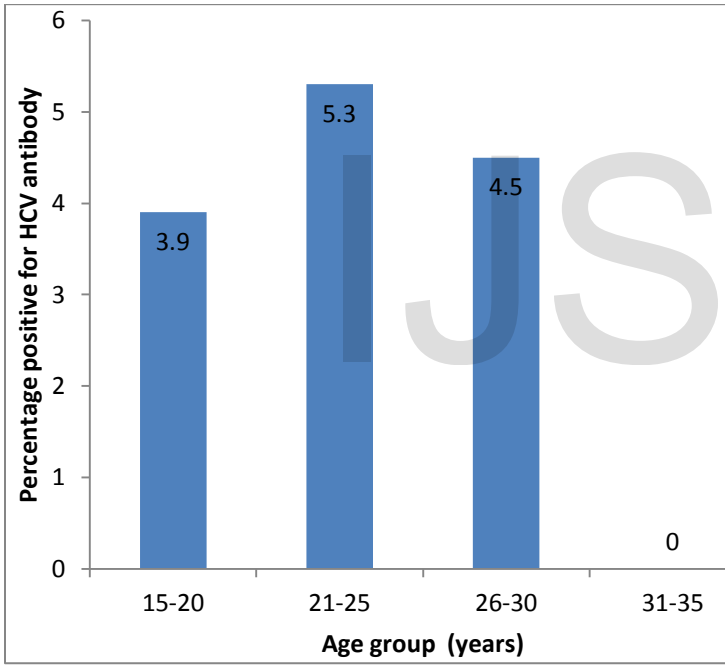

Fig.1. Percentage frequency distribution of HCV infection among students of all age groups

Table 2: Gender distribution of HCV infection

Gender	No tested	No positive (%)	P_value
Male	93	4 (4.3)	
Female	107	5 (4.7)	0.587
Total	200	9 (4.5)	

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Table 4: Socio-demographic risk factors for HCV infection

Variable	HCV status of student		P_Value
	No positive (%)	No negative (%)	
1. Knowledge of HCV Infection			

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Yes (n=84)	5(5.95)	79(94.05)	0.399
No (n=116)	4(3.45)	112(96.55)	
2. Mouth to mouth kissing			
Yes (n=137)	8(5.84)	129(94.16)	0.178
No (n=63)	1(1.59)	62(98.41)	
3. Shared sharp object			
Yes (n=132)	5(3.79)	127(96.21)	
No (n=68)	4(5.88)	64(94.12)	0.499
4. Sexual relationship			
Yes (n=133)	5(3.76)	128(96.24)	0.477
No (n=68)	4(5.97)	63(94.03)	
5. **No of sexual partner**			
None (n=66)	4(6.06)	62(93.94)	
One (n=89)	2(2.25)	87(97.75)	
Two (n=31)	1(3.23)	30(96.77)	0.198
More (n=14)	2(14.29)	12(85.71)	
6. History of STDS			
Yes (n=71)	3(4.23)	68(95.77)	0.889
No (n=129)	6(4.65)	123(95.35)	
7. Use of condom			
Regular (n=33)	2(6.06)	31(93 .94)	
Occassional (n=91)	3(3.30)	88(96.70)	0.742
Never (n =76)	4(5.26)	72(94.74)	
8. Had Blood transfusion			
Yes (n=16)	3(18.75)	13(81.25)	**0.004**
No (n =184)	3(3.26)	178(96.74)	
9. History of Surgery			
Yes (n=26)	1(3.85)	25(96.15)	0.863
No (n=174)	8(4.60)	166(95.40)	

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10. History of intravenous drug use			
Yes (n=9)	0(0)	9(100)	
No (n=191)	9(4.71)	182(95.29)	0.505
11. Alcohol consumption rate			
Low (n=122)	3(2.46)	119(97.54)	
Moderate (n=66)	4(6.06)	62(93.94)	0.058
High (n=12)	2(16.67)	10(83.33)	
12. Marital status			
Single (n=176)	7(4.0)	169(96.0)	
Married (n=23)	2(8.7)	21(91.3)	0.58
Divorced (n=1)	0(0.0)	1(100)	

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DISCUSSION

Nearly 200 million individuals in the world are infected with HCV [5], [6]. The infection is usually asymptomatic, but chronic infection can progress to liver cirrhosis and/or hepatocellular carcinoma [21], [22]. One of the major problems with HCV infection is that majority of individuals initially infected with this virus will become chronically infected, a condition that may last for decades. Since HCV is an important cause of morbidity and mortality, it is necessary to carry out studies that provide basic information about the infection and associated risk factors among students of Kogi State University, Anyigba, Nigeria.

The prevalence of HCV antibody in students of Kogi State University is 4.5% in this study. This is high considering the fact that these are apparently healthy population. This finding is comparable to previous reports among pregnant women from Port Harcourt, Nigeria [23], Jos, Nigeria [18] and Eastern Mediterranean [24] where a seroprevalence rate of 4.3% each and 4.6% respectively were reported. It also correlates with the finding of Zeba *et al.* [25] among blood donors at Ouagadougou in Burkina Faso where a seroprevalence rate of 4.4% was reported. In contrast, this finding is higher than previous reports by Okonko *et al.* [26] from Port Harcourt, Achinge *et al.* [27] from Makurdi, and Onakewhor and Okonofua, [28] from Benin City where HCV prevalence of 0.0%, 2.3%, and 1.86% respectively were reported. Finding from this study is however lower than the 8.0% HCV prevalence reported among fresh undergraduate student of the University of Ilorin [29], and 8.4% reported from Abuja by Agwale *et al.* [11].The distinctiveness in the modes of transmission of HCV dictated by socio-cultural practices and environmental factors might be a possible reason for these differences.

Analysis by age revealed that students within the age bracket 21-25 years had the highest prevalence of HCV infection although; the association was not statistically significant (P>0.05). This finding is similar to the peak age prevalence of "18 – 27" years obtained in Port Harcourt by Erhabor *et al*. [16]. The age group "21-25" years coincides with the more sexually active group who are expectedly more vulnerable to sexually transmitted infections, like Hepatitis – C infection. From the age of 26 years downward, there was a decline in HCV seropositivity. This observation correlates with the findings from other studies both within and outside Nigeria where a clear trend of decreasing positivity for anti-HCV with increasing age

among students, blood donors and other selected groups have been documented [30].

The prevalence of HCV antibody in this study is higher in females than their males' counterparts however, the difference was not found to be significant (P>0.05). This observation is comparable to previous findings by Pennap *et al*. [31] and Afolabi *et al*. [30].The reason for the preponderance of female infection in this study is not clear.

Some of these students were found to indulge in behaviours that have been reported as possible risk factors in HCV transmission. Of all the risk factors assessed, only history of blood transfusion was found to be statistically significant (P<0.05)(Table 4). The practice of blood transfusion although saves millions of lives who are in need of blood or blood products each year, it however put the recipients at risk of becoming infected with blood-borne diseases such as hepatitis C virus (HCV)when infected blood and/ or blood products is administered [30], [32]. In line with this finding, screening of blood prior to transfusion is essential since HCV is largely blood-borne and also for the fact that these students are also potential blood donors.

CONCLUSION

Overall, the results of this study show that the prevalence of Hepatitis–C virus among apparently healthy students of Kogi State University situated in the North Central region of Nigeria is much higher than the reported seroprevalence of HCV in some other parts of Nigeria. This signifies a large reservoir of infection for susceptible persons who in one way or the other might have contacts with the blood or bodily fluid of affected students. Therefore, routine screening policy should be adopted and enforced to reduce the risk of HCV infection among students of tertiary institutions. Also, nearly half of the anti-HCV positive students in this study were not aware of HCV infection and this lack of knowledge of an ongoing infection delays the diagnosis of HCV-related liver disease which in turn favors the spread of the virus. Consequently, public awareness about HCV infection should be put in place to enlighten and educate students of tertiary institutions.

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