



Detection of HCV antibody among sexually active patients in Abeokuta, Southwestern Nigeria

Okonko IO^{1*}, Soley FA², Nwanze JC³ and Onoh CC³

¹Department of Microbiology, University of Port Harcourt, Choba, PMB 5323 Port Harcourt, Rivers State, Nigeria;

²Department of Health Services, University of Agriculture, Abeokuta, Ogun State, Nigeria;

³Department of Pharmacology and Therapeutics, Igbinedion University, Okada, Edo State, Nigeria

Abstract

This study aimed to determine the seroprevalence of anti-HCV antibodies among sexually active patients at UNAAB, Abeokuta, Nigeria. Samples of blood serum were collected from 132 subjects, stored and processed using standard laboratory procedures. DiaSpot® HCV-Ab Test strips (manufactured by DiaSpot Diagnostics, USA), Global® HCV-Ab Kit (manufactured by Global Diagnostics, USA) and IND® HCV-Ab kits (manufactured by IND^R Diagnostica, USA) were used in a stepwise order for the detection of anti-HCV antibodies in the blood serum samples. The study showed that only 2(1.5%) of the subjects were positive for anti-HCV antibodies. Anti-HCV antibodies were detected only in males 2(3.1%). Anti-HCV antibodies were only detected in ages 15 to 29 years of age 2(1.7%) and none in ages 30 years and above. The study has further confirms the presence of anti-HCV antibodies in sexually active group (ages 15 to 29 years of age). HCV risk factors like age and gender appeared to be significantly associated with HCV antibody seropositivity ($P < 0.05$), thus emphasizing the need for routine screening of blood for HCV in order to prevent their transmission among general population. The need for intensive health education to encourage abstinence among sexually active group is also emphasized.

Key words: Anti-HCV antibodies, HCV, Sexually active group, Seroprevalence, Nigeria

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*Corresponding Author, e-mail: mac2finney@yahoo.com, iheanyi.okonko@uniport.edu.ng,

Tel.: +234 803 538 0891

1. Introduction

Viral hepatitis has been described as major public health, occurring endemically, in all areas of the world [1]. While viral hepatitis may be a mild sub-clinical infection with nonspecific symptoms to an overwhelming multisystem fulminant disease [2], chronic carrier state may occur resulting in chronic viral hepatitis following either overt or inapparent acute infection [3]. Hepatitis C virus (HCV) is becoming a significant causative factor in the aetiology of chronic liver disease worldwide [4]. However, information on the prevalence of Hepatitis C virus infection in chronic liver disease in Nigeria is sparse [4] especially from the Abeokuta, Ogun State, South Western region. Individuals with chronic infection of HCV have a high risk of liver cirrhosis and hepatocellular carcinoma [5]. Serological markers for HCV are screened in blood banks and antennal clinics routinely. The evaluation of the data of the prevalence of the HCV antibodies among patients gives an idea for the epidemiology of these infections in the community [5].

Human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) have similar routes

of transmission namely through blood and blood products, intravenous drug abuse, unsafe injections and sexual activity, shared needle, other body fluids such as semen, vaginal fluid and breast milk; intravenous drug abuse, from mother to child, needle stick injury, ear piercing, tattooing and other tribal ceremonies (scarification), barbers razors etc. [6-8]. HCV infections are known to occur in the general population, and due to their mode of transmission through blood and blood products, it has made the provision of safe blood difficult, and the screening of blood absolutely necessary [9]. Infection may also spread by fomites, sharing of tooth brush, abrasion, and sexual contact (hetero- or homosexual) with infected persons [10]. Detection of anti-bodies to HCV (anti-HCV) is used to detect HCV infection [8]. HCV has been shown to have a worldwide distribution, occurring among persons of all ages, genders, races and regions of the world [11-12]. As regards seroepidemiological study of HCV, detection of antibodies specific for the virus in human blood is the usual method of laboratory diagnosis. This is made possible by the enzyme immunoassay screening of human blood for anti-HCV antibodies introduced during the early 1990s; this in turn has reduced transfusion of blood and blood products as a major mode of acquiring HCV [13-15].

Schreiber *et al.* [1] reported that, in spite of improvements in the generations of serodiagnostic kits to detect HCV antibodies, the window period for the infection was generally more than 40 days. Through screening, prevalence rates of anti-HCV antibodies have been determined for various nations of the world. One hundred and seventy million people (3%) of the world population are reportedly infected by HCV, 20% and 70% of which respectively represent acute and chronic cases [16]. Various prevalence rates of anti-HCV antibodies have been documented in African countries. Prevalence rates reported from some African countries also differ from place to place. Nigeria, the nation as one of the countries highly endemic for viral hepatitis, the prevalence rate of HCV infection was earlier said to vary between 5.8% and 12.3% as reported by Inyama *et al.* [17]. With the low prevalence of anti-HCV in developed countries, the risk of infection is still estimated at about 1:100,000. This risk is expected to be higher in our environment where the prevalence is high in addition to the virtual non-existence of testing methods for HCV markers [18]. Indeed, HCV is a devastating disease agent that share common modes of transmission with HBV and HIV. Most people infected by these viruses have no symptoms and do not know that they carry the virus, but all who are infected can transmit the virus to others [19].

The aim of this study therefore was to detect the presence of anti-HCV specific antibodies in blood of patients attending University of Agriculture, Abeokuta (UNAAB) health centre in Abeokuta, the capital of Ogun State; and to study the association of some of the patients' variables with the seroprevalence of anti-HCV antibodies.

2. Material and methods

2.1. Study area

This study was carried out among patients attending the Department of Health Services, University of Agriculture, Abeokuta (UNAAB), Ogun State, Southwestern, Nigeria. The University of Agriculture, Abeokuta with the acronym UNAAB is one of the three Universities of Agriculture in Nigeria, the other being in Makurdi (Benue State) and Umudike (Abia State). It was established in January 1988. The University started at its mini-campus in Isale-Igbein right in the heart of Abeokuta, the Capital of Ogun State located in the forest zone of Southwestern Nigeria, which borders Lagos State to the South, Oyo and Osun states to the North, Ondo State to the east and the republic of Benin to the west. The University moved in December 1997 to its permanent site, a 10,000-hectare Campus which is located next to the Ogun-Osun River Basin Development Authority on the Abeokuta-Ibadan road in the North Eastern end of the city, 15 km from Abeokuta City Centre.

2.2. Study population

A total of 132 patients (64 males and 68 females) of different ages and socioeconomic status attending Department of Health Services, University of Agriculture, Abeokuta (UNAAB), Ogun State, Southwestern, Nigeria, were enrolled in this study. The study was conducted from March to

August, 2010 by recruiting consecutive consenting patients presenting at Department of Health Services, University of Agriculture, Abeokuta (UNAAB), Ogun State, Southwestern, Nigeria until a total of 132 participants was attained. All study was performed according to the International Guidelines for Human Experimentation in Clinical Research. Following informed consent, the participating patients; apparently healthy without jaundice were interviewed to obtain information on their demographic data such as age and sex.

2.3. Screening for antibodies to HCV

Venous blood (3.0 ml) was obtained from participants aseptically into plain bottles and allowed to clot and retract after which serum was isolated by centrifugation at 2000g for five minutes. DiaSpot® HCV-Ab Test strips (manufactured by DiaSpot Diagnostics, USA), Global® HCV-Ab Kit (manufactured by Global Diagnostics, USA) and IND® HCV-Ab kits (manufactured by INDR Diagnostica, USA) were used in a stepwise order for the detection of anti-HCV antibodies in the blood. These methods which are immunochromatographic and qualitative in nature, detect the presence of anti-HCV antibodies in human blood and can be read in-vitro having more than 99.9% sensitivity and 98.6% specificity. The interpretation of test results was performed according to the manufacturer's specifications.

2.4. Data analysis

The prevalence for HCV infection was calculated by using patients with positive samples as numerator and the total numbers of patients enrolled in this study as denominator. The data generated from this study were presented using descriptive statistics. The data was subjected to statistical analysis using SPSS computer software version 17.0 for Windows to determine any significant relationship between infection rate, age and gender.

3. Results

A total of 132 blood samples from asymptomatic patients were collected between March, 2010 and August, 2010; of which 2 representing 1.5% were positive for HCV antibodies (Table 1). The ages of the patients ranged 15-60 years (mean age = 19.4 years). Table 1 shows the prevalence of asymptomatic HCV patients in relation to the risk factors. The age-specific infection rate showed that only patients in ages 15 – 29 years (1.7%) were positive for HCV antibodies as shown in Table 1. None of the patients in ages 30 years and above was positive for antibodies to HCV. Statistical analysis by chi-square however showed significant difference in the distribution of infections with respect to age ($P < 0.05$). There is significant association ($P < 0.05$) between the age groups of the patients seropositivity to HCV antibodies (Table 1). The gender-specific infection rate showed that seropositivity to HCV antibodies was found only among males, 2(3.1%) as shown in Table 1. Statistically, there was significant difference in the distribution of seropositivity to HCV antibodies by gender ($P < 0.05$). Thus, there is significant association ($P < 0.05$) between gender of the patients and the antibodies to HCV.

4. Discussion

In this study, 132 consenting patients were recruited and examined for presence of markers of HCV infections. From this study, the age range of the subjects was 15 to 60 years with a mean of 19.4 years. Over the period under study,

Table 1: Risk factors for HCV antibodies among sexually active patients of UNAAB, Abeokuta, Ogun State, Southwestern Nigeria

Risk factors	No. Tested (%)	No. Positive for HCV (%)
Age Group (years)		
15- 29	121 (91.7)	02 (01.7)
30 and above	011 (08.3)	00 (00.0)
Sex		
Males	64 (48.5)	02 (03.1)
Females	68 (51.5)	00 (00.0)
Total	132(100.0)	02 (01.5)

the seroprevalence rate of this viral infection among the subjects was 1.5% for anti-HCV antibodies. This is contrary to previous results reported in different parts of Nigeria [8-9, 20]. The prevalence of HCV infection in this community was also found to be high when compared to reports from some countries in Western Pacific (3.9%), South East Asia (2.15%), America (1.17%) and Europe (1.03%) [21] and comparable to Eastern Mediterranean (4.6%), but lower than reports from some countries in Africa (5.3%) [21] and Egypt (20.0%) reported by Frank *et al.* [22] and reports from Enugu where 14.9% was reported [23]; the 5.2 and 11.09% reported in Jos and Kaduna respectively [24] and 4.3% in a study among a presumed low risk group in Jos [25].

The seroprevalence of anti-HCV antibodies reported in this study also differs from previous studies. It is lower than the 13.3% reported for Anti-HCV by Pennap *et al.* [26] in Keffi, Nassarawa State, Nigeria; the 12.3% reported by Gholamreza *et al.* [27] for anti-HCV antibody in North Eastern part of Iran; the 9.2% found by Ogunro *et al.* [28] in Osun State; the 8.4% anti-HCV antibody seroprevalence rate reported by Ayolabi *et al.* [29] in Lagos; the 6.0% seroprevalence reported by Egah *et al.* [18] in Plateau State; the 5.8% HCV seroprevalence reported by Udeze *et al.* [30] in Ibadan, Southern Nigeria; the 5.7% reported by Inyama *et al.* [17] in Plateau States, Nigeria; the 4.8% reported by Mabayoje *et al.* [31] in Osogbo, Osun State, Nigeria; the 3.7% found by Nwokediuko *et al.* [32]; the 3.0% found by Ezeani *et al.* [33] in Southeastern, Nigeria; and the 2.4% HCV infection rate found by Olokoba *et al.* [9] in Yola. It is comparable to the 1.5% and 1.6% current seroprevalence of HCV at MNH in Dar es Salaam by Matee [34]; the 1.1% reported by Buseri *et al.* [35] for HCV in Osogbo, Nigeria. However, it is higher than the 0.85% reported by Chandra *et al.* [36] in India; the 0.4% documented by Imoru *et al.* [37] in Kano State; the 0.2% found in the work of Abdalla *et al.* [38]; the 0.5% in the work of Ejele *et al.* [39]; and the 0.0% HCV seroprevalence previously reported by Elfaki *et al.* [40] in Sudan.

The 1.5% anti-HCV antibodies seroprevalence reported in our study differs greatly from the 13.0% reported by Seremba *et al.* [41] in Uganda; the 6.0% seroprevalence documented by Buseri *et al.* [35] in Osogbo, South of Nigeria; the 3.6% reported by Sule *et al.* [3] in Lokoja, Kogi State; the 2.9% reported by Koate *et al.* [42] in Port Harcourt; the 5.0% reported by Jeremiah *et al.* [43] in Port Harcourt; the 8.0% HCV seroprevalence reported by Udeze *et al.* [30] in Ibadan; and more recently, the 3.0% seroprevalence reported for HCV antibodies respectively [44]. Karuru *et al.* [45] reported 4.4% in Kenya; in 2004, Lassey *et al.* [46] recorded 2.5% in Ghana and 3.3% in Burkina Faso [47]. The 1.5% seroprevalence rate for anti-HCV antibodies found in our study is, however, relatively comparable to values ranging between 0 and 1.4% reported from USA and Europe [48-49] and the 0.64% seroprevalence of HCV reported in Kathmandu, Nepal [50]. Laraba *et al.* [4] reported detection of anti-HCV in 14.4% and 2.4% of patients and controls respectively in Maiduguri, Nigeria.

The findings of this study which showed that the seroprevalence of anti-HCV antibodies in this group of subjects is lower or somewhat similar to those carried out in similar populations in previous studies in Nigeria [31]. However it has been shown that it has been shown that HCV antibody prevalence is much higher in older adults than in young adults. For example, it was shown that HCV antibody prevalence was much higher (8.0%) in clergy men aged 30-39 years [25]. This differs greatly from the findings of this present study in which antibodies to HCV was only detected in young adults aged 15-29 years. The implication of high prevalence of asymptomatic HCV infection among these adolescents is that they may become chronic carriers of the virus, thus acting as reservoirs for subsequent transmission. Also the age of acquiring infection is the major determinant of the incidence and prevalence rates [51].

This study reported the seroprevalence rate of 1.5% for anti-HCV antibodies is higher in young adults aged 15-29 years. This also correlates with age of greatest sexual activity thus lending credence to the role of sexual transmission [42] although said to be rare [26, 52]. In line with the assertions of Mabayoje *et al.* [31], this strongly suggests that the viral burden amongst this population of students and staff is similar and that probably similar factors (demographic) are responsible for maintaining this level of viral load. Further studies would be needed to elucidate the reasons why this is the case. Also it would be necessary to reemphasize the methods of prevention of transmission of these viruses, and to ensure their implementation in order to reduce the viral levels and therefore avoid the long term sequelae [31]. The observations that age was apparently statistically associated with prevalence of HCV antibody in this study disagrees with those made by Tess *et al.* [15] in Northwestern Tanzania.

The statistically significant difference in seroprevalence of anti-HCV antibodies between males and females in the present study suggests that they were not equally exposed to HCV in disagreement with earlier findings [3, 7, 30-31, 44] but however collaborates with the findings of other authors elsewhere [11]. There was no obvious explanation for the difference in gender as a risk factor for this HCV infection although Bwogi *et al.* [52] reported a

lower prevalence of HCV in men than in female and suggested the interplay of circumcision as protective. In line with Pennap et al. [26], this was not the case in this study even though it was in an area that male circumcision is mandatory. However, the male volunteers were few than females. In addition, though among sickle-cell anemic patients, Torres *et al.* [53] observed no significant gender difference in HCV antibody prevalence in Brazilian population. In agreement with the observation of Inyama *et al.* [17] and Mustapha *et al.* [55], males in this study had higher prevalence (3.1%) of HCV antibody than their female counterparts (0.0%). This might be due, in part, to lower number of males that enrolled in the study. This observation is not consistent with that of Ejele *et al.* [56] who reported that females had higher prevalence of HCV antibody than their male counterparts in Niger Delta, Nigeria. Statistical analysis, however, showed significant difference ($P < 0.05$) between the prevalence rates of HCV antibodies in the males than females. The observations that age and gender was apparently statistically associated with prevalence of HCV antibody in this study do not correspond with those made by Tess *et al.* [15] in Northwestern Tanzania.

5. Conclusion

Although much is known about the epidemiology of HCV in Nigeria, limited investigation has been carried out on HCV infection in Abeokuta, Ogun State, Nigeria. Studies carried out by various authors have shown that HCV infections are highly prevalent among Nigerians [31, 57]. Thus the higher prevalence recorded in these earlier studies were not unexpected as it has been shown that HCV are contracted in early childhood. Also, the wide differences in the HCV infection rate among the general population in the different regions within Nigeria, and even outside Nigeria may be due to the differences in geographical locations, age range of patients, sample sizes, the period of time the studies were carried out, and the different socio-cultural practices such as sexual behaviour, marriage practices, circumcision, scarification, tattooing etc which take place in these regions [9]. Access to healthcare, immunization practices, and the laboratory test reagents used may also be contributory factors [9]. In conclusion, the results of this study have highlighted the fact that HCV infection is common in Abeokuta, an urban area of Ogun State. This virus remains the greatest public health problem as of today. This study showed that the prevalence of HCV antibodies is generally comparable to results obtained from similar studies carried out elsewhere.

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