

Original Research Article

Seroprevalence of Hepatitis C Virus amongst blood donors in parts of North Central Nigeria.

ABSTRACT

Background: Hepatitis C virus is one of the blood borne transmissible infections of public health significance. It can easily be transmitted to a wider population through transfusion of contaminated blood or blood products. **Objective:** To determine the seroprevalence of HCV antibodies amongst blood donors in parts of North Central Nigeria.

Aim: to determine the seroprevalence of HCV antibodies amongst potential blood donors in the study area.

Materials and Methods: Seven hundred and ten (710) samples were collected from consented blood donors in the study area and were examined for anti-HCV antibody using a third generation enzyme-linked immunosorbent assay (ELISA) Test kit (Autobio Diagnostics, China) based on the manufacturer's instructions. Structured questionnaires were administered to the participants and results were analyzed using SPSS version, 23.0 statistical software package.

Result: Of the 710 samples of voluntary blood donors examined, 7.0% were positive for anti-HCV antibody. Male participants had a higher prevalence of 7.1% than females who had 6.7% ($p = 0.88$). The age group 41-50 years had the highest seroprevalence of 10.9%, followed by age groups ≤ 20 , 21-30, 31-40, 51-60, and ≥ 61 with a prevalence of 8.8%, 7.7%, 4.7%, 0.0% and 0.0% respectively ($p = 0.46$).

Conclusion: The seroprevalence of HCV infections is evident amongst potential blood donors and this called for health care providers and policy makers to ensure that there is proper screening for HCV in all health facilities in the area before any blood transfusion in order to minimize the spread of the infection in the area and Nigeria at large.

Key Words: Prevalence, anti-HCV antibodies, Blood Donors, Nigeria.

1. INTRODUCTION

Hepatitis C virus (HCV) is a single stranded ribonucleic acid (RNA) virus; approximately 9.5 kb which belongs to the Flaviviridae family [1]. HCV has a single stranded, positive sense genome of approximately 9.6kb. The genome contains one long open reading frame (ORF) encoding a polyprotein of approximately 3011 amino acids, flanked by 5' and 3' noncoding regions[2] Choo *et al*, 1991). Hepatitis C is a disease with a significant global impact. According to the World Health Organization there are 130-170 million people infected with the hepatitis C virus (HCV), corresponding to 2-2.5% of the world's total population. There are considerable regional differences. In some countries, e.g., Egypt, the prevalence is as high as 22% [3].

In Nigeria HCV infection has been reported by various researchers from different parts of the country amongst blood donors. Alao *et al*. [4] reported 5.4% among blood donors in Makurdi, North-central Nigeria, Olokoba *et al*. [5] reported 2.4% among blood donors in Yola, North-eastern Nigeria, while Afolabi *et al*. [6] reported 1.4% among blood donors in Ibadan, South-western Nigeria.

Hepatitis C virus (HCV) is a major cause of morbidity and mortality worldwide [7]. Hepatitis C virus has been classified into 6 major genotypes and into several subtypes. The genotypes have a geographically distinct distribution which carries important implications such as treatment decisions, possible transmission route and vaccine development. For example the response to therapy observed in patients infected with genotypes 1 and 4 is lower than those infected with genotypes 2 and 3 [8].

Hepatitis C virus is predominantly transmitted parentally and causes hepatic inflammation. Usually acute HCV infection passes un-noticed and majority of the persons remain asymptomatic or have mild symptoms. Individuals positive for HCV antibody are potentially infectious and 60-85% of them become chronically infected with the virus whereas 10-20% of them may develop cirrhosis and 1-5% may develop hepato-cellular carcinoma in 20-30 years time [9, 10, 11, 12].

The risk factors associated with the transmission of HCV include: transfusion of blood and blood products, intravenous drug use, unprotected sexual exposures with infected partners, haemodialysis, organ transplants, birth to an HCV-infected mother and tattooing and contaminated hospital equipments [13, 14, 15, 16, 17, 18, 19, 20].

Hepatitis C virus (HCV) is a major cause of liver disease worldwide and a potential cause of substantial morbidity and mortality in the future. The complexity and uncertainty related to the geographic distribution of HCV infection and chronic hepatitis C, determination of its associated risk factors, and evaluation of cofactors that accelerate its progression, underscore the difficulties in global prevention and control of HCV [21].

Currently, the treatment for HCV infection has achieved appreciable successes, yet most of the patients who need treatment are unable to afford it. Up till now there is no vaccine for immunization for passive prophylaxis against the infection as such public health interventions therefore continue to be the only effective method of preventing the infection. These include: screening blood and blood products before transfusion, effective use of universal precautions and contraceptive barrier methods, use of disposable sharp instruments and promotion of health education on HCV infection and its prevention. However, any strategy to prevent HCV infection must be based on accurate data [22, 23].

70 This study was designed to determine the seroprevalence of HCV antibodies amongst potential blood
71 donors in the study area.

72 **2. MATERIALS AND METHODS**

73 **2.1 BACKGROUND OF THE STUDY AREA**

74 The North Central Nigeria is made up of six states and Abuja the capital of Nigeria. This study
75 covered three states which comprised of Plateau State, Nasarawa State and Benue State. The States
76 have a diverse range of indigenous ethnic groups. The main occupation in the rural areas is farming,
77 while those in urban areas are civil servants, traders and students. The states have several tourist
78 sites, institutions, hospitals, markets, hotels and brothels cut across the states. All these attract people
79 from different parts of the country or the world, thus creating avenues for various social interactions
80 which can contribute in the spread of the infection. The hospitals used for sampling were the major
81 tertiary health facilities in the study area which serve as a referral centre to the other primary and
82 secondary health care facilities for patients in the study area.

83

84 **2.2 STUDY DESIGN**

85 The study was a hospital based cross-sectional study. Samples were collected randomly from
86 patients from the study populations and examined for presence of disease with regards to the
87 demographic data captured in the structured questionnaire.

88

89 **2.3 STUDY POPULATION**

90 The study population focused on male and female blood donors attending Jos University Teaching
91 Hospital (JUTH), Federal Medical Centre (FMC), Keffi and Federal Medical Centre (FMC), Makurdi.

92 **2.4 ETHICAL CONSIDERATION**

93 Ethical approvals were obtained from the Research Ethics Institutional Review Board of Jos University
94 Teaching Hospital, Plateau State, Federal Medical Centre Keffi, Nasarawa State and Federal Medical
95 Centre Makurdi, Benue State before the commencement of the work. Also, Informed consent of each
96 participant was obtained prior to sample collection.

97 2.5 SAMPLING METHOD

98 A structured questionnaires and consent forms were administered randomly to subjects who gave
99 their consent in other to obtain some demographic data.

100

101 2.6 COLLECTION OF SAMPLE

102 Five (5) mls of blood was collected in an anti-coagulated tube. The plasma was separated and stored
103 in a freezer at -20 until ready for use.

104

105 2.7 INCLUSION CRITERIA AND EXCLUSION CRITERIA

106 All those that consented, all those within age group 16- 65 years, and non- HIV patients within the
107 study population were recruited. All those who declined their consent, those not within the age group
108 and those infected with HIV were excluded.

109

110 2.8 ASSAY PROCEDURE

111 The samples were all screened for antibody to HCV (anti-HCV) using a third generation ELISA Kit
112 manufactured by Autobio Diagnostics, China. According to the manufacturer, the ELISA kit has a
113 sensitivity of 100.0% and specificity of 99.5%.

114

115 2.9 STATISTICAL ANALYSIS

116 Data were subjected to statistical analysis using the statistical software SPSS version 23.0. Pearson
117 chi-squares were calculated at a 95% confidence interval. P values < 0.05 were considered
118 statistically significant.

119

120 3. RESULTS

121 Of the 710 samples examined amongst blood donors in the study area, 7.0% (n= 50) had evidence of
122 HCV antibodies. The seroprevalence of antibodies to HCV in respect to gender shows that males had
123 the highest seroprevalence of 7.1% (n= 44) than females who had the least seroprevalence of 6.7%
124 (n= 6) as shown in Table 1. This showed a statistically no significant association ($P=.88$).

Table 1: Gender-related Seroprevalence of HCV antibodies among blood donors in the study population

Sex	No. Examined	No. Positive (%)
Male	620	44(7.1)
Female	90	6(6.7)
Total	710	50(7.0)
$\chi^2= 0.022$ DF= 1 $P= .88$		

Of the 710 blood donors examined in the study population 7.0 % (n= 50) were sero-positive for anti-HCV. The result of the study indicates that the age group 41 – 50 years had the highest prevalence of 10.9% (n= 7), followed by age group ≤ 20 years with a prevalence of 8.8% (n= 5) and age groups 51 - 60 years and ≥ 61 years had the least with no detectable anti-HCV as shown in Table 2. However, no statistically significant difference ($P= .46$) was recorded in the prevalence in relation to age.

Table 2: Age -related Seroprevalence of HCV antibodies among the participants in the study population

Age group	No. Examined	No. positive (%)
≤ 20	57	5(8.8)
21 -30	365	28(7.7)
31 -40	212	10(4.7)
41 -50	64	7(10.9)
51 -60	11	0(0.0)
≥ 61	1	0(0.0)
Total	710	50(7.0)
$\chi^2= 4.625$ DF= 5 $P = .46$		

4. DISCUSSION

Gender-related seroprevalence in this study shows that the prevalence was higher amongst males (7.1%; n= 44) than among females (3.9%; n= 35). This is in agreement with the findings of Vardas *et*

al. [13] in a similar study in Namibia reported that males had higher prevalence (1.6%; n=13) than females (0.4%; n=5); Udoze *et al.*[24] in Ibadan, South-western Nigeria reported that males had the highest prevalence of 8.2% while the females had the lowest with 6.3%; Olokoba *et al.*[5] in a study in Yola, North-eastern Nigeria reported that males had the highest seroprevalence of 96.0% while females had 4.0%. However, Afolabi *et al.* [25] reported a higher prevalence in females than males in Ibadan, South-western Nigeria. The result obtained in this study reveals that gender did not show any statistical significant association with the seroprevalence of Hepatitis C Virus ($P= .88$). This may be attributed to the fact that both the males and females lived in the same area and are involved in virtually the same activities or shared the same facilities that can predisposed them to the infection. This implies that gender differences can not be used as a determinant for the transmission of the viral infection in the study area.

Of the 710 blood donors examined in the study population as shown in Table 2 reveals that 7.0 % (n= 50) were sero-positive for HCV antibodies. This finding is in consonance with the report of Chukwurah *et al.* [23] who reported a seroprevalence of 7.6% amongst blood donors at University Teaching Hospital, Enugu, South- eastern Nigeria; Sheyin *et al.* [26] reported a seroprevalence of 7.7% among blood donors in Kaduna State, Northwestern Nigeria, while Afolabi *et al.* [25] reported a much lower seroprevalence of 1.4% amongst blood donors in Ibadan, South-western Nigeria. The variation in the seroprevalence of Hepatitis C Virus in this study area and the other studies may be due to differences in socio-cultural, religious beliefs and the sample size used in the various studies from the different parts of the country.

The result of the study among blood donors indicates that the age group 41 – 50 years had the highest seroprevalence of (10.9%; n= 7), followed by age group 10 - 20 years with (8.5%; n= 5) and age groups above 50 years had the least with no detectable HCV antibodies (0.0%; n= 0). However, no statistically significant difference ($P= .47$) was recorded in the prevalence in relation to age. The entire trend of the seropositivity decreases with age except in the age group 41 – 50 years which recorded the highest and this may be due to the low sample size of those recruited within that age group. Earlier findings recorded a highest seroprevalence within age groups below 40 years which coincided with the most productive years [5, 24, 25, 27].

5. CONCLUSION

Of the 710 samples of voluntary blood donors examined, 7.0% were positive for anti-HCV antibody. Male participants had a higher prevalence of 7.1% than females who had 6.7%. The age group 41-50 years had the highest seroprevalence of 10.9%, while the least was amongst age groups above 51 years. The seroprevalence of HCV infections is evident amongst potential blood donors and this called for health care providers and policy makers to ensure that there is proper screening for HCV in all health facilities in the area before any blood transfusion in order to minimize the spread of the infection in the area and the country at large.

CONSENT

All participants who are all adults comprising of blood donors and pregnant women gave written informed consent. The Consent form were filled and signed by all who participated in the study.

ETHICAL APPROVAL

Ethical approvals were obtained from the Research Ethics Institutional Review Board of Jos University Teaching Hospital, Plateau State (JUTH/DCS/ADM/127/XIX/5103), Federal Medical Centre Keffi, Nasarawa State and Federal Medical Centre Makurdi, Benue State (FMH/FMC/MED.108/VOL.1/112) before the commencement of the work.

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