

Hepatitis C Virus Among Prospective Blood Donors in Aminu Kano Teaching Hospital, Kano - Nigeria

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Abstract

Hepatitis C virus (HCV) is a blood borne, spherical, hepatotropic, single stranded RNA virus belonging to the Flaviviridae family, genus; Hepacivirus that causes chronic hepatitis, cirrhosis and hepatocellular carcinoma (HCC). At least 185 million individuals around the globe have been infected with HCV, of whom 350 000 pass away every year. The study aimed at determining the prevalence of Hepatitis C virus from prospective blood donors in the current study. Ninety (90) blood samples were collected from fit blood donors at Aminu Kano Teaching Hospital (AKTH) in Kano were screened. Enzyme linked-immunosorbent assay (ELISA) method was used for the screening of anti-HCV IgG antibodies according to manufacturer's instructions (ATHENESE-Dx Pvt. Ltd.). The results showed that 3 (3.3%) of the prospective blood donors were positive for the IgG anti-HCV antibody. A total of 88 (97.8%) subjects were males and 2 (2.2%) were females between the ages of 20–50 years. The result showed the presence of HCV among fit blood donors in the study area. Thus, there is the need for community interventions through compulsory screening of blood and its products before transfusion using a more sensitive and specific techniques to minimize the chance of transmitting HCV to recipient.

Keywords: Hepatitis C virus, Seroprevalence, Prospective Blood donors, Kano.

INTRODUCTION

Hepatitis C virus (HCV) is a blood borne, spherical, single stranded RNA virus (Ferr, 2015). It is a hepatotropic virus which belongs to the *Flaviviridae* family, genus *Hepacivirus* and causes chronic hepatitis, cirrhosis and hepatocellular carcinoma (HCC) (Rusyn and Lenon, 2014). It is among the group of pathogens that causes the disease called transfusion transmissible

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infections (TTIs), this necessitate the screening of blood donors for antibodies to Hepatitis C virus before donating blood or blood products (Zerihun *et al.*, 2018).

HCV was recently been implicated in the pathogenesis of non Hodgkin's lymphoma (Khaled *et al.*, 2017; Rattotti *et al.*, 2019). More than 170 million people are positive to HCV antibodies worldwide with prevalence rate of 1-2% in most populations (PetruzzIELLO *et al.*, 2016). It has 80%-85% rate of persistence with only 15%-20% of HCV cases could be sero-converted and resolved (PetruzzIELLO *et al.*, 2016). The medical significance of this viral agent is owing to its persistence in about 85% of persons infected and the momentous risk of causing irrevocable liver damage (Moradpour *et al.*, 2016).

The virus is mostly blood borne pathogen with possibility of sexual and mother to child transmission (Kungoane, 2018). The key risk groups for Hepatitis C virus includes; Recipients of blood or blood components, patients on haemodialysis, injection drugs users, accidental needle stick injury, nosocomial transmission, cultural and ritual practices; such as circumcision and traditional tattooing, perinatal route (Badr *et al.*, 2016).

The factors suggestive for complication of HCV include old age, male sex, immunodeficiency, concurrent alcohol abuse and coinfection with HIV or Hepatitis B virus (Fuster *et al.*, 2016). Currently, there is no vaccine developed against Hepatitis C virus, thus, blood donors screening for this terrible transfusion transmissible virus (HCV) is very vital to prevent the spread of virulent strain to the recipients. The study was intended to find out the seroprevalence of this viral infection amongst voluntary prospective blood donors at the study area.

MATERIALS AND METHODS

Study Area

The research was conducted at Aminu Kano Teaching Hospital (AKTH), Kano State, north western Nigeria. AKTH is a tertiary health care institution and referral centre for many primary and secondary health facilities within the north-west geographical zone. It was created on May 27, 1967 from part of the Northern Region. It is located along Zaria road within Kano metropolis, Kano State. The state is geographically situated at northwestern region of Nigeria laid between latitude 11° N and longitude 8° E with a total land area of 20760 KM² (Kurawa, 2006). Kano State borders Katsina State to the Northwest, Jigawa State to the Northeast, Bauchi State to the South-east and Kaduna State to the South-west.

Ethical Considerations

The ethical clearance to carry out this study was obtained from the ethical committee of AKTH, and participant's consent was also sought.

Research Design

This research is a hospital based descriptive cross-sectional study.

Sample Size Determination

The sample for this research was calculated and determined using the Formula below:

$$n = \frac{Z^2 pq}{d^2} \quad (\text{Cochran, 1977})$$

n = number of samples

Z = confidence interval at 95%=1.96

p = prevalence 5% = 0.05 (Jeremiah *et al.*, 2008).

q=1-p (0.95)

d=Allowable error (precision), 5% (0.05)

$$\frac{1.96^2 \times 0.05 \times 0.95}{0.05^2} = 73 \text{ with attrition of } 10\% (7.3) = 81 \text{ samples.}$$

However, 90 samples were recruited so as to improve the precision of this research.

Study Population

Ninety (90) prospective voluntary fit blood donors were recruited in this study.

Inclusion Criteria

Prospective voluntary fit blood donors that gave their informed consent during the course of the research were included.

Exclusion Criteria

Prospective voluntary non fit Blood donors and fit blood donors that declined to give their consent were excluded.

Commercial blood donors were also been excluded

Laboratory Procedures

The demographic data of prospective blood donors was obtained using a structured questionnaire. Consents of the participants were sought before data and sample were taken. About 2ml of blood sample was aseptically collected from the voluntary prospective blood donors and aseptically dispensed into plain container. Samples were left to clot and after which they were spinned at 3000 rpm for 5 minutes. The serum of each was put in to labeled plain container and kept at -20°C until required for investigation. Samples were assayed for Hepatitis C virus IgG antibodies using HCV IgG ELISA kit, latest generation solid phase ELISA which specifically detected IgG to HCV in human serum or plasma according to manufacturer's instruction (ATHENESE-Dx pvt. Ltd - India).

Statistical Analysis

Data obtained from this work was evaluated for statistical association of HCV infection with age, and also gender using Statistical Package for Social Sciences (SPSS) version 20.0 package, statistically significant difference was determined using appropriate measurement of tendency and dispersion considering a 95% confidence interval and *P value* of less than (< 0.05) as reference.

RESULT

A total of 90 subjects with different age and gender were considered in this study that was conducted from April to September, 2018 out of which 3 (3.3%) were seropositive to HCV infection, while 87 (96.7%) were seronegative. The age of the participants ranges from 20-50 years. Eighty-eight (97.8%) among the participants were males and two 2 (2.2%) were females as presented in table 1 below. Age distribution showed that age range of 20-29 years is had the highest percentage (54.4%), followed by age range of 30-39years (33.3%) and the least was 40-49years (12.2%) as presented in table 1 below.

Table 1: Sex and Age distribution of the Participants

Gender	Frequency	Percentage (%)
Male	88	97.8
Female	02	2.2
Age (Years)		
20-29	49	54.4
30-39	30	33.3
40-49	11	12.2
Total	90	100

In general, occurrence of HCV infection was 3.3% among voluntary fit blood donors in the study area. The seropositivity of HCV occurred at the age range of 20-29 years with highest seropositivity of 3 (3.3%) as presented in table 2.

Table 2: Age range and HCV status of the study participants

AGE (years)	HCV STATUS		TOTAL	P value
	Positive (%)	Negative (%)		
20-29	3(3.3)	46(51.1)	54.4	0.028
30-39	0(0.0)	30(33.3)	33.3	
40-49	0(0.0)	11(12.2)	12.2	
Total	3(3.3)	(96.7)	100	

Key: HCV - Hepatitis C virus

The incidence of HCV amongst genders of fit blood donors shown in table 3 revealed HCV seropositivity of 3 (3.3%) in male donors.

Table 3: Incidence of HCV status among gender in the study participants

GENDER	HCV STATUS		TOTAL	P value
	Positive	Negative		
Male	3(3.3)	85(94.4)	88	1.0
Female	0(0.0)	2(2.2)	02	
Total	3(3.3)	87(96.7)	90	

DISCUSSION

This viral illness is a worldwide public health problem, resulting in a growing level of liver-related morbidity and death owing to the disease progression (Wasitthankasem *et al.*, 2018). It is amongst the main internationally causes of liver related bereavement and morbidity (Rosenberg *et al.*, 2018). In the current study, out of 90 samples examined, IgG antibodies to HCV were found in 3 (3.3%) participants all of which were males. The current finding is lower than that of Halim and Ajayi (2000) 12.3%, 8.4% reported by Agwale *et al.* (2004), prevalence of 7.6% by Chukwurah *et al.* (2005), Ayolabi *et al.* (2006) 8.4% and 6.3% reported by Sheyin *et al.* (2011) in their study subjects in Nnewi, South-Eastern Nigeria, Abuja, Lagos and Kaduna respectively. This difference might be due to the time elapse between their study and our own, which in their own case there was low awareness with regard to the HCV in the society. Our finding (3.3%) is higher than that of Rosenberg *et al.* (2018) who reported a prevalence of 0.84% in his study subjects. The differences could be attributed to the level of awareness concerning the risk factors in relation to HCV infection which is higher in his study subjects compare to ours. Age group 20 - 29 years have the higher rate (3.3%) which contrast the report of Ayolabi *et al.* (2006) that observed higher prevalence among 30-39 years age group. No statistical relationship between gender and HCV infections in our study which agrees with the finding of Ayolabi *et al.* (2006). Out of these subjects included in this study, majority 88 (97.8%) were voluntary fit males blood donors, while 2 (2.2%) were females. The current finding is in agreement with the finding of Farshadpour *et al.* (2016) who reported a higher male ratio compare to female for blood donation in their study. High male ratio voluntary donors might be as a consequence of cultural and conventional factors or incapability of females to give blood for the reason that some physiologic factors such as menstruation and pregnancy may limit the likelihood of them to donate. Though, a good number of females even those fit to donate usually did not agree to do so. The main risk cause of HCV in developing nations like Nigeria is transfusion of blood or blood products that have not been properly cross checked (Conry-Contelena *et al.*, 1996). Rate of 3.3% established from our findings is slightly similar to 3.4% obtained by Bala *et al.* (2012), which could be as a result of similarity in geographical location. On the contrary, Beatriz *et al.* (2000) obtained a lesser seroprevalence of 1.2% among

northwestern Tanzanian general population, 0.84% reported from US States (Rosenberg *et al.*, 2018) and 0.1% reported by Farshadpour *et al.* (2016) in South of Iran. Our findings (3.3%) were elevated when compared with that of 1.5% for Caribbean, 1.8% each for Europe and Australasia (Petruzzello *et al.*, 2016). These differences might be owing to the reality that occurrence of HCV to a great extent differs based on the geographical position, environmental and personal hygiene and health care standards of a population.

CONCLUSION

The results obtained from our study revealed that 3.3% hepatitis C virus infection exists amongst voluntary fit blood donors. The outcome further indicated a striking incidence rate within the study population which was higher than the global estimate of 2.5%. As a result it may be recommended that there should be a better future studies using advanced methods for the detection of hepatitis C virus among prospective blood donors in order to decrease numbers of HCV related transfusion hepatitis in the nation. Strict donor selection by means of standard methods is extremely suggested to guarantee the safety of blood for the recipient. And still further efficient techniques for example polymerase chain reaction (PCR) are required to assure blood safety.

Recommendation

To reduce the prevalence of HCV infection in our community, the followings should be considered:

1. Advanced sensitive techniques such as ELISA should routinely be used to screen blood for Hepatitis C virus among prospective donors.
2. There is need for community enlightenment concerning the existence of HCV infection and potential risk factors.
3. HCV is endemic in our environment; therefore there is also need for an effort for the development of vaccines against this dangerous virus as the current chemotherapy is inefficient.

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