

Seroprevalence of Hepatitis C Virus Infection among Blood Donors in General Dipumba Hospital in Mbuji-Mayi, Democratic Republic of Congo

A Mukendi Ntumba Kennedy¹, Ciamala Mukendi Paul¹, Kanyiki Katala Moise², Banza Ndala Deca Blood², Mukendi Mukendi Jean René¹, Kazumba Nsaka Dieudonné³ and kabamba Nzaji Michel^{4*}

¹Department of Teaching and Administration in Nursing, Higher Institute of Medical Techniques of Mbuji-Mayi, Mbuji-Mayi, Republic Democratic of Congo

²Department of Epidemiology, Higher Institute of Medical Techniques of Mbuji-Mayi, Mbuji-Mayi, Republic Democratic of Congo

³Department of Medical Biology, Higher Institute of Medical Techniques of Mbuji-Mayi, Mbuji-Mayi, Republic Democratic of Congo

⁴Department of Public Health, Faculty of Medicine, University of Kamina, Kamina, Democratic Republic of Congo

Received: 16 February, 2018; Accepted: 19 February, 2018; Published: 21 March, 2018

*Corresponding author: Michel Kabamba Nzaji, Department of Public Health, Faculty of Medicine, University of Kamina Kamina, Democratic Republic of Congo, Tel: 00243978467432, E-mail: michelnzaji@yahoo.fr

Abstract

Hepatitis C virus is one of the blood borne transmissible infections of public health significance. It can be transmitted to a wider population through transfusion of contaminated blood or blood products. The aim of this study was to determine the seroprevalence of HCV antibodies amongst potential blood donors in Dipumba's hospital in Mbuji-Mayi.

Retrospective cross-sectional descriptive study of seroprevalence of hepatitis C were conducted from consented blood donors in the study area and were examined for anti-HCV antibody using HCVSCAN test. Results were analyzed using SPSS version, 23.0 statistical software Package of the 1584 blood donors examined in the study population 1, 9% (n= 30) were sero-positive to Hepatitis C Virus (HCV), 77.8% were male (sex ratio M/F 3.5 and familial donors were 50.4%. No statistical significant association with the seroprevalence of Hepatitis C Virus and general characteristics of blood donors in Mbuji-Mayi (age, sex, marital status, blood donation category).

Our findings further confirm the presence of hepatitis C virus infection among blood donors in Mbuji-Mayi. Routine HCV screening of blood donors is therefore recommended in order to reduce the risk of post transfusion hepatitis C.

Keyword: Seroprevalence; hepatitis C; blood donors; Mbuji-Mayi

Case Presentation

Hepatitis C Virus (HCV), first identified in 1989, is strictly a blood-borne RNA viral infection in the family Flaviviridae. Humans are the only reservoir for this viral infection. Despite that Hepatitis C is one of the most frequent infections associated with blood transfusion; it was the HIV epidemic that alerted general public to the importance of serological tests in blood banks [1].

Hepatitis C infection is a worldwide problem in public health and has become a significant cause of morbidity and mortality, especially in developing countries. Blood transfusions save millions of lives, but Transfusion Transmitted Infections

(TTIs) still put millions of people at risk and pose a serious problem, especially in multi transfused patients [2, 3].

Hepatitis C Virus (HCV) infection is one of the most challenging health problems to face humanity for decades, especially in developing countries where the disease remains highly endemic. HCV is considered to be endemic in the Democratic Republic of the Congo (DRC). It is estimated that HCV affects approximately 647,000 Congolese and 130-150 million people throughout the world [4].

HCV infection is usually self-limited in the initial stages, but failure of the immune system to clear the virus leads to chronicity. Chronic hepatitis C is often clinically insidious but develops progressively and persistently over years or decades. Chronic infection with HCV is a serious public health concern as it is linked to hepatic cirrhosis and hepatocellular carcinoma and can ultimately cause premature death [5, 6, 7].

Hepatitis virus screening is not yet implemented routinely, and the lack of effective care and treatment programmes make matters worse. Furthermore, the DRC is not currently listed in the HCV synthesis project. Some medical institutions in the DRC fail to perform HCV screening on donated blood [4, 8]. Therefore, patients undergoing blood transfusions are at high risk of HCV infection. Different studies have reported inconsistent prevalence rates of HCV in the DRC. The prevalence of HCV antibodies (anti-HCV) has been estimated to vary from 0.2% to 13.7% [9, 10]. Therefore this study was carried out to investigate the seroprevalence of HCV antibodies among blood donors in the city of Mbuji-Mayi in order to contribute to safe transfusion.

Patient and Method

We performed a retrospective cross-sectional descriptive study of serum hepatitis C markers in blood donors. The study

was spread over a period of 12 months, from January 1 to December 31, 2016. Our target population is made up of all voluntary, family and remunerated blood donors who have consulted Dipumba General Hospital during 2016. Consisting of 1584 donors, our sampling is exhaustive.

All blood donors were screened for anti-HCV using HCVSCAN test. A recording grid was used to collect the data from the study. We have encoded the data with the Excel software but the analysis was done using the SPSS 23 software. The descriptive analysis was carried out by calculating the proportions for the qualitative variables. The study variables are age, sex, donor categories and HBs serology.

The descriptive analysis was carried out by calculations the proportions for the qualitative variables and the different frequency comparisons were encrypted using the Chi-square test of Pearson and the Fisher test if necessary. We set the statistical significance threshold at $P < 0.05$.

This study was approved by related ethics committee besides and donors sign informed consent and have a whole understanding of this study. Our study had no binding character. Any information collected from donors has been and will remain confidential. Similarly, the names of participants will remain confidential and will not be mentioned in the presentation of results or associated to results in any way whatsoever. They will also be disclosed to any third party.

Results

It appears from table 1 that the majority of donors in our study was 20-35 years (60, 2%); 77.8% were male (sex ratio M/F 3.5); and 76, 9% of married. Note that 50.4% of donors were our series family and almost half of the blood donors were from group O.

Of the 1584 blood donors examined in the study population 1.9 % (n= 30) were sero-positive to Hepatitis C Virus (HCV) while 1554(97.8%) were sero-negative. The confidence limits of this prevalence varies from 1.3% to 2.73%.

It is apparent from this table 3, that age, sex, marital status and blood donation category were not statistically significantly associated with the seroprevalence of Hepatitis C Virus.

Discussion

Hepatitis C virus is an important cause of morbidity and mortality. Detection of antibodies to various hepatitis C viral antigens indicates infection with the virus and in most cases portrays a chronic infection. The course of the chronic hepatitis can be prolonged and insidious and infected persons may not develop symptoms for many years after onset of chronic infection [11].

The study showed that more than 77, 8% of the donors are males (Table 1). These results are consistent with the fact finding by Tagny, et al. that one of the common characteristics among blood donors in sub-Saharan Africa is the predominance of young adult men [12]. The low proportion of women among blood

donors is explained by many contraindications for blood donation including among others, pregnancy, anemia, menstruation, breastfeeding etc [13].

In this study, 798 (50.4%) blood donors were family donors and 27.6% of paid donors (Table 1). Indeed, several previous studies worldwide have shown that replacement donors were markedly prevalent [15]. At the Provincial Blood Transfusion Center of the Province of Katanga, trends appear to be identical to our results and also those obtained by Noubiap in Cameroon [18]. This indicates that many things must be done to motivate and closer through awareness campaigns voluntary donors on the importance of blood donation, expect conditions to meet the objectives that WHO is assigned.

General characteristics of blood donors	Frequency	Percent
Sex		
Female	352	22.2
male	1232	77.8
Age (years)		
< 20	104	6.6
20-35	954	60.2
> 35	526	33.2
Marital status		
In couple	1218	76.9
single	366	23.1
Blood donation category		
Volunteer	349	22
Familial	798	50.4
Paid	437	27.6
Blood group		
A	445	28.1
AB	145	9.2
B	204	12.9
O	790	49.9

Central Africa is considered as a high-prevalence region of anti-HCV antibodies, detected in about 2–20% of the population [19]. The HCV prevalence in this study was found to be 1.9% (Table 2). This is lower than 12.3% as well as 6.3% HCV prevalence rates

Case	Frequency	Percent	95% conf limits
Positive	30	1.9	1.3%-2.73%
negative	1554	97.8	97.3%-98.7%
Total	1584	100	

reported by Halim and Ajayi as well as Sheyin, et al. respectively [20, 21]. In addition, the prevalence of 1.9% obtained in this study is also lower than the 8.4% HCV prevalence reported from Abuja by Agwale, et al. Chukwurah, et al. also reported a prevalence of 7.6% among blood donors in south-eastern State of Nigeria [22, 23]. Ayolabi, et al. reported a sero-prevalence rate of HCV among blood donors in Lagos, Nigeria to be 8.4%, which is also higher than the one observed in the present study. On the other hand, Beatriz, et al. reported a lower 1.2% sero-prevalence rate of HCV in the general population of northwestern Tanzania [24, 25]. Different studies have reported inconsistent prevalence rates of HCV in the DRC. The prevalence of HCV antibodies (anti-HCV) has been estimated to vary from 0.2%-13.7% [4]. These variations could be due to the fact that prevalence of HCV greatly differs according to the geographical location of the population.

Gender-related seroprevalence in this study shows that the prevalence was higher among females (2.3%) than among males (1.8%) (Table 3). This is in agreement with the findings of Afolabi et al. who reported a higher prevalence in females than males in Ibadan, South-western Nigeria [26]. However, Vardas, et al. in Namibia, Udeze, et al. in Ibadan and Olokoba et al. in a study in Yola, North eastern Nigeria reported that males had higher prevalence than females [11, 27, 28]. The result obtained in this study reveals that gender did not show any statistically significant association with the seroprevalence of Hepatitis C Virus ($P=0.55$). This may be attributed to the fact that both the males and females lived in the same area and were involved in virtually the same activities or shared the same facilities that can predispose them to the infection. This implies that gender differences cannot be used as a determinant for the transmission of the viral infection in the study area.

Table III. Association between results HCV and general characteristics of blood donors

General characteristics of blood donors	Hepatitis C		OR [IC 95%]	P
	Positive	Negative		
Age (years)				
<20	2 (1.9%)	102 (98.1%)	1.23 [0.13-5.44]	0.88
20-35	15 (1.6%)	939 (98.4%)		
>35	13 (2.5%)	513 (97.5%)	1.59 [0.75-3.36]	0.22
Sex				
Female	8 (2.3%)	344 (97.7%)	0.78 [0.35-1.77]	0.55
male	22 (1.8%)	1210 (98.2%)		
Marital status				
In couple	24 (2.0%)	1194 (98.0%)	0.83 [0.34-2.04]	0.68
single	6 (1.6%)	360 (98.4%)		
Blood donation category				
Familial or Paid	25 (2.0%)	1210 (98.0%)	1.42 [0.53-4.79]	0.66
Volunteer	5 (1.4%)	344 (98.6%)		

Analysis of the age related seroprevalence of HCV antibodies in this study showed that age group > 35 years had the highest prevalence of 2.5% followed by age group < 20 years which had prevalence of 1.9% (Table 3). The findings of this study were also in agreement to observations of Ejele, et al. and Ayolabi, et al. who reported highest prevalence of HCV antibodies in the age group 30-39 years, the supposedly sexually active group [29, 30]. There was, however, no statistical association ($P=0.88$, $P=0.22$) between however, no statistical association ($P=0.05$) between age of the patients and prevalence of HCV.

Conclusion

At the end of our study, we note that a majority of blood donors were aged between 20-35 years is 60.2%, while 6.6%

were aged < 20 years, 77.8% were male, 78.0% were composed of family and paid donors and 22.0% were voluntary donors. The seroprevalence of hepatitis C was around 1.9%. (95% CI: 1.3%-2.73%). No statistically significant association with the seroprevalence of Hepatitis C Virus and general characteristics of blood donors in Mbujimayi.

The seroprevalence of HCV infections is evident among potential blood donors and this calls 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.

References

1. Awadalla HI, Ragab MH, Nassar NA, Osman MA. Risk factors of hepatitis C infection among Egyptian blood donors. *Cent Eur J Public Health*. 2011;19(4):217-221.
2. Haslina MN, Khairiah Y, Zainy DZ, Shafini MY, Rosnah B, Marini R. Seroprevalence of hepatitis C virus infection among blood donors in a teaching hospital in northeastern Malaysia. *Southeast Asian J Trop Med Public Health*. 2012;43(3):668-673.
3. Diro E, Alemu S, G/Yohannes A. Blood safety and prevalence of transfusion transmissible viral infections among donors at the Red Cross Blood Bank in Gondar University Hospital. *Ethiop Med J*. 2008;46(1):7-13.
4. Muzembo BA, Akita T, Matsuoka T, Tanaka J. Systematic review and meta-analysis of hepatitis C virus infection in the Democratic Republic of Congo. *Public Health*. 2016;139:13-21. doi: 10.1016/j.puhe.2016.06.017
5. Yoshizawa H. Hepatocellular Carcinoma Associated with Hepatitis C Virus Infection in Japan: Projection to Other Countries in the Foreseeable Future. *Oncology*. 2002;62:8-17.
6. Tanaka J, Kumada H, Ikeda K, Chayama K, Mizui M, Hino K, et al. Natural histories of hepatitis C virus infection in men and women simulated by the Markov model. *J Med Virol*. 2003;70(3):378-386.
7. Hajarizadeh B, Grebely J, Dore GJ. Epidemiology and natural history of HCV infection. *Nat Rev Gastroenterol Hepatol*. 2013;10(9):553-562. doi: 10.1038/nrgastro.2013.107
8. Jayasekera CR, Barry M, Roberts LR, Nguyen MH. Roberts. Treating Hepatitis C in Lower-Income Countries. *N Engl J Med*. 2014;370(20):1869-1871. doi: 10.1056/NEJMp1400160
9. Nzaji MK, Ilunga BK. A study of the prevalence of infectious markers in blood donors in rural areas. The case of Kamina hospital. *Sante Publique*. 2013;25(2):213-217.
10. Iles JC, Abby Harrison GL, Lyons S, Djoko CF, Tamoufe U, Lebreton M, et al. Hepatitis C virus infections in the Democratic Republic of Congo exhibit a cohort effect. *Infect Genet Evol*. 2013;19:386-394. doi: 10.1016/j.meegid.2013.01.021
11. AO Udeze, IO Okonko, E Donbraye, WF Sule, A Fadeyi, LN Uche. Seroprevalence of Hepatitis C Virus Antibodies Amongst Blood Donors in Ibadan, Southwestern, Nigeria. *Department of Medical Microbiology and Parasitology. College of Health Sciences*. 2009;7(8):1023-1028.
12. DV Tagny CT, Owusu-Ofori S, Mbanya D, Deneys V. The blood donor in sub-Saharan Africa: a review. *Transfus Med*. 2010;20(1):1-10. doi: 10.1111/j.1365-3148.2009.00958.x
13. S E Mavnyengwa RT, Mukesi M, Chipare I. Prevalence of human immunodeficiency virus, syphilis, hepatitis B and C in blood donations in Namibia. *BMC Public Health*. 2014;14:424.
14. Singh B, Verma M, Kotru M, Verma K, Batra M. Prevalence of HIV and VDRL seropositivity in blood donors of Delhi. *Indian J Med Res*. 2005;122(3):234-236.
15. kakkar N, Kaur R, Dhanoa J. Voluntary donors-need for a second look. *Indian J Pathol Microbiol*. 2004;47(3):381-383.
16. Paul Pellemans. Le marketing qualitatif: perspective psychoscopique. *Perspectiv*. Paris. 1998;328.
17. Pahuja S, Sharma M, Baitha B, Jain M. Prevalence and Trends of Markers of Hepatitis C Virus, Hepatitis B Virus and Human Immunodeficiency Virus in Delhi Blood Donors : A Hospital Based Study. *Jpn J Infect Dis*. 2007;60(6):389-391.
18. Michel Kn, Mulubwa Kyalubile NFS, Tshibanda CN, et al. Seroprevalence of Hepatitis B and C in the Blood Donors in Kolwezi , Democratic Republic of Congo. *Int J Liver Diseases Diagnostic Res*. 2017;2(1):1-4.
19. L Stella G Linguissi, CN Nkenfou. Epidemiology of viral hepatitis in the Republic of Congo : review. *BMC Research Notes*. 2017;10:665. doi: 10.1186/s13104-017-2951-8
20. Halim NK, Ajayi OI. Risk factors and sero-prevalence of hepatitis C antibody in blood donors in Nigeria. *East Afr Med J*. 2000;77(8):410-412, 2000.
21. RA Sheyin Z, Jatau ED, Mamman AI. Risk factors associated with prevalence of hepatitis C virus in Kaduna State, Nigeria. *Biol Environ Sci J Trop*. 2011;8(3):264-266.
22. Agwale SM, Tanimoto L, Womack C, Odama L, Leung K, Duey D. Prevalence of hepatitis C (HCV) co-infected in HIV-infected individuals in Nigeria and characterization of HCV genotypes. *J Clin Virol*. 2004;1:S3-S6.
23. Chukwurah EF, Ogbodo SO, Obi GO. Sero-prevalence of hepatitis C virus (HCV) infection among blood donors in southeastern State of Nigeria. *Biomed Res*. 2005;16(2):133-135.
24. JA Bala, AH Kawo, MD Mukhtar, A Sarki, N Magaji, IA Aliyu. Prevalence of hepatitis C virus infection among blood donors in some selected hospitals in Kano, Nigeria. *International Research Journal of Microbiology*. 2012;3(6):217-222.
25. Tess BH, Levin A, Brubaker G, Shao J, Drummond JE, Alter HJ, et al. Sero-prevalence of hepatitis C virus in the general population of north-western Tanzania. *Am J Trop Med Hyg*. 2000; 62(1):138-141.
26. Afolabi AY, Abraham A, Oladipo EK, Fagbami AH. Hepatitis C Virus in Potential Blood Donors in Ibadan. *Global Advanced Research Journal of Microbiology*. 2012;1(9):155-159.
27. E Vardas, F Sitas, K Seidel, A Casteling, J Sim. Prevalence of hepatitis C virus antibodies and genotypes in asymptomatic , first-time blood donors in Namibia. *Bull World Health Organ*. 1999;77(12):965-972.
28. AA Olokoba AB, Salawu FK, Danburam A, Desalu OO, Olokoba LB, Wahab KW, et al. Viral Hepatitides in Voluntary Blood Donors in Viral Hepatitides in Voluntary Blood Donors in Yola , Nigeria. *European Journal of Scientific Research*. 2009;31(3):329-334.
29. Ejele OA, Nwauche CA, Erhabor O. Seroprevalence of Hepatitis C Virus in the Niger Delta of Nigeria. *Niger Postgrad Med J*. 2006;13(2):103-106.
30. CI Ayolabi, MA Taiwo, SA Omilabu, AO Abebisi, OM Fatoba. Sero-prevalence of Hepatitis C Virus among Blood Donors in Lagos, Nigeria. *African J Biotechnol*. 2006;5(20):1944-1946.