PREVALENCE OF HBV AND HCV AMONG PROSPECTIVE BLOOD DONORS IN TERTIARY HEALTH INSTITUTION, YOLA, NORTHEASTERN NIGERIA

Ezekiel, F. C.
[1]Department of Medical Microbiology Ahmadu Bello University Teaching Hospital Zaria
[2]Department of Medicine, Ahmadu Bello University Zaria.
Corresponding author: Email:ezekielfiryanda@gmail.com; 08088734066

ABSTRACT
Background: Prevalence of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) among blood donors can compromise the safety of blood in the science of blood transfusion. Blood donation is a very important lifesaving intervention in healthcare services and safety of blood still remains a challenge in developing countries. Therefore, this study aims to determine the prevalence of HBV and HCV in blood donors in Tertiary Health Institution, Yola for safe blood transfusion practice.
Methodology: A total of 1,189 blood donors were screened over a period of one year (2017). 1,180 males and 9females participated in this study. 5ml of blood was collected from each donor through ante cubital vein into plain vacutainer. The blood was allowed to clot and the serum obtained was tested for HCV and HBV antibodies using one step rapid test.
Results:1180(99.2%) of the blood donor were males while 9(0.8%) were females and in 1189 donors tested, 34(2.9%) of donors were reactive to HBV while 27(2.3%) were reactive to HCV atp>0. 05.None of the female donors reacted to both HBV and HCV (0.0%).
Conclusion: The prevalence of HBV and HCV among blood donors have been determined. This study revealed low prevalence of HBV and HCV in the prospective blood donors. Hence, the population of blood donors in Tertiary Health Institution in Yola have relatively low risk of transmission of HBV and HCV in blood transfusion.
Key Words: Prevalence, HBV, HCV, Blood Donors, Yola, Nigeria.

INTRODUCTION

Transfusion of blood and blood products is a life-saving measure and of immense benefits to patients worldwide (Salema *et al.*, 2017). However, blood transfusion is also an important route of transmission of infectious diseases like Hepatitis B virus (HBV), Hepatitis C virus (HCV) to blood and blood products recipients. Most global blood transfusion policy makers have demonstrated interest in ensuring safety of blood and blood products for instance, in 2005, all member states of World Health Organization (WHO) signed a document that commits them to the provision of safe and adequate blood and blood products to patients (WHO Document, 2010).The presence of Hepatitis B (HBV) and hepatitis C (HCV) among blood donors can undermine the safety of blood and blood products. HBV and HCV are viral infections that affect the liver and they are the most common causes of chronic liver disease worldwide (Youssef *et al.*, 2009). Available medical literatures have reported the presence of co-infection of HCV and HBV in blood donors and this Co-infection in the same host ranges from 9% to 30%, depending on the geographical region (Chen *et al.*, 2017,Kouassi *et al.*, 2017).

However, there are possibilities that donors may be falsely tested negative for Hepatitis B surface antigen (HBsAg) using rapid test kit. Hence, these percentages may underestimate the true number of people with HBV and HCV co-infection and also there is well known entity of occult HBV infection that patients arenon-reactive to HBsAg but positive in serum HBV DNA test in patients with chronic hepatitis C infection (Yan and Liu, 2015).

Transfusion transmitted infectious diseases remain a major topic of interest for people who are involve in blood safety (WHO Documents, 2010). Hepatitis B virus (HBV), Hepatitis C virus (HCV) are a major global public health problems warranting high priority efforts for prevention, control and treatment of people with high risk of infection with HBV and HCV (Anuradha& Rh, 2014) in order to ensure safety of blood donations. Despite several measures to provide safe blood for recipients, there are still reports from a study that some centers in Nigerian blood donation facility are yet to implement routine screening of HCV for blood donation purposes(Chukwurah *et al.*, 2009).The purpose of this study therefore, is to determine the prevalence of HBV and HCV among blood donors in a Tertiary Health Institution in Yola, North-easternNigeria.

MATERIALS AND METHODS:

Study Population

A total of One Thousand One Hundred and Eighty-Nine (1,189) blood donors were involved in this studyat Tertiary Health Institution in Yola. The age groups of the donors were18 – 57 years.Pre and Post Counseling were done for each consenting donor who were further screened for HBV and HCV.

Materials

Vacutainer Needles; Plain Vacutainers; Rapid Screening Kits for HBV and HCV (popular^{TM}); Sphygmanometer; Weighing Balance, Stethoscope; Tourniquet; Methylated Spirit and cotton wools.

Sample Collection procedure

5ml of blood was collected from each donor throughante cubital vein into plain vacutainers which was further labeled with the corresponding donor's number and the blood collected was allowed to clot and the serum obtained was tested for HCV and HBV antibodies.

Testing procedure

HBV and HCV test strips (Popular ^{TM}) was used, the serum was added to the test strips and allowed to stand at room temperature and the test result was interpreted according to manufacturer's instruction.

Interpretation of Results

Reactive – Two red lines appear; the first line is Test (T) while the second line is Control (C).

Non-Reactive – only control line appears.

Invalid – No test and control lines appear or only test line appears.

STATISTICAL ANALYSIS

The data obtained were analyzed using Statistical Package for Social Sciences (SPSS) Version 17.0. Categorized variables were compared using Chi-Square Test. Percentage values were presented as the number of cases

RESULTS

A total of one thousand, one hundred and eighty-nine(1,189) blood donors,from Januaryto December 2017 at Tertiary Health Institution, Yola were tested for HBV and HCV. 1180(99.2%) of the blood donor were males while 9(0.8%) were females. The highest blood donors were observed among people of age group 26 – 33years with donation number of 444(37.6%) and 4 (44.5%) for male and female respectively (Table 1). The Sera reactive to HBV was observed to be highest 14 (41.2%) in donors of age (18 – 25 years) while HCV sera reactive was highest in age (26 – 33years) which is 15 (55.6%) of total sample (Table 2).The percentage donors reactive to HBV and HCV were 34(2.9%) and 27(2.3%) respectively among males but none of the female blood donors reacted to HCV and HBV as indicated in Table 3.

Table 1: Number of Male and Female Blood Donors Based on Age Group (n=1,189)

Age (Years)	Male		Female	
	Number of cases	Percentage value	Number of cases	Percentage value
18 – 25	343	29.10%	1	11.10%
26 – 33	444	37.60%	4	44.50%
34 – 41	291	24.70%	1	11.10%
42 – 49	91	7.70%	1	33.30%
50 – 57	11	0.90%	0	0.00%

Table 2:Sera Reactive of Blood Donors by Age Group (n=1,189)

Age(years)	**Sera reactive (HBV) Count (%)**	**Sera reactive (HCV) Count (%)**
18-25	14 (41.20%)	6 (22.20%)
26-33	13 (38.20%)	15 (55.60%)
34-41	5 (14.70%)	6 (22.20%)
42-49	2 (5.90%)	0 (0.00%)
50-57	0 (0.00%)	0 (0.00%)
Total	34 (2.85%)	27 (2.27%)

Table 3: Percentage of Male and Female blood donors reactive (R) and Non-Reactive (NR) to HBV and HCV

R/NR	**Male Count (%)**	**Female Count (%)**
R=HBV	34 (2.9%)	0 (0.0%)
NR=HBV	1146 (97.1%)	9 (0.8%)
R=HCV	27 (2.3%)	0 (0.0%)
NR=HCV	1153 (97.7%)	9 (0.8%)

Key: R=REACTIVE; NR=NON-REACTIVE

DISCUSSION

It is evident from the results in Table 1 thatin the Tertiary Health Institution in Yola, there were more males blood donors than females blood donors, this result is similar to study conducted by Bala *et al.*(2012), this is probably due to females' physiological differences associated with reproductive changes and menstrual cycle. In addition, previous studies have also shown that women are less willing to donate blood than men (Arora *et al.*, 2010;Doro *et al.*, 2015 and Salema *et al.*, 2017).

Table 2 shows that the prevalence of HBV 34 (2.9%) was more than HCV 27(2.3%) among blood donors and this result conforms to a previous research on the prevalence of HBV and HCV among Students at University of Maiduguri by Isa *et al.* (2015),who stated that HBV 9(4.5%) and HCV 8(4.0%) were recorded among the volunteers' blood donors. The high infection of HBV among donors compared to HCV could be that HBV have a high pathogenicity than HCV in Yola. Furthermore, the donors within the age range between 26 – 33yearshad more percentage of HCV (55.6%) infection compared to 38.2% of HBV recorded in the same age group, whereas, those within the age group of 18 – 25 years had more HBV (41.2%) infection than HCV (22.2%). These results are similar to the work done by Isa *et al.* (2015), which indicated that age variability exists among patients with HBV and HCV.

From results on Table 3, it is shown that, none of the female blood donors reacted to both HBV and HCV when compare to their male counterpart, this may not be unconnected to their low participation in blood donation exercise, as observed in Table 1.

The current finding that indicated higher HBV in Yola, agrees with earlier other studies from different parts of Nigeria. Musa *et al.* (2015) reported high prevalence rate of 12.8% for HBV in Minna, Niger State. Also, 15.8% of HBV was reported in Maiduguri, Dawurung*et al.* (2012), while Agwale *et al.* (2014) reported 11% in Makurdi. These reports are in conformity with this present study. However, lower cases of HBV were reported in some parts of Nigeria such as 2.19% reported by Ojide *et al.* (2015)in Benin City. Also, 8.3% was reportedin Zaria by Musa*et al.* (2015) as prevalence rate for HBV. The high prevalence of HCV was also reported in some regions outside Nigeria, for instance, in Libya, the HCV prevalence is found more indonors' blood than HBV (Salema*et al.*, 2017). Meanwhile, the lower prevalence of HBV reported in Libya are in variance to this study.This could be due to the fact that simultaneous suppression of both viruses by the other can also occur (Daw*et al.* 2016).Likewise, Kouassi *et al.* (2017) reported lower prevalence of HBV and higher HCV in Abidjan, Cote-De-Ivories. In general, the current study has shown that the number of donors reactive to HBV and HCV is low compared to the total 1189 sampled in this study. This is also similar to some reports earlier made in other parts of Nigeria, Africa and rest of the world.

CONCLUSION

In conclusion, the study revealed higher prevalence of HBV (2.9%) than HCV (2.3%) respectively among blood donors screened at Tertiary Health Institution, Yola, using rapid test kit(Popular^{TM}). It also, indicates that HCV and HBV antibody exists among blood donors, therefore, there is need for proper screening of donors to avoid transmission to recipients of blood and blood products.

RECOMMENDATION

It is recommended that, more awareness should be advocated for blood donors, as some of the donors that were reactive do not know their status.

REFERENCES

Agwale M S., Lorine T., Chad W., Odama L., Dolores D., Negedu R M., Israel A., Shehu B M., Uford I., Graham B. and Reiner Z. (2014). Prevalence of Hepatitis C (HCV) Co-infected in HIV Infected Individuals in Nigeria and Characterization of HCV Genotypes. *Journal of Clinical Virology*. 1:53-56.

Anuradha M and Rh E. Seroprevalence of Transfusion - Transmissible Injections HIV, HBV and HCV Among Blood Donors in Perambalur, Tamilnadu. *Internal Journal of Health Sciences and Research*. 2014; 4 (5):76-81.

Arora D and Khetarpal A. Seroprevalence of HIV, HBV, HCV and Syphilis in Blood Donors in Southern Haryana. *Indian Journal of Pathological Microbial*. 2010; 53(2): 308-309.

Bala JA., Kawo AH., Mukhtar MD., Sarki A., Magaji N., Aliyu IA., and Sani M N. 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.

ChenF., ZhangJand Guo FE. "Hepatitis B, C, and D virus infection showing distinct patterns between injection drug users and the general population," *Journal of Gastroenterology and Hepatology*, 2017; vol. 32, no. 2, pp. 515–520.

Chukwurah E F., Ogbodo S O., and Obi G O. Sera-Prevalence of Hepatitis C Virus (HCV) Infection Among Blood Donors in South-Eastern State of Nigeria. *Biomed*. Res.2009; 16(2): 133-135.

DawM A., El-BouzediA., Ahmed M O., DauA A., and AgnanM M. "Hepatitis C virus in North Africa: an emerging threat," *The Scientific World Journal*, 2016,vol. 2, pages, 11 – 20.

Dawurung J S., Bukbuk D N., Ajayi B B., and Baba M M. Prevalence of Hepatitis B and C Virus Co-Infection Among Students of University of Maiduguri, Nigeria. *Achieves of Applied Science Research*, 2012, 4 (4): 1581 – 1584.

Doro B., Zawia W M., Walid M., Hussein R., Abdalla N M., Rifai A N., Dourou E., Amar F J., and Aboughress A A. Blood Donors Status of HIV, HBV, and HCV in Central Blood Bank in Tripoli, Libya. *International Blood Research and Reviews.* 2015; 4(3):1-8.

Isa M A., BelloH S., MustaphaA., ManggaH K., GulaniI A., and Muhammed A A. Prevalence of hepatitis B Virus among students attending University of Maiduguri clinic, Borno, Nigeria. *International Journal of Advanced Research in Biological Sciences,*2015; 2(1):138 – 142

Kouassi M., Bengue A., Abdoulaye O., Moussa D., and Dosso M. A very high frequency of Hepatitis B and C virus infections during an active screening campaign in Abidjan. *African Journal of Microbiology Research*. 2017;11(1):8-15.

Musa BM., Bussell S., Borodo MM., Samaila AA., and Femi OL. Prevalence ofhepatitis B virus infection in Nigeria, 2000-2013: A systematic review andmeta-analysis. *Nigerian Journal of Clinical Practice*. 2015; 18 (2): 163 – 172.

Ojide CK., Kalu EI., Ogbaini-Emevon E., and Nwadike VU. Co-infections of hepatitis B and C with human immunodeficiency virus among adult patients attending human immunodeficiency virus outpatients clinic in Benin City, Nigeria*. Nigeria Journal of Clinical Practice*. 2015;18:516-21

Salema R M Qowaider, Marjowa S Ali., Souad A M Moftah and Fayrouz A Khaled. Prevalence of HBV and HCV Infections among Blood Donors in North East Libya. *International Blood Research & Reviews* 7(1) : 1-5, 2017; Article no IBRR. 29124 ISSN: 2321 – 7219.

Yan H. and Liu EY. "Viral entry of hepatitis B and D viruses and bile salts transportation share common molecular determinants on sodium taurocholate cotransporting polypeptide," *Journal of Virology*, vol. 88, no. 6, pp. 3273–3284, 2014.

Youssef AY., Yano T., and Utsumi EA., "Molecular epidemiological study of hepatitis viruses in Ismailia, Egypt," *Intervirology*, vol. 52, no. 3, pp. 123–131, 2009.