

## Prevalence and Risky Health behaviours Associated with Hepatitis B and C Infection among Blood Donors in Ogun State, Southwest, Nigeria

Article by Taofeek Adedayo Sanni<sup>1</sup>, Olorunfemi Emmanuel Amoran<sup>2</sup>

<sup>1</sup>Department of Community Medicine, Federal Teaching Hospital, Ido-Ekiti, Ekiti State

<sup>2</sup>Department of Community and Primary Care, Olabisi Onabanjo University, Ogun State  
E-mail: sannitaofeeqade@gmail.com<sup>1</sup>

### Abstract

*Infections from Hepatitis B and C viruses are gradually becoming a major public health challenge especially in Sub-Saharan Africa where prevalence is high with numerous chronic carriers harbouring the viruses in their liver. Chronic infection can lead to lethal consequences. Blood transfusion which is a common cause of Hepatitis B and C infections is still common in resource poor setting where adequate screening of blood might be a challenge. The purpose of this study is to determine the prevalence and risky health behaviours associated with Hepatitis B and C infections among blood donors in Ogun State.*

*A descriptive retrospective study was carried out on 2044 Blood donors to National Blood Transfusion Service, Ogun State in year 2014 using pro-forma to obtain needed information and data was analyzed using SPSS.*

*Prevalence of Hepatitis B (10.7%) and Hepatitis C (1.1%) was high among blood donors in the state. Age 21-40years (75% and P-value 0.015), Divorce/Separation (0.7% and P-value 0.001) and Yoruba tribe (85.2% and P-value 0.000) are significantly associated with Hepatitis B infection among blood donors. Age >40years (13.3% and P-value 0.007), Divorce/Separation (0.7% and P-value 0.039) and Yoruba tribe (85.2% and P-value 0.001) are significantly associated with Hepatitis C infection among blood donors. Risky health behaviours among blood donors include tattooing, occupational needle injury, untreated sexually transmitted diseases and multiple sexual partners.*

*The study recommends education of the population on risk factors and effect of Viral Hepatitis.*

**Keywords:** Prevalence, Hepatitis, Blood Donor, Ekiti.

### Introduction

Hepatitis B and C infections cause acute or chronic hepatitis worldwide and they create adjuvant burden to health care system due to high morbidity and mortality and cost of treatment. Hepatitis B and C are spread through blood and blood secretions but studies have demonstrated that sexual, household, occupational and vertical transmission may also be important.<sup>1</sup> Hepatitis can also be due to toxin notably alcohol, other infections or from autoimmune process.<sup>2</sup> Hepatitis signifies injury to the liver characterized by the presence of inflammatory cells.

The condition may be self-limiting, healing on its own or can progress to scarring of the liver.<sup>1,2</sup> In developed countries, Hepatitis B and C infection in the general population has been controlled to a large extent through interruption of some of the transmission links, by introducing test for surrogate makers in blood.<sup>3</sup> However because of lack of universal and appropriate screening in developing countries and also shortcomings in our blood banking system (with flourishing of professional blood donation despite existing law against it), the risk of post transfusion Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) is still unknown.<sup>3</sup>

Blood donation occurs when people voluntarily have blood drawn and used for transfusion and/or made into biopharmaceutical medications by a process called fractionalization (separation of whole blood components). Donation may be of whole blood or of specific blood component directly (the later called apheresis). Blood banks often participate in the collection process as well as the procedure that follows it including storage<sup>4</sup>. In most countries blood donors are unpaid volunteers who donate blood for community supply. In poorer countries most time, donors usually give blood to their

relatives and friends who need transfusion (directed donation) with many donors donating as an act of charity. Individual donor can also donate for their own future use (autologous donation).<sup>4</sup>

Before donation, potential donors are evaluated for anything that might make their blood unsafe to use. The screening includes testing for diseases that can be transmitted by blood transfusion including HIV, Hepatitis B and Hepatitis C. The donor also answers question about medical history and take a short physical examination to make sure the donation is not hazardous to his or her health. This has greatly helped in reducing blood transfusion induced Hepatitis B and C infections.<sup>4</sup>

The problem of chronic infection with HBV and HCV may be greater than generally recognized. Also the HbsAg positive and anti HCV positive donors are usually asymptomatic and have no symptom that obviously relate to liver disease and deny any risk factors from exposure to viral hepatitis during pre- donation questionnaire.<sup>4</sup> Though health education of donor, screening for HbsAg and Anti HCV (blood maker for HBV and HCV infection) are available in many centers to detect infected individual before donation, transmission can still occur during the initial window period of an acute infection or during late stages where virus is still present (HBV-DNA positive) though Hepatitis B surface antigen (HBsAg) and Anti HCV is negative, so called occult hepatitis B infection.<sup>4, 5</sup>

According to the World Health organization (WHO) estimates, one third of the world's population have been infected with HBV virus and more than 350 million have chronic infection while about 170 million people have chronic HCV infection. Also 3-4 million new infections occur each year.<sup>6</sup> The transmission risk of Hepatitis B virus and Hepatitis C virus depends on the actual disease prevalence rate. Where the prevalence is low, the transmission risk is estimated at approximately 1:60,000; whereas in areas of endemic HBV infection, the transmission rate is probably much higher.<sup>4</sup>

The HBV carrier prevalence ranges from 0.1 – 8.0% globally. Rate of carrier prevalence varies from country to country. In Sub-saharan African the prevalence of Hepatitis B infection is greater than 8%.<sup>7</sup> For HCV infection, prevalence is between 0.4 – 19.2% among blood donor's globally.<sup>8</sup> The rate is high in Pakistan (6.5%), India (0.12 -4%), Thailand (5.6%).<sup>3</sup> The geographical variety of HBV and HCV Seroprevalence can be explained by the extent to which different risk factors contribute to the transmission of the infection.

Safe blood transfusion remains a challenge in resource limited setting where blood transmitted diseases are endemic.<sup>4</sup> Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV). Therefore, HBV and HCV infections are important disease for all, and public measures aimed at prevention, early diagnosis and treatments are of great importance. Though while effective vaccines currently exist for HBV, a fully protective HCV vaccines is not yet available and current treatment methods for those infections are not highly effective and globally applicable<sup>1</sup>

Rate of blood transfusion is relatively high in the rural settings of the state due to frequent presentation at the hospitals with severe anaemia secondary to severe malaria and malnutrition in this community. Also, there is paucity of data on risk factors, transmission and prevalence of Hepatitis B and C among blood donors in the area of study and any strategy to prevent HBV and HCV infection must be based on accurate data including information about prevalence and risk factors associated with the infection. Therefore, this study is not only required but will be of significant value to plan strategy towards reducing the risk of transmission of viral hepatitis through blood transfusion.

## **Objectives**

### **General**

To determine the prevalence and risk factors associated with HBV and HCV infections among blood donors in Ogun State.

### **Specific**

1. To determine the Socio-demographic characteristics of blood donors in Ogun State.
2. To determine the prevalence of HBV and HCV infection among blood donors in Ogun State.
3. To identify the risky health behaviours which may predispose to HCV and HBV infections among blood donors.

## **Methodology**

### **Study location**

Ogun state also popularly called Gateway State is located in the South Western Nigeria. The state was created in 1976 and Abeokuta is the Capital and largest city in Ogun State.

The State is bordered by Lagos State to the South, Oyo and Osun States to the North, Ondo State to the East and Republic of Benin to the West. The state is divided into 3 senatorial districts, namely: Ogun East, Ogun West and Ogun Central senatorial districts with 20 local government areas. It has a total area of 16,980.55km (6,556.23sqm). Its 2014 projected population estimate (from 2006 census using growth rate of 2.9%) is 4,606,400.<sup>9</sup>

Ogun state has one Federal University (Federal University of Agriculture, Abeokuta), two State Universities, numerous Polytechnics and both federal and state-owned Colleges of Education. Ogun state has the largest number of industries in Nigeria mostly concentrated at the Agbara Industrial Estate. Two tertiary health facilities {Olabisi Onabanjo University Teaching Hospital and Federal Medical Centre Abeokuta are also located within the state. The state is blessed with numerous material resources to include Clay, limestone and crude oil, while the agro based products are cocoa, cassava, yam, palm oil, plantain, maize etc.<sup>9</sup>

### **Study population and subjects**

Blood Donors to the National Blood Transfusion Service in Ogun State between the ages of 18 and 55years were studied from January to December, 2014. Other blood donating facilities in the state could not be used as many lack adequate records of blood donor needed for this study.

### **Study design**

This is a descriptive retrospective study to determine the prevalence and risk factors of Hepatitis B and C infection among Blood donors (18-55 years male and female) in Ogun State.

### **Sample size**

Total number of donors (2044) within the period of review was studied.

### **Criteria for inclusion**

Blood donors in Ogun State in the one-year period of review (January to December, 2014) between the ages of 18 – 55years.

### **Criteria for exclusion**

1. Donors with incompletely filled questionnaires
2. Blood Donors in the state outside NBTS

### **Data collection**

A Proforma was used to collect data retrospectively from National Blood Transfusion Service, Ogun State, achieves in last one year (January to December, 2014) after due information and consent.

The pro-forma was design along the pre-donation questionnaire of the National Blood Transfusion Service. Three research assistances who are staff members of the National Blood Transfusion Service were recruited in the extraction of data after being briefed and trained. They assisted in the transfer of data from already filled questionnaire prior to donation to the pro-forma.

### **Ethical consideration**

Permission was taken from the National Blood Transfusion Service, Ogun State through her Coordinator to review the data collected from patient prior to donation and the results of screening on patient blood. The service was encouraged to always inform donors who are positive to blood transmissible infection and to also refer them to Centre where they can be properly managed.

## Data analysis

Data were edited on collection. The data was coded and entered into a computer database and statistical analyses were conducted using SPSS for window version 15.

Percentage, proportions or measure of central tendency were conducted for baseline characteristics of subjects interviewed. The data analyses focused on univariate frequency table for socio-demographic characteristics and risk factors. Bivariate cross tabulation was done between Hepatitis B and C result and variables that include Socio-demographic characteristics, risk factors and other blood transmissible infection.

## Limitations

1. Incompletely filled questionnaires by Blood Donors.
2. Unavailability of records in many blood donations Centers.

## Results

**Table 1a.** Socio – demographic characteristics of blood donors in Ogun state

Variable		Frequency N = 2044	Percentage (%)
Age Group (in years)	Less than 21	239	11.7
	21 – 30	1058	51.8
	31 – 40	475	23.2
	41 – 50	201	9.8
	Above 50	71	3.5
Mean Age $\pm$ SD	29.6 $\pm$ 9.2		
Sex	Male	1958	95.8
	Female	86	4.2
Marital Status	Single	1380	67.5
	Married	650	31.8
	Divorced/Separated	14	0.7
Tribe	Yoruba	1743	85.2
	Igbo	139	6.8
	Hausa	40	2.0
	Others	122	6.0
Occupation	Unemployed	1046	51.2
	Civil Servant	528	25.8
	Self employed	470	23.0

**Table 1b.** Prevalence of hepatitis B and C among blood donors in Ogun State

Variable		Frequency N = 2044	Percentage (%)
Hepatitis B	Positive	219	10.7
	Negative	1825	89.3
Hepatitis C	Positive	23	1.1
	Negative	2021	98.9

**Table 1c.** Frequency of engagement in risky health behaviours to hepatitis B and C among blood donors

Variable	Frequency N = 2044	Percentage (%)
History of Occupational Needle Injury	09	0.44
History of Tattooing / scarification Marking	08	0.39
History of Sexually Transmitted Infection in the last 1 year	21	1.03
Past History of Sexual Assault	12	0.59
History of Previous Blood Transfusion	15	0.74

**Table 2a.** Socio – demographic characteristics and Hepatitis B infection among blood donors

Variable		Hepatitis B		Total N=2044	p-value
		Positive (%) n = 219	Negative (%) n = 1825		
Age Group (in years)	Less than 21	25 (10.5)	214 (89.5)	239	<b>0.015</b>
	21 – 30	117 (11.1)	941 (88.9)	1058	
	31 – 40	63 (13.3)	412 (86.7)	475	
	41 – 50	11 (5.5)	190 (94.5)	201	
	Above 50	3 (4.2)	68 (95.8)	71	
Sex	Male	209 (10.7)	1749 (89.3)	1958	0.779
	Female	10 (11.6)	76 (88.4)	86	
Marital Status	Single	166 (12.0)	1214 (88.0)	1380	<b>0.001</b>
	Married	49 (7.5)	601 (92.5)	650	
	Divorced/Separated	4 (28.6)	10 (71.4)	14	
Tribe	Yoruba	205 (11.8)	1538 (88.2)	1743	<b>0.000</b>
	Igbo	3 (2.2)	136 (97.8)	139	
	Hausa	8 (20.0)	32 (80.0)	40	
	Others	3 (2.5)	119 (97.5)	122	
Occupation	Unemployed	111 (10.6)	935 (89.4)	1046	0.189
	Civil Servant	66 (12.5)	462 (87.5)	528	
	Self employed	42 (8.9)	428 (91.1)	470	

**Table 2b.** Socio – demographic characteristics and hepatitis C infection among blood donors

Variable		Hepatitis C		Total N=2044	p-value
		Positive (%) n = 23	Negative (%) n = 2021		
Age group (in years)	Less than 21	4 (1.7)	235 (98.3)	239	<b>0.007</b>
	21 – 30	10 (0.9)	1048 (99.1)	1058	
	31 – 40	1 (0.2)	474 (99.8)	475	
	41 – 50	5 (2.5)	196 (97.5)	201	
	Above 50	3 (4.2)	68 (95.8)	71	
Sex	Male	21 (6.2)	1937 (93.8)	1958	0.252*
	Female	2 (2.3)	84 (97.7)	86	
Marital Status	Single	18 (1.3)	1362 (98.7)	1380	<b>0.039</b>
	Married	4 (0.6)	646 (99.4)	650	
	Divorced/Separated	1 (7.1)	13 (92.9)	14	
Tribe	Yoruba	18 (1.0)	1725 (99.0)	1743	<b>0.001</b>
	Igbo	2 (1.4)	137 (98.6)	139	
	Hausa	3 (7.5)	37 (92.5)	40	

	Others	0 (0.0)	122 (100.0)	122	
<b>Occupation</b>	Unemployed	13 (1.2)	1033 (98.8)	1046	0.124
	Self employed	2 (0.4)	526 (99.6)	528	
	Civil Servant	8 (1.7)	462 (98.3)	470	

**Table 3a.** Risky health behaviours and association with hepatitis B infection among blood donors.

Variable		Hepatitis B		Total N=2044	p-value
		Positive (%) n = 219	Negative (%) n = 1825		
<b>Sexually Transmitted Disease in last 5years</b>	Yes	8 (38.1)	13 (61.9)	21	<b>0.001*</b>
	No	211 (10.4)	1812 (89.6)	2023	
<b>Sexual Assault</b>	Yes	6 (50.0)	6 (50.0)	12	<b>0.001*</b>
	No	213 (10.5)	1819 (89.5)	2032	
<b>Occupational Needle Injury</b>	Yes	4 (44.4)	5 (55.6)	9	<b>0.010*</b>
	No	215 (10.6)	1820 (89.4)	2035	
<b>Previous blood transfusion on donor or partner</b>	Yes	3 (20.0)	12 (80.0)	15	0.213*
	No	216 (10.6)	1813 (89.4)	2029	
<b>Tattoo, Scarification marks, etc. in last 12 months</b>	Yes	3 (37.5)	5 (62.7)	8	<b>0.045*</b>
	No	216 (10.6)	1820 (89.4)	2036	

\*Fisher's exact test applied

**Table 3b.** Risky Health Behaviours and association with Hepatitis C Infection among Blood Donors.

Variable		Hepatitis C		Total N=2044	p-value
		Positive (%) n = 23	Negative (%) n = 2021		
<b>Sexual Assault</b>	Yes	3 (25.0)	9 (75.0)	12	<b>0.000*</b>
	No	20 (1.0)	2012 (99.0)	2032	
<b>Previous blood transfusion on donor or Partner</b>	Yes	5 (33.3)	10 (66.7)	15	<b>0.000*</b>
	No	18 (0.9)	2011 (99.1)	2029	
<b>Sexually Transmitted Disease in last 5years</b>	Yes	7 (33.3)	14 (66.7)	21	<b>0.000*</b>
	No	16 (0.8)	2007 (99.2)	2023	
<b>Tattoo, Scarification marks, etc. in last 12 months</b>	Yes	2 (25.0)	6 (75.0)	8	<b>0.003*</b>
	No	21 (1.0)	2015 (99.0)	2036	
<b>Occupational Needle Injury</b>	Yes	3 (33.3)	6 (66.7)	9	<b>0.000*</b>
	No	20 (1.0)	2015 (99.0)	2035	

\*Fisher's exact test applied

## Discussion

2,044 donors, who donated through the National Blood Transfusion Service, Ogun State, between January and December, 2014 were studied.

A large percentage (75%) of donors was between age 21-40years and the mean age of the donors was  $29.5 \pm 9.2$  (as shown in table 1a). This finding is similar to study done in Vietnams, India where mean age of donor was found to be  $34.6 \pm 8.2$ . This study shows majority of donors are young adults.<sup>4</sup>

95.7% of donors were male with 10.5% of them being Hepatitis B positive while only 1% of them are hepatitis C positive (as shown in table 2a and 2b). On the other hand, among the 4.3% females who participated in the study, 11.5% are Hepatitis B positive while none is Hepatitis C positive. This is similar to findings in a study done in Alexandra, Egypt where majority (93.3%) of donors were males but the prevalence of Hepatitis is higher in males than females. This implies that majority of

blood donors are male, but the prevalence of Hepatitis B is marginally higher in females than male. However, Hepatitis C infection is commoner in males than females.<sup>1</sup>

Though 67.5% of donors are single, only 12.0% of them are positive to Hepatitis B and 1.3% to Hepatitis C (table 2a and 2b). However, divorced/separated who were only 0.7% of the total donors showed significant association with Hepatitis B and C with prevalence rate of 28.6% (P Value 0.001) and 7.1% (P Value 0.039). Hepatitis B and C is commoner in individuals who are divorced or separated from their spouse. This might be due to tendency to engage in risk factors to these infections by this group of individuals.

Civil Servants had the highest burden of Hepatitis B and C (12.5% and 1.7% respectively) though they have no statistical significance to this infection (table 2a and 2b). This is in contrast done in Alexandra Egypt where the greatest burden was in Manual Workers. The burden of Hepatitis B and C infections is higher in Civil Servants.<sup>1</sup>

The Hausas have statistical significance association with Hepatitis B and C infections with a P value of 0.000 and 0.001 respectively (table 2a and 2b). Hepatitis B and C infections are commoner in Hausas than other tribes in the country.

This study showed a high prevalence rate of 10.5% for Hepatitis B Infection among Blood Donors in Ogun State (table 1b). This result is similar to studies in Ilorin with (10.9%) prevalence rate, Sokoto with prevalence rate of (9.3%) and Cameroun with 12.14% prevalence rate. But higher than in Egypt with rate of 5%, Kosovo with (4.2%), Yemen with (5.1%) and Morocco with (0.9%). Prevalence of Hepatitis B infection is high in Ogun State and in line with the pattern in developing countries.<sup>1,11,12,13,14</sup>

Hepatitis B prevalence was highest in the 21-40years age group in this study (table 2a) and is significantly associated with Hepatitis B (P Value 0.015). This is similar to findings in Egypt put prevalence at highest in age 20-30years.<sup>1</sup> The prevalence and burden of Hepatitis B infection is highest in young adult. This might be due to the fact that exposure to risk factors is higher in this age group.

This study also showed a prevalence rate of 1% for Hepatitis C (table 1b). This is similar to studies in Yemen with (1.3%), Jordan with 0.9% and Cameroun with 1.44%. It is however lower than findings in FMC, Makurdi (5.4%).<sup>7,10,11,12</sup> Prevalence of Hepatitis C is low in Ogun state as compared to other region of the country.

Hepatitis C infection peaks at over 50years and above (table 2b). This finding is close to a study done India where it was found that Hepatitis prevalence increases with age.<sup>8</sup> However, a study done in Egypt showed highest prevalence in age 30 – 40years.<sup>1</sup> Hepatitis infection burden in Ogun state is more in late adulthood to older age.

This study showed that Tattoo and Scarification marking, Sexual Assault, Accidental needle prick injury, previous Blood Transfusion and Sexually Transmitted Disease are associated with Hepatitis B and C transmission (table 3a and 3b). This is similar to findings in India where history/contact with Hepatitis, Needle stick injury, Tattooing/Ear and piercing, surgery and sharing of shaving kits are important risk factors for transmission of Hepatitis B and C.<sup>8</sup> Major risk factors to transmission of Hepatitis B and C in Ogun State includes contact with person with Hepatitis, Tattooing and Scarification marking, Sexual Assault, Accidental needle prick injury, previous Blood Transfusion and Sexually Transmitted Disease. Effort towards reducing engagement in these risk factors will help in bringing down the prevalence of these infections.

## Conclusion

Prevalence of Hepatitis B among Blood Donors in Ogun State is high according to the findings in this study and similar to various other studies done in the country and other developing world. The prevalence of Hepatitis C among Blood Donors in Ogun State is however low compared to findings in Eastern and northern part of the country.

Age (21-40years), being single/divorced/widow and Hausa tribe are associated with Hepatitis B and C and are greater contributor to the burden of these infections. History of Tattoo and Scarification marking, Sexual Assault, Accidental needle prick injury, previous Blood Transfusion and Sexually

Transmitted Disease which are important risky health behaviours for Hepatitis B and C Infections are common in Blood Donors.

Efforts targeted at reducing the transmission of Hepatitis B and C will be beneficial. These should include educating the population on mode of transmission as well as risk factors for the infections, avoidance of practices that increase the risk of exposure to infection, adequate sterilization of reusable surgical and dental instruments, careful screening of blood and blood products, free screening for the infections and prompt treatment of positive patient. Also, Hepatitis B vaccine must be given to high risk groups like healthcare workers especially those having jobs involving exposure to blood and individuals living in low socio-economic standard. These will help reduce the spread, complications and life-threatening effects of Chronic Hepatitis B and C infections.

All blood banks or blood donation centers in the state and the country should encouraged to administer questionnaire to prospective donor to extract information on socio-demographic characteristics, risk factors to blood transmissible infections and other important details prior to donation. This will aid research work on blood donors in the population.

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