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Prevalence and Trend of HBsAg, Anti-HCV and Anti-HIV among Blood Donors in a Tertiary Hospital in North Central Nigeria

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Abstract

A major risk of blood transfusion is the acquisition of one or more of the transfusion transmissible infections. This risk correlates with the prevalence of markers of these infections in the donor population.

The aim of the study was therefore to determine the prevalence and trend of HBsAg, HIV and HCV among blood donors in Ilorin. The screening records of prospective, mainly family replacement donors from January 2011 to December 2015 were retrospectively evaluated. All screenings were done by ELISA method using kits manufactured by Inteco Diagnostics, England, United Kingdom according to manufacturer's instructions.

36889 prospective donors were screened over the five year period. Seroprevalence of HBsAg, HIV and HCV was 12.9%, 2.2% and 1.9% respectively. There was a gradual decline in the prevalence of HBsAg from13.5% in 2011 to 11.3% in 2015, HIV prevalence similarly declined from 3.2% in 2011 to 1.2% 2015, HCV prevalence fluctuated throughout the 5 year period.

Although the prevalence of TTI among blood donors is generally on the decline, it is still substantially high especially that of HBV. This exposes transfused patients to a substantial risk. There is therefore the need to slow down on blood transfusion and adopt the practice of weighing the risks and benefits before decision to transfuse any patient.

***Key words*:** blood donors, HIV, Hepatitis B and C, prevalence, trend

Introduction

Blood transfusion is an essential component of patient management within the health care system. Adequate supply of safe blood is therefore crucial in any hospital that provides quality comprehensive health care to patients. One of the resolutions of the world health assembly of members states of the World Health Organization in 1975 is that all member states should ensure quality-assured screening of all donated blood for transfusion transmissible infections, including HIV, hepatitis B, hepatitis C,*Treponema pallidum* (syphilis) and, where relevant, other infections that pose a risk to the safety of the blood supply, such as *Trypanosoma cruzi* (Chagas disease) and *Plasmodium* species (malaria). [1] Most blood banks all over the world did not initiate HIV screening until 1985 following the discovery of HIV and development of commercial HIV antibody tests.[2] In Nigeria, screening of donor blood for HIV, hepatitis B, hepatitis C is now done routinely, some centres also screen for syphilis, but this has not become a routine practice in many centres in Nigeria, including university of Ilorin Teaching Hospital Ilorin. [3, 4]

The prevalence of any of the transfusion transmissible infections (TTI) in any population has a bearing on the safety of blood because of the window period risk of infectivity. The trend in the prevalence of the TTI among blood donors is also likely to reflect the trend within the general population. It is therefore important to determine prevalence and trend of these transfusion

transmissible infections among blood donors in order to be able to evaluate the safety of blood supply in our blood bank. Studies on the trend of TTI among blood donors have been done in many blood banks outside Nigeria and in some centres in Nigeria. [3-6] The aim of this study therefore is to determine the prevalence and trend of HBsAg, Anti-HCV and Anti-HIV among blood donors in Ilorin, which is the gate way between the northern and southern part of Nigeria.

Materials and Methods

This was a retrospective study conducted at the blood bank of University of Ilorin Teaching Hospital Ilorin. Ilorin is a cosmopolitan city, the capital of kwara state, located in the North central zone of Nigeria. The university of Ilorin Teaching hospital is a 640 bedded hospital which serves as a referral centre to all the primary and secondary health care centres in the state and neighboring states of Oyo, Niger, Kogi and osun state.

The screening records of prospective, mainly family replacement donors from January 2011 to December 2015 were retrospectively evaluated to retrieve the result of screening tests for HBsAg, HCV antibodies and HIV antibodies. All screenings were done by ELISA method using kits manufactured by Inteco Diagnostics, England, United Kingdom according to manufacturer's instructions. Data was collated and analyzed using Microsoft Office Excel 2007 and results were reported using simple statistical methods of summation, proportion and percentages.

Results and Discussion

A total of 36889 prospective donors were screened for HBsAg, HCV and HIV during the five year study period, 6162(16.7%) were positive for one or more of the viral markers and were therefore deferred. Donor deferral rate decreased gradually from 18.1% in 2011 to 17.9% in 2012, 17.1% in 2013 and 14.7% in 2014 but increased slightly to 15.1% in 2015. (table1) Seroprevalence of HBsAg, HIV and HCV was 12.9%, 2.2% and 1.9% respectively over the 5 year study period (table 1) Out of the 6162 donors that were deferred over the five year study period, 4678(75.9%) were positive for Hepatitis B virus only, 629 (10.2%) for Hepatitis C virus

only, 773(12.6%) for HIV only and eighty-two (1.3%) had multiple infections with 2 or 3 of the infectious agents. Hepatitis B and C co-infection was the most common among those with multiple infections. (Table 2)

Table 1: Seroprevalence of HBsAg, HIV and HCV among blood donors in Ilorin

Year	Total donors screened	HBsAg(%)	HIV(%)	HCV(%)	*TTI positive (%)
2011	6918	931 (13.5)	224(3.2)	126(1.8)	1252(18.1)
2012	7783	1094(14.1)	183(2.4)	141(1.8)	1393(17.9)
2013	8996	1189(13.2)	233(2.6)	121(1.3)	1538(17.1)
2014	6325	756(12.0)	91(1.4)	88(1.4)	930(14.7)
2015	6867	775(11.3)	83(1.2)	211(3.1)	1037(15.1)
Total	36889	4745(12.9)	814(2.2)	687(1.9)	6162(16.7)

*positive for one or more of HBsAg, HIV and HCV

Table 2: Various combinations of multiple infections among blood donors

Viral markers	2011	2012	2013	2014	2015	Total (%)
HBsAg and HCV	12	7	1	3	18	41(50.0)
HBsAg and HIV	10	12	0	1	1	24(29.3)
HIV and HCV	4	6	0	0	5	15(18.3)
HBsAg, HCV and HIV	0	0	0	0	2	2(2.4)
total	26	25	1	4	27	82(100)

Figure 1 shows that the seroprevalence of HBsAg among the prospective donors rose from 13.5% in 2011 to 14.1% in 2012 and then declined gradually to 13.2%, 12.0% and 11.3% in 2013, 2014 and 2015 respectively. The prevalence of HIV declined from 3.2% in 2011 to 2.4% in 2012, then rose to 2.6% in 2013 and then declined to 1.4% and 1.2 % in 2014 and 2015 respectively. The prevalence of HCV was 1.8% in both 2011 and 2012, declined to 1.3% and 1.4% in 2013 and 2014 respectively but there was an upsurge to 3.1% in 2015

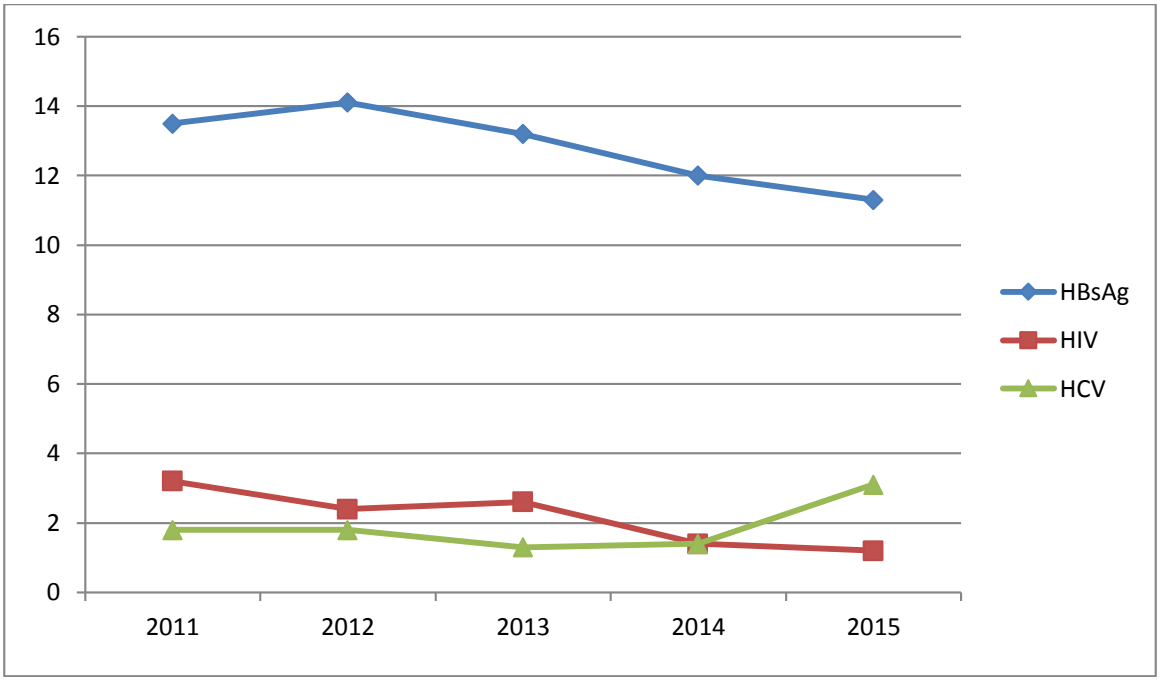

Figure 1: Trends in the prevalence of HBsAg, anti-HIV and anti-HCV

Transfusion transmissible infections are a major risk of blood transfusion. Even with quality controlled screening of donor blood for these TTI, there is still a potential risk. This is because most of the screening tests detect antibodies and there is still the window period risk of infectivity. This window period risk correlates positively with the prevalence of the particular infectious agent in the particular population. The prevalence and trend of these TTIs among blood donors can therefore be used to assess the risk of acquiring any of these TTIs from blood transfusion.

The overall prevalence for HBsAg obtained in this study was higher than that obtained in some other parts of Nigeria like Lagos (9.8%)[3] and Ile-Ife(7.5%)[4] but lower than that obtained in Ibadan(13.2%)[7] and Jos(14.3%)[8] . Studies in some other sub-Saharan countries reported 8.2% in Ethiopia [9], 13.8% in Ghana[10] and 13.9% in Mali[11]. The high prevalence of HBsAg in this present study which is in keeping with the prevalence in other countries in sub-Saharan Africa further confirms the endemicity of Hepatis B virus in sub-Saharan Africa. Countries in other parts of the world where hepatitis B virus is not endemic have reported a

relatively low prevalence of HBsAg among blood donors. 4.19% was reported in Turkey[3, 4], 1.7% and 3.1% was reported by Kaur et al[5] and Sharma et al[13] respectively in India, 0.56% in Iran[6] and 0.01% was reported in Australia[14]. The downward trend in the prevalence of HBsAg among donors obtained in this study is also in keeping with studies done in Ile Ife by Salawu et al[4], in Ghana by Nkrumah et al[10] and India by Sharma et al.[13]

The overall prevalence of HIV was higher than that reported in Ile-Ife[4] and Lagos[3] (0.96% and 1.37% respectively), but lower than that reported in Osogbo[15] (3.1%) .The first HIV Sentinel Survey in Nigeria in 1991 showed a prevalence of 1.8%. Subsequent sentinel surveys produced prevalence of 3.8% (1993), 4.5% (1996), 5.4% (1999), 5.8% (2001), 5.0% (2003), 4.4% (2005), 4.6% (2008) and 4.1 %(2010). [16] The national HIV/AIDS and reproductive health survey (NARHS) conducted showed a decline in the national prevalence from 3.6% in 2007 to 3.4% in 2012. [16] In the current study there was also a decline in the prevalence from 3.2% in 2011 to 1.2% in 2015 which is in keeping with the trend of prevalence in the country. The prevalence in 2012 of 2.4% was however higher than the prevalence 1.4% reported for kwara state in 2012. [16] In other sub-Saharan countries, Diarra et al[11] reported a prevalence of 2.6% in Mali in 2009 while Diro et al[9] reported a prevalence of 4.5% in Ethiopia in 2008. In India, Pallavi et al[17] reported prevalence of 0.44% in 2011 while Sharma et al[13] reported a prevalence of 0.13% in 2014.

The overall prevalence of HCV of 1.9% among blood donors in Ilorin was higher than the value of 0.86% reported by Salawu et al[4] in Ile-Ife in 2010, and the value of 0.84% reported by Akinleye et al[3] in Lagos in 2013. The relatively high prevalence obtained in this study was due to the upsurge of prevalence to 3.1% in 2015, even though there was a decline in prevalence from 1.8% in 2011 to 1.4% in 2014. The screening kits used in 2015 may be responsible for this upsurge. High prevalence of HCV among blood donors have however been reported in some African countries, 5.8% was reported in Ethiopia by Diro et al[9] and 3.3% was reported in Mali by Diarra et al.[11] In countries outside Africa the prevalence is rather low, Sharma et al reported 0.24% in India[13], Amini Kafi-abad et al reported prevalence of 0.13% in

Iran[6] and Polizzotto reported 0.013% in Australia[14].

In this study, prevalence of HBsAg was highest among blood donors followed by HIV and prevalence of HCV was the least. This pattern is similar to findings in studies carried out in other parts of Nigeria. [3, 4] In other parts of Africa and outside Africa the prevalence of HBsAg was also the highest among blood donors but that of HCV was higher than HIV. [9,11,13] In the study done in Australia prevalence of HCV was even higher than that of HBsAg.[14]

Apart from the fact that sub Saharan countries are the most affected with infections with HIV, HBV and HCV, the fact that most centres do not follow the donor selection criteria strictly could also explain the high prevalence of TTI in this study and other studies in Sub Saharan Africa compared to studies in developed countries. [18]

The proportion of infected donors that had multiple infections was 1.3% and the most common combination was co infection with hepatitis B and C. This is similar to finding from studies carried out in other parts of Nigeria. [3, 4] The occurrence of multiple infections further validates the common route of these infections which is mainly heterosexually. Co-infection of hepatitis with HIV in patients on highly active antiretroviral therapy has been found to have a negative effect on their liver function. [19]

Conclusion

In conclusion, although the trend in the prevalence of TTI among blood donors is generally on the decline, the prevalence was still high especially that of HBV. This high prevalence exposes transfused patients to a substantial risk of acquiring these infections. The national blood transfusion policy on donor selection criteria should therefore be strictly adhered to in all blood banks in Sub Saharan countries in order to eliminate high risk donor and increase safety of blood in our hospitals. There is however no zero risks transfusion even with stringent donor selection criteria. This fact underscores the need to slow down on blood transfusion and adopt Patient Blood management policy in which the risks and benefits of blood transfusion are

weighed for every single patient before the decision to transfuse is made.

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