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Pre-donation screening of intending blood donors for antibodies to infectious agents in a Nigerian tertiary health institution: a pilot study

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Summary

Large pools of blood donors are difficult to get in most donor centres in Nigeria: donors come in trickles and only when there is pressing need. Predonation screening for transmissible agents, using individualised rapid screening techniques is often employed to avoid wastage of blood bags and reagents. The aim is to compare the relative prevalences of serum markers of infectious diseases in intending blood donors before blood donation for the purpose of elimination. Both paid and volunteer blood donors were screened for HIV, HbsAg, and HCV antibodies using the rapid test kits. The presence of microfilaria in blood and low haematocrit were also checked for. Prospective donors were initially sorted using a structured questionnaire on risk behaviour and were physically examined. Screenings were done before bleeding them. A total of 1259 donors were screened during the six-month duration of the study and 151 (12%) were rejected. Seropositivity for HBsAg in 69 (5.48%), HCV in 56 (4.45%), HIV in 9 (0.71%) were responsible for the rejection. Fourteen (1.1%) were rejected because of low haematocrit, while two (0.16%) others were not bled because of circulating microfilaria. We conclude that hepatitis viruses were responsible for most cases of donor rejection in Nigeria, post-donation screening for infectious agents lead to wastage of blood bags, problems of decontaminating and discarding infectious blood, and the loss to treatment and follow-up of infected persons who are likely to continue to spread the infectious agents. We therefore suggest pre-donation screening of prospective donors in blood banks.

Keywords: *Blood donors, rejection criteria, infectious agents, pre-donation, Nigeria*

Résumé

Il est difficile d'avoir des donneurs de sang dans les centres au Nigeria et viennent seulement lorsque le besoin est aussi très urgent. Cependant le dépistage est souvent fait. Le but de cette étude était de comparaître les taux relatif des marqueurs dans le sérum des maladies infectieuses dans les échantillons de sang prélevés des donneurs avant les dons de sang étaient testés au

anticorps du HIV, HbsAg et HCV à l'aide des kits rapide. Les donneurs prospectif volontaires ou payés initialement sélectionnés à l'aide d'un questionnaire structure sur leur comportements et l'examen physique La présence de faible hématoците et des microfilaries étaient aussi testés. Au total 1259 donneurs étaient dépistés durant six mois et 151 (12%) des sangs donnés étaient rejetés. 69 (5.48%) étaient séropositif au HbsAg, 56 (4.45%) étaient séropositif au HCV et 9 (0.71%) séropositif au VIH respectivement. Quatorze (1.1%) étaient rejetés à cause du faible hématoците, et Deux (0.16%) pas collectés à cause des microfilaries dans le sang. En conclusion, les virus d'hépatite étaient responsables de la plupart des cas des dons de sang rejetés, des problèmes de décontamination et de disposer les sangs infectés, le manque ou perte de suivi pourraient contribuer à la distribution de ces maladies. Nous recommandons le dépistage des donneurs prospectif avant les dons de sang.

Introduction

The essence of screening intending blood donors is to ensure that the donation of approximately 450ml of whole blood is not harmful to the donor and that the blood being donated does not constitute a potential source of transmission of infectious diseases [1]. Infectious agents that are usually screened for in donor blood include hepatitis viruses (Hepatitis B and C [HbsAg and HCV, respectively]) and human immunodeficiency viruses (HIV), while some centres also screen for human T-cell lymphotropic virus [HTLV] antibody, filarial worms, malarial parasites and perform serologic test for Syphilis [2-6] Haematocrit of 40% [1,7] and above are required to avoid clinical side effects on the part of donors post-donation. History of risky sexual behaviours, alcohol and drug abuse—all of which may make donated blood unsafe, are obtained from the intending blood donors. In addition, a thorough physical examination, with particular attention to the site of venipuncture, is conducted. Intending blood donors that fail to meet the required criteria are considered unfit for donation. It was the practice that screening for infectious

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infectious agents was carried out post-donation in many blood banks. However in view of current rise in the incidence of HIV infection, pre-donation screening has been advocated [8] to reduce wastage of blood bags, reduce problem of discarding infectious blood and to enhance proper follow-up of carriers of these infectious agents to reduce the spread in the community. The relative prevalence of serum markers of infectious diseases in blood donors in a tertiary health care centre are highlighted in this report.

Materials and methods

The study was carried out at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria between October 2003 and March 2004. All donors were interviewed, physically examined, and counselled before being screened for infectious diseases. Rapid test kits were used [HIV-1 and HIV-2: GENE II HIV-1/HIV2, BIO-RAD-France and Determine HIV1/HIV2-ABBOTT-Japan; HbsAg and HCV: BIOTEC Diagnostic-United Kingdom]. Since positivity in two different rapid tests for HIV has been considered confirmatory [9] those that were found positive were notified and referred for further counselling and management. Prospective donors were also screened for the presence of microfilaria by direct examination of a drop of blood sample under microscope at x10 objective, in addition to ensuring that the haematocrit of such intending donors is not less than 38% for females or 40% for males. Those that were found unsuitable to donate on account of inadequate haematocrit values and/or seropositivity for any transmissible agents were similarly referred for appropriate management.

Table 1: Rejection rate and prevalence of infectious agents in prospective blood donors in Ile-Ife, Nigeria

Rejection factor	Number rejected	Prevalence (%)
HIV	9	0.71
HBsAg	69	5.48
HCV	56	4.45
Low haematocrit	14	1.11
Microfilaria	2	0.16
HBsAg + HCV	1	0.08

Results

The OAUTHC blood bank collects an average of about 2,500 units annually with the majority being replacement/remunerated donors. A total 1259 donors were screened during the six-month study period. The ratio of voluntary donors to replacement/remunerated donors was 1:200. There were 143 males and 8 females; with ages between 19 and 62 (mean \pm SD = 31.54 \pm 8.82) years. Of the 1259 donors,

151 (12%) were rejected; due to seropositivity for HBV in 69 (5.48%), HCV in 56 (4.45%), anaemia in 14 (1.1%) and HIV in 9 (0.71%) [Table 1]. One (0.08%) rejected donor was positive for both hepatitis viruses, while two (0.16%) others were rejected for the presence of microfilaria.

Discussion

Transfusion of blood or its products is no doubt a life-saving procedure but is also a veritable means of transmitting many infectious diseases including viral, bacterial and parasitic diseases. One of the steps usually taken to minimize this risk is the screening for these infectious agents and rejection of intending donors found to be positive for any of them. Our study shows that for every single donor rejected for being positive for HIV infection, approximately 9 others have been rejected for being positive for hepatitis viruses (HBV, HCV) [Table 1]. The sero-prevalence of 5.48% obtained for HBV in our blood donors is low compared to 14.9% obtained in a similar study in the northern part of the country [10]. In Zaire, Jager *et al* [3] found 13.1% of their blood donors to be positive for HBV marker while in Ghana Sarkodie *et al* [11] reported 15% positivity in their blood donors. Our study however revealed higher prevalence for HCV (4.45%) in our blood donors unlike what was obtained in the Ghana study, which showed lower prevalence of 0.3% in their blood donors. The sero-prevalence of 0.71% for HIV infection in blood donors obtained from our study is significantly low compared to reports of Sarkodie *et al* [11] (2.4%), Jager *et al* [3] (4.8%) and by Chikwem *et al* [10] (5.8%). Reasons for the relative lower prevalence of viral markers in our blood donors are unclear. It may reflect possible differences in life style of people in Ile-Ife, a semi-urban University town as compared to Kumasi (Ghana), Kinshasa (Zaire) and Maiduguri (Nigeria) that are large urban cities. This finding however underscores the need to be cautious in the use of results from blood donors for epidemiological purposes as it may sometimes not reveal the true prevalence in a not too well motivated population.

In six months, 1259 donors were screened giving an average of 7 donors per day, and these intending donors only come when the blood is actually needed. In view of this, screening seven donors per day may not be cost effective using the relatively cheaper ELISA method. This makes the use of rapid test kits that can be used for single test suitable in our environment. The ELISA method of screening is, however, employed during field donation.

The results also showed that 135 blood bags were saved as a result of pre-donation screening of intending donors. Disposal of infected blood also involve the use of disinfectant thereby increasing the loss to the blood bank. Pre-donation screening was

adopted in view of our reliance on remunerative (The ratio of voluntary donors to remunerated donors was 1:200) donors [12] who may conceal their risk behaviour during the pre-screening counselling for fear of being rejected. The method of pre-donation screening of blood also reduces the number of blood bank workers at risk of occupational exposure through accidental sharp pricks as our phlebotomists bleed after completion of screening. The method also affords the opportunity of counselling those found positive for any of the infectious agents on the treatment options available and the precautionary methods to adopt to avoid the spread of the disease to their spouses, lovers or carers. However the significantly high prevalence of HBV and HCV markers is noteworthy. Hepatitis B virus infection, though found worldwide, is endemic in developing countries and has been implicated in the aetiopathogenesis of chronic hepatitis and its long-term complications including liver cirrhosis and primary liver cell carcinoma [13]. Chronic hepatitis C Virus infection has also been implicated in several haematological [14], autoimmune [15], dermatological [16] and renal disease [17] in addition to its role in the aetiology of cirrhosis and hepatocellular carcinoma.

Conclusion

Unlike the old method of merely screening for microfilaria and anaemia before bleeding our donors, and screening for HIV, HBV and HCV at a more convenient time, pre-donation screening has helped to reduce wastages of blood bags as infected units are always discarded. It has also reduced congestion in our bleeding room as screening and bleeding are done at specified periods except on emergency situations. We also suggest that similar efforts currently being expended at combating the scourge of HIV/AIDS by both government and non-governmental organizations be extended to the reduction of prevalence of hepatitis viruses (HBsAg and HCV) that are equally associated with high morbidity and mortality in view of their high prevalence in the population.

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