

QUALITY OF CARE: ENSURING PATIENT SAFETY IN BLOOD TRANSFUSION IN IRRUA, EDO STATE NIGERIA

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ABSTRACT

Blood transfusion can be very beneficial and life saving to patients; though it carries with it the risk of Transfusion Transmissible Infections [TTIs] likes the Human Immuno deficiency Virus [HIV], Hepatitis B Virus [HBV], Hepatitis C Virus [HCV] and Syphilis. Unfortunately, many hospitals in Nigeria are unable to undertake adequate donor-blood screening for TTIs using the ELISA Technique, owing to lack of facilities, manpower and/or funding. As our center partners with the National Blood Transfusion Service [NBTS] for screening with ELISA, we set out to determine the prevalence of the TTIs among blood donors in order to underscore the desirability of optimal screening of blood and partnering with the NBTS to improve blood safety. Donor blood units were sent to the NBTS for rescreening with ELISA technique, after we had screened for the TTIs using rapid kits. We then reviewed the results of 613 donors over two years to determine the prevalence of TTIs among donors. Overall results showed that 86 (13.6%) was reactive for one or two of the TTIs: HIV 23(3.6%); HBV 41 (6.5%); HCV 17 (2.7%) and Syphilis 5(0.8%). Our findings suggest that screening donor blood with rapid kits only is froth with dangers to the patient; hence hospitals lacking the capacity to screen with ELISA should partner with the NBTS.

Key Words: Blood Safety, ELISA Screening, Rapid Kit Screening, TTIs, NBTS

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INTRODUCTION

Modern medical interventions can bring significant benefits to patients but they also carry inevitable risks of adverse events that can- and too often do- happen [WHO, 2002]. Blood transfusion is an essential and life saving support within the health care system. Yet the quality and safety of blood transfusion therapy continue to be threatened particularly in developing countries by inadequate supply of blood and blood products, risk of Transfusion Transmissible Infections (TTIs), Laboratory Technical errors and errors in the administration of blood and blood components [WHO 2008].

Blood transfusion remain a very effective medium of transmitting the Human Immunodeficiency Virus types I and II (HIV I & II), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Syphilis and other known TTIs and those that may emerge (Orkuma, 2014). The World Health Organization therefore

recommended that member states should screen blood meant for transfusion purposes for a minimum of four TTIs, namely HIV I&II, HBV, HCV and Syphilis. Screening for other TTIs like Chagas disease, Malaria and so on are also recommended for member states where these agents pose significant risk to blood transfusion (WHO, 2008). Member states are also encouraged to establish national blood systems based on Voluntary Non-Remunerated Blood Donors (VNRBD) for the provision of blood and blood components in their various countries (WHO, 2011). Nigeria has adopted these recommendations in her National Health Policy and the National policy on Blood Transfusion (FMOH, 2004; 2005)

The National Blood Transfusion Service (NBTS) in Nigeria was formally commissioned in 2005 followed by the launching of the revised National policy on blood transfusion in 2006. Over the years, this service have progressively improved her effort at providing adequate, safe and timely blood for Nigerians, as recommended by the WHO, but the

efforts have grossly fallen short of national need. The estimated national need for blood is 1.4-1.7 million; unfortunately much less is collected by the NBTS and of these, only ten percent are from VNRBDs (Awute, 2015). Hospitals have therefore resorted to other sources of blood to support the service provision mainly through Family/Replacement donors and often Commercial or paid donors who masquerade as family members for blood bank staff.

The prevalence of the TTIs is higher amongst these categories of donors than amongst VNRBDs; making it imperative for hospitals to properly screen their blood supplies before transfusion. Unfortunately however, hospitals have to rely on rapid test kits for the screening of their blood supply for TTIs as many hospitals, including our own hospital, Irrua Specialist Teaching Hospital, Irrua Edo State Nigeria, do not have facilities for screening for the TTIs using the Enzyme-Linked Immuno-Sorbent Assay (ELISA) technique. Therefore very many hospitals in the country still use the rapid kits to screen donor blood for transfusion uses; a practice that is associated with the dangers of increasing the burden of the TTIs in the population because of the poorer sensitivity of the method compared to ELISA technique as demonstrated in studies and recommended minimum standards by the WHO (WHO, 2013; Orkuma, 2014).

In view of the forgoing, our hospital partnered with the NBTS South-South Zonal Center in Benin in the Hospital Linkage Program of the service. One component of this program is the Blood Rotation Program in which units of donor blood collected in the hospital, and which were initially screened and found none reactive for any of the TTIs are taken to the NBTS Benin Center for screening for the TTIs using ELISA technique before returning same to the hospital for patient's use. We then undertook a retrospective survey of our data over a two years period to;

- a. Determine the disparity between rapid test kit-screened and ELISA Technique screened blood and hence, the prevalence of TTIs amongst blood donors in our center.
- b. Underscore the imperativeness of screening donor blood for TTIs using ELISA, or even more advanced techniques such as Nucleic Acid Testing (NAT) if we are to reduce to the barest minimum the incidence of TTIs in blood recipients in our hospitals.

- c. Underscore the imperativeness of partnership with the NBTS in their HLP for hospitals that are yet unable to acquire the capability to screen blood meant for transfusion using ELISA techniques.

MATERIALS AND METHODS

Sample Size: This comparative / retrospective study involved the evaluation of a total of 631 blood sample units.

Routine Rapid Sample Screening: Prospective blood donors in our blood bank are routinely screened for HIV I&II, HBV, HCV and Syphilis using the rapid test kits before being bled if their blood was satisfied non- reactive. These units of donor blood will then be sent to the NBTS South-South Zonal center in Benin City, Edo State, Nigeria, for re-screening with the ELISA Technique. Usually, the Determine™ HIV-1/2 rapid kit is used to screen for HIV I&II while Skytec rapid kits manufactured by Skytec Medicals USA, is used to screen for Hepatitis B Surface Antigen (HBsAg), antibodies to HCV and Syphilis. The manufacturers' instructions in the products are routinely followed during the screening with the rapid test kits.

Blood Re-Screening Techniques: In partnership with NBTS, blood units are re-screened using the second algorithm (combo-Antigen and antibody) 4th generation ELISA technique with STATFAX-2600 washer and STATFAX-2100 reader (Awareness Technology); Biorad Genscreen Ultra HIV Ag-Ab was used for HIV I & II screening, Biorad Monolisa HBsAg ULTRA was used for HBsAg screening while HCV and Syphilis were screened using Dia.Pro Diagnostic Bioprobes. After re-screening, the NBTS returns the non-reactive blood units with results of all units sent to them. Subsequently, these results are evaluated.

Retrospective Data Collection: A retrospective study of our records from January 2013 to December 2014 was conducted to determine the prevalence of HIV, HBV, HCV and Syphilis amongst donor blood that was sent to the NBTS for re-screening. A total of Six Hundred and Thirty one units of donor blood were involved. We collated the returned TTI status of donor blood for two years and analyzed it.

Data Analysis: Comparative percentages were calculated for the data collected within the period under review as shown in table 1

RESULTS

Blood re-screening results by NBTS indicated that out of the 631 (largely family replacement cum commercial donors masquerading as family) donor samples, 86 (13.6 %) were reactive for one, or two of the TTIs. The pattern of reactivity for the TTIs were 23 (3.6 %) for HIV, 41 (6, 5 %) for HBV, 17(2.7%) for HCV and 5 (0.8 %) for Syphilis as shown in Table 1 below. Fifty (50) donors were positive for

only one or the other of the TTIs mostly HBV while Nine (09) were positive for both two of the TTIs. Two of the later were positive for the pairs of HIV/HCV and HCV/Syphilis; with three (3) being positive for the combination of HBV/HCV, while one (1) each was positive for the combination of HIV/HBV and HBV/Syphilis. None of the donors were positive for three or four TTIs. Overall, the prevalence of HIV amongst our donors was 3.6%.

Table 1: Positivity for TTIs

TTIs	Number of Positive Samples	Percentage of positive Samples
HIV	23	3.6 %
HBV	41	6.5 %
HCV	17	2.7 %
Syphilis	5	0.8 %
Total Reactive Samples	86	13.6 %

DISCUSSION

The observed prevalence of HIV among the donor-blood units examined (3.6%) is comparable to the 3.24% observed among family replacement donors by the NBTS nationally, but higher than 1 % (Ejele *et al.*, 2005) amongst donors in Port-Harcourt. This could be because the Port-Harcourt donors consist of a substantial number of Voluntary Non-Remunerated Blood Donors (VNRBDs) amongst them. The calculated prevalence of HBV in this study is 6.5% which is lower than the 9.75% but much higher than 2.99% found by the NBTS amongst FRBDs and regular VNRBDs respectively. This further underscores the fact that regularly VNRBDs are the safest in terms of risk of transmission of any of the TTIs.

Furthermore, the Sero-prevalence of HCV amongst our donors was 2.7% which is much higher than 0.5% found in blood donors by Erhabor *et al.* (2006) in Port Harcourt. It is also higher than the 0.8% and 0.2% found amongst Commercial and Family replacement donors respectively by Erhabor *et al.* (2006). Interestingly, our figure is higher than the 1.37% found in Regular VNRBDs by the NBTS. This is most likely because the pre-donation interview of donors is more thorough in Port Harcourt than it is in ours center thus calling for a review of our pre-donation donor screening for better results. It also underscores the inevitability of obtaining donor blood

from only VNRBDs if we aim to ensure supply of safe and cost effective blood to our patients. The sero-prevalence for Syphilis amongst our donors was 0.8% which is comparable to 0.69% but higher than 0.34% obtained by the NBTS, while the sero-prevalence for all the TTIs amongst our donors was 13.6%. This figure is comparable to 17.6% obtained by the NBTS amongst FRBDs but higher than 5.41% found amongst regular VNRBDs by the NBTS. A VNRBD is one who gives blood, plasma or cellular component of blood of his/her own freewill and receives no payment for it, either in the form of cash, or in kind which could be considered a substitute for money. This would include time off work other than that reasonably needed for the donation and travel. Small tokens, refreshments and reimbursements of direct travel costs are compatible with voluntary non remunerated donation.

Family replacement donation on the other hand often lead to coercion and place undue burden on patients' family and friends to give blood. This often leads to systems of hidden payments as is applicable to some of our donors because relations of patients will simply tell you that a commercial donor is their relation and of course, there is no easy way of knowing better. Indeed, inadequate blood supplies in developing countries exert pressure on caregivers and blood banks, which in most cases, induces sharp practices. Even outright commercialization and racketeering of blood donation is froth with

exploitation of donors who frequently have high risk behaviors for infection with the TTIs.

Several studies have also shown that the safest blood for transfusion is that donated by VNRBDs and based on this, the WHO recommended that high priority be given to the elimination of family/replacement and paid donor systems which are associated with a significantly higher prevalence of TTIs. The body further recommended that the education, motivation, recruitment and retention of VNRBD populations who donate blood regularly, should be the foundation of a safe and adequate national blood supply. Whilst the NBTS is in place in the country, their operations have been unable to meet the National need for blood leaving hospitals to source for blood elsewhere with its attendant risks to patients and health workers.

The current situation calls for strengthening NBTS to be able to meet the National need for blood, or at least substantially reduce the wide gap between the demand and supply of blood. The improvement in transfusion practices in our hospitals through capacity building for proper donor selection and deferral is recommended. We believe that absolute safe blood transfusion is possible but through infrastructural/facility upgrades and the training and retraining of personnel.

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AUTHORS' CONTRIBUTIONS:

Dr Olanrewaju DO was involved in the conception of the study, analysis of data, literature review and writing up the work as well as overall supervision. Drs. Ikponmwen OD, Okogun FE, Otumu OS and Ehizogie AO were involved with collection data and Literature review. Drs. Isoa EM and Omoifo VO were involved in analysis of data as well as review of literature