

High Incidence of Transfusion-Related HIV Infection in Nigeria

A Ubesie, I Emodi, A Ikefuna

Citation

A Ubesie, I Emodi, A Ikefuna. *High Incidence of Transfusion-Related HIV Infection in Nigeria*. The Internet Journal of Hematology. 2009 Volume 7 Number 1.

Abstract

There is a high incidence of transfusion related HIV infection in Nigeria. This was evident in our pilot study that indicated that the incidence was 1.2% in a teaching hospital in Enugu. In this article, we discuss several possible reasons for the high incidence of transfusion related HIV infections in the Enugu hospital. Firstly, most donors were paid. There was no structured questionnaire to identify populations at risk and to increase self-awareness of the risk of HIV infection. Even if a donor were concerned about having a HIV infection, there was no mechanism for self-deferral. Donated blood was screened only by an ELISA, a test that usually does not detect HIV if contracted within 90 days prior to testing. To control transfusion related HIV infection, the National Blood Transfusion Service (NBTS) was established in 2005, and a National Blood Policy was developed in 2006. Seventeen blood transfusion centers have been set up with support from the private sector, the United States Presidential Emergency Plan for AIDS Relief (PEPFAR), the Safe Blood for Africa (SFA) and the Center for Disease Control (CDC). The goals were: 1) to actively change attitudes to encourage voluntary non-paid donations; 2) to develop and use questionnaires to identify individuals and populations at risk for HIV and to increase self-awareness of the risk for HIV; 3) to introduce mechanisms for self-deferral; 4) to screen blood with antigen testing in addition to the ELISA to detect new HIV infections contracted within 16 days prior to testing. An ELISA alone only detects HIV contracted 90 days prior to donation. Despite the regulations introduced by the NTBS, the incidence of HIV infected blood in blood banks is still high. There are multiple reasons for the continued high incidence of transfusion related HIV infections in Nigeria, which includes high endemic incidence of HIV. Another reason is that most donors are still being paid. In teaching hospitals in Nigeria in 2009, about 75% of donors are still paid for donations. The guidelines outlined by NTBS have not been widely implemented. There are an insufficient number of established safe transfusion centers to meet the country's need for safe blood. Although the government administers public health, the private sector accounts for about 70% of all the health facilities in the country. According to the Nigeria National Blood Transfusion Service, more than 80% of blood collected and transfused in Nigerian hospitals is not properly screened. The donor deferral option has not been widely implemented. The ELISA is still the only test used to screen donated blood for HIV. Unfortunately, there is a lack of political will to regulate adequately the screening of donors for infections. An example of successful reduction of transfusion-related HIV infection in South Africa is discussed that could serve as a role model for addressing this problem in Nigeria.

BACKGROUND

A high incidence of transfusion related HIV infection has been reported in Nigeria^{1,2}. The incidence of HIV due to transfusions given to children with sickle cell anemia was found to be 1.8% in a teaching hospital in Zaria, Nigeria¹. Our preliminary study described below indicates that the incidence of transfusion related HIV infection in the University of Nigeria Teaching Hospital (UNTH) in Enugu was 1.2%.

The incidence of transfusion related HIV infection has to be considered in the context of the prevalence of HIV in Nigeria³⁻⁵. The HIV incidence among blood donors in the city of Kaduna was noted to be 2.8%.³. The adult HIV

prevalence rate in Nigeria, the largest country in sub-Saharan Africa, was 4.6% in 2008⁵.

The most common sources of HIV infection in Nigeria adult population are heterosexual intercourse and through mother-to-child-transmission (MTCT) in children⁶. However, transfusion related HIV infection is a known risk factor^{7,8}.

A PRELIMINARY STUDY

We have conducted a retroactive study on the incidence of transfusion related HIV infection in children with sickle cell disorders (SCA) who had been transfused since birth. The study was carried out in the Sickle Cell Clinic of the Department of Paediatrics of the University of Nigeria

Teaching Hospital (UNTH) in Enugu. A total of 69 children with SCA were studied, 40 males and 29 females. Age ranged from 18 month to 18 years. More than half of the subjects (52%) were aged 13 -18 years. The subjects had received a total of 169 transfusions.

Interviews were conducted to rule out a source of HIV infection other than blood transfusions under conditions that ensured privacy and gained confidence to reveal sensitive information.

The children were tested for HIV using HIV SPOT TEST⁹, a rapid test for the detection of antibodies to HIV-1 and HIV-2 in serum or plasma. The sensitivity of the test was 100% and specificity 99.9%.⁹ The blood samples that tested positive to this rapid test were retested with Western blot analysis. There were no discordant sera.

Two of the older children tested positive for HIV, but all other children tested negative. Interviews with all children revealed no evidence of consensual sex or sexual abuse or exposure to contaminated sharp objects. These children had never lived or travelled to other regions at which they might have received transfusions.

Based on these data, the incidence of HIV was 1.2% (2/169 transfusions). However, since the 2 children who contracted HIV were at least 13 years old, sexual contact could not be ruled out. The 2 children who supposedly contracted HIV had not been previously tested for HIV. Therefore, our study of SCA children does not conclusively document that the observed HIV positivity was due to tainted transfusions. Nevertheless, the 1.2% incidence of transfusion related HIV infections is consistent with previously reported incidence of 1.8% of transfusion related HIV infection in SCA patients¹ as well as other studies^{2,10}. Therefore, the incidence of transfusion related HIV infection continues to be extremely high.

Blood given to the SCA children was collected, processed and screened at the University of Nigeria Teaching Hospital in Enugu. Most donors were paid for their donations since about 62.3% of the blood given to the children was obtained from paid donors. Potential donors were not asked to fill out a structured questionnaire about risk factors for HIV. Therefore, donors with a high risk for HIV were not identified. In addition, a sensitive screening process was not in place that might have increased donor self-awareness of the risk for HIV. There was no option for self-deferral. Therefore, there was no mechanism for donors, who

suspected that their blood might be infected, to choose face-saving self-deferral.

Donated blood was screened for HIV with an Enzyme Linked Immunosorbent Assay (ELISA). During the time frame of the study, 90 of a total of 1,510 units of donated were discarded due to positive ELISA tests. Therefore, the ELISA detected HIV in about 6% of donated blood that reflected the endemic incidence of HIV. However, a major limitation of ELISA testing is that it would not detect HIV contracted during a 3 month period prior to the donation

EFFORTS TO REDUCE TRANSFUSION RELATED HIV INFECTION IN NIGERIA SINCE 2005

In order to improve blood safety and reduce transfusion transmissible infections, Nigeria established the National Blood Transfusion Service (NBTS) in 2005¹¹ and the National Blood Policy in 2006¹². From 2006 till now, 17 blood transfusion centers¹³ have been set up in the country with support from the private sectors, the United States Presidential Emergency Plan for AIDS Relief (PEPFAR) through Safe Blood for Africa (SFA) and the Center for Disease Control (CDC).¹⁴

The NBTS established regulations for reducing transfusion related HIV. The following are examples of these regulations. Before each donation, qualified staff should establish that prospective donors are in good health and not at risk for having HIV. Standardized questionnaires should also be used to identify high risk donors. Prospective donors with high risk behaviours should be given the opportunity for self deferral. Donors who are unable to demonstrate an understanding of high risk behaviours should be deferred. Both an ELISA and p-antigen testing should be carried out to shorten the window period between contraction and detection of HIV from 90 days to about 16 days^{15,16}.

The following was implemented to encourage non-paid donations. Donor motivation and mobilization should be promoted through extensive awareness programs, such as organized donor drives at community levels, schools, churches and mosques. Public awareness should be created using information/education/communication (IEC) materials, public campaigns, print and electronic media, jingles, billboards, posters and other methods.¹²

INCIDENCE OF TRANSFUSION RELATED HIV INFECTION DESPITE THE EFFORTS OF THE

NTBS

Despite the regulations introduced by the NTBS, the risk of HIV infections due to transfusions is still high and is still a major public health issue in Nigeria. There are multiple reasons for the continued high incidence of transfusion related HIV infections in Nigeria that includes the high endemic incidence of HIV^{17,18}.

The guidelines outlined by NTBS have not been widely implemented. Most donors are still being paid. Since 2006, 90 to 95% of donors in Nigeria are still being paid for donations¹⁹. A recent disturbing report revealed that unhealthy individuals were still being allowed to donate blood and seek payment to offset poverty.²⁰

Sensitive and organized screening and questionnaires are not being used. The donor deferral option has not been widely implemented. There are an insufficient number of established safe transfusion centers to meet the country's need for safe bloods.¹¹ Therefore, blood is collected, screened and administered by hospital based transfusion centers.²¹ The standard of care in processing blood varies at different hospitals. There is a lack of a blood system infrastructures and shortage of skilled professionals.²²

Although public health is administered by the government, the private sector accounts for about 70% of all the health facilities in the country¹⁵. Some of these private health facilities have no standard at all that ensures blood safety. According to the Nigeria National Blood Transfusion Service, more than 80% of blood collected and transfused in Nigerian hospitals is not properly screened²³.

The sole reliance on ELISA testing was inadequate for screening blood from "high risk" donors since new infections contracted 90 days prior to testing would not have been detected. Odaibo et al²⁴ conducted antigen and cDNA tests on donated blood from two blood banks that was found to be HIV negative based on ELISA (GeneScreen Plus). Out of 500 units of blood that was ELISA negative, six (1.2%) were found to be positive using antigen and cDNA assays²⁴. This study probably underscores the need to routinely screen with antigen and DNA tests in addition to ELISA testing.

Lack of political has complicated the situation. Health funding appears not to be a priority of Nigerian government. The health sector is poorly funded. This situation has become worse due to frequent sectarian crises and the AIDS epidemic that has overwhelmed the health system. Additionally, there is also the problem of dilapidated health

infrastructure especially at the primary and secondary tiers of the health system.

EXAMPLES OF SUCCESSFUL REDUCTION OF TRANSFUSION-RELATED HIV INFECTION THAT COULD SERVE ROLE MODELS FOR ADDRESSING THIS PROBLEM IN NIGERIA

Transfusion related HIV infection was markedly reduced in South Africa from 0.17% in 1999-2000 to 0.08% in 2001 to 2002²⁵. The endemic incidence of HIV in South Africa at that time was high and up to 11.4%.²⁶ The reduction in transfusion-related HIV was due to a new donor selection and education policy.²⁵ The new policy included the following. 1) The new policy that closed donor clinics in areas where HIV prevalence was high. 2) Initiating programs to encourage young people to donate and to promote repeat donations. 3) Developing education programs for staff and donors to identify high risk patients. 4) Obtaining information using structural donor interviews and direct questioning to help identify high risk donors. 5) A mechanism for rejection based on universally accepted criteria (males having sex with males, injection drug abuse, recent sexually transmitted diseases, sex with prostitutes, heterosexual exposure to multiple partners, casual sex, and sexual assault)²⁵. 6) Adopting additional criteria to defer donors with a history of sexual assault in the prior 12 months, a history of having more than 1 sexual partner, or having casual sex in the prior 6 months.²⁵

Prevention of transfusion related HIV infection has been most effective in the USA, Canada and other developed countries. Only 1 per 1.25 million transfusions in developed nations like United States. Stramer et al²⁷ in a US study reported an incidence rate of blood transfusion related HIV of 1 in 3 million. These low rates seen in developed countries can be attributable to multiple factors that include lower endemic prevalence, effective history taking and screening and routine use of a combination of antibody, antigen and DNA testing.

WHAT COULD BE DONE IN NIGERIA TO REDUCE TRANSFUSION RELATED INFECTIONS?

The South African model is a cost effective strategy that could be adopted in Nigeria. It would be important to use a standardized questionnaire that identifies high risk donors. Blood should not be obtained from high-risk donors. Blood donations in communities with high prevalence of HIV should be discouraged. Self-deferral options should be

implemented. In addition to screening blood with ELISA, antigen and NAT screening should be implemented. However, the current budget limitation may limit the expansion of laboratory screening.

Campaigns that encourage voluntary non-remunerated donors should be intensified using the media, opinion leaders, traditional and religious leaders, government officials and organized civil society. The health system in the country should be strengthened to recruit well-trained and motivated health care workers, repair and upgrade health facilities as well as repair and replace obsolete equipment.

References

1. Ogunrinde GO, Keshinro MI and Ige SO. HIV Seropositivity in Children with Sickle Cell Disease. *Annals of African Medicine*. 2005, 4: 104-6. [Online]. Available from: <http://www.bioline.org.br/request?am05027>. (Accessed April 14, 2010).
2. Fasola FA, Kotila TR and Akinyemi JO. Trends in Transfusion-Transmitted Viral Infection from 2001 and 2006 in Ibadan, Nigeria. *Intervirology*. 2008, 51: 427-31. [Online]. Available from: University of Liverpool Online Library. (Accessed April 14, 2010).
3. Hassan A, Muktar HM, Mamman AI, Ahmed AJ, Isa AH, and Babadoko AA. The incidence of HIV among blood donors in Kaduna, Nigeria. *Afr Health Sci*. 2008; 8:60. [Online]. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2408538/>. (Accessed April 2, 2010).
4. Umolu PI, Okoror LE and Orhue P. Human immunodeficiency virus (HIV) seropositivity and hepatitis B surface antigenemia (HBSAG) among blood donors in Benin city, Edo state, Nigeria. *Afr Health Sci*. 2005, 5: 55-8. [Online]. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1831904/?to=ol=pmcentrez>. (Accessed April 17, 2010).
5. Terfa S. Benue State HIV Epidemiology Response and Policy Synthesis. Benue State Agency for Control of AIDS. 2009.
6. Ojukwu JU, Ogbu CN. Paediatric HIV/AIDS in Abakaliki. *Nig J Paediatr* 2003; 30, 4: 128 –34.
7. Adejuyigbe EA, Nte A, Rabasa AI, Uzono LG, Sani-Gwarzo N et al. National guidelines for paediatric HIV/AIDS in Nigeria. NASCP, Fed Min of Health. 2003; 5-20.
8. Okafor GO. Acquired immune deficiency syndrome. In: Ukaejiofor (ed). *Blood Transfusion in the Tropics*. 1st ed. Ibadan, Salem Media 1996: 143 – 60.
9. HIV SPOT Test, from Biosystems Inc. Timbergent; Dallas, Texas, USA. LOT NO; 098AG.
10. Harry TO, Moses AE, Ola TO, Obi SO and Bajani MD. Increasing risk of transfusion-associated AIDS as the pandemic spreads: Experience in Maiduguri, Nigeria. *Journal of Tropical Medicine and Hygiene*. 1993, 96: 131-3. [Online]. Available from: <http://www.scopus.com.ezproxy.liv.ac.uk/record/display.url?eid=2-s2.0-0027341350&origin=inward&txGid=ohFyus7vWACzsUiDm41pmh6%3a2>. (Accessed April 17, 2010).
11. FMOH. National Blood Transfusion Service. [Online]. Available from: <http://www.nbts.gov.ng/>. (Accessed April 12, 2010).
12. The National Blood Policy. National Blood Transfusion Service, Federal MoH, Abuja. 2006. [Online]. Available from: http://www.nbts.gov.ng/APPROVED_NIGERIAN_NATIONAL_BLOOD_POLICY.pdf. (Accessed April 2, 2010).
13. allAfrica.Com. National Blood Policy to Improve Health Sector. Vanguard, 2009. [Online]. Available from: <http://allafrica.com/stories/200903030634.html>. (Accessed April 5, 2010).
14. USAID. USAID/Nigeria: Investing in People-HIV/AIDS/TB. 2009. [Online]. Available from: http://www.usaid.gov/ng/hiv_aids_o.htm. (Accessed April 5, 2010).
15. Federal Ministry of Health. Operational Guidelines for Blood Transfusion Practice in Nigeria. NBTS, 2007.
16. Eraga P. The National Blood Transfusion Service, South-South Zonal Center, Benin City. The Challenging Task Confronting the National Blood Service. [Online]. Available from: <http://www.ubthard.org/2008/ADVERTORIAL.pdf>. (Accessed April 4, 2010).
17. Alao, O & Okwori, E. Sero-Prevalence of HIV Infection among Blood Donors in a Secondary Health Institution in the Middle Belt of Nigeria. *The Internet Journal of Hematology* 2009; 6(1):1.
18. Buseri FI, Muhibi MA and Jeremiah ZA. Sero-epidemiology of transfusion-transmissible infectious diseases among blood donors in Osogbo, south-west Nigeria. *Blood Transfusion*. 2009, 7:293-9. [Online]. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2782806/>. (Accessed April 14, 2010).
19. Obeta MS. World Blood Donor Day. WHO, 2009. [Online]. Available from: <http://www.who.int/worldblooddonorday/events/CelebrationNigeria.pdf>. (Accessed April 14, 2010).
20. The Guardian. Blood for Cash. Editorial 2009. [Online]. Available from: http://www.nguardiannews.com/editorial_opinion/article01/221209?pdate=221209&ptitle=Blood%20for%20cash?&pdate=221209. (Accessed April 13, 2010).
21. Bates I and Hassall O. Should we neglect or nurture replacement blood donors in sub-Saharan Africa? *Biological*. 2010, 38: 65-7. [Online]. Available from: University of Liverpool Online Library. (Accessed April 14, 2010).
22. Ayo F. A Shortage of Skilled Professionals is Impacting Blood Management in Nigeria. *America's Blood Centers 2008*. [Online]. Available from: <http://iwebb.carterbloodcare.org/hosp/Hospital/File/102408.pdf>. (Accessed April 12, 2010).
23. Adelakun T. Discussing the Safety of Blood Transfusion Practices in African Hospitals. *Helium*. [Online]. Available from: <http://www.www.helium.com/items/889924-discussing-the-safety-of-blood-transfusion-practices-in-african-hospitals>. (Accessed April 14, 2010).
24. Odaibo GN, Taiwo N, Aken'Ova YA, Olaleye DO. Detection of HIV antigen and cDNA among antibody-negative blood samples in Nigeria. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2008; 102: 284-7. [Online]. Available from: University of Liverpool/Laureate Online Library. (Accessed April 2, 2010).
25. Heyns AP, Benjamin RJ, Swanevelder, Laycock ME, et al. Prevalence of HIV-1 in Blood Donations Following Implementation of a Structured Blood Safety Policy in South Africa. *JAMA* 2006; 295: 519-526. [Online]. Available from: <http://jama.ama-assn.org/cgi/content/full/295/5/519>.

(Accessed April 2, 2010).

26. Connolly C, Shisana O, Colvin M, Stoker D. Epidemiology of HIV in South Africa - results of a national, community-based survey. *S Afr Med J.* 2004;94:776-781 [Online]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15487845?dopt=Abstract>. (Accessed May 23, 2010).

27. Stramer SL, Glynn SA, Kleinman SH, Strong MD, et al. Detection of HIV-1 and HCV Infections among Antibody-Negative Blood Donors by Nucleic Acid-Amplification Testing. *NEJM* 2004; 351: 760-8. [Online]. Available from: http://content.nejm.org/cgi/content/abstract/351/8/760?ijkey=9fb99c3fd662ab8aa3b2e4e4e1fd42b45d742508&keytype=tf_ipsecsha. (Accessed April 2, 2010).

Author Information

A.C. Ubesie, MBBS, FMCPaed, MWCPaed, MPH

Department of Paediatrics, University of Nigeria, Enugu Campus

I.J. Emodi, MBBS, FMCPaed, FWCPaed

Department of Paediatrics, University of Nigeria, Enugu Campus

A.N. Ikefuna, MBBS, FMCPaed

Department of Paediatrics, University of Nigeria, Enugu Campus