

Screening for HIV I through the regional blood transfusion service in southwest Uganda: the Mbarara experience *



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Abstract

Antibody screening for HIV has reduced transmission of AIDS by blood transfusion. Of the 12,768 units of blood donated to the Mbarara Regional Blood Bank between January 1992 and December 1994, 577 were found to be HIVI-positive using the ELISA technique. Percentage of positivity decreased from 5.4 in 1992 to 3.9 in 1994. Replacement donors had a higher positivity rate than volunteer donors. The females had more positives than the males. Distribution of the blood groups O and AB was similar between the Ugandan and English samples. There were differences in the blood groups A and B. The AB blood group which was only 4 per cent of the total had a higher percentage of HIV I positives. This preliminary finding should be confirmed by a more organized study.

Seroconversion has been documented in both human beings and chimpanzees between two and eight weeks after inoculation with materials from persons positive for HIV I or from patients with AIDS (Landesman, Ginzburg and Weiss 1985). Detectable antibodies have not developed in some asymptomatic immunologically normal persons infected with HIV I virus for more than six months (CDC 1985). These virus-positive, antibody-negative persons may represent the earliest stage of HIV I infection, with active viral replication and very little or no antibody response: possibly a stage of antigen excess. The unknown number of such serologically negative but virologically positive persons adds to the risk of blood transfusion.

As with all screening tests, false positives and false negative results are to be expected from the HIV I screening using the Enzyme-like Immunosorbent Assay (ELISA). The problem of false positive results is combated by requesting confirmatory tests using the same or other methods. The problem of false negative results, which are mostly due to technical reasons, puts the recipients of blood or blood products at risk (*Instruction Manual* 1994:1-14). Barring these risks, the application of antibody screening for HIV has drastically diminished the transmission of Acquired Immunodeficiency Syndrome (AIDS) by blood transfusion.

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The Regional Blood Transfusion service started at the Blood Bank of the Mbarara University Hospital in 1991. This centre caters for most of the districts in Southwest Uganda, like Bushenyi, Kabale, Rukungiri, Ntungamo and Mbarara. Blood screened in this centre is distributed to hospitals in these districts. This paper presents the observations made at this

centre while screening blood donated for HIV I and the relationship between the positive tests and the ABO blood groups.

Subjects and method

A total of 12,768 blood donations were screened for HIV I between 1992 and 1994. The age range of volunteer donors, mostly from post-primary schools in the area, was between 17 and 30. Replacement donors were sometimes above this age range. At the time of donation 5 ml of blood was taken in a vacutainer (specimen bottle without anticoagulant). Part of this blood was used for ABO and Rhesus blood group testing while the remainder was allowed to clot, centrifuged and stored in a refrigerator at 3°C. This is used to screen for hepatitis B surface antigen (HBsAg) and the Human Immunodeficiency Virus (HIV I). The HIV I screening was done with the Wellcozyme Recombinant test kit using the ELISA method (*Instruction Manual* 1994:1-14). These ELISA screening methods have over 99 per cent sensitivity and specificity (Johnson 1989). All positive results were sent for confirmation at the Nakasero Blood Bank.

Results and discussion

The Mbarara experience shows that 4.5 per cent of blood donors were found to be HIVI-positive between 1992 and 1994. Percentage of positivity diminished from 5.4 in 1992 to 4.1 in 1993 and further to 3.9 in 1994. This we think is due to self-exclusion because of the pre-education talks and the questionnaire that each donor is given to fill before donation. The low positivity rate is also due to the age group of the donors and the fact that most of the volunteer donors were from the surrounding secondary and technical schools, and are a low-risk group.

Table 1
Positive results from blood donors 1992-1994

Year	1992	1993	1994	Cumulative
Total donors	4,651	3,726	4,391	12,768
No. HIV-positive	250	154	173	577
Per cent positivity	5.4	4.1	3.9	4.5

Table 2 shows that the age of the replacement donors was usually higher than that of the volunteer donors and so also was their positivity rate (Table 2). Other centres also have a higher rate of HIV-positives among the replacement donors, whom they usually call 'relatives' (Personal communications). This group apart from actual relatives consists of the poor who sell their blood for money.

Table 2
Comparison of HIV positive results between volunteer (V) and replacement (R) donors 1992-1994

Year		1992	1993	1994
Total donors	V	3737	2587	3470
	R	914	1139	921
No. HIV-positive	V	185	105	97
	R	65	49	76
Per cent positivity	V	5.0	4.1	2.8
	R	7.1	4.3	8.3

Although fewer females than males volunteered to donate blood, the percentage positive was higher among females (Table 3). Data from The AIDS Support Organisation (TASO) confirms that in the 15-19 age group there are six times more infected females than males (TASO/WHO 1995:2).

Table 3
Sex distribution and percentage positivity among donors 1992-1994

Year		1992	1993	1994
Total donors	Male	2266	1588	2307
	Female	1205	723	981
No. HIV-positive	Male	106	63	71
	Female	74	40	35
Per cent positivity	Male	4.7	4.0	3.1
	Female	6.1	5.5	3.6

Table 4 shows that blood group O had the highest distribution among the donors. An average for the years 1992 to 1994 gives 46 per cent while the least was the AB blood group with 4 per cent (Table 4). This is similar to previous studies among whites in England (See Table 5) who had 47 per cent for the O and 3 per cent for the AB blood group (Simpson and Knight 1985:44). However, differences were found in the A and B blood groups. While our figures showed 27 per cent for the A blood group, the European studies had 42 per cent. For the B blood group the European studies had 8 per cent while our results showed 23 per cent (Table 5).

Table 4
Percentage distribution of ABO blood groups among donors 1992-1994

Blood group	1992	1993	1994	Average
O	49.9	50.1	36.8	45.6
A	24.9	26.0	31.3	27.4
B	21.5	20.6	27.1	23.1
AB	3.7	3.3	4.8	3.9

Table 5
Comparison of percentage distribution of ABO blood group between Uganda (blacks) and England (whites)

Blood group	O	A	B	AB
Uganda (Blacks)	46	27	23	4
England (Whites) ^a	47	42	8	3

^a Source: Simpson and Knight (1985:44)

An interesting finding was in the number of donors who were HIV-positive in each blood group. The AB blood group, which has the lowest percentage, 4 per cent, in the population has a higher percentage of HIV positives. We know that people with the AB blood group do not have agglutinins for the A and B antigen. Does this make a person with AB blood group

more susceptible to HIV infection? The answer to this question will require further work by centres which are capable of doing it.

Table 6
Percentage of HIV positive donors among the blood groups 1992-1994

Blood group	1992	1993	1994	Average
O	6.0	5.3	5.0	5.4
A	6.2	3.3	3.8	4.4
B	5.4	3.9	4.0	4.4
AB	10.4	8.8	2.6	7.3

Apart from the pre-donation talks and the questionnaire the Mbarara Regional Blood transfusion centre also gives post-test counselling. Referral is also made to appropriate centres. We suggest that rejected donors should be told why, especially if they are positive for Hepatitis B virus. The reasons are obvious.

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