Prevalence of HIV among blood donors at Juba Teaching Hospital Blood Bank, South Sudan

Kenneth L L Sube, Oromo F Seriano, Rose P Gore, Salvador Jajaa, Richard L Loro, Emmanuel Oryem Lino, Opiaka A Seriano, Samuel N Wania, Loboro J Alexa, Kwoji R Jack, and Isaac W Abraham

Background

Since the first reported cases in 1981, HIV remains one of the most serious health and developmental challenges worldwide [1]. HIV is one of the most frequently recorded transfusion-transmissible infections (TTIs) [2]. HIV screening among blood donors is therefore a key safety issue in addition to screening for other TTIs such as HBV, HCV and syphilis. According to the World Health Organization (WHO) guidelines screening of all blood for TTIs should be mandatory [3]. As a result, there is reduction in TTIs in countries where routine serological screening of donors is carried out [4].

The prevalence rate of HIV among blood donors differs between countries and regions depending on several factors such as the general HIV prevalence, education of the public regarding blood donation, the selection of donors and pre-donation screening [3]. As a result in high income countries, the prevalence of HIV among blood donors is as low as 0.001% while in low income countries it may be higher than 0.5%.

The Republic of South Sudan has emerged from war in the past 9 years. These were years of isolation, but with the advent of peace there is a great movement of people between South Sudan and neighbouring countries and within South Sudan. Countries bordering South Sudan, such as Kenya, Uganda and the Democratic Republic of Congo, have high HIV prevalence rates of 6.3%, 6.5% and 1.6% respectively [5]. These high rates and the movement of people is likely to fuel the HIV/AIDS epidemic in South Sudan, and the impact is likely to be felt most in Juba.

Juba Teaching Hospital is a tertiary referral hospital with 500 beds and this is where the main blood bank has been located until July 2014 when the National Blood Bank was inaugurated. This provides services for the whole country. We searched the literature and could not find any information on the prevalence of HIV among blood donors in the Republic of South Sudan.

The aim of this study was to determine the prevalence of HIV among blood donors in Juba Teaching Hospital.
Blood Bank.

Method and materials

This is a retrospective study involving analysis of blood donors' records in the blood bank of Juba Teaching Hospital from June to August 2013. These two months were randomly selected from the twelve months of the year.

From the records demographic data (age and sex), transfusion transmissible infections test results (HIV+/ve/-ve, HBsAg+/ve/-ve, HCV+/ve/-ve, and syphilis serology +ve/-ve) and blood group results (A, B, AB, O and Rhesus +ve/-ve) of the donors were abstracted. HIV, HBsAg, HCV and VDRL/Syphilis were tested using Uni-Gold (Trinity Biotech Plc-Ireland), HBsAg (Cypress diagnostic-Belgium) dipstick, Anti-HCV (Cypress diagnostic-Belgium) dipstick, and VDRL (Cypress diagnostic-Belgium) dipstick respectively. Anti-sera (Cypress diagnostic-Belgium) was used to identify respective blood groups. Out of 1195 blood donors, only 1079 had a complete set of variables in the records, and so were included in the analysis.

Ethical clearance was obtained from the Ethical Committee of the National Ministry of Health.

Data were collected onto data sheets and then entered into a computer database. Statistical analysis was performed using SPSS Version 20 Software. A p-value of <0.05 was considered statistically significant. Descriptive statistics were used to summarize the data in the form of means, medians, standard deviation and frequencies. Results are displayed in tables and a pie chart. Chi-square test was used to determine associations of categorical variables. A p-value <0.05 is regarded as statistically significant.

Results

Of the 1095 blood donors in this study, 1074 (98.1%) were males and 21 (1.9%) females. The mean age for the range for the whole group was 29±7.16 (15-69) years: for males it was 29.1±7.18 (15-69) years while for females it was 26.9±5.79 (18-45) years.

The prevalence of HIV in males was 85/1074 (7.9%) and in females 1/21 (4.8%), p=0.6 with the age group 20-29 years with highest prevalence (4.5%) - see Table 1. In the sub-population with TTIs there were 86/420 (20%) HIV+ve, 195/420 (47%) HBsAg+ve, 34/420 (8%) HCV+ve, and 105/420 (25%) VDRL+ve blood donors as illustrated in Table 2 and Figure 1.
Among the blood groups of the donors, blood group O positive had the highest percentage in the whole population (n=614; 56.1%) - see Table 3 - and of those infected with HIV (n=50; 58.1%) and the least were O negative with (n=0) with p=0.7 as shown in Table 4. There was no A negative, B negative and AB negative among the blood donors. There were co-infections between HIV and HBV, HCV and syphilis of 14 (50%), 5 (18%) and 9 (32%) with p-values of 0.7, 0.1, 0.8 respectively.

**Discussion**

The first case of HIV/AIDS in the Republic of Sudan was reported in 1986 before the independence of South Sudan. The Sudan National AIDS Control Programme (SNAP) was established in 1987 [6]. While the demand for blood products will continue to be high because of the need of blood in surgical, obstetrical, medical and other conditions, HIV poses an immense challenge to transfusion medicine in regions of the world where the quality of blood cannot be guaranteed. Hence for the safety of blood and its products, strategies to select appropriate blood donors are important and all donated blood should be tested for HIV and other transfusion transmissible infections.

The prevalence of HIV among blood donors in this study was 7.9% which is very high. This is higher than studies conducted in Nigeria which report HIV prevalence rates ranging from 0.45% to 7.7% [7]. Also studies conducted in Ethiopia show levels between 3.5% to 5% as reported by Ethiopian Federal Ministry of Health. Other studies in Ethiopia have however reported very high prevalence rates of 16.7% [8], 10.6% and 11.9% [9]. In Ghana a prevalence rate of 3.5% [10] has been reported.

The prevalence of HIV is high in South Sudan mainly because most, if not all, blood donors are family replacement donors rather than voluntary donors. Schneiber and Busch 1996 [11] assert that commercially remunerated blood and family replacement blood donation are more likely to transmit TTIs than voluntary donors. Indeed the majority of blood donors in sub-Saharan Africa are family replacement donors who have a higher risk for TTIs [12, 13].

In this study there were fewer female blood donors than male donors. Other African studies have shown low female blood donor percentage [14, 15]. This observation has also been reported in many studies done in Asia [16]. Low blood donation by women is attributed to cultural beliefs in South Sudan that women should not donate blood because of the monthly blood loss that occurs during menses. Hence the few who donate blood are those forced to do so when male relatives or friends are not available to donate blood for relatives requiring blood products. There is no scientific basis for this belief, so potential female blood donors should be encouraged to donate blood. This can be achieved by increasing public awareness through the mass media, civil societies, community based organizations, religious leaders, community leaders, women groups, etc. The recruitment and training of more female staff will also encourage more women to come forward and donate blood.

In this study HIV contributes 20% (86) of all TTIs. This percentage is a higher than in the study by Azene et al in Ethiopia who reported the contribution of HIV to all TTIs to be 11.7%. The most affected age group was the 20-29 years group (n=49, 57%) of all HIV positive donors, although this was not statistically significant (p=0.9). This is similar to an Ethiopian study where 58.2% of HIV positive blood donors were in the 20-29 years age group [17]. The difference with our study is that it was much larger and covered a period of 4 years.

Co-infection between HIV and the other TTIs does occur since they have the same mode of transmission namely: sexual intercourse, mother to child, and blood transfusion. Barth et al [18] noted that the prevalence rates of HBsAg+ve and HCV+ve among HIV positive donors were 15% and 7% respectively. These figures are less than in our study (50% and 18%) which may be due to the fact that our sample size is smaller.

Even though blood group O positive is the most infected and commonest blood group, statistically, it is not significant (p=0.7). This may be due to blood group O being a universal donor and so is easily used as a replacement donor.

**Recommendations**

In consideration of the results of this study, we

<table>
<thead>
<tr>
<th>Blood Groups</th>
<th>Total</th>
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<tbody>
<tr>
<td>HIV Positive</td>
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<tr>
<td>A+Ve</td>
<td>18 (21%)</td>
</tr>
<tr>
<td>A-Ve</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>B+Ve</td>
<td>15 (17.4%)</td>
</tr>
<tr>
<td>B-Ve</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>AB+Ve</td>
<td>3 (3.5%)</td>
</tr>
<tr>
<td>AB-Ve</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>O+Ve</td>
<td>50 (58.1%)</td>
</tr>
<tr>
<td>O-Ve</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>HIV Negative</td>
<td></td>
</tr>
<tr>
<td>252 (25%)</td>
<td></td>
</tr>
<tr>
<td>2 (0.2%)</td>
<td></td>
</tr>
<tr>
<td>165 (16.4%)</td>
<td></td>
</tr>
<tr>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>18 (1.8%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>563 (55.8%)</td>
<td>9 (0.9%)</td>
</tr>
<tr>
<td>Total</td>
<td>270 2 180 0 21 0 613 9 1095</td>
</tr>
<tr>
<td>p-Value</td>
<td>0.7</td>
</tr>
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</table>
recommend strengthening of the health system as well as increasing public awareness towards encouraging more voluntary donors than family replacements. Health Education should focus on changing sexual behaviours of youth so as to have an impact in reducing prevalence of HIV among blood donors.

A study is needed to determine the distribution of blood groups among the population.

There is a need to monitor the trends in the prevalence of HIV and other TTIs among blood donors over time and to institute strategies to reduce these infections.

**Limitations of the study**

1. Data were collected during only 2 months in the year, and from only one blood bank.
2. There were no data on the selection of donors (presumed to be family replacement donors) or their level of education.

**Acknowledgements**

We are grateful to the director of Juba Teaching Hospital, Dr Wani Lolik, for allowing us to conduct this study at the hospital, and to the director of Laboratories, Mr Charles Mazinga and his colleagues for permitting us to collect data from the blood bank registration book.

**Conflicts of interest**

None.

**Contributors**

All members participated and contributed equally in this research varying from literature review, questionnaire design, data collection, entry and statistical analysis, and typing, discussing and reviewing the manuscript.

**References**

South Sudan Medical Journal


South Sudan Forms the General Medical Council

Press Release from the Ministry of Health

On my own behalf and on behalf of my colleagues in both the public and private health sector, I am pleased to inform all of you that the Council of Ministers has unanimously endorsed the formation of the South Sudan General Medical Council, as per the Provisional Order, 2014 for the formation of the council.

The Council of Ministers has endorsed the nominees for the General Medical Council as indicated in the following table:

<table>
<thead>
<tr>
<th>S/N</th>
<th>Name</th>
<th>Position</th>
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</thead>
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<tr>
<td>1</td>
<td>Prof. John Adwok Adieng</td>
<td>Chairperson</td>
</tr>
<tr>
<td>2</td>
<td>Prof. Mayen Machut Aciek</td>
<td>Deputy</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Anthony Lupai Simon</td>
<td>Member</td>
</tr>
<tr>
<td>4</td>
<td>Dr. Dario Kuron Lado</td>
<td>Member</td>
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<td>5</td>
<td>Dr. Peter Adwok Otto</td>
<td>Member</td>
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<tr>
<td>6</td>
<td>Dr. Jino David Ladu</td>
<td>Member</td>
</tr>
<tr>
<td>7</td>
<td>Dr. Rose Ajak Costa</td>
<td>Member</td>
</tr>
<tr>
<td>8</td>
<td>Dr. James Vacilli</td>
<td>Member</td>
</tr>
<tr>
<td>9</td>
<td>Dr. Mabior M. Deng</td>
<td>Member</td>
</tr>
<tr>
<td>10</td>
<td>Dr. Edward Luka</td>
<td>Member</td>
</tr>
<tr>
<td>11</td>
<td>Dr. John Pasquale Rumunu</td>
<td>Member</td>
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Dr. Margaret Betty Eyobo Member
Dr. Victoria Stephen Majur Member
Dr. Emmanuel Oryem Lino Member
Dr. Benjamin Malek Member
Dr. Buchay Othom Rago Member
Dr. Santino Lino Member
Dr. Cain Jacob Member

The South Sudan General Medical Council is an important regulatory body that will ensure proper conduct of business in the health sector. With the council operational, the current illegal involvement of non-qualified personnel and malpractices in the sector will be brought to an end. Those who are qualified to do the business in the sector will do that comfortably within the approved norms and regulations governing the sector.

I would like to take this opportunity to congratulate the chairperson, his deputy and all the members of the Medical Council for the trust bestowed upon them by H.E President Salva Kiir and the entire cabinet. Together we can build a very strong health sector that our people deserve.

Yours Sincerely,

Dr. Riek Gai Kok
Minister for Health
Republic of South Sudan