

## SOME ASPECTS OF BLOOD TRANSFUSION PRACTICE IN WEST AFRICA

J.K. ACQUAYE

National Blood Transfusion Service (N.B.T.S.), P.O. Box 78, Korle-Bu

### INTRODUCTION

Blood transfusion began in Ghana in 1954 at the Medical Research Institute Laboratories, Korle-Bu, to meet the demand by surgeons and obstetricians. Until about ten years ago over sixty per cent of blood usage in Ghana was for surgery<sup>1,2</sup>. Surgeons and obstetricians have therefore played and continue to play significant roles in the development of transfusion medicine in West Africa especially in those countries without transfusion medicine experts. As indicated below, the pattern of blood usage in Ghana has changed with diseases of children and women making the most demand on the blood supply. Practice of blood transfusion for a long time was on the basis of "bleed and give" with only a casual check on the donor's blood haemoglobin and enquiries on a past history of jaundice. Until recently there was no screening for syphilis or hepatitis B. The blood was given immediately or stored in a small blood bank refrigerator or domestic refrigerator for a few hours or days.

The appearance of AIDS brought a revolution in blood transfusion in Europe and America. The WHO through the Global Blood Safety Initiative (GBSI) tried to influence developing countries to pay retention to blood transfusion in their respective countries since most of the countries lacked voluntary blood donor recruitment programmes, had no blood

screening system nor facilities for blood storage. Only the teaching hospitals made some attempts at blood screening. The GBSI is encouraging and assisting developing countries to institute measures to focus attention on safe blood transfusion. The emphasis is therefore not only on HIV but to prevent the spread of all transmissible micro-organisms like HBV, HCV, HIV, *T. palladium*, plasmodium, etc. Through the activities of GBSI and other international blood transfusion bodies it is now agreed that safe blood transfusion is achieved only through the joint implementation of the following:

- (a) safe blood donation
- (b) quality in testing and processing
- (c) transfusion only when essential.

The purpose of this article is to throw light on current transfusion practice in West Africa and suggest ways to implement the three components which together make blood transfusion safe.

### BLOOD USAGE

The major recipients of blood in the Sub-region are children and women suffering from pregnancy related diseases. In Ibadan in 1991, 35 per cent of blood transfusion in the University College Hospital (U.C.H.) was in children<sup>3</sup>. This pattern is seen in the teaching hospitals and the district or provincial hospitals (Table 1).

Pregnancy related diseases requiring transfusions are abortions, ruptured ectopic pregnancy, caesarean section, ante partum and post partum haemorrhages and severe, third trimester anaemia. A six months study of 1,306 requests for blood received from the department of child health, Korle-Bu Teaching Hospital, revealed that 818 (62.5%) (Table 2) were for severe anaemia of unspecified cause or with malaria or due to sickle cell anaemia. Many of these anaemias were poverty related. The haemoglobin level was not stated on most of the request forms. In

many instances it was easier to have blood cross-matched than have Hb estimated. The Hb was stated in 540 (41.3%) of the patients. The mean Hb for these was 4.6g/dl. These included patients for cold surgery, and neonates whose blood haemoglobin levels were high and therefore made the mean Hb deceptively high. Unnecessary transfusions in adults is a feature of district hospital practice. The last column of Table 1 shows the single unit transfusions in hospitals where lack of blood could not be the cause for the single unit transfusions. A recent unpublished

Table 1: BLOOD USAGE IN FOUR HOSPITALS, 1991

Hospital	Children	Obstetrics	Other Adults	Total Units Transfused	Single Units in Adults
Atua	141 (27.2)	158	220	519	178 [47.1]
Tarkwa	232 (40.7)	241	97	570	283 [83.7]
Tamale	912 (33.7)	632	1163	2707	Unavailable
Tema	422 (45.1)	290	223	935	479 [93.4]

( ) Percentage of the blood given to children 12 years and below

[ ] Percentage of single unit of blood given to adults

Table 2: DIAGNOSIS OF PATIENTS TRANSFUSED IN THE DEPARTMENT OF CHILD HEALTH, KORLE-BU TEACHING HOSPITAL

DIAGNOSIS	Number of cases (n)	% of Total
Severe anaemia	494	37.8
Sickle cell anaemia	205	15.7
Severe anaemia with malaria	119	9.0
Haemolytic disease of newborn	133	10.2
P.C.M.	12	0.9
Bleeding in neonates	37	2.8
Neonatal anaemia (mostly premature babies)	73	5.6
Planned surgery	52	4.0
Malignancy	31	2.4
Trauma and emergency surgery	24	1.8
Sepsis	53	4.1
Others	73	5.6
Total	1306	100



study of clinicians' attitude to blood transfusion in some district hospitals in Ghana revealed that despite the presence of written guidelines on blood transfusion, these were not complied with.

Some remedial actions to reduce the transfusions are required. These include reduction in the poverty related anaemia, provision of facilities for Hb estimation before transfusion, stoppage of the single unit transfusions in adults and compliance to the guidelines on usage of blood and blood substitutes.

## SOURCE OF BLOOD SUPPLY

For blood to be safe two main factors are important. These are a safe donation and quality in testing and processing. The type of donor and the clinical screening he undergoes are so crucial that it had been remarked that "proper selection and screening of donors based on their medical sexual history and moves to eliminate paid donor sources of blood and plasma have proven to be the single best way to maintain a safe blood supply".

This takes care of the window period in the blood screening process. There have been many recorded cases where patients receiving blood or blood products negative on HIV screening had seroconverted<sup>4,5</sup>. An additional measure practised in some centres to forestall this problem is the discard of the cellular components or the whole donation of first time voluntary donors since they had not been tested previously and the documented higher rate of seropositivity of first time donors compared to repeat donors<sup>6,7</sup>.

In the system prevalent in most developing countries, Ghana included, replacement donation is the predominant practice. In blood donation systems based on family or replacement donations it is the responsibility of recipients or their relatives to ob-

tain the blood that is needed. This type of system may lead to coercion of donors when there is pressure on family and friends. It may also encourage remunerated donation, when recipients or relatives covertly pay other individuals to donate blood. Remarks had also been made (personal communication) by some practitioners in Ghana and Nigeria where in some instances the relatives and friends of the patients had been deliberately failed by blood bank staff in preference to paid donors having special connections with hospital and blood bank staff.

Based on these facts that paid donors and family replacement donors are unsafe, first time voluntary donors are less safe and that repeat voluntary donors make the safest donation, for the purpose of this paper, blood transfused in West Africa may be graded as follows:

- i) **Unsafe blood:** There is no clinical screening of the donor by a trained nurse or doctor and no microbiological screening of collected blood
- ii) **Marginally safe blood:** There is no clinical screening of the donor by trained nurses or doctors; there is screening for HIV by rapid methods with or without HBV screening.
- iii) **Fairly safe blood:** At least there is clinical screening of the donor by trained staff, the donor population is mixed voluntary and replacement, and the blood is tested in large batches for at least HBV and HIV.
- iv) **Safe blood:** The minimum requirements are clinical screening of donors by trained staff, all the donors are voluntary and the blood is tested for HBV, HIV and *T. palladium*.

According to these criteria majority of blood used in West Africa belong to the first three categories. Voluntary blood donation is poorly developed in the Sub-region.



In 1991 only 10 per cent of the donor population in U.C.H, Ibadan was voluntary and that of Accra was 34%<sup>3,8</sup>. Table 3 shows the types of donors in some hospitals in Ghana. In 1990, 8,000 units of blood was collected in Yaunde of which 15 per cent came from voluntary donors<sup>9</sup>. Majority of the blood donors are replacement donors most of whom are unkempt, unemployed, very sexually active youth hired by patients' relatives or in financial arrangements with blood bank staff. Many of the donors in the district hospitals do not undergo clinical screen-

ing. Fig. 1 shows anaemic blood drawn from one of these who was declared fit and bled by a technician. Many of the district hospitals have laboratories manned by unsupervised who do rapid screening tests on these replacement donors. These end up being marginally safe blood. In Ghana a few district hospitals have fairly safe blood. These are those with blood donor programme organisers and hospitals collecting their blood from the blood centres. The lack of supervision of the technicians is a source of worry.

Table 3: Type of Donors in Some Hospitals in Ghana, 1991

HOSPITAL	CATEGORY	VOLUNTARY DONORS	FAMILY DONORS	TOTAL
Korle-Bu	Teaching	3356 (33.9)	6556 (66.1)	9912
Komfo Anokye	Teaching	1003 (14.7)	5818 (85.3)	6821
Tetteh Quarshie Memorial	District	617 (77.5)	179 (22.5)	796
Tamale	Regional	331 (13.9)	2049 (86.1)	2380
<b>TOTAL</b>		<b>5307 (26.7)</b>	<b>14602 (73.3)</b>	<b>19909</b>

[% IN BRACKETS]

Figure 1: Blood Collected from a Donor in a District Hospital Compared to a Standard Collection at N.B.T.S., Korle-Bu (Note the low volume of red blood cells in the district collection, an indication of moderate/severe anaemia)





In one hospital over a two year period, none of the 1,600 blood donors screened positive for HIV when the national average is about 2 per cent. The blood given to patients is not the safest that can be given under the circumstances. Efforts must be made to ensure that every blood given is at least in the fairly safe category.

### PROVISION OF SAFE BLOOD

This involves three elements. These are 100 per cent voluntary blood donation, efficient clinical screening of donor and quality testing. Getting 100 per cent voluntary blood donation is the most difficult. The first step towards realisation of this is the recruitment and training of full time blood donor programme organisers provided with skills in communication and public relations. They will carry out public education and community mobilisation in implementing the tasks of voluntary blood donor recruitment and retention. Past strategies were overdependent on enticing donors with parcels at every donation. In Ghana and Nigeria parcels of milk, sugar, milo, etc. were given. In La Côte D'Ivoire and Chad, blood donors were given meals after each donation<sup>10</sup>. These have been found to be counterproductive. Firstly the donors ease to come in the absence of parcels. Secondly it drives away genuine voluntary blood donors who do not want to be seen as "beggars". Thirdly, donors, especially unemployed youth coming for a free meal or parcel, do not tell the truth about their state of health and social circumstances. They use the system to satisfy their poverty or hunger. This compromises the safety of the blood collected.

The main tools for improvement in the voluntary donor base are education and community participation. The donors must be motivated to return. This involves confidentiality and expert handling by the nurses. Donor self deferral must be encouraged. The

donors must undergo a thorough but friendly screening exercise by nurses especially trained for the purpose and under the supervision of a doctor. The health of both donor and recipient is equally important. The blood collected must be screened microbiologically. The diseases to be screened for must be based on local research findings but must include HBV and HIV I and II. The technicians must be well trained, use written standard operating procedures and be well supervised. The continued screening for syphilis is now a controversial issue but many believe it must continue since it serves to exclude those with questionable sexual behaviour. Some have also questioned the need for HBV screening in West Africa since about two-thirds of the population have antibody to GB\*. On the other hand the one-third of the adult population without any immunity and the children who have not yet been infected must all be protected. This is even more important when the complications of HBV infection are considered in a population with high prevalence of hepatoma<sup>11</sup>.

Many good simple screening kits for HBV, HIV and syphilis are on the market. However, there is wide variation in sensitivity and specificity which must be taken into consideration when choosing a kit. The most important factor is the expertise of the technician. It is also better to screen in batches to allow day to day comparison of results. Emergency screening must be limited to exceptional circumstances only.

### TRANSFUSION ONLY WHEN ESSENTIAL

The third component of safe blood transfusion is that transfusion should be done only when essential. The overloaded medical school curriculum does not permit a thorough training in transfusion medicine. More of the training is done under continuing medical education. Indications for transfusing blood and



its products must be written out and complied with. Liberal use of crystalloids and colloids as plasma expanders in acute blood loss must be encouraged. As a rule blood transfusion is unnecessary in healthy people with acute blood loss of less than 30 per cent of blood volume. Many of the diseases demanding blood transfusion are due to preventable causes. Improved nutrition with iron supplementation in children, education of mothers on:

- a) the early symptoms of anaemia
- c) sickle cell disease and malaria prevention are measures that may reduce transfusion in children considerably. Maternal health programmes with education on pregnancy related diseases like A.P.H., P.P.H., retained placenta, abortion and obstructed labour will also have a positive impact on the need for transfusion.

The measures required to reduced blood transfusion must be written as a protocol. Many developing countries have done this. In Ghana Hb below 5g/dl in children or severe anaemia with signs of cardiac failure or cerebral anaemia are indications for transfusion<sup>12</sup>. In Uganda the critical Hb level for transfusion is 3.0g/dl or below or 4.0g/dl or below with malaria or 5.0g/dl or below with cardiac failure<sup>13</sup>. Periodic peer reviews of transfusion practices in the hospitals need to be encouraged. A word of caution on sicklers is important. Excessive delay in transfusing these patients by setting the critical Hb too low puts excessive strain on the heart which may contribute to early development of cardiac enlargement and failure.

## SUGGESTIONS FOR IMPLEMENTATION

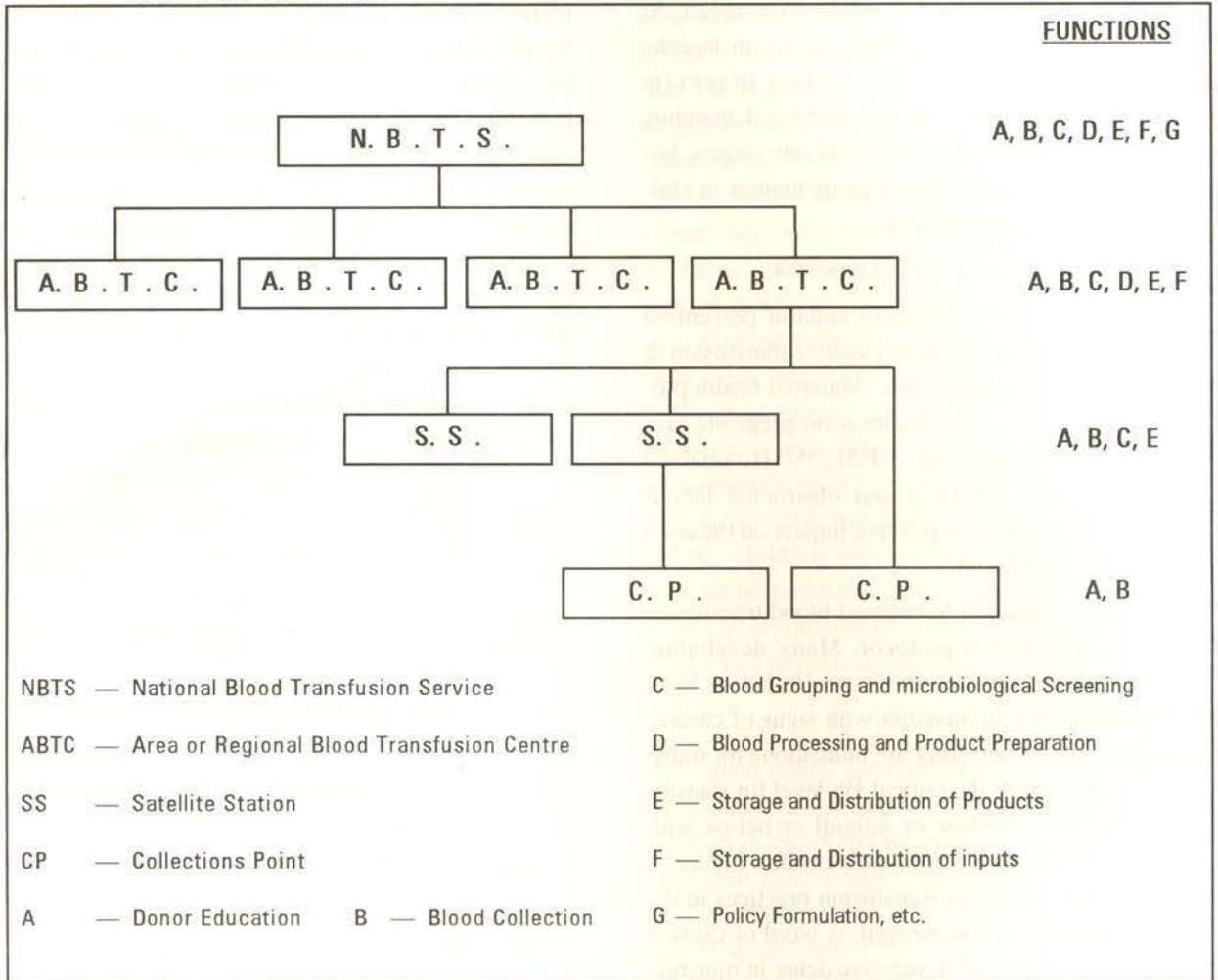
The objective of any blood transfusion policy must be provision of adequate supplies of safe blood and its products, effective and accessible at reasonable cost. This is the same as the GBSI objective. The

achievement of this means the setting up of a body with adequate funds and governmental support to integrate through regional centralisation of blood collection and procession activities which in turn must be co-ordinated nationally (Figure 2). Well trained personnel led by medical directors are required for such an organisation. The personnel must include doctors, nurses, scientists, blood donor programme organisers, medical laboratory technologists and technicians and supporting staff. A carefully formulated plan with reasonable time frames must be drawn out to cover the following after assessing the needs:

- i) Staff recruitment, training and placement.
- ii) Community mobilisation for the blood donation programmes.
- iii) Identification and setting of the blood transfusion centres and any satellite stations that may be required.
- iv) Plan for blood grouping screening and processing.
- v) Establishment of blood distribution network.
- vi) A programme of building construction and equipment procurement.
- vii) Education of the users of blood.
- viii) A system of financing.
- ix) A national blood transfusion policy.

The purpose of centralisation of blood collection and testing is to instil quality whilst at the same time keeping cost to a minimum. For example two state registered nurses trained in transfusion medicine, two laboratory technologists and few nurses and technicians with a basic set of equipment can handle fifteen thousand donors annually when operating from a centre. It will not be possible to distribute this staff in all hospitals in the region but the products from the single centre are enough to meet the regions' needs and can be distributed. In most countries in the Sub-region state registered nurses, scien-

**Figure 2: SCHEMATIC REPRESENTATION OF THE VARIOUS LEVELS AND FUNCTIONS OF AN INTEGRATED TRANSFUSION SERVICE**



tists and laboratory technologists can be recruited easily and given short training to perform the tasks. Many countries are without blood donor programme organisers and this must be seriously tackled.

Experience in Ghana indicates that people trained in communication, public relations or community work, can be recruited and given six months training. A few graduates in sociology are required to do the research aspect of blood donor organisation. Blood donor organisation must make use of recent

findings from sister organisations adapting them to suit local conditions. It must aim at 100 per cent voluntary donations and have plans for effective community mobilisation. All blood collection must either be from the centre which must be located at the hospital with highest blood usage or in addition to this a few satellite blood collection points may also operate under the centre. Donor blood grouping, microbiological screening and processing should be done at the centre though some aspects of it may be delegated to a satellite station depending on circum-



stances. All activities must follow written standard operating procedures and must be adequately documented. In short a system of good manufacturing practice must exist.

An efficient blood distribution system network should be established. It is easy to distribute to hospitals where the travel time does not exceed three hours. Where it is in excess of this a local collection and testing system must be established but supervised from the centre. Over a two year period experience in Accra had shown that blood usage in two district hospitals doubled when they started collecting processed blood from Accra. Compared to when the blood was collected locally from donors. Experiences in the United States of America and England had shown the need of co-ordinating the activities of the centres. This allows among other things:

- a) the uniformity of education messages
- b) the uniformity of donor selection procedures
- c) products of uniform effectiveness.

Majority of doctors practising in the Sub-region are locally trained and have no experience of the system described above. Having been used to local hospital blood collection they express apprehension when asked to requisition for blood from a remote centre. Health administrators and planners also do not see their way clear. Educating these doctors, senior nurses, local opinion leaders and others is vital to the success of the programme. In addition the doctors must be trained in the use of blood and encouraged to use the written guidelines. They must also be involved in the revision of the guidelines.

A programme of building construction and equipment procurement is imperative. Purposely built blood transfusion centres are non-existent in the Sub-region. Existing blood banks may be modified initially to serve the purpose as had been done in Cameroun<sup>14</sup>. Permanent structures will need to be

constructed later. Equipment including blood bank refrigerators are in short supply. The programme described is also dependent on mobile blood collecting sessions and blood movement both of which depend on vehicles. The GBSI had developed an equipment list for guidance. Money is required for these capital expenditures. Recurrent costs covering educational activities, mobile blood collection, blood bags and blood giving sets, blood grouping, blood screening, blood storage, equipment storage, staff salary, etc. need also be considered. In Rwanda, the cost of processing, storage and distribution is US \$43 per unit of blood<sup>15</sup>. Patients and the public as a whole do not understand why they should pay anything for blood. It is important to educate the public on this. Governments in developing countries cannot afford the full cost of blood transfusion. In the absence of an insurance system, most patients cannot afford the full cost of blood transfusion. A bold decision has to be taken as to which aspects of the cost must be borne by the government and which should be covered by user fees.

Before a unit of blood is transfused many interest groups are involved. These are the donors, the recipient, the recipient's doctor, the hospital, staff of the transfusion centre, government, etc.

To satisfy these interest groups and also have an efficient system a national blood transfusion policy to be supervised by a national blood transfusion committee or board is advocated. The policy which may be regulatory or legislative will among others define the sources of blood supply, protect the interest of both donor and recipient and define the roles of different organisations involved in blood transfusion therapy.

Some countries have taken the initial steps in having a co-ordinated and integrated transfusion service. Cameroun has got a legislative blood transfusion policy. Others are yet to form a service. Despite its



complexity and cost, there is no cheaper alternative to it in providing safe blood and blood products.

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