DEVELOPMENT OF A GUIDELINE AND DOCUMENT OF LINKAGE AMONG THE BLOOD TRANSFUSION CENTRES

Program Manager (WHO)
And
Director (Hospitals & Clinics)
DGHS, Mohakhali, Dhaka

DEVELOPMENT OF A GUIDELINE AND DOCUMENT OF LINKAGE AMONG THE BLOOD TRANSFUSION CENTRES

Editorial board

Dr. Md. Aktar Hossain Bhuyian
Director, Hospital & Clinics, DGHS
Dr. SAJ Md. Musa
DPM Training, DGHS
Dr. Md. Asadul Islam
Associate Prof. Transfusion Medicine
BSMMU, Dhaka
Dr. Md. Shamim Hyder
Associate. Prof. Transfusion Medicine
Dr. Md. Aminul Hasan
Medical Officer, DGHS

Independent Reviewer

Dr. Sufia Begum
Professor, Transfusion Medicine
IDCH. Dhaka

TABLE OF CONTENTS

Executive Summary

Shortage of blood of the right type at the time of need is one of the tragedies that we face regularly in our daily life. To minimize the shortage of blood in different countries neighboring of the world including our countries like India, Thailand, Singapore etc. adapted the strategy of networking of the blood transfusion centres. In Bangladesh after the centres introduction of safe blood transfusion program 98 blood transfusion centres are providing safe blood to the community. But still no networking is existing among the public and private blood transfusion centres. According to the necessity and with the financial help of WHO the proposal for the “development of a guideline and document of linkage and networking among the blood transfusion centre: is prepared. After approval of the activity in the form of APW under work plan no: BAN HIV one working group was formed with relevant experts to prepare this proposal. The working group after reviewing the document of other countries experiences in this respect developed this proposal in consultation. The proposal contains proposal for blood transfusion centre networking model, other country experiences of blood transfusion centre networking along with the introduction and justification of this proposal. In this proposal the following areas / issues are highlighted.

- Role of government and private blood transfusion centres in relation to ICT and networking.
- Major activities / areas of blood transfusion centre networking like donor, patient entry, component preparation entry, required information, blood grouping and cross-matching screening, service delivery reports and accounting report etc.
- Donor recruitment policy / guideline.
- Criteria for blood donation
- Donor awareness program for recruiting client.
- Regulatory framework for networking and ethical issue.
- Knowledge bank for blood.
- Accreditation issue and strategy.

- Q.A. and operational modalities for computerized blood transfusion management system.
- Estimation of blood need.
- Blood transfusion management with customize software and costing.

Preparation of the proposal is not the major event for establishing blood transfusion centre network but proper translation of the proposal into reality will be the major event. The policy maker, implementers and other concerned stakeholders should work with sincere effort to establish blood transfusion centre networking with a mission to provide safe blood to everybody during emergency and individual need.

Introduction:

Networking is exchanging information. Networking also includes supplying services and establishing personnel connection. Shortage of blood of the “right type” at the time of need is one of the tragedies that we face in our day-to-day life. We are experiencing shortage of blood in our hospitals because of the difference between collection and demand of blood. The total requirement of blood in the country is about 3.50 lakh unit per aurum and which is increasing day by day. According to WHO the need of blood in the developing countries are:

- Pregnancy related – 37%
- Children – 14%
- Surgery – 12%
- Trauma – 18%
- Medical – 19%

The Bangladesh Government is committed to provide safe blood for everybody and already initiated effective program like safe blood transfusion and also formulated law for upholding safety and quality.

The status of voluntary donation of blood increased from 10% (2000 year) to 24.54% (2007 year), but still not satisfactory according to the need. Each year more than 500,000 women die during pregnancy and 99% of them are in the developing world. Bangladesh is a country of 140 million of people and if only 2% of the population donate blood then the amount of blood collection will be 28,00,000 units per year. But the reality is different because it is not as per expectation. The scenario of voluntary blood donation is not satisfactory because the percentage is only 25% and the rest 65% and 10% are from friends / family members and paid donor respectively and accordingly which is not at all desirable. We have some problem like giving more emphasis on to the supply of blood rather than the collection, shortage of manpower, lack of skilled and trained manpower at field level, low literacy rate, lack of knowledge and awareness about blood donation, poor campaign for blood donation, improper blood and networking among public, private and NGO blood transfusion centres run.

In Bangladesh we already experienced shortage of blood in relation to demand and collection of blood and may be similar with the scenario of some neighboring countries. But those countries already adapted some strategy to combat the situation like:

- Networking of blood transfusion centres and donors.
- Knowledge bank for blood donors and community.
- Use of ICT (Computer, Telephone, fax, mobile) regarding the availability of blood stock or any other blood related issues.
- Rational use of blood.
- Maintenance of blood safety.
- Massive campaign for growing awareness, new donor recruitment and retention.

This APW with WHO co-operation aims to develop a structured proposal on development of a guideline and document of linkage and networking among the blood transfusion centre.

Blood transfusion services in Bangladesh started in 1950 at Dhaka Medical College Hospital and till 2000 the country's blood supply was depended on paid donors. But after the introduction of Safe Blood Transfusion Programme at 98 blood transfusion centre the achievement is significant in reducing the percentage of paid donor from 70% to 10%. The MOH&FW with the assistance of development partners reforming the SBPT by giving a fresh look. The reform initiative are the establishment of NBTC as focal point for blood transfusion services in the country, recruitment of low risk donors, rational use of blood in addition to blood screening, expansion of SBT program at UHC level, capacity development of the different categories of personnel in relation to SBTP, application of blood safety for blood donation and co-ordination.

This proposal developed by a working group of relevant expert like blood transfusion medicine, IT, BCC and program management specialist. The documents on blood transfusion centre networking system in different countries were reviewed before developing this proposal. The proposal developed on the basis of other country experience, Bangladesh country situation, existing country regulatory frame work, resource development and future need.

Specific Objectives of APW:

- To review the present status of blood transfusion centre networking system of Bangladesh. in comparison to other countries.
- To identify the areas for the development of blood transfusion centre networking system in Bangladesh.
- To explore operational modalities for functioning of blood transfusion centre networking system among the public and private blood transfusion centres.
- To fix-up the role of public and private sector for the functioning of blood transfusion centre networking.
- To explore the possibility for the establishment of knowledge bank in relation of SBT management as a part of net working system.
- To identify the type of ICT support needed for blood transfusion centre networking.

Justification of work:

Safe blood saves life – but too many patients survival around the world depends on available and safe blood transfusion. Every second of every day, people around the world – of all ages and form all walks of life – need blood transfusion to survive. The demand for blood is growing day by day, but WHO global database on blood safety (GDBS) reveals that 20% of the global population residing in the developed countries have access to 80% of safe blood supply whereas 80% of the population inhabiting the developing countries have access to only 20% of safe blood.

Not only in Bangladesh but also in India, all states have blood shortage ranging from 20-50% Many countries of the developed and developing world applied some initiative to minimize the gap between collection and supply of blood. One of the major application in ICT and networking among the blood transfusion centre and donors. One experiment in the state of Gujrat of India already done in this respect among the 30 blood transfusion centres to minimize the blood shortage with the help of blood transfusion centre networking. The networking alone helped them to minimize 25-30% of blood shortage. The benefit of blood transfusion centres networking are:

- It saves life.
- It ensure optimum utilization of blood.
- It help to balance demand and supply.
- It creates knowledge bank for blood.

The public and private blood transfusion centres in Bangladesh are providing blood to patients but the question is that whether it is sufficient according to the present and the future growing need. The answer will be non-satisfactory. Because some important area still not addressed property and the major missing area is the development of blood transfusion centre networking system. The scenario of blood shortage can be improved if we can establish linkage between various stakeholders such as blood transfusion centre, hospitals, patients and donors and as a result of intervention the following result can be achieved.

- The community will be able to obtain a specific group of blood in their emergency need.
- Optimization of collected blood and will minimize the shortage.
- The wastage of blood can also be reduced.

ICT and blood transfusion centre networking alone can not solve the problem. Side by side we need to give emphasis on recruitment of voluntary blood donors, social campaign, and dissemination of knowledge on blood transfusion and blood safety activities. This proposal on the development of blood transfusion centre networking system is very much timely initiative and justified activity to save the life of the people of Bangladesh especially the mothers.

OTHER COUNTRY EXPERIENCE:

1) Gujrat state, Western India:

They started on experimenting with 30 private blood transfusion centre owners and made them agree to co-operate for their own interest, because each blood transfusion centre had a problem either with the demand or supply of blood. The banks were asked to implement the following schemes for efficient and increased blood availability which in turn increased the business.

a) Networking:

The blood transfusion centres were asked to co-operate, to accommodate and serve each donor of other blood transfusion centre. For example if a donor of "X" blood transfusion centre need blood anywhere in Gujrat State, then all the blood transfusion centres will extend the same facilities to him as if he is the member/donor of all blood transfusion centres. Networking alone helped them to minimize 25-30% of blood shortage. It is also generated good result in donors participation to the tune of increased blood supply. Moreover rare blood group were easily available to every patient in the state.

b) Blood assurance Scheme:

If one member of a family donates blood once in a year, he is entitled to enjoy various benefits as under -

- He gets two units of blood in exchange of one unit, which he has donated throughout the year.
- He does not have to pay for testing and replacement charges.
- His total family (of 4 members) is entitled for above benefits.
- He can get blood any where of the state where networked blood transfusion centres are available.

Other aspect of intervention

In addition to ICT and networking application they are also addressing the following issues.

- Quality of blood transfusion centre.
- Credibility of blood transfusion centres.

- Government regulations.
- Self owned blood transfusion centre network.
- Co-ordination and co-operation among blood transfusion centres.

In the experiment program they also created knowledge bank for blood with an aim to create knowledge bank and information warehouse on blood, blood transfusion and related issues management such as –

- Blood safety and quality management
- Blood utilization management
- Component production and storage.
- Clinical haemotherapy.
- Transfusion practices
- Regulation and standards – roles and responsibilities
- Transfusion transmitted infections
- Donor selection and recruitment.

In the designed system of blood transfusion centre networking the expected activities from blood transfusion centres are:-

- Stocks of blood are reported every day to the portal.
- Information collation to be region-wise, country-wise to facilitate logistic
- Each blood transfusion centres maintains an account of blood received and given
- Periodically accounts are settled as per the mutually agreed norms.

Result of the project:

Their experiment generated good results and could eliminate blood shortage in Gujrat. Moreover they offered generated excess blood to neighboring state Maharashtra. The project does not require major financial involvement and also regarded self sustaining replicable model.

2) Beijing Blood transfusion centre, China:

The Beijing blood transfusion centre experienced a severe shortage as the donation dropped significantly. To combat the situation China setup National Blood transfusion centre network from early 2002. The network involves 29 upgraded provincial blood transfusion centres, 289 blood stations at the city or prefecture level and 141 blood transfusion centres at country level in western part of the country. The network help the country to improve its quality contract capacity in collecting and supplying blood (Xinnua News agency May 21, 2003).

3) Blood transfusion centre networking System in Srilanka:

The project being introduced to maintain a database of donors belonging to different groups. The donors included in the database will be requested to call over for donation based on the stock level of different groups instead of a general call for donation of blood. The project is facilitating the blood transfusion centres to function effectively and reduce the crisis situation that prevails during periods of calamities.

Main information technologies / tools being used and developed:

A) At the host centre:

- Two PC networked using windows 95 workgroup operating system.
- On top of workgroup operating system comes the “Wildcat” database management system (client server DBMS) using wildcat DBMS programming

facility, the blood donor database application has been developed to facilitate research analysis.

- Using the dialup navigator, the host centre links to the supplementary databases maintained at remote locations (such as social organizations and hospitals)

- The voluntary donors and inquires of people are recorded and downloaded using this dialup link.

B) At the remote locations:

The remote locations are installed with a wildcat navigator with configuration to search for donors, blood related information from the database. Within an effective network system the volunteers in every locality are enjoying to carryout their awareness campaign and also can recruit new donors with details of their blood group and contact addresses. Now hospitals does not need to do any advertise in the newspaper for their specific requirement of blood group but could search through this network. This networking is facilitating the blood transfusion centres to function effectively and reduce the crisis situation during any calamities.

4) Blood index experience:

Blood index provides fast and safe blood information to all when and wherever required. It encourages collection, compilation and collation of the knowledge generated in blood care through networking of blood transfusion centres, educational and research institution, government agencies and generation of awareness among individuals on donation and safety of blood.

Major activities:

- To create awareness in the society on the science of blood and blood donation.

- To make people aware of the safe blood transfusion.

- To motivate people to donate blood voluntarily.

- To organize training programs
- To publish posters and booklets to promote voluntary blood donation.
- To motivate the donors of tomorrow.
- To help the government and other regulatory bodies in blood care
- To redefine blood care.

Mission statement of the organization:

Stepping towards safety and also looking towards future. Ensuring safe blood.

Details of some activities:

1. Individual Registration - Free. By individual registration you can -

- reach to a wide online information on about blood, blood donation, blood transfusion centreing management, nutrition, blood diseases & disorders
- access online health tools and utilities
- community shared educational resources such as articles and research papers
- participate in discussion forums and community dialogs
- store, track, printout, and manage your personal health records as calendar diaries
- publish news events and awareness campaigns to happen or planned for organize nearer your cities
- request for blood from volunteer donors in open forum

2. Corporate registration: As a corporate, by using this service you can

- Get involved for a social cause & increase your corporate reach
- Receive safe blood for your employees and their family
- Donate blood through you company to the needy persons

- Join hands in spreading the message of ‘safe blood’ universally
- Access the key database via WAP enabled mobile phones
- Conduct e-Learning, e-Workshop, e-Training to your corporate people.
- Online Private/Public Conference with your corporate team.

3. Organization Registration:

As an organization member, by using this service you can

- access NGOs, SHGs Directories, clubs, Associations, Religious forums, Village Community groups,
- Colleges, Schools, Educational Institutions – join here and serve humanity
- Participate member discussion forum
- Post technical reports / Articles or research papers on clinical area;
- Access the key database via WAP enabled mobile phones.
- Conduct e-Learning, e-Workshop, e-Training to your organization people.
- Online Private/Public Conference with your organization team.

4. Blood transfusion centre Registration: As a member of blood transfusion centre, by using our service you can -

- Maintain blood stock online and enhance quick reach
- Guide blood requesters to find your blood transfusion centre online
- Efficient support in case of emergency or trauma
- Strengthening hands of blood care worldwide
- Clarification from our expert panel online.
- Technical & Clinical articles and updates on blood
- Conduct e-Learning, e-Workshop, e-Training to your corporate people.
- Online Private/Public Conference with your corporate team.

5. Hospital / Blood Test Labs Registration:

As an Hospital / Blood Test Lab member, by using this service you can –

- Join the world with your institution for safe blood care
- Add profile in blood index directory, reachable to the world
- Your camp details shall be published in blood index
- Search blood transfusion centres and blood stocks to meet your requirements
- Publish your scientific & research papers
- Conduct e-Learning, e-Workshop, e-Training to your staff members.
- Online Private/Public Conference with your team.

6. Expert Registration: As an expert, by using this service you can -

- Join the world for a safe blood care through blood index
- Publish your technical scientific, research and medico-legal papers in blood
- Share your views, comments and experience to the members of blood-index.
- Provide your guidance online through 'expert-talk' to the members.
- Spread the message – "Need of safe blood in today's world".
- Conduct e-Learning, e-Workshop, e-Training to the public interested.
- Online Private/Public Conference with invited people.

5. Blood transfusion centre of Hawaii, USA:

Mission of the blood transfusion centre: The blood transfusion centre of Hawii's mission is to provide safe and adequate blood supply for the patients of the state.

Hawii's community blood transfusion centre:

The blood transfusion centre of Hawaii is a non-profit organization that provides lifesaving blood products to 11 civilian hospitals on Oahu and 08 hospitals on the neighbor islands. Blood usually collected from 02 fixed site and by mobile collection

sites. The blood transfusion centre of Hawii is a founding member with American Blood transfusion centre (ABC), which is the nations largest network of independent non profit community blood transfusion centre that collect about 45% of the nations blood supply. ABC members are licensed and regulated by the US food and drug administration. In 1999, the blood transfusion centre of Hawii joined an alliance with four other blood transfusion centre in the pacific and Northwestern united states to enhance blood services, help / prevent regional blood shortages, improve the safety of blood transfusion and to reduce costs.

Limitation of the APW

1. Documents on Blood bank Networking were not available sufficiently. So, literature review can not done properly.

2. Available document in the internet were not very much descriptive in nature.

3. It is difficult to say in advance that the proposed blood bank centre networking model will work effectively in relation to Bangladesh context.

4. Financial involvement for the proposal can not figure out properly due to time constrain.

5. After implementation of the proposal, it may need revisit more to figure out properly.

6. Previous exposure of the blood transfusion centre expert in Bangladesh on blood transfusion centre networking is limited in nature.

7. The proposal highlighted only outline of different activities for developing blood transfusion centre networking in Bangladesh.

Linkage and networking among blood transfusion center: Documentation and guideline

Role of government and private blood transfusion center in relation to ICT and networking

(1) All blood transfusion centers either government, semi-government, Autonomous, institutional and other government funded hospitals and all licensing non–government blood transfusion center will maintain and ensured register for group wise all blood donors list such as; 'A' Group, 'B' Group, 'AB' Group, 'O' Group, Rhesus (D) positive and Rhesus (D) negative, other blood groups even Rare blood group list and donation wise blood donor list such as; Voluntary Blood Donor, Replacement Blood Donor, Directed Blood Donor, Autologous Blood Donor etc.

(2) Blood transfusion centers of all government, semi-government, Autonomous, institutional and other government funded hospitals will prepare their monthly group wise & donation wise all blood donors list and send it to the National Blood Transfusion Center (NBTC) for national database preparation, preservation & feed back for management. And all licensing non–government blood transfusion center will also prepare their monthly group wise & donation wise all blood donors list and send it to the National Blood Transfusion Center (NBTC) for national database preparation, preservation and feed back for management.

(3) All blood transfusion centers either government, semi-government, Autonomous, institutional and other government funded hospitals and all licensing non–government blood transfusion center will send their monthly blood collection list (ABO, Rhesus groups with transfusion transmissible infections screening, blood component and antibody status report) to the National Blood Transfusion Center (NBTC) for national database.

(4) a. All L-1 center will send their monthly blood collection list (ABO, Rhesus groups with blood screening data, blood component stock and antibody status report to the National Blood Transfusion Center (NBTC) and everyday stock of blood and blood component list as well as blood donor list to the internet

portal so that focus on exchange of information among blood transfusion centers, institutions and other government agencies

b. All L-2 center will send their monthly blood collection list (ABO, Rhesus groups with blood screening data to the National Blood Transfusion Center (NBTC) and everyday stock of blood and blood donor list to the internet portal so that focus on exchange of information among blood transfusion centers institutions and other government agencies

c. All L-3 center will send their monthly blood collection list (ABO, Rhesus groups with blood screening data to the National Blood Transfusion Center (NBTC).

(5) The National Blood Transfusion Center (NBTC) after collection, compilation and collation data from all those centers dissemination of collective information among blood transfusion centers institutions and other government agencies and world wide through hoisting website or internet portal as platform of networking under safe blood transfusion program (SBTP). This Internet portal would also serve as platform for creating worldwide knowledge bank and an information warehouse taking advantage of the developments in Internet technologies and knowledge management.

Major activities or areas for blood transfusion centre networking:

(1) General activities:

a. Donor Entry:-

It includes complete record of donors with updating and deletion facility;

Personal particulars of the blood donors (name, ID number, address, age, occupation, sex); health related information (medical/health history, diagnosis, lab results, treatment); where the donor is volunteer or not and information about the medical condition of the donor (vital signs or biological indicators, temperature, pulse, blood sugar level, blood pressure).The doctor or the administrator will mainly retrieve information.

b. Patient Entry:- It includes complete record of patient with updating;

(i) Patient surname, patient forename, patient sex, patient date of birth, hospital number, data & time that the request was made, unique request reference number, consultant responsible for this admission episode, patient address(optional),request type(group and cross-match),reason for request, requesting doctor.

(ii) **If blood components are requested then other mandatory data are required;** Type of component including special requirements. number of units is required, date &time that component is required.

(iii) **The following additional information is desirable**;

Blood group, previous transfusion (Y/N), pregnancy history (parity, antibodies, hemolytic disease of newborn), presence of known antibodies, high risk indicator**.(Electronic signatures in association with satisfactory security features are acceptable.)**

c. Issue Entry: - It includes issue entry, as per bag no, Group-wise, component- wise and generation of receipts of bag issued.

d. **Component preparation Entry: -** The entry of all blood components prepared is done in this form by just clicking the donor number.

   (i) The following information must be captured for each individual unit:

   Unique donation identifier; ABO and RhD type and compatibilities required between the patient and the product; component code (full product name for printing on reports); expiry date (life span of the product for calculating expiration date);

   (ii) Additional information:

   Additional typing (Indicator of the product being a red cell product, plasma product, platelet product or others); indicator of the product being a pooled type; routine screening and CMV negative; irradiated ;and transfer from.

   (iii)Mandatory information:

   Nature of unit and special characteristics; date and time of receipt; date and time where appropriate; date and time of issue; patient(s) to whom unit was previously allocated; details of patient to whom unit was transfused; the date of transfusion; reason for discard if not transfused (received damaged, out dated, inappropriate storage, other); stock movements.

e. **Discard Entry:-** The discard details are entered in this form from i.e. the positive test details, leakage, damaged, inappropriate storage, out dated, expired and other. which is automatically updated in the stock.

f. **Article Stock:-** It includes the purchase entry of the articles, purchase issue of the articles, the balance details of the articles as per the batch no. & expiry dates.

g. **Payment Entry:-** The payment entry is done through this form, to generate the dealer accounts, maintain balances, etc.

h. **Camp Details: -** It include the camp organized details, and will generate the reports of donors and issue list held in camps. Organizer's mailing list and mailing labels.

(2) Special Entry:

a. Blood grouping.

ABO and RhD grouping:

The following information should be stored:

The sample number; the test results, date and time test performed, identity of person(s) entering/validating results, technique used for performance of test.

b. Blood screening.

Routine mandatory blood screening shall be done as per Safe Blood TransfusionAct-2002. The following information should be stored:

The sample number; the test results, date and time test performed, identity of person(s) entering/validating results, technique used for performance of test. confidentiality of test results, disposal positive/reactive samples.

c. Compatibility testing.

(i) ABO group red cell required special authorization.

(ii) For components other than red cell it should be possible to define criteria locally with regard to ABO and RhD acceptability.

(iii) The system should allow a definable reservation period for cross-matched units and produce a return to stock list. The reservation date must not exceed the expiry date of the components.

(iv) The system should allow results to be entered against each unit cross-matched. Whatever the method of entry the following information must be stored.

* Date and time test performed.

* Identify of person (s) entering /validating results.

(v) After verification of results a compatibility report and labels must be produced.

(vi) The cross-match record should retain information on both compatible and incompatible units.

(vii) The facility should exist to allow the issue under password control of ABO-compatible, but serologically incompatible units in exceptional circumstances. All such units must be appropriately labelled.

d. Documentation of special laboratory testing such as Antibody Screening and identification, Titration, Genotype & Phenotype, Du Test, Haemolysin test, Detection of cold Antibody and secretor status etc.

(i) Antibody Screening and identification:

(a) The methodology used should be stored with the result.

(b) There should be the facility to enter more than one antibody specificity and the date of identification for each separate antibody should be stored.

(c) There should be a facility to allow for comments, e.g.

* Of no clinical significance.

* Of clinical significance.

* Phenotype of patients' red cells, etc.

(ii) Direct anti-globulin test (DAT)

(a) When entering results on DAT, the computer should record the type of sample tested. There should be available space for computer to be added.

(b) It should be possible to enter results obtained with monospecific AHG reagents.

e. Investigation of Transfusion reactions.

It should be possible to store the results of serological testing performed in the case suspected transfusion reaction.

f. Quality control of blood and blood product.

g. Monitoring and evaluation of the quality of the services of the blood transfusion centers.

(3) Super Quality Technology:

a. Other red cell antigen typing.

b. HLA typing.

c. Western blot, PCR & NAT testing.

d. Aphaeresis & Transfusion Therapy.

e. Cross matching; Solid phase, Gel technology, Micro plate& Electronic cross-match.

f. Stem cell, Cord Blood & Bone Marrow Transplantation.

g. Exchange, Intrauterine transfusion, & Therapeutic aphaeresis.

h. Calibration and validation of equipment.

(4). Reports:-

a. Daily Donor Register.

b. Daily Patient Register.

c. Daily Issue Register.

d. Daily Component prep. Register.

e. Discard Register.

f. GroupWise Vol. Donor's List.

g. Doctor wise and Hospital wise Product List.

h. Doctor wise and Hospital wise Issue List.

i. Patient wise Issue and Donor List.

j. Daily, Monthly and Yearly Purchase Reports.

k. Current Stock of Articles.

l. Stock Book of Articles.

m. FORMAT and REPORTS. FORM

(5) ACCOUNTING REPORTS:

a. Daily permanent / Temporary / Donor Deposit Receipt Details.

b. Daily Refund Reports.

c. Daily Recovery Details.

d. Daily /Monthly Concession List.

e. Daily / Monthly Invoice Details.

f. Monthly Balance Report.

g. Daily Cash Summary.

i. Patient wise Balance Report.

Donor recruitment policy or guideline at different level both in public & private sector:

a) Blood and blood components are always collected from recruitment of low risk voluntary non-remunerated, healthy and disease free blood donors also free from recent vaccination or illness. There is strict policy/ guideline or internationally approved periodically reviewed national criteria for the recruitment of blood donors. Before the enactment of Safe Blood Transfusion Act-2002, (10th April-2002) selection of blood donors were done in accordance with donor selection criteria of Government of Bangladesh vide-Government memo-no; ME-1/4M-5/76/517 dated 5-6-1976; criteria for donor selection.

b) After the enactment and enforcement Safe Blood Transfusion Act-2002, selection of blood donors done as per Safe Blood Transfusion Act-2002 and SRO of Rule - of Safe Blood Transfusion Act-2002.

c) Donor selection criteria are same for both public and private blood transfusion centers although there is some variation in aphaeresis donor selection.

d) **Criteria for blood donation: (Conditions for donation of blood)**

(i). General- No person shall donate blood and no blood transfusion centre shall draw blood from a person, more than once in three months. The donor shall be in good health. Mentally alert and physically fit and shall not be inmates of jail, persons having multiple sex partners' and drug-addicts. The donors shall fulfill the following requirements, namely:-

a. The donor shall be in the age group of 18 to 60 years.

b. The donor shall not be less than 45 kilograms/ 100 pounds

c. Temperature and pulse of the donor shall be normal;

d. The systolic and diastolic blood pressures are within normal limits without medication;

e. Hemoglobin which shall not be less than 12.5 grams;

f. The donor shall be free from acute respiratory diseases;

g. The donor shall be free from any skin diseases at the site of phlebotomy;

h. The donor shall be free from any disease transmissible by blood transfusion, insofar as can be determined by history and examination indicated above:

i. The arms and forearms of the donor shall be free from skin punctures or scars indicative of professional blood donors or addiction of self injected narcotics.

(ii) Additional qualifications of a donor: - No person shall donate blood, and no blood transfusion centre shall draw blood from a donor; in the conditions mentioned in column (1) of the Table given below before the expiry of the period of deferment mentioned in the column (2) of the said Table.

Table: Deferment of blood donation

CONDITIONS	PERIOD OF DEFFERMENT
(a) Abortions	6 months
(b) History of Blood transfusion	1 year
(c) Surgery	12 months
(d) Typhoid	12 months after recovery
(e) History of Malaria and duly treated	3 months (endemic) 3 years (non endemic)
(f) Tattoo	6 months
(h) Breast feeding	12 months after delivery
(i) Immunization (Cholera, Typhoid, Diphtheria, Tetanus, Plague, Gamma globulin)	15 days
(j) Rabies vaccination	1 year after vaccination
(k) History of Hepatitis in family or close contact	12 months
(l) Immunoglobulin	12 months.

(iii) **No** person shall donate blood and no blood transfusion centre shall draw blood from a person, suffering from any of the diseases mentioned below, namely:-

a. Cancer
b. Heart disease
c. Abnormal bleeding tendencies
d. Unexplained weight loss
e. Diabetes-controlled on insulin
f. Hepatitis B & C infection
g. Chronic nephritis
h. Signs and symptoms, suggestive of AIDS
i. Liver disease
j. Tuberculosis
k. Polycythemia Vera
l. Asthma
m. Epilepsy
n. Leprosy
o. Schizophrenia
p. Endocrine disorders

Donor awareness program in recruiting client in networking system :(Strategy, activities in different level)

All living organisms communicate. Communicate to build up their knowledge and awareness through information. Starting from uni-cellular amoeba to the highly sophisticated human being, all living creatures communicate their feeling in one way to another. The basic goal of donor awareness is to promote knowledge, attitudinal change and beliefs & also to educate the donors about self-selection and self-exclusion.

Strategies

Strategies are:

a) Efforts shall be made to improve the knowledge and awareness among general population regarding Safe Donor, Safe Blood and Safe Blood Transfusion through effective management, information and communication system.

b) Mechanism shall be developed to disseminate the donor recruitment process among suitable population that every effort must be made to ensure both the safety of the donor and the safety of the transfusion for the recipient and thus introduce suitable population in donation process.

c) Efforts shall be directed to disseminate the message of danger of using blood from professional blood donors among population and gradual phasing out of professional blood donors from the donation system.

d) Through effective awareness, education, information and communication system replacement, family and relative donor shall be encouraged to become regular voluntary donors.

e) Mechanism shall be developed in such a way that effective and proper communication can help to motivate potential donors to become donors, encourage suitable donors to be regular donors, and deter unsuitable individuals from donating blood, thus reducing the chances of transmitting infections through blood transfusion.

Activities in different level:

Donor are the bricks of which the main structure of the blood transfusion services is build and the organizers are the mortars which hold the structure together. Blood transfusion is life saving but always associated with hazards including deadly transfusion-transmitted diseases. So it is necessary to initiate donor awareness program in all blood transfusion center including Information Communication Technology (ICT) in order to improve donor motivation, education and recruitment system & to ensure safe blood and blood product accessible to all blood recipient or patients. There are different type of approach in donor awareness & motivation program such as individual approach, group approach and mass approach. Following are the different level at which donor awareness & motivation program can be done: -

(i) Educational Institutions.

(ii) Industrial and commercial houses.

(iii) Social and cultural organizations.

(iv) Religious and spiritual groups.

(v) Political organizations.

(vi) Government officer

(vi) Trade unions.

(vii) Medical Institutions.

(viii) Uniform services.

(ix) Women organizations.

(x) Fan clubs.

Types of information awareness and communication:

(1) Oral Communications**;**

- Local publicity assisted by NGO's and other associations.
- Meeting and lecture on blood transfusion.

(2) Written Communications;

- Brochures, Posters and information leaflets

(3) Information Through Mass media;

- Articles in newspapers, magazines etc.
- Radio and television.
- Public figures, e.g., eminent business leaders.
- Celebrities, e.g., sportsman, film stars etc.
- Political or Religious leaders-especially if they themselves can be persuaded to donate blood.

Developing messages for effective awareness program;

Public relations are built on the foundation of good communication. It depends on the messages to be conveyed and channels to be used to reach the target with these messages. A clear and simple message conveyed in a local language is most effective. All health education or communication materials e.g. poster, leaflets, flip charts etc., once prepared should be field-tested among a subset of target population and suitably modified based on the feedback from the field test. Educational material suitable for the target group should then be prepared and used for the purpose of motivating potential donors.

The main messages on which the communication program should be highlighted include the following;

- Awareness on importance of voluntary blood donation by the general population.
- Community responsibility for blood donation.
- Information about collection, processing and distribution of blood.
- Assuring harmlessness of blood donation, safety of blood donors through their pre-donation medical check up and use of disposable equipment for blood collection.
- Emotional appeals regarding haemotherapy required to manage blood related disorders.

- Need for preventing transfusion-transmitted infections and risk associated with blood collected from paid blood donors.

Regulatory link for enhancing/ensuring networking system:

a) Regulatory link obviously enhancing/ensuring networking system especially in the area of donor confidentiality, data error correction and maintenance of Standard Operative Procedures (SOP). According to Safe Blood Transfusion Act-2002 and SRO of Rule - of Safe Blood Transfusion Act-2002 it is mandatory that, All blood transfusion centers either government, semi-government, Autonomous, institutional and other government funded hospitals and all licensing non–government blood transfusion center will send their monthly blood collection list; ABO, Rhesus groups with blood screening data, blood component (If prepared) to the National Blood Transfusion Center (NBTC) for national database preparation ,preservation and data feedback for management.

b) In the final draft National Blood Policy in is mentioned that, all government blood transfusion centers and all non-government blood transfusion centers after getting license shall send their monthly blood collection list (ABO, Rhesus groups with transfusion transmissible infections screening, blood component and antibody status report) to the National Blood Transfusion Center for national database.

c) Practice of transfusion medicine involves lots of ethical, legal and regulatory issues since blood comes from human beings and is a precious & scarce resource with limited shelf-life. There is a moral responsibility both toward donors and patients which based on following;
    a. Respect for individual & his /her worth.
    b. Protection of individual right and well being.
    c. Avoidance of exploitation.

d) Regulatory and ethical issues related to donors:

(i) Blood donation as a Gift;

WHO requirements recommended that National Blood Services should be based on voluntary non-remunerated blood donation and no one should be ever forced to become a donor, neither for family or economical or for any other reason. Trade of human blood is unethical.

Non-remunerated blood donation is considered as a gift and selection and deferral of blood donor done as national standards of donor selection criteria under regulatory framework. Patient's right to get safer blood is higher than donor's right not to be discriminated as blood transfusion centers are made to help patients and not donors.

(ii) Donor confidentiality, donor counseling and donor consent:

Donor confidentiality is also an important issue. Personal information disclosed by blood donor during course of pre-donation interview and that obtained by various test performed on the donated component is expected to be held in confidence by donor center. It is the donor's moral and ethical duty to provide right and truthful information. Donor center always keep donor information confidential and disclose the relevant information to the third parties i.e. family members, employers, public health authority or police officers under regulatory framework/policy guideline. Collection of blood from the blood donor is done after proper counseling and written consent of the donor.

e) Regulatory and ethical issue related to patients:

Regulatory and ethical issues in relation to patients include access of risk free safe blood, free of change or need of replacement, informed consent for transfusion, right to refuse the transfusion, right to be informed if harmed.

(i) Consent for Transfusion:

Consent for transfusion has to be informed consent i.e. the patient should be informed of the known risks and benefits of transfusion, alternative therapies available i.e. autologous transfusion, erythropoietin etc. and then the consent should be documented. In the event if the patient is unable to give prior informed consent, the basis of treatment by transfusion should be in the best interests of patient.

(ii) Right to refusal:

The patient's right to refuse blood transfusion should be respected. A certain religious sect of people `'Jehovah's Witness'' do not accept blood transfusions. Such others issues should be respected.

(iii) Right to be informed if harmed:

If the patient has been transfused blood and component that was not intended for him, whether harmful or not, he has the right to be informed. Similarly the patient who has been inadvertently transfused a transfusion transmissible marker positive blood has a right to be informed and due compensation.

(f) Regulatory and ethical Principles for blood establishments:

A profit motive should not be the basis of establishment and running of blood transfusion services and wastage should be avoided to safeguard the interests of all potential donors and recipients.

(g) Quality testing and others related issues:

Since blood is a biological product, It is unlikely that the risk for transfusion-transmitted infection will can be reduced to zero. So collection of blood, processing, screening, testing, preparation of blood component, storage, transportation, transfusion to the patient, monitoring of transfusion hazards, quality control of all and waste disposal should be done as per regulatory framework/national standards and policy guideline.

(h) Quality assurance program:

The approach to emerging infections associated transfusion of blood and blood product includes assessing the transmissibility of the agent by this route. Effective preventive strategies are screening tests; donor deferral policies; improving viral and bacterial inactivation process; and applying quality assurance program in all respect. Vigilance is needed to help ensure proper balance between safety and the availability of blood. Lastly, in order to provide safe blood it is essential to have good quality of assurance program in place from vein to vein (donor to the recipient) in blood transfusion services.

Knowledge bank for blood:

The overall purpose of blood transfusion centre information is to track a blood product from the time of preparation to the point of final distribution. In addition, system should hold patient historic data for test results and transfusion information for the length of time required by local regulations. Finally, the system should assist the blood transfusion centre professionals in selecting and issuing blood products that are safe for patient transfusion.

In the use of the information system, there are many times when evaluations can be made about the appropriateness of the actions taking place. So it needs appropriate awareness & feedback for community, service providers and service recipients.

A. Information for community;

Information system should build up in such a way that it can easily rich and update the knowledge of community people regarding important aspect of blood transfusion such as importance of blood transfusion in modern medical sciences; Cases where blood transfusion are needed; History of blood transfusion and blood transfusion centreing; Reason of shortage of blood for transfusion in the country; There is no substitute of human blood; Who can donate blood; Blood groups and importance of one's blood group; Safe blood transfusion; Danger of using blood from professional blood donors; Why every eligible person should donate blood; Information about indoor and out door voluntary blood donation camp; Recognition of voluntary blood donors; Information regarding blood transfusion center of the country;Voluntary blood donors list; Which center are ready for providing whole blood transfusion service; Component therapy service; Information regarding rare blood groups and others.

B. Information for service providers;

Information system for service providers should be strengthened in such a way to improve the technology and quality of service so as to increase the hospital capacities (central to district) for safe blood transfusion. Adequate information about sample collection; blood collection; processing; testing; screening; cross-matching; preparation of blood component; storage; quality management; documentation and record keeping should be incorporated in the information system. Knowledge of service chain such as transfusion practices in clinical interface; clinical haemotherapy; appropriate & rational use of blood; awareness about transfusion transmitted infections may rich the information system more effective. Donor motivation; donor recruitment; donor counseling should be incorporated as behavioral aspect. Regarding blood stock management there should be extended cooperation & co-ordination among blood transfusion centers, exchange of stock list of whole blood and components, so that the centers can utilized their blood and blood products by giving proper transfusion to patients or blood recipients. All the information should be designed as per Safe Blood Transfusion Act and rules, National Standards & guideline in the light of National Blood Policy.

C. Information for service recipients;

Patients or service recipient's information system should be incorporated in such a way that, patient may aware about his disease and category of transfusion such as whole blood (WB); packed red cell PRC); platelet concentrate (PC); fresh frozen plasma (FFP); washed red cell (WRC) and other component; hazards of transfusion; dreadful diseases transmitted by transfusion; fate of transfusion; Danger of using blood from professional blood donors; benefit of safe blood transfusion; Name & number of blood transfusion centers from where patient may get this transfusion service through testing; screening and processing of blood after collection from voluntary non-remunerated blood donors. Information regarding next transfusion; post transfusion follow up of those patients; quality control of all the process; blood donation camp and voluntary blood donors list may enrich the information management system. Information management system may further be strengthened by including effective strategies for awareness of the service recipient regarding transfusion of appropriate blood & blood products

in rational/requisite amount to a clinically needed patient & in therapeutically effective time; use of blood & blood components with minimum cost but afford maximum safety, minimum risk to both donor and recipients and improve judicious use of blood & blood product with clinical transfusion practices; use of blood component that needed & avoid unnecessary wastage of other component.

Accreditation criteria for blood transfusion centre networking: (Strategy and step for selection of blood transfusion centre in networking system)

Accreditation of Blood Transfusion Center for networking system:

Accreditation is an approved procedure by which regulatory authorities or an authorized body accord formal recognition to a laboratory to undertake specific tasks provided that predefined standards are met by the laboratory i.e. mandatory for laboratories to be accreditated before commencing their functions. Standards for laboratory accreditation have been developed by the International Standards Organization/ under regulatory authority.

Strategy for Accreditation of Blood Transfusion Center for networking system:

a) Efforts shall be directed for inspection of blood transfusion centers and their licensing by the inspection committee formation as per Safe Blood Transfusion Act-2002 to ensure conformity to pre-defined criteria pertaining to various aspect of infrastructure and functioning of the blood transfusion centers as well as networking system as per their request letter or application.

b) Mechanism shall be developed for inspection of government blood transfusion centers by the inspection committee formation as per Safe Blood Transfusion Act-2002 and under the directive of licensing authority and licensing committee to ensure the conformity of various aspect of infrastructure and functioning of the blood transfusion centers as well as networking system

c) To developed mechanism in ensuring good quality laboratories (blood transfusion center) both in government and private sector, since those who do not confirm to the pre-defined criteria are not given license to undertake laboratory activities as well as networking system.

Step for selection of blood transfusion centre in networking system:

(1) The process of accreditation starts with the request of the blood transfusion center /laboratory for accreditation in networking system.

(2) The accreditating authority deputes inspector(s) to assess the blood transfusion center/ laboratory on the basis of specific criteria.

(3) The report of the inspectors may recommend accreditation of the blood transfusion center/ laboratory or may suggest some corrective measures.

(4) In situation, the blood transfusion center /laboratory is informed of the decision of the authorities. The deficiencies pointed out by inspectors are to be rectified before formal recognition is accorded.

Standards for inspection of Blood transfusion centers/ laboratories:

a. Organization and Administration: The laboratory should have a document describing its scope of work, defined objectives adequate financial strength and adequate interaction between the routine management, information management system and the technical staff.

b. Staffing and Direction: The number of staff members their educational qualification and experience in similar setting should be adequate. Each staff member should have written description of his job profile. Continuous education after an initial induction training should be mandatory

c. Facilities and Equipment: The space for reception of patient, collection of blood sample and donor blood, performance of tests, blood grouping, blood screening, cross-matching, other investigation, preparation of blood component, storage, transportation, transfusion,documentastion & record keeping, disposal and sterilization as well as storage of material should be adequate. The working environment should be safe. Sufficient data storage retrieval and communication facilities should exist. Appropriate equipment and provision for their maintenance should be ensured and there should be a suitable system of maintenance of records and issuing of reports.

d. Policies and Procedures: A standard operating procedures (SOPs) for each technique should be available to all the technical staff. This must include instructions for collection, testing, processing, storage and transportation for transfusion of blood and blood products and their disposal. Written instructions should also be available to field staff regarding this.

e. Staff Development and Education: A continuing education programme for all staff members should form a part of the policy of the blood transfusion center/laboratory and adequate resources must be made available for in-house as well as outside training activities. A system for appraisal of staff members should also be in position.

f. Evaluation: The blood transfusion center/laboratory must have a formal policy for internal quality control and must participate in relevant external quality assessment scheme.

Conclusion:

Accreditation is not a one-time affair. A periodicity of (may be of 2-3 years or in accordance with regulation) should be decided to reassess the blood transfusion center/laboratory to ensure that standards are maintained.

Operation modalities for computerized blood transfusion management system:

Introduction:

The presence of HIV/AIDS in Bangladesh, the rapidly worsening due to Epidemiological situation in the neighboring countries and existence of socioeconomic factors making the country vulnerable to rapid spread of HIV/AIDS infection. In neighboring countries such as India, Myanmar and Thailand has been detected HIV/AIDS largely. As blood transfusion is one of the roots for transfusion of HIV and other Transfusion Transmissible infection it is prudent to take an effective prevention programme to prevent the spread of HIV, and others. Currently 98 Blood Transfusion centres are screening for HIV / AIDS, Hepatitis- B, Hepatitis –C, Syphilis and Malaria is in place.

Current documentation and reporting system of blood transfusion activities appear to be incompatible with present need to ensure safe blood. So Blood Transfusion Services needs improvements in this area in respect to laboratory testing, blood donor profile quality assurance and other routine management services in order to provide effective patient care in the hospitals. So mechanism be established to monitor the trend of HIV and other infection marker in blood donor to support and feed the nation comprehensive area wise statistical data needed to take appropriate actions from the top Management of the Government to prevent HIV/AIDS.

Record keeping and reports on monthly or yearly activities are rather fixed. Any variation when query or asked for needs a crush program, all concerned officials and staff become busy in preparing the report suspending all routine. Again accuracy of such report is questionable.

The result is that one has to do many repetitive works and obviously that reduce the efficiency and effectiveness of the entire system.

The blood transfusion operation procedure now being exercised by the centers indicates that the system is manual one has lot of check crosscheck and accountability. Human error is quite common in a manual system. One

wrong entry may take whole day to trace. Handwriting of many persons is not legible. In such situations wrong entries become unavoidable, In the present system; unless the supervisors keep constant monitoring accountability cannot be ensured. It is impossible to trace all usage statement not prepared or send for several months timely by scrutinizing each and every account manually.

To improve the system, computerized data preservation, compilation and report generation is a must for the dynamic management and timely taking action. So, a computer based information system (BTMS) has to be proposed to improve the quality of work, improved service quality and overall efficiency of work done and that needs following:-

a. Manpower;
b. Training;
c. Equipment& Instrument;
d. Maintenance and error reporting.
e. Standard operative procedures

a. Manpower:

The need to manage the system introduced a new cadre of professionals to the center setting. Two to three persons in each center were selected from Doctor (Specialist or trained in transfusion medicine)/Administrative and nursing staff to co-ordinate the system. At least one individual called system manager /system administrator who is responsible for the system and is delicately familiar with database and system maintenance procedures. The system manager is also responsible for implementation of new software enhancement, training new users, adding new data items to the database, and maintaining the system and trouble-shooting to be taken under a support service contact with developer. Some personnel to be undergo on-job training while the system was being installed. Ideally several individuals should share this responsibility.

Recommendation:

The workloads of Transfusion Medicine (Blood Transfusion) are mainly laboratory, donor and patient oriented. Government is going to

functioning of 206 blood transfusion center in Bangladesh. But there is shortage of manpower in blood transfusion centers. Under civil surgeon in all district civil surgeon office one medical technologist (Lab) is working, and medical technologist (Lab) working under all Sader Upozilla Health & Family Planning Officer. Their working area is limited. So it possible to reduced the worked load of blood transfusion center by proper deputation of those medical technologist (Lab) in the nearest blood transfusion center or at least for working as duty roster wise. This can be done by DGHS as DG (Directorate General) is the Member-Secretary of National Safe Blood Transfusion Council and president of the Bangladesh Blood Transfusion Committee. And again it is possible to placement of one nurse to the respective blood transfusion center routinely through Hospital Director/Superintendent

(i) So in short term plan all L-1center and Reference laboratory of National Blood Transfusion Center may undergo networking system immediately after proper training and deputation of manpower and others. Some center even may not require manpower.

(ii) In medium term plan-networking system may started in All L-2 centers after conducting proper training and providing manpower on deputation, equipment and others.

(iii) All L-3 centers may include under networking system in long-term plan after adequate post-creation through revenue budget in all blood transfusion centers through National Safe Blood Transfusion Council, which is the apex body of Blood Transfusion Services of Bangladesh. Conduction of proper training and supply of equipment and others are mandatory.

b. Training:

The system requires only two to three trained manpower to handle the system in each center i.e. one operator, one system manager /system administrator and one transfusion medicine expert/ or doctor trained in transfusion medicine as unit in-charge. But, it will manage and provide all the relevant information regarding blood transfusion to every concerned authority experts, doctors, officials, administrator and

agencies. Training are in the form of operation of the information system to enter data into the system. Update the data, and retrieve to assist them in their daily functions. Special users, called system managers, are trained to maintain the information system just as individuals are trained to maintain other laboratory instruments. So technically the system is very robust and efficient.

Format of training:

- Introduction to Computers, peripherals and operating system.
- Word Processing and Spread Sheets.
- Training on Application Software
- Training on Interface Software
- Training on operating system Software
- Training on Data entry & Data Management
- Training on Report Generation
- Introduction to website
- Training on Report Generation
- Browsing of Internet
- Back –up procedures and evaluation.

c. Equipment & Instrument:

Information systems consist of three components: Hardware, System software, application software and accessories.

Hardware:

(i) Two computers
(ii) One Printer

PC which generates and stores the soft copy information and printer which generates the hard copy information. So each center to be provided with 01 PC (designated as client to be operated by the operator) and another server PC (to be operated by system manager/administrator-authorized person). The authorized person may be a specialist/doctor or any other official of the department.

System software:

This system software supports windows-98, NT, & Linux operative system. So the system is very flexible to support operating system.

Application software:

The system is the combination of the following application software, that helps the user to work in the same platform but access in different applications. To fulfill the entire need of computer based operation, the following application modules to be developed and implemented in each computer center of the department:

* Donor Health Profile Management Module.

* Recipient Health Profile Management Module.

* Blood Screening Data Management Module.

* Cross-Matching Data Management Module.

* Medicine Inventory Control Management Module.

* Blood stock Inventory Management Module.

* Check-List Management Module.

* Investigation And surgical Management module

*And other Module as required.

The technologies to be used to develop and implement the application software are as follows:

* SQL server for back end (which is store data & information)

* Visual Basic 6 for front-end.

* Crystal Report for report generation.

* Sheridan Grid for on-line data viewing.

* Microsoft word, Microsoft excel for documentation.

Accessories:

UPS, Voltage Stabilizer, Modem, Networking, Land Telephone computer table, required furniture and others.

Recommendation:

(i) All L-1 centers have two computers and L-2 center has one computer. So in short term plan al L-1 and Reference laboratory of National Blood Transfusion Center networking system may start immediately.

(ii) All L-2 centers have also one computers. So in medium term plan networking system may start after conducting training and providing manpower on deputation.

(iii) All L-3 centers may include under networking system in long term plan.

d. Maintenance and error reporting:

Maintenance:

Information systems have maintenance requirements that include both hardware and software components. For the software, periodic programs may need to be run to purge data from the system to servent the disks from becoming full. The database integrity may also be monitored with special utility programs, which will notify the system manager of problems to be corrected. Hardware devices have preventative maintenance schedules to ensure the proper nationality of the devices. The recommendations for hardware maintenance are made by the hardware vender.

The software and database should routinely be copied onto a tape media or another set of discs to serve as a back up for the system data. The frequency for creating the backup depends on the volume of data entered and the vendor recommendations. The backup copies should be stored in a safe area to prevent damage of the media. Copies should be stored in a location away from the computer system to ensure that if computer area met with a disaster such as a flood or fire, the backup copies would not be destroyed. The usual recommendation is that a periodic backup should be placed in an off-sit storage location. In the event of such a disaster, the backup copies

would be used to recreate the information system data base and software.

Error Reporting;

In the routine maintenance and monitoring of an information system, any problems or errors should be recorded in a log. The information recorded in this log should include the date and time of the problem, the person identifying the problem, the steps that occurred before the problem, and if indicated, to whom the problem may have been escalated for resolution.

e. Standard operative procedures

Just as standard operating procedures (SOPs) are written for the technical procedures in the laboratory, they must also be written for the procedures of the information system. The basic information for maintenance procedures for the information system is provided by the manufacture of the information system. However, some options exist that must be incorporated into the specific blood transfusion center or transfusion service's SOPs. In addition to the system maintenance SOPs, the technical procedures such as antibody screening or antigen testing should be written to include the use of the information system.

Estimation of blood need:

It is essential to estimate blood requirements so as to meet the demand through planned donor recruitment and through planned production of blood components and plasma derivatives. It will also be of significant help in arriving at the budget estimate by evaluating the requirement of material resources.

The Requirement of Blood and Blood Products in a Country depends on the following factors:-

- Population
- Health Care structure
- Prevalence of conditions requiring blood transfusion e.g thalassaemia, hemophilia, other causes of chronic anaemia
- Type and extent of surgical procedures performed
- Clinician regarding judicious use of blood

Blood Requirement is assessed in Relation to:-

- Total/ regional population
- Acute hospital beds
- Medical facilities available in the area
- Annual blood usage (past, present, future)

Ideally, if 2% of the population donate blood, it will be sufficient to meet national needs

The requirement of blood is usually calculated for red red cells, which very often falls short of the requirement of plasma and plasma components.

- Calculation of Required Number of Donations of a Country.

(1) Calculation based on population:

In developing countries the national needs for blood are met sufficiently if 2% of the population donate blood (Intending Donor)

Example-

If present population = 48,000,000

Annual number of required donations = 2% of 48, 000, 000

= 960, 000

*In India for a population 100 crores (1000 million), 2 crores (200 million) of intending blood donor would be more than sufficient for the country by taking into consideration all Possible allowances, The present estimated blood need of India is 80 Lakhs (8 Million) units.

(*Estimation Blood Need & Planning Blood Donor Recruitment. Gift of Blood, Official Organ of Association of Voluntary Blood Donors, West Bengal, India. July-2001. Number-64. Page-04.

(2) Calculation based on acute hospital beds:

The required annual number of donations can obtained by multiplying the number of acute hospital beds by 7 and Specialist beds by 30. (30% of beds do not usually need blood)

Example-

Number of hospital beds in Bangladesh (Dec-2005) =56,500

(Govt.hospital beds=40,000, & Private hospital beds=16,500)

30% of beds do not usually need blood = 16,950

Number of beds required donations

(56,500-16,950) = 39,550

Special hospital beds 1500x30 = 45,000

Acute hospital beds =38050x07 = 2,66,350

Number of required donations

= 45,000+2,66,350= 3,11,350

** A small portion of the collected blood, about 5%, may be outdated; another potion of about 1% may be discarded after testing, for various reasons.

(* Direction, Hospital & Clinics. Directorate General of Health Services (DGHS), Mohakhali, Dhaka-1212, Bangladesh. Dec-2005)

(** National Guidebook of Blood Donor Motivation. Ministry of Health and Family welfare (MOHFW), National Aids Control Organization, Government of India, New Delhi- 110001. Page-39)

(3) Calculation of the Required Numbed of Donors:

Example:-

Number of required donations =139,209

Donation form (x) No of donors, twice yearly =2x

Donation form (y) No of donors, 3 times a year =3y

Donation form (x No of donors, once yearly =z

Total number of donations =(2x+3y+z)

Deficit = 139,209-(2x+3y+z)

For the year in question [139.209-(2x+3y+z)] donors must be requited. The recruitment programme for future years must be modified (10%)* correspondingly to take account of donors, retiring, moving or leaving the programme for any other reasons

(*National Guidebook of Blood Donor Motivation. Ministry of Health and Family welfare (MOHFW), National Aids control Organization, Government of India, New Delhi – 110001 .page -39)

(4) Calculation of Projected Blood Needs:

Calculation of projected blood needs must take account of expected changes in the national blood demand, which in turn will vary With-

- The development of the health service
- Increase in the number of hospital beds
- Annual growth rate of the population

Example:-

Present population =48,000,000

Number of donations required (2% of population) = 960,000

Annual population growth rate =1.86%

Population after 10 years =56,928,000

Number of donations required after 10 years =2% of 56,928,000

= 1,138,560

Increase in number of donations required =1,138,560-96,00

= 178,560

(5) Calculation of Blood Needs in Individual Regions/State & Divisions:

Realistic calculations of the annual total collection goal of region should be based on-

- The medical demands of the region

- The donor potential of the region, and expected frequency of donor attendance
- The present of anticipated number of staffs, in the regional transfusion center
- The adequacy of present or projected premises and equipment

Security and Validation:

Security:

A crucial part of any information system is the security applications available to limit access to the system only authorized individuals. The first level of security determines that a person is allowed access to the information system. A user at this point should be required to have both a user code and an individual password. The system should require to change their password periodically to optimize the security of the system.

The second level of security is implemented within the software application itself. At this level, each, user is allowed access only to specified applications for which they have been authorized by the system manager. For example, technologists would be allowed access to enter test results on a patient. Clerical staff would not be allowed access to these programs, but they could inquire about patient information to answer questions received in a phonecall.Currently information is kept in cabinet. So there is hardly any privacy of data.Moreover, there is provisions for backup and restores data. No access would be given to unidentified users. The system is structured in such a way that different staff members have different access permits to the system.

Validation:

Validation is a systematic process of testing the components of an information system – hardware, software, and user- to ensure that they are functioning correctly for their intended purposes. Information systems constitute an invaluable tool that assists blood transfusion centre professionals in providing quality care to patients. Therefore, every step must be taken to guarantee that

the system is functioning as it should. When system validation is done, through documentation of the process should be maintained as the validation process is conducted.

Types of validation:

Through the cycle of an information system, different types of validation can be performed. If the system has been in use but has never been formally validated, retrospective validation world be performed for bank systems that had never been previously validated as per regulation.

Prospective validation is performed before implementing a new system. Periodically, after information system has been implemented, new software, hardware, or database items may be added to the system to enhance existing applications or add new features. Any changes made to the system should be validated for correct functionality. This type of validation is referred to as change control.

The final type of validation is periodic. Periodic validation can be part of a quality assurance program that monitors the functionality of the system when no changes are being made to the system. Examples of periodic validation might include quarterly accuracy checks of donor deferral lists, or annual competency testing of users.

Computerized Blood Transfusion Management System

(Blood transfusion centre Networking)

By and large, current documentation and reporting system of blood transfusion activities appear to be incompatible with present need to ensure safe blood. So, Blood Transfusion Services needs improvements in this area in respect to laboratory testing, blood donor profile, quality assurance and other routine management services in order to provide effective patient care in the hospitals.

A comprehensive customized software called **Blood Transfusion Management System** is required to implement by incorporating blood screening data, blood donor profile, valid documentation of laboratory testing , schedule for regular blood donation and motivational camp, schedule for training programme, management of routine blood supply, monitoring of transfusion hazard, quality control of blood and its product, procurement and finance related activities. By establishing networking system between the centers will enhance optimum use of information and data exchange to oversee, monitor and evaluate the quality of the services of the centers from a National Reference Center and dissemination of collective information world wide through Website on Safe blood Transfusion Programme of Bangladesh .

The proposed computer based **Blood Transfusion Management System** will transform the traditional manual recording /documentation and production of reports and other document into easy accessible for a single handed administer operating system for concerned individuals. The establishment of this Blood Transfusion Management System operating by trained manpower will act as national data source all blood transfusion activities and will assist in conducting survey and research in this discipline .

The proposed computerized Blood Transfusion Management may be implemented through integration of Software and Hard Ware.

Objectives

The objectives of the programme are as follows:

1. Provision of Hardware and software for Head Quarter and other 20 Center.
2. Development of Customized software as appropriate for up-hold the service performance.
3. Installation and use of designed Customized software.
4. Development of Manpower through training/orientation.

5. Design, develop Website and Web based software for Blood Transfusion Management System.
6. Establishment the LAN and WAN

Major Benefits

The Proposed Information System is the solution that gives the following benefits:

- Centralized Information system through Web based application
- Easily update the information from periphery centers to central level.
- Effective tools for monitoring and evaluation.
- Institutional development to conduct survey, investigation and research.
- Improved health care services for the general population.
- Improvement of quality control and quality assurance.
- Improvement efficiency of management of Blood Transfusion Services through cost savings and optimization of workflow and coordination of Blood Transfusion activities
- Better donor service as the relevant information is readily available
- Better recipient service as the relevant information is readily available
- Improved communication through shared access to centre information
- Fast access to updated information with the assistance of Web site
- A scalable system can use on virtually any PC or laptop

Technical Aspect

The major thrust of the programme will be to establish one Central Computer Center at reference laboratory at Dhaka Medical College premises and peripheral centers connected with Wide Area Network for the computerization and integration of monitoring, evaluation and management of the Blood Transfusion Services of the country. The task will include:

a) Collection of primary data, review and finalization of the requirement of Blood Transfusion Services for automation.
b) Development of **Blood Transfusion Management System** application software with two part including Web based application as well as local multi user application software.
c) Establishment of LAN and WAN to connect each center.
d) Installation and Implementation of application software to the central and peripheral centers locally and also use the Web based software for centralized information system
e) Operational and administrative training to the staff.

f) Design and Development **'Website'** for world wide information dissemination.

Customize software:

To fulfill the entire need of computer based operation, the following application modules to be developed and implemented in each computer center of the department:

- Donors Health Profile Management Module
- Recipient Health Profile Management Module
- Blood Screening Data Management Module
- Cross-Matching Data Management Module
- Medicine Inventory Control Management Module
- Blood Stock Inventory Management Module
- Check-List Management Module
- Investigation and Surgical Management Module
- And other module as required

Estimated costing of Transfusion Management System

	Name of the Goods	Specification	Qty	Unit Cost	Cost	Comments
1	2	3	4	5	6	7
Hardware						
	Computer Server		2	4.00	8.00	For Dhaka Center
	Processor	Xeon 3.0GHz Dual Core Single processor Dual processor Capable				
	FSB	Min 800				
	Cache	Min 2 MB L2				
	Video RAM	16 MB Video RAM				
	RAM	2GB Dual channel DDR2 SDRAM with Expandability				
	Channel	Integrated Dual channel Ultra320 SCSI Disk Controller				
	Controller	RAID Controller with support 0,1,5				
	Hard Drives	4X73 GB SCSI Ultra320 , Min 10K RPM , 1 Hot Swap Hard Disk				
	Bays Drive	6 X 1" (Min) hot pluggable Ultra320 Hard drive bays Min 9 Bays including 6 Hard drive bays				
	Port	Min 2 USB , Serial , parallel , VGA , PS/2 mouse & Key board Port				
	PCI Slot	6 PCI Expansion Slot				
	DVD ROM	Min 8X or Latest Speed DVD ROM				
	Ethernet Card	Dual Gigabit Ethernet Card				
	Back Up System	DAT Back Up 40/80 GB				
	Monitor	17” Color Monitor (Digital Control) Flat				
	Resolution	Resolution 1024 X 768				
	Power Supply	Redundant power Supply				
	Casing	Tower casing				
	Management Software	Server management Software included				
	Warrenty	3 years Comprehensive warranty with parts and labour				
	Brand Type	International Reputed Branded				
	Country of Origin					
	Made in (One Country only)					
	Personal Computer		42	0.65	27.30	19* 2=38 (For

						Periphery)
	Processor	Intel Core 2 Duo				1*4=4 (For Dhaka)
		Processor–Intel Pentium 2.40 GHz or higher				
	FSB	(FSB 1066 MHz)				
	Cache	2MB L2 Cache				
	Chip Set	Intel 965 Chipset				
	RAM	1GB DDR2 with Expandability				
	Hard Drive	120GB SATA Hard Disk				
	Graphics Card	Intel Graphis Media Acclerator 3000 or higher				
	Ethernet Card	10/100/1000 Gigabits Ethernet card				
	Port	6 USB Port (2 front access) , Serial , Parallel , VGA , PS/2 Mouse & Keyboard				
	CD/DVD Drive	DVD R , CD R/W Latest Speed				
	PCI Slot	min 3 PCI Expansion Slot				
	Floppy Drive	1.44” Floppy Disk				
	Audio	Integrated Audio with internal speaker				
	Monitor	17” LCD Color Monitor				
	Brand Type	International Reputed Branded				
	Casing	Tower Casing				
	Operating system	Preloded Windows Vista Professional with original license				
	Warrenty	3 years Comprehensive warranty with parts and labour				
		Standard : US/UK/Japan & Equivalent Standard.				
	Country of Origin					
	Made in (One Country only)					
	Laser Printer		21	0.50	10.50	18 * 1=18
	Laser Jet					1*2=2
	Print Speed	Print Speed Min 30 PPM				
	Resolution	Resolu. 1200X1200 DPI				
	Processor Speed	Processor Speed 400 MHz				
	Memory	Memory Min 48 MB RAM Upgradale up to 300 MB				
	Tray	350 Sheets Paper Tray(Tray 1, 100 Sheets and Tray 2 , 250 Sheets)				
	Extra Toner	1(One) Extra Laser Toner				
	Print Type	Duplex Automatic				
	Connectivity	USB				
	Brand Type	International Reputed Branded				
	Warrenty	3 years Comprehensive warranty with parts and labour				

	Product Quality Certificate Country of Origin Made in (One Country only)	Valid International Product Quality Certificate to be submitted				
	Uninterrupted Power Supply (Online) Brand Model Capacity Type Rated Frequency Input Range Output Range Backup Time Response Time Output Monitoring System Country of Origin Made in (One Country only)	 2000 VA UPS On line Support (Windows,UNIX,LINUX) 50HZ AC 160V-270V AC220+-2% Minimum 2 Hours 0 Pure sine wave On line Support(Manageable with software) with LCD Display **Sub Total :**	2	0.70	1.40	For server
	Uninterrupted Power Supply(Off line)		42	0.05	2.10	For every Computer
	Brand					
	Model					
	Capacity	1000 VA				
	Type	**Off line**				
	Rated Frequency	**50 HZ**				
	Input Range	AC 160V-270V				
	Output Range	AC220+-2%				
	Backup Time	Minimum 20 Minutesin full load				

Software

	Operating System & Application					

	Software					
		Windows 2003 Server with 10 User	1	3.00	3.00	
		Microsoft SQL Server 2005 10 user	1	2.00	2.00	
		Visual Studio Pro 2005 with Documentation	1	0.50	0.50	
	Customized Software					
		Web Based Safe Blood Management Software and Local Multiuser Software	1	10.00	10.00	
		Sub Total :	**3**		**15.50**	

Web Page

		Domain Name Registration per year	1	0.02	0.02	
		Hosting 5GB Space + 100GB Bandwidth with Database per year	1	0.20	0.20	
		Web Page development for Safe Blood	1	5.00	5.00	
		Sub Total :	**3**		**5.22**	

WAN/Internet Connection

	Dial Up Internet Connection					
		Available Telephone Line	20	0.15	3.00	
		External Modem (One Time)	20	0.03	0.60	
		Internet Cost with Telephone line per month	20	0.01	0.20	
	GPRS System					
		GPRS Modem (One Time)	20	0.08	1.60	
		Internet Cost per month	20	0.01	0.20	
		Sub Total :	**40**		**1.80**	

Maintenance

		Maintenance the system for three years	1	3.00	3.00	
		Sub Total :			**3.00**	
		Grand Total			**74.82**	

Costing Summary

Costing for Central(HQ) Level :

Sl No	Component	No of Item	Cost
1	Hard Ware		
	Server	**2**	**8.00**
	Computer	**4**	**2.60**
	Laser Printer	**2**	**1.00**
	UPS online	**2**	**1.40**
	UPS Offline	**4**	**.20**
	Total		**13.20**
2	Software		
	Windows 2003 server with 10 user	**1**	**3.00**
	Microsoft SQL Server with 10 user	**1**	**2.00**
	Visual Studio pro 2005	**1**	**0 .50**
	Web based Blood Transfusion	**1**	**10.00**
3	**Management System**(for three years)		**3.00**
	Total		**13.0**
4	Web Page		
	Domain Name Registration per year	**1**	0.02
	Hosting 5GB Space + 100GB Bandwidth with Database per year	**1**	0.20
	Web Page development for Safe Blood	**1**	5.00
	Total		5.22
5	**WAN/Internet**		
	GPRS Modem (One Time)	1	.08
	Internet Cost per month	1	.01
	Total		0.09
	G. Total		**35.02**

Costing for Periphery Level (per unit) :

Sl No	Component	No of Item	Cost
1	Hard Ware		
	Computer	**40**	**26.00**
	Laser Printer	**20**	**10.00**
	UPS Offline	**20**	**2.00**
	Total		38.00
2	**WAN/Internet**		
	GPRS Modem (One Time)	20	1.60
	Internet Cost per month	20	0.20
	Total		1.80
	G. Total		**39.80**

Recommendation:

- The proposed networking system needs proper translation of activities for execution.
- The initiatives should be taken by the DGHS to form a national working group with relevant blood transfusion centre expert to figure out the process of implementation on the basis of proposed proposal.
- Detailing of the customize software on blood transfusion centre network need to developed by a separate APW of WHO
- Other country experience needs to share by arranging study visit of the relevant blood transfusion centre expert to neighboring countries where blood transfusion centre network is in practice.
- Regulatory framework and ethical issues in relation to blood transfusion centre networking need to address meticulously.
- Proper resource need to mobilize for establishing blood transfusion centre networking in Bangladesh.
- Proper attention should be given for recruiting voluntary donors in addition to blood transfusion centre networking.
- Social campaign also needs to develop for growing awareness on blood donation.
- Proper capacity development of the blood transfusion centre service providers need to develop to operationalize the blood transfusion centre networking system.
- Opportunities should exist for incorporating latest concept and technologies in relation to the implementation of blood transfusion centre networking.
- Approved national policy and guideline should be in place for public and private blood transfusion centre networking.

Reference:

1. Developing national policy and guideline on the clinical use of blood, WHO/BCT/BTS/01.30, March 1998.

2. Strategies for increasing the U.S. Blood supply, United State Department of Health Human Services, 2007.

3. Mowlana, S. Ali, Pioneering blood transfusion centre network system in Sri Lanka, April 1998.

4. America's Blood transfusion centres - Its about life, 2007.

5. Blood index, http:\\www.bloodindex.org.2007

6. Shukla, J.C., Eliminator of blood shortage and eradication of corneal blindness, 2003

7. No more blood shortage globally, Nahak Overseas Ltd., http:\\www.change makers.net\ journal/300508.2007.

8. Dr. Sultan, Murad "National Blood transfusion centre – Demanded structure for blood transfusion services in Bangladesh", 14th June 2007.

9. Dr. Huda, Kazi Mumtaz, "Blood donation system in Bangladesh, 14th June, 2007.

10. No more blood shortage globally, Nahak, http:\\www.nahak.com/ bloodbank.php, 2007.

11. Strategies for blood donor recruitment, report of an inter-country workshop, Dhaka, Bangladesh, 24-28, Sept. 2000, WHO, June 2001.

12. No one should die, Because, Indu Health research foundation, Vadodora, (P 1-3), www.indu.bloodbank.org, 2007

13. About Us, Blood transfusion centre of Hawaii.