

THE BLOOD TRANSFUSION SERVICES IN MALAYSIA

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INTRODUCTION

The special nature of Blood Transfusion Services has been very well described by Wolf who states that "unlike other clinical laboratories the blood bank provides a parenteral therapeutic agent. Unlike the pharmacy's primarily synthetic parenterals, blood and its components resemble tissue or organ transplants. They require individual patient-donor matching. The unique aspects of transfusion practice are attributable to the complexity of the biological agent administered, the resultant sequelae, its perishability, and the vagaries of a supply that is dependent on a complex technology of collection and the good will and cooperation of physicians, patients, and the general public. It is these factors which increasingly determine the activities of the hospital blood bank and explain its evolution towards a transfusion service quite unlike its sister laboratories, and not entirely similar to the pharmacy or the organ transplant service, yet sharing with them several important similarities. At the same time, the service continues to have an important role as a diagnostic laboratory not unlike that of any other clinical laboratory. In this role, the blood service shares the same organizational and managerial problems common to all clinical laboratories and all too familiar to clinicians such as prompt and accurate reporting of results and reliability of assays".

Therefore the important considerations in the organization of a Blood Transfusion Service are (i) the complexities of blood and its use as several vital therapeutic agents, (ii) the dangers involved and technology required in its administration, (iii) the safe, effective and economical utilization of blood, (iv) the problems associated with the need to maintain continuous supplies in the face of increasing and seasonal peak demands of a necessarily limited resource, (v) the need for co-operation and good will of people at both hospital and public levels as well as the need for public relation skills, (vi) the need for close co-operation of all blood banks in the country and co-ordinated planning in order to project future needs.

In recent years, blood component therapy has made a great impact in the more effective

management of various disorders. Many of the components of blood such as fresh frozen plasma, cryoprecipitate, packed red cells and platelet concentrates, can be easily prepared in blood bank laboratories equipped with blood bank centrifuges. Many other derivatives of blood of therapeutic value can be fractionated. However this type of processing requires the use of much more sophisticated machinery. Today as many as 20 therapeutic agents can be produced from blood as distinct components and fractions.

While blood transfusion is like a miracle life saving drug, it is important to recognize that the procedure can be dangerous to patients, that every activity involved in the handling of blood from the initial donor interview to eventual blood transfusion can affect the quality, safety and efficacy of blood transfusions. As the effective and safe use of various blood components and products in a variety of clinical conditions are important considerations, a strong clinical bias is certainly necessary in the organization of transfusion services, apart from the establishment of appropriate technology, general blood bank management, and quality control systems. While certain aspects of laboratory management do resemble that of other clinical laboratories, there are aspects peculiar to blood bank laboratories e.g. problems of blood inventory, control and the proper storage, despatch and transport of blood. The grouping, cross-matching and serological procedures have also to be considered.

As the transfusion service is dependent on community support and the good-will and generosity of the public, continuing meaningful publicity programmes at national and local levels combined with well organized expert bleeding teams are essential to ensure the ready availability and supply of blood.

Because of the obvious limitation of procurement of blood, resource sharing activities have to be developed. An integrated network of blood banks having the same standards of performance throughout the country would be able to share blood resources resulting in efficient utilization of every unit of blood collected. Such a co-ordinated national system

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would also ensure that the whole country would have equal access to the full range of activities for patient care. Furthermore it would also be possible to fulfil sudden increases in demands more efficiently e.g. in the event of national or local disasters.

Against this background illustrating the complexities of running a transfusion service, we can now consider how the transfusion services in Malaysia have met these challenges. It is perhaps best to start with a short history of the early beginnings of the service.

THE ORGANISATION OF TRANSFUSION SERVICES IN MALAYSIA.

Early Beginnings

As early as 1950, the importance of blood transfusion as a life-saving procedure was recognized in Malaysia, as there are records of donors having donated to the Blood Bank, General Hospital, Kuala Lumpur in that year.

In 1955 the Blood Bank (then known as the Selangor Blood Bank) was run by a British Red Cross lady volunteer and the Bank only operated once a week on Wednesday from 5.00 pm. to 6.30 p.m. The average number of donors per week was 25 and the highest obtained was 44 donors in a week. There was apparently good co-operation from the police, army and government departments and the blood collected was said to be just sufficient to meet the demand. It was realised even then that the Blood Bank could not depend on random donors and attempts were made to purchase a mobile blood donor van. This idea was however shelved due to lack of funds. The Jaycees (Junior Chamber of Commerce) was actively involved in recruiting donors.

From 1958 onwards a medical officer appointed by the Ministry of Health was attached part time to the Blood Bank and later in the same year a supervisor was appointed to take overall charge full-time.

In 1961 the staff of the Blood Bank of the General Hospital, Kuala Lumpur comprised one medical officer, two supervisors, two assistant nurses and one attendant. In 1970 the number of blood units collected increased to 5803 and a total of 13860 cross-matchings were undertaken. In 1971 the Blood Bank moved to the present premises.

Launching of the National Blood Transfusion Services

In April 1972 the National Blood Transfusion Service was launched by the Director-General of Health Services with the National

Blood Transfusion Centre set up as "an independent body sited at the Blood Services Centre, Hospital Besar, Kuala Lumpur integrating all government hospital blood banks services in the country including the serving of the Hospital Besar with proper staff and facilities under the Hospital Division of the Ministry of Health". A full time director (Haematologist) was appointed.

Progress in the development of the National Blood Transfusion Services

By 1975 standardization was brought about throughout the country in all government hospital blood banks in various aspects of blood banking e.g. rules of work, stationery, methodology, reagents, staffing and equipment. Training courses for medical officers and laboratory technologists were conducted with WHO assistance to improve standards of serology practice in blood bank laboratories. Basic text-books were made available to consolidate the training programmes. The plastic blood bag system was introduced, replacing the old practice of collecting blood in glass bottles which carried considerable risks to both patients and donors. The plastic blood bag system enabled blood banks particularly the Blood Services Centre, Kuala Lumpur to produce blood components e.g. fresh frozen plasma, cryoprecipitate, platelet concentrates, packed red cells and washed red cells. Budgeting for running the National Blood Transfusion Services was drawn up and was estimated to be \$1.9 million (excluding special expenditure items) in 1975.² The compilation of national annual data on transfusion services provided essential information on progress and data for development possibilities, for public consumption, and donor recruitment exercises.

Apart from transfusion services, specialized haematology services were also provided by the Blood Services Centre to the General Hospital. This linkage of transfusion services with haematology proved to be advantageous, providing a better understanding of transfusion needs for patients and unique opportunities for medical officers and technologists for comprehensive and meaningful training in both transfusion and haematology in the same premises. It also provided a strong clinical bias to transfusion services which as pointed out earlier is an important aspect in the organization of transfusion services. The continuing function of the centre include providing transfusion services to the General Hospital, referral services for transfusion problems for the country, routine

and referral haematology services for the investigation and management of patients, and central registry for haemophilia. The investigation for Hepatitis B infection in blood donors, patients, contacts and staff is also the special responsibility related to transfusion services carried out by the Centre.

TYPE OF ORGANIZATION

The type of organization of transfusion services may differ considerably from country to country. It may be an independent organization completely divorced from hospital services, its functions being mainly collection, processing, special despatch of blood and research activities which are carried out by very large centres run by specialist haematologists while the actual hospital transfusion services and haematology services together are looked after by other specialist haematologists (as in Australia). The services could be under governmental control or under Red Cross but funded by the government (as in Australia) or under some other form of community organization. It could be pluralistic as in the United States in the sense that different groups of blood banks in the country operate under differing policies and different organizations instead of ideally operating under one type of system only. There could be many regional centres each having its own director but without the advantage of central co-ordination by a National Director (as in U.K.).

In Malaysia almost all the blood banks are attached to government hospitals i.e. the organization is fundamentally hospital based and hospital controlled. There are 60 hospitals in Peninsular Malaysia and 32 hospitals in East Malaysia, 13 of which may be designated as having regional blood banks. The National Blood Services Centre is itself part of the General Hospital Kuala Lumpur.

In countries with well organized transfusion services, many specialists are available to run the service at all levels i.e. at central, regional and hospital levels. In Malaysia there is a paucity of specialists for transfusion and haematology services. Only 2 haematologists (Director and Deputy Director) are available. Furthermore the service is essentially hospital based and controlled. However within this setting it has been possible to provide a clinically orientated transfusion service as well as develop special fields of clinical significance i.e. Haemophilia and Hepatitis B infection. The speciality of blood transfusion is not generally considered an "attractive" posting for Malaysian doctors. The development of

and emphasis on the clinical aspect of blood transfusion has therefore played an important role in attracting suitable medical officers for the service, and will continue to provide a suitable training environment in all aspects of transfusion and haematology in the country for future specialists.

Hollan in a recent report³ states that the lack of experts in developing countries is one of the most important limiting factors in the development of National Blood Transfusion Services (NBTS). She states that since haematology and immunology overlap and intersect with blood transfusion, the best solution would be to train physicians (medical officers) in blood transfusion, haematology and immunology in a combined specialists training scheme.

The basic framework of the transfusion service in Malaysia resembles to some extent the Hungarian Blood Transfusion Services. Excerpts from the report⁴ on the latter are as follows:—

1. The Hungarian Blood Transfusion Services is governmental . . . supported by funds advanced to the Ministry of Health.
2. The service is centralized. Professional guidance and control are exercised by a Centre for Haematology and Blood Transfusion.
3. All other blood transfusion centres in the country operate within hospitals The Central Institution of the National Blood Transfusion Service (N.B.T.S.) functions directly under the Ministry of Health, while the regional, country and other blood transfusion centres are supervised by the Centre.

In summary, the Hungarian Blood Transfusion Service is said to have greatly benefited from the fact that the Centre directs and controls the national network of blood banks, and that besides the production of blood and blood components, it also treats haematological patients directly and works in unison in the areas of blood transfusion, haematology and immunology.

The above system is cited as reasons for a highly developed blood transfusion service in Hungary.

Another reason for rapid growth was attributed to the close organizational and scientific co-operation between the three disciplines; blood transfusion, haematology and immunology. "The centre is also actively involved in the treatment of haematological patients . . . New scientific achievements, new or improved methods are passed on imme-

diately to the 65 regional centres. The intimate connection with clinical practice, among others, attracts well trained physicians (doctors) and other science graduates to work and stay in the service . . .”

POLICY AND AIMS

Because of world wide problems and hazards of transfusion services, the World Health Organization at its 28 World Health Assembly in Geneva in May 1975 urged all member states

- (a) to promote the development of national blood services based on voluntary non-remunerated donation of blood;
- (b) to enact effective legislation governing the operation of blood services and to take other actions necessary to protect and promote the health of blood donors and of recipients of blood and blood products.

The early history of blood transfusion practice in this country geared the services towards a voluntary non remunerative system, and most blood banks attempted to recruit donors based on these principles. Furthermore a national policy for a non remunerated system for donor recruitment was formalized in 1979, when the first National Seminar for Transfusion Services was held. At that time the private sector was also represented to discuss the problems of transfusion services. It was officially established that the National Transfusion Services incooperating all blood banks in the country would be run on a voluntary non remunerative system. Some of the aims and goals laid down at this seminar were as follows:

1. To encourage, foster and support efforts to form a totally voluntary non-remunerative blood donation system;
2. To achieve a target of 10% of adult urban or 2% of the general population in donor recruitment in all states in Malaysia. Under this system mobile and group donations were to be increased.
3. Greater centralization of donor recruitment was to be brought about to prevent unnecessary competition for donors, particularly in the main cities.
4. Replacement donors were to be gradually abolished. Mobile and group donations were to be increased.
5. Component therapy was to be increased and whole blood transfused reduced progressively to not more than 20%.

FUTURE DEVELOPMENT

While at the present time, there is no unified

centrally managed truly "National Blood Transfusion Services", the basic frame work of this services has already been established. such as standardization of methodology and various aspects of laboratory management. The Blood Services Centre also functions as a referral centre for transfusion, haematology problems, haemophilia and hepatitis and provides the strong clinical bias that is necessary in modern transfusion practice. Organization of transfusion services based on a centre carrying out combined activities of blood transfusion with haematology has been found to be very successful and is recommended by Hollan³ for transfusion services in developing countries. Donor recruitment policy has been established based on the 1975 WHO Assembly and on the Code of Ethics of the International Society of Blood Transfusion and certain goals and aims have been outlined. Some of these goals have been met. The number of blood units donated in the whole country has increased (Table 1). In Kuala Lumpur the amount of blood collected at the Blood Services Centre has increased to 22,866 units in 1983. More than 65% are from non replacement civilian donors (Table 2). The number of blood units collected in the *Wilayah/Petaling Jaya* area in 1983 amounts to more than 35,500 (Table 3). 3.2% of the population in this area appear to be donors (Table 4). Almost 50-60% of the blood collected at the Blood Services Centre are separated into components. In all other blood banks it is mostly whole blood that is used.

As more haematologists become available, considerable improvements to both transfusion and haematology services can be expected together with better co-ordination of services on a national scale. Trained medical officers and specialist haematologists would act as key personnel establishing better communication between the central and peripheral counterparts in all aspects, e.g. professional, supplies, referrals and administration. It would also be possible to increase the production of components and bring about more effective utilization of blood by promoting component therapy rather than whole blood at peripheral hospitals. While the recruitment of blood donors is an important aspect of the transfusion services, the proper utilization of blood in our hospitals is equally if not even more important.

Because the amount of blood collected and the amount of blood products that can be made available is necessarily limited by the number of people donating blood and presence of processing facilities, blood and blood

products should be regarded as the country's very own precious resource for vital therapeutic materials. It is important therefore to assess basic and future needs.

The basic blood requirements for the centre may be estimated from the number of acute hospital beds. It is said that to meet the requirements of 1000 emergency hospital beds, a panel of about 7000 donors is required.' As there are 26,816 government hospital beds in both Peninsular and East Malaysia at least 187,712 units of blood would be required. It is also said that the need for blood can be met if about 2% of the population are regular donors. However with the development of open heart surgery, renal dialysis, and other procedures using transfusion, more blood would be required. As the population of Malaysia is 13.1 million the requirements for blood would be in the region of 262,000 units if no specialised units have been developed. The quality and adequacy of transfusion services can also be gauged from the availability of blood products for haemophilia. According to world statistics it can be assumed that at least 50 haemophilia cases per million population can be expected. Each patient would require at least 20,000 units of Factor VIII every year. In Malaysia it is estimated at least 13 million units of Factor VIII would be required for the management of haemophilia. Therefore more than 130,000 units of blood would need to be processed for cryoprecipitate, if 100 units of Factor VIII can be extracted from each unit of blood. However as the sole use of cryoprecipitate has several serious disadvantages, lyophilized concentrates would have to be produced requiring large amounts of good quality source plasma. If ideally 5% of the population donate blood it would be possible to recover 4 - 10 thousand litres of plasma from which 200 units of Factor VIII (intermediate potency, average technique) per litre could be extracted and processed in a fractionation plant, depending on the quality of source plasma, among other limiting factors affecting the Factor VIII concentration of the final product⁶. From another viewpoint each patient, utilizing 20,000 units of Factor VIII per year, would require the processing of 100 litres of plasma to produce intermediate potency concentrate.'

The collection of blood for the country as a whole needs to be greatly increased and component therapy promoted. As the situation in the Kuala Lumpur area is promising, a similar pattern of greater collection and more effective utilization of blood can be expected in other

blood banks.

New blood banks are being established in the private sector. This would result in fragmentation of blood banking services, differing standards among the different blood banks and competition for blood donors. At the same time total effective plasma collection and utilization would be less than what can normally be expected from a centralized service. Furthermore the particular dangers associated with blood bank technology and transfusion of blood carry with it special responsibilities. Constant availability of control and reagent cells and antisera are also necessary, the use of which in small blood banks may prove very expensive and impractical.

As the number of specialists in the service increase, strengthening of the existing framework of organization can be expected. A co-ordinated national network of blood banking and haematology services geared to serving hospitals and community can promote development of efficient, economic and effective utilization of blood and blood products and eventually self-sufficiency.

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TABLE I

UNITS OF BLOOD COLLECTED IN 1982 AND 1983 IN MALAYSIA.

State	1982	1983
Perlis	1,850	1,685
Kedah	7,493	7,474
Pulau Pinang	7,829	7,754
Perak	11,183	11,191
Selangor	5,174	5,036
Negri Sembilan	4,682	5,164
Melaka	4,226	4,264
Johor	11,416	11,756
Pahang	4,487	4,799
Terengganu	1,981	2,180
Kelantan	6,457	6,830
Blood Services Centre, Kuala Lumpur	21,727	22,866
Peninsular Malaysia	88,505	90,999
Sabah	13,780	15,158
Sarawak	12,626	12,793
Total for Government Hospital Blood Banks	114,911	118,950

Blood units collected from other hospitals in Kuala Lumpur.

University Hospital	9,672	9,889
Chinese Maternity Hospital	280	201
Assunta Hospital	2,682	2,470
Lady Templer Hospital	324	203
	12,958	12,700

Total collection from Peninsular and East Malaysia	127,869	131,650
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Ratio of Blood Donors to Population = 1.0 : 100

BLOOD TRANSFUSION SERVICES

TABLE 2

UNITS OF BLOOD COLLECTED ACCORDING TO CATEGORY OF DONORS

Category	Year				
	1978	1979	1980	1981	1982
Civilian	10,294	11,699	13,473	14,535	14,586 (67.14%)
Army	888	1,012	1,778	1,429	1,702 (7.83%)
Police	4,113	3,122	2,330	1,501	1,567 (7.21%)
Replacement	1,013	1,888	2,715	3,004	3,872 (17.82%)
Total	16,313	17,721	20,296	20,469	21,727

TABLE 3

BLOOD COLLECTION IN WILAYAH (Kuala Lumpur City) AND PETALING JAYA

Hospitals	Blood Units collected in 1974, 1982, 1983		
	1974	1982	1983
Blood Services Centre, General Hospital, Kuala Lumpur.	11,533	21,727	22,866
Other Hospitals) University Hospital	6,946	9,672	9,889
in and around) Assunta Hospital	*	2,682	2,407
Kuala Lumpur) Chinese Maternity	*	280	201
Lady Templar	*	324	203
Total of 4 Hospitals	*	12,959	12,700
TOTAL COLLECTION		34,686	35,566

* Not known.

TABLE 4

RATIO OF BLOOD DONORS TO POPULATION IN THE WILAYAH/PETALING JAYA AREA

Area	Population (1980 Census Report)	Total Donations in 1983
Wilayah (Kuala Lumpur City)	919,610	23,270
Petaling Jaya	207,805	12,296
Total	1,127,415	35,566

Ratio of blood donors to population = 3.2 :100