A Need for Computerization of Blood Bank for Efficient Services

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Abstract

A well organized Blood Transfusion Service is vital component of any health care delivery system. The Blood Transfusion Service in the country is highly decentralized and lacks many vital resources like man power, adequate infrastructure and financial base.

Hence the following study was undertaken to study the existing work pattern in a Blood Bank of a Tertiary care hospital and to suggest the effective measures to reduce the unproductive work for optimum and effective utilization of human resources.

Introduction

A well organized Blood Transfusion Service (BTS) is vital component of any health care delivery system. The Blood Transfusion Service in the country is highly decentralized and lacks many vital resources like man power, adequate infrastructure and financial base.

There is shortage of trained health care professionals in the field of transfusion medicine. For quality, safety and efficacy of blood and blood products, well equipped blood centres with adequate infrastructure and trained manpower is an essential requirement. For effective clinical use of blood, it is necessary to train clinical staff. Drugs and cosmetics Act 1945, Schedule F, Part XII B and Part XII C is applicable to the License.

The daily load of investigations per technician is more, staff gets taxed physically and mentally. This has led to increasing dissatisfaction and demotivation among the staff personnel.

Hence the following study was undertaken to study the existing working pattern and set up the measures/strategies for increasing the efficiency of work.

Material and Methods

This case study has been taken up to analyze the existing working pattern of Blood Bank service in a tertiary hospital i.e B.Y.L. Nair Hospital, Mumbai.

The following methodology was used in assimilating and compiling data for case study.

- Critical review of existing staff personnel, methods, systems and procedures.

- Compilation of historical data base of year 2004 to 2006.

- Informal chart & feedback from staff.

- Existing data management.

- Analysis of workload for meaningful trends.

Result

See Table 1.

Similarly same time is taken for HCV testing and Hepatitis B testing of Blood units.

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Table 1 : Time motion study of each job

1. Stock Checking	400 Bags (minimum)	1 and 1/2 hour
2. Stock Report Preparation	Rough and Fair	40 minutes
3. Planned surgery (C.M) calls	For preparation and testing	70 minutes
6. Emergency calls	For preparation and testing	30 minutes
7. For calls associated with Coomb's test		1 hour (3-4 days)
8. Antibody calls		1 hour 15 minutes
9. Serum grouping	For preparation	2 hours
(50 samples)	A cells and B cells	15 minutes
	O cells and O cells papain	30 minutes
10. To check Bags to be taken on stock	50 Bags	30 minutes
11. Ante Natal Checking	10 samples	15 minutes
12. Cord grouping	10 samples	10 minutes
13. Ward ANC	20 samples	30 minutes
14. Outdoor Cards entry (Donor Register)	100 Cards	3 hours
15. Donor Entry (Master Register)	100 Cards	3 hours
15. Writing Diagnosis in Issue Register	100 cards	1 hour
16. Filling the register for test results 7 Registers	2 Hour 80 minutes	
17. Micro ELISA HIV test		(3 hours and 35 minutes)

As seen above (No. 14 and 15) this data writing takes 3 hours for 100 cards. They are being **duplicated** causing waste of 3 more hours; and there is **triplication** of writing the test reports.

The staff works for 8 hours daily.

The Blood Bank services are round the clock and staff works in three shifts.

If 3 hours are spent on documentation out of 8 working hours

Therefore 3/8 X100= 37.5% of hours on writing

Physical stock verification and preparation of daily report takes 2/8x 100= 25% of hours on writing.

The workload of last 3 years tabulated below shows increasing work and patients (Table 2).

The above data shows increasing trend of donors and the blood bank work. This has led to increased work load on existing technicians.

Table 2

	2004	2005	2006
I) Total Blood Collection	11,618	12,914	13,668
II) Pretransfusion in Patients			
Cell Grouping	9,952	8,687	10,146
Serum Grouping	9,952	8,687	10,146
Compatibility Tests (Cross matching)	15,606	14,468	16,174

of the patient's samples.

Discussion

The daily load of investigations per technician is 70-100 testings day, which taxes them physically and mentally.

The above Table shows 3 years analysis work load has increased by 10 %.

Calls for planned surgeries, emergency duties, Elisa tests for HIV, HBsAg, HCV, VDRL is manual and takes 3- 4 hours. These jobs are allotted to the six approved laboratory technicians respectively which are done during routine hours only.

1) Documentation and writing in the registers by the personnel takes 35%-40% of their time.

— Generating daily stock reports after physical stock verification takes 25% of time.

— Ledger maintenance, Invoice, preparing order forms for the consumables, equipments, quotations and typing letters by the CCT (clerk cum typist).

Maintaining the utilization of each and every blood unit which leaves the blood bank and recording it in the Master Register done by the Record Assistant (RA).

All these jobs are extensively manual labour oriented.

There is no computerization of the Blood Bank.

Recommendations

Documentation

Documenting and maintenance of records is an important aspect of Blood Bank and is mandatory and statutory requirement by FDA.

The following significant and important information were obtained :

- Duplication and triplication of same data
- Documentation activity consumes 35%-40% of working hours of every employee
- Delay in generating monthly and administrative reports
- Difficulty in preparing and procuring data from old files whenever required by the Incharge or other administrators.
- Problems of errors and omissions.

A Data base frequently analyzed to see the trend and arrive at meaningful results.

The above problems can be addressed to a very large extent by using the Computers in the Blood Bank.

Computerization

Indian parliament adopted a 'National Blood Policy' in 2002, which clearly says in objective 3, strategy 3.5 that use of automation shall be encouraged to manage higher workload with increased efficiency.[1]

Automation for many other blood bank tests is unavailable. Many facilities had data processing capability, which is used primarily for accounting.[2]

There are several basic reasons for the rapidly expanding use of computers in blood banks.[3]

- The computers are more precise and accurate than human beings.
- Transcription and labelling errors do not happen with the computers.
- They can perform monotonous and repetitive functions with far more accuracy.
- Inventory management with principle like First-In-First-Out (FIFO) becomes extremely easy.

If financial resources are severely limited, where installation of a central computer system proves impossible, it may still be feasible to use microcomputers, the costs of which are low, to solve a particular problems. Microcomputers are able to,

- control laboratory instruments, and analyze, store, and print out the results;
- store and retrieve special donor data;
- help with inventory control;
- store and retrieve blood grouping and test results.

Nevertheless, they are no substitute for a central computer system, although they can ultimately be connected to such a system and thus act as terminals.

Use of computer demands suitably trained

staff to work at the terminal stations, to read the simple questions from the screen and enter the answers on the keyboard, or to enter the questions on the keyboard and read and record the computer's answers. This type of work requires only literacy and a disciplined approach.

The following queries or details can be obtained very fast.

No. Query

1. Details of outdoor collection during certain period
2. Details of Indoor blood collection during certain period
3. Complete details of a blood bag
4. Transfusion reaction Details
5. Serology test details
6. List of seropositive donor details
7. Details of Discarded blood bags
8. Blood Issue details for a particular period (day)
9. Blood stock details group wise
10. Blood component stock details component wise (group wise)
11. Anti sera purchase details
12. Plant machinery and lab equipment details
13. Service contract details
14. List of Consumables expiring in next three months
15. List of Consumables reaching Reorder level
16. List of Service Contracts expiring in next three months
17. List of Components/Blood with expiring after 7 days
18. List of Platelets which are expiring after 8 hours

These data can be of extreme use in:
- Audit purpose
- Hospital Transfusion Committee Meetings.
- Also avoids duplication and triplication of record writing.

This will reduce the unproductive work and will improve efficiency of staff thus increasing the effectiveness.

Reports

No. Reports

1. Monthly Blood Bank Report (Form B- S.B.T.C)
2. Blood Bank Report (monthly)
3. Annual Administrative Report
4. Blood camp details
5. Blood reserved for planned surgery details
6. Blood stock details group wise.
7. Blood component stock details component wise (group wise)
8. Letter for HBsAg and HCV reactive donors
9. Donor Card for Voluntary donors
10. Blood Bag No. on sticky paper for samples to be tested.

These reports have to be generated daily. Here extensive manual labour was required and there used to be wastage of time. However computerization with only once entry of data the above data/ reports could be generated.

Benefits Reported by :

For patients :
- Reduced waiting time for getting the services
- Improved care due to:
  - Accurate records
  - Fast retrieval of records
  - Better forecast of services

For Hospitals :
- Better communication of patient orders.
- Standardization of protocols for diagnostics and treatment
- Improved medical audits
- Better planning and evaluation
- Assistance in teaching and research

Novel applications of computer-based technology in blood banking and transfusion

medicine have been developed and reported in the medical literature.[4]

Computerization of a Blood Bank (annual collection of 10,000- 12,000 units) of a tertiary care Hospital will improve the efficiency and effectiveness of the staff personnel benefiting the patients and donors at large.

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BLINDNESS IN THE ELDERLY

Cataract is the leading cause of blindness in older people, followed by uncorrected refractive errors, glaucoma, age-related macular degeneration, and diabetic retinopathy. With ageing population, rising obesity, poor diet, and sedentary lifestyles, diabetic retinopathy is an increasing, yet preventable, cause of new-onset blindness in many countries. Overall, 75% of blindness from all causes is preventable treatable, or curable.

In developed countries, age-related macular degeneration is the most common cause of blindness, with as many as two-thirds of people aged older than 80 years showing signs of the disease.

Over the past 2 years, intravitreal injections of vascular endothelial growth factor suppressors (ranibizumab, pegaptanib, and bevacizumab) have revolutionised the treatment of wet or neovascular age-related macular degeneration, which is the most visually disabling form of this disease.

Most of the huge burden of blindness in elderly people worldwide is more readily addressed by providing glasses, cataract surgery, eyedrops for glaucoma, a healthy diet, and stopping smoking.

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