

# BLOOD BANK MANAGEMENT SYSTEM

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**Abstract** - The goal of blood bank which is used in storing and managing blood which is collected by blood collection and donation, which can then be use for transfusions in future. It is possible to store data on donors and blood availability online using web-based blood bank management systems, as well as to track transactions and other information. The research on this topic suggests that manual systems are less effective and more costly than computer systems. As a result, it also extols the virtues of computerization for achieving efficiency and effectiveness and highlights some imperative issues that are left unaddressed, such as the proper assignment of responsibility for managing the computer systems. The CBBR (Centralized Blood Bank Repository) is a new system for managing blood banks. The system allows both donors and recipients, such as hospitals and patients, to register. The administrator of the system will add blood banks into the system so that donors can access information about blood donation campaigns that are organized by these blood banks. Aside from receiving important information about the type of blood available and where it gets donated, recipients (patients, hospitals, clinics, etc.) can also access specific information about the blood donation centres. It will also be possible for the system to keep a continuous record of all transactions in the blood banks so that proper reports and decisions can be made. Blood banks, hospitals, patients, and donors will be able to benefit from a variety of functionalities and access a wealth of information thanks to the new CBBR. This means that blood donation and reception will become much easier and faster.

**Key Words:** blood bank, blood bank management system, donate blood, save size, blood receiver etc.

## 1. INTRODUCTION

Records of blood, as well as information about the donors of the blood, as well as hospitals and patients who need blood, are kept by blood banks. In this process, there is not a whole lot of margin for error, if any, and therefore, it should be managed and controlled carefully. Blood donation has a very delicate process, and therefore, it should be managed and controlled carefully.

When matching a donor with a recipient, the type of blood is taken into consideration, as well as differences in the type of blood, sugar content, antibodies, etc. As such, it is imperative to store and maintain these data and information with high levels of integrity and protection. Furthermore, primary test results are also important information. Today's blood banks keep their data and

information in files. This means sheets, papers and files organized alphabetically or numerically keep a record of blood, donors and recipients. In addition, test results are recorded on paper, making data retrieval difficult and time-consuming. This leaves data vulnerable to errors and human error, putting lives at risk. The system is also not very efficient.

Retrieving information about donors, recipients, and blood is a tedious process that takes a lot of time. In addition, hospitals' requirements and the urgency usually involved causes hospitals to be more difficult to manage and puts recipients in danger. Data security, backups, and safety also suffer as files and papers can be easily stolen, lost, or destroyed.

There are several computerized blood bank management systems (BBMS) available, but the current systems are merely archival databases that are virtually useless to doctors and nurses. As a result, they still haven't been accepted by establishments since they focus more on storage than on coordinating management and operational processes. In this paper, we will analyze relevant researches and documents in order to offer a new solution after a careful analysis.

## 1.1 objectives

The purpose of this research is to find a feasible solution to the problems currently encountered by blood banks and blood donation centers. This research has the following objectives:

- 2 A feasible solution for managing blood bank activities should be developed.
- 3 Establish communication channels between donors, hospitals, donors, and recipients.
- 4 Organize blood banks and blood donation centers to collaborate.

## 2. Literature review

Throughout this study we aim to find a solution that will assist blood centers as well as patients and willing blood donors alike. In order to reach that goal, plenty of effort has been devoted to studying existing research in this area and gathering enough information to help. The concept of blood bank management systems has been the subject of a number of researches and the vast majority see computerization as an effective strategy for improving

efficiency and effectiveness in this area without considering some potential drawbacks the system might experience limited or functionalities.

As a management information system, Pah Essah and Said Ab Rahman (2011) developed a blood bank management system based on information about the donor, the recipient, and the blood. We propose that the system has three modules: However, one crucial issue is left out in this approach, such as who should be responsible for administrating the system. Their system has three modules: the donor module, the patient module, and the blood module.

The development of a blood bank data management system is one approach to prevent near misses and improve retrieval of records, according to Maitrey D Gaijjart (2002). With computerization, they assert, records can be faster retrieved which will improve operations at blood banks.

By analyzing supply chain management for blood and blood products Jeroen Benien and Hein Force (2012) suggested that the process was irregular, as were demand levels for blood. Developing an effective blood bank management system would have profound implications.

Last but not least, E. M. S. S. Ekanayaka and C.

Wimaladharma (2015) developed a Blood Bank Management System that can collect all the blood donors in one place and inform them constantly about the opportunity for blood donation by SMS to their mobile phones.

The following is a proposal for a system that would fix many of the current problems with blood bank management

### 3. METHODOLOGY.

#### *a. Design:*

Our first research method will be qualitative, specifically interviewing a number of people at a blood donation event. By examining the processes, activities and amount of information collected throughout the process, we can better understand the methods that were employed to perform them.

And our next step will be to add support to what we have learned through the interviews with a quantitative approach, such as document reviews and observation. Several of the interviews appear vague, and some of the interviewees might provide information that is not representative of what is going on in the real process.

#### *b. Approach:*

Using two approaches, we began with peer-reviewed

research papers in the area of this study. We then extracted all the important information from these papers. This part of the literature review follows the method proposed by Prof. Kitchenham, which provides guidelines for software engineering researchers to produce a literature review that is a fair evaluation of a research topic by using a set of criteria.

In the case of FTMS College, we visited a blood donation campaign, and in Celebrity Gym in Endah Parade, we visited a blood donation campaign. We interviewed donors, campaign organizers, and nurses. Two of the people interviewed in each place were donors, two campaign representatives, and three nurses from the Malaysian Blood Transfusion Society were trying to collect donor information on the forms.

### 4. DISCUSSION.

#### *4.1 Age and gender of donors:*

Approximately 30 percent of blood donations worldwide has been come by women, although these numbers vary across countries. In twenty reporting countries, the proportion of female donors is less than 10%.

In low- and middle-income countries, proportionately more young people donate blood than in countries with high incomes. For the formulation and monitoring of recruitment strategies, demographic data are important.

#### *Types of blood donors:*

There are 3 types of blood donors:

The following options are voluntary unpaid \* family/replacement \* paid.

Regular, voluntary, unpaid blood donors are the most reliable and safest source of safe blood, as they have the lowest mortality rate from blood borne diseases. According to the resolution (WHA63.12) of the World Health Assembly, all Member States should develop voluntary unpaid blood donation systems and do their best to achieve self-sufficiency.

Among low- and middle-income countries, voluntary unpaid blood donation rates have increased significantly:

- During the period 2004–2012, 162 countries reported an increase of 8.6 million voluntary unpaid blood donations. Blood donations from voluntary unpaid donors increased most in SouthEast Asia (78%) and Africa (51%), while in Western Pacific they increased by the most number in absolute terms.
- The majority of blood supply in 73 countries comes from voluntary, unpaid donations. Sixty countries receive 100% (or more than 99%) of

their blood supply from voluntary unpaid donors.

- About 50% of the blood supply is still derived from family/replacement and paid donors in 72 countries.
- There was still a reported collection of paid donations in 25 countries in 2012, with a total of about 1500000 donations.

#### **4.2. Challenges Facing Blood Transfusion in Developing Countries:**

Nigeria, for example, has a blood transfusion process that is prone to errors and challenges that ultimately result in the loss of human lives. Blood donation and transfusion are facing numerous challenges, including blood shortages, inequitable access, increasing needs, Insufficient data and documentation as well as a lack of interactions between hospitals and blood banks, donors and recipients are contributing to a decreasing pool of eligible donors; increasing donor selection criteria; poor blood stock management; and bad management of blood stocks. Despite the study's inclusion of 73 nations, more than 50% of the blood supply still requires family/replacement and paid donors. This is a result of insufficient information on the part of potential donors and poor recruitment on the part of blood donors. **3.3. Global Population and Blood Supply**

The World Health Organization's Director of Blood Transfusion Safety, Dr. Neelam Dhingra, in 2013 conducted a study that identified 107 million blood donations were made worldwide from 177 countries. Most of the blood collected from paid donors comes from medium-income nations, which make up 98 out of 100 countries. High-income countries made up 49%, while low-income countries made up only 12%.

### **5. PROPOSED SYSTEM.**

So from the above review, we made the aim of our research to pay a very close attention to blood transfusion centers, blood banks and the various processes and stakeholders that are involved in those establishments in order to develop a system that will coordinate and improve the quality of the various activities and processes that are carried out. The system we are proposing will be centralized. This means that it will be a single system that will accommodate different types of users all accessing the same information and a number varying functionality.

The proposed system will be Web-based. It will be developed in HTML 5/CSS and JSP on the WWW platform and will be accessed through the HTTP protocol. HTML 5/CSS will be used to develop the user interface for the application while JSP will be used to implement the backend functionalities.

The proposed system will store a large amount of

information and therefore will be connected to a database. For this project, we will use H2 database. H2 database is a pretty new, As a result, it is really fast, secured and quite easy to use.

A number of important yet lacking functionalities have been identified while reviewing the existing systems. These functionalities represent the processes that tends to keep the blood centers lagging technologically.

For the donors, which can be paid or volunteer donors, they will have access to important information on blood donation process and requirements as well as the location of blood centers and blood donation campaigns. They can also be able to register as a regular donator. This provides a vital link that is lacking in the existing systems. With the new system, a donor is just clicking away from any information he needs on a blood center or campaign event. The proposed system will also help eliminate redundancy of performing group and genotype tests every time a donor is donating.

The proposed system will also support transactions on both acceptors and donor's side. An acceptor can pay for a transfusion center's services and a donor can also be paid for his services.

On the receptors side, the proposed system will provide them with important information about the availability of their required blood type, the blood center in which it is available and transaction information. Receptors can also communicate real time with donors and blood centers. In case of an unavailable type, the system will give the receptors the chance to post a general request that can be seen by anybody willing to be a donor.

The proposed system will also accommodate a super admin that will manage the existing, new and changing information on blood bank and centers and to confirm (Accept or Deny) campaigns and event requests before they are posted to the system. The proposed system can be accessed by anybody with internet connection and a web browser.

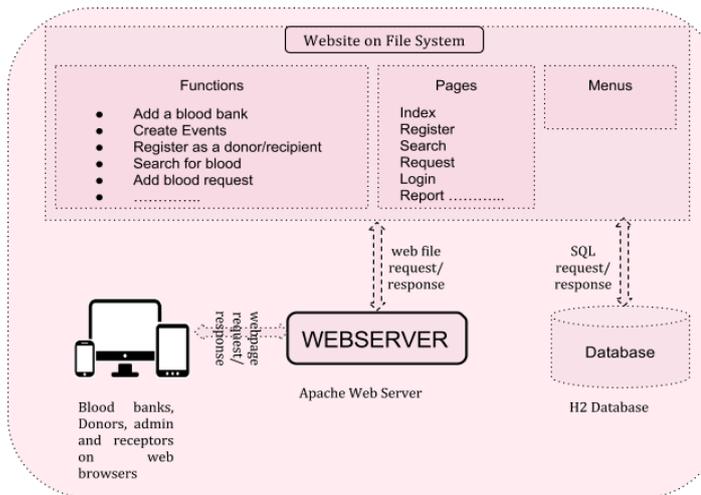


Figure 1: Architecture of BBMS

### 2.3. Proposed Architecture

Our new system will be a website hosted on an apache web server. The overall architecture is centralized. In this sense, the system is deployed in a central server while being accessed and collecting data from browsers on different devices in distributed areas.

Unlike the existing blood bank management systems, the new system is designed to be used by different blood bank centers while maintaining data security and privacy of individual blood banks but at the same time having the same level of access to other data and information like donors' and recipients' information.

The new system is designed to be "deployed once and use anywhere" as opposed to some researches that suggest management activities to be implemented on standalone systems that will be deployed on individual computers in the blood bank centers. All System functionalities will be accessible over the internet depending on the type of user accessing the system.

## 6. CONCLUSIONS

We conducted a general analysis of the blood bank management system based on researches done by a number of authors in recent past. The data we obtained helped reveal how the system was misaligned. In order to meet up with these needs, a solution has been developed as the centralized blood bank repository. The centralized blood bank repository has been shown to help eliminate all the problems previously faced by the previous system. By using this system, Blood banks, Hospitals, Patients and Blood donors will be able to easily obtain a broad range of functions and access a large amount of information, thereby facilitating and speeding up blood donation and reception.

### 6.1. Future Work

With everything moving to the cloud these days, our CBBR system is designed to be future-proof due to the rapid progression of computing technology and it is scalable and can easily be transformed into a cloud server that can be tapped by different blood banks to collect data and use various functions.

However, in the near future, we are considering SMS integration, where alerts and notifications will be sent directly to users' mobile phones.

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