# BACTERIAL SURVEY ON BLOOD TRANSFUSION BAGS & BLOOD COMPONENTS AT DIFFERENT TIMES OF COLLECTION



**Thesis**

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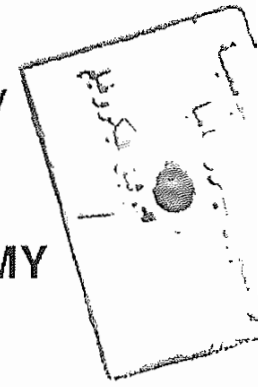

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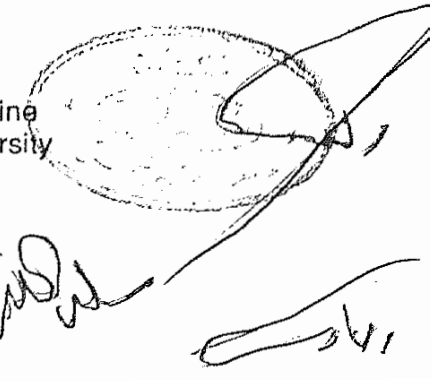

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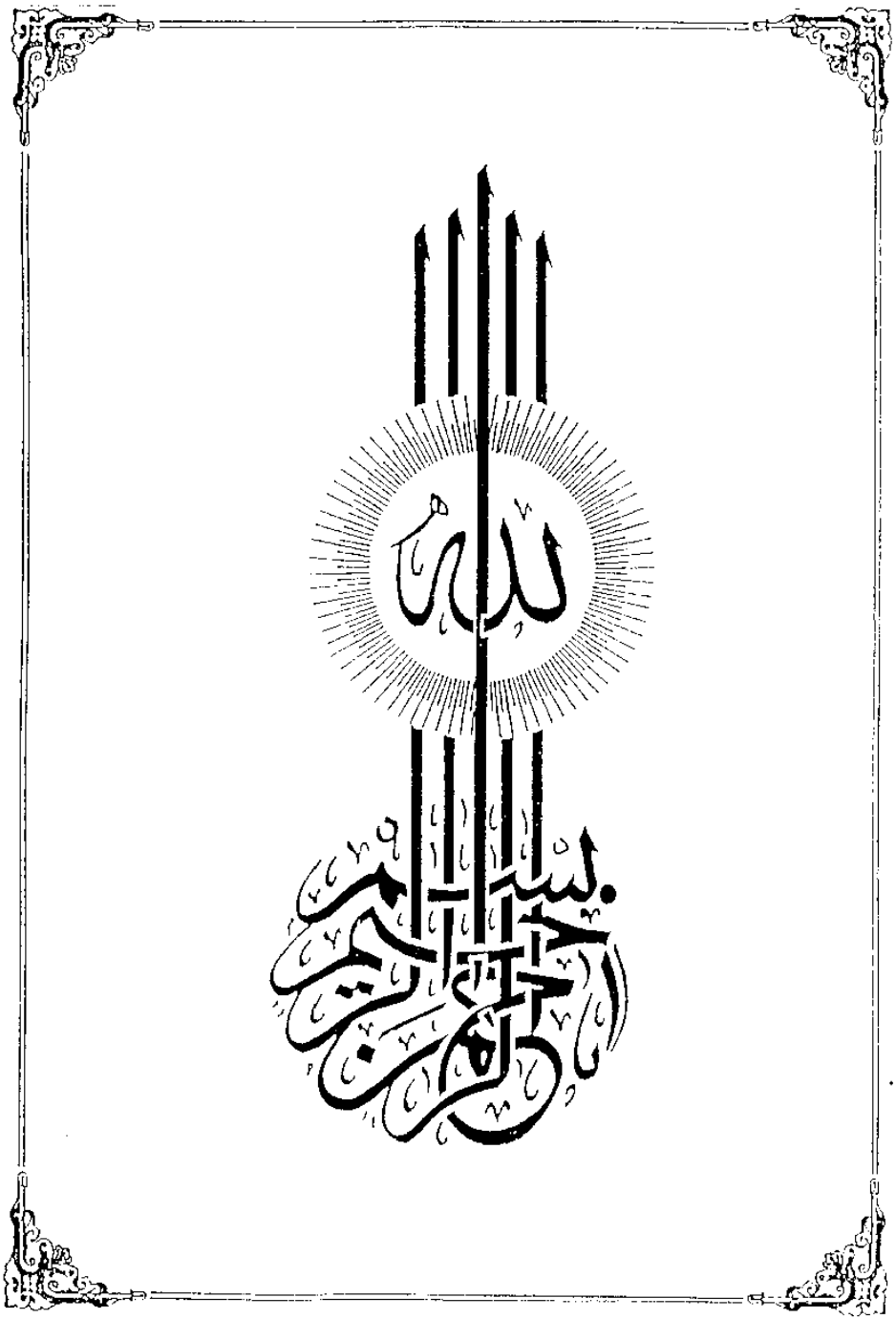

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# INTRODUCTION AND AIM OF THE WORK

# INTRODUCTION

Blood differs from most other tissue used for transplant in the fact that it is a fluid and can be put in container, preserved, and stored. These properties make transfusion possible. However they are responsible for some of the difficulties of organization and financing in blood donor services. An intricate system of blood suppliers and users thus grown up to serve medical needs.

Since it is neither convenient nor desirable to transfer blood directly from donor to recipient, a facility for blood storage is necessary. This is called Blood Bank or Blood Centre. Its function includes donor recruitment, blood collection, blood processing, storage, and distribution. Some blood banks particularly those in hospitals also do pretransfusion testing of recipients, compatibility testing and sometime other immunohaematological procedures such as HLA typing for tissue transplantation, (Douglas et al., 1981).

The safety of any blood transfusion begins with proper selection of blood donor. The first and most important commandment in blood donors selection is that the donor should be in a state of good health. Donors may appear fit but may be carriers of some disease transmissible by blood transfusion and therefore they must be identified (if possible) and excluded from blood donation as a public health measure. Blood donor is assessed by his medical history, physical examination, and laboratory tests (Grace, 1957).

Satisfactory transfusion results depend on meticulous blood collection techniques and these are the responsibility of blood collecting

agency. The rigidly controlled conditions of blood storage and handling are responsibility shared by the collecting blood bank and hospital transfusion service. Collection is done in plastic containers, their principal advantages are compactness and flexibility in storage and shipment. The plastic blood bags are manifactured from polyvinyl chloride with stabilizing agent and plasticizers added **(Jaeger and Rubin, 1972).**

# AIM OF THE WORK

The aim of this work is to check the presence of any bacterial growth in transfusion bags containing freshly prepared blood and its components as well as, at different times after storage in the blood bank. Swasbs from disinfectant, clamps, refrigerators and different working surfaces in the blood bank were also cultured for bacteriological study.

# REVIEW OF LITERATURE

# Blood safety in blood banks

## Blood donor selection:

All fresh blood components and manufactured blood products originate from blood donors so the safety of blood transfusion begins with careful selection of donors.

To protect both donor and recipient from any ill effects, donors must be in good health and unpaid volunteers. A full medical examination cannot be performed on every volunteer, much reliance is therefore placed on answers to questions about general health, medical history and drug being taken.

## Blood collection, storage and preservation:

Collection is done in plastic containers, their principal advantages are compactness and flexibility in storage and shipment. The plastic blood bags are manifactured from polyvinyl chloride with stabilizing agent and plasticizers added (Jaeger and Rubin 1972).

## Cleaning:

A liquid surgical soap is applied with either cotton balls or gauze square. The skin should be scrubbed well over an area about 3 or 4 inches in diameter, centering around the venipuncture site. The soap is then removed with sponges saturated with 70% alcohol, or with alcohol and acetone. If dirt can still be seen on these, the surface should be scrubbed again.

## Disinfection:

Tincture iodine or povidone-iodine are probably the best disinfectans, although others may also be satisfactory **(Lee et al., 1967).**

## Screening test for blood donations:

Since the onset of Aquired Immune Deficiency Syndrome (AIDS) epidemic, the possible transmission of infectious diseases by transfusion of blood or blood products has received marked attention **(Hollan et al., 1990).** The post transfusion occurrence of other viral as well as transfusion reaction associated with bacterial contamination have been well documented. **(Conrad, 1981, Mollison, 1983, Berkman, 1984).**

A large variety of microorganisms can be transmitted by transfusion of blood or blood products. Viruses implicated include hepatitis B virus **(Barbara and Tedder, 1984)**, the agent of nonA nonB hepatitis (hepatitis C), cytomegalovirus, Epstein-Barr virus, human retrovirus **(Currau et al., 1984)** and human immune deficiency virus (HIV). Among protozoal disease, malaria **(Bird and Menou, 1961 Guerreero et al., 1983)**, kala Azar, Leishmaniasis, toxoplasmosis **(Roth et al., 1971; Siegel et al., 1971)** Chaga's disease and babesiosis **(Jacoby et al., 1980)** have been reported. The most striking features of these viral and protozoal infections are that the initial clinical manifestation in the recipient appear days to months after the transfusion and that the donor is always the source of infection. In contrast, adverse reactions due to bacterial contamination of blood or blood products usually appear during the transfusion or shortly after, and infection caused by the responsible bacteria can rarley be demonstrated in the donors **(Rhame et al., 1973; Bjanu and Ruud, 1984; Wright et al., 1985; Collins et al., 1985; Heal et al., 1987, Stenhousen and Milenr, 1982).**

The first and most important step in maintaining a safe blood supply will always be the proper selection of prospective blood donors. The second is the use of specific microbiological screening tests. Agent transmissible by transfusion can be either cell associated for example, cytomegalovirus and human T cell leukaemia virus type I (HTLV-I) or plasma associated-for example, hepatitis B virus, hepatitis C and HIV. If they are plasma associated, pooling large numbers of units of plasma greatly increases the chances of disseminating such contaminants. Even without pooling, treatment with blood components may result in upto four or five patients being infected by a single contaminated donation **(John and Barbara 1990).**

Thus, the most important consideration in blood banks is to avoid transmitting infective agents to the recipient, usually by a combination of strict criteria for the selection of donor and the use of laboratory screening test.

Screening tests are paradoxically usually directed at antibody to the agent rather than antigens for the agent, except in the case of hepatitis B virus. Antibody screening tests are markers for certain persistent or chronic infections and therefore indicate a potential for infectivity, especially when the inoculum is as large as a unit of blood or a blood component.

Various agents may be transmitted by transfusion, but there are only some screening tests for blood donations that are currently mandatory. These are hepatitis B surface antigen for hepatitis B virus, antibody to hepatitic C virus, antibody to HIV-I, HIV-II and antibody to Treponema

pallidum (sphyilis). Tests for several other agents are available, but it has not yet been considered necessary to extend the present range.

The range of techniques for screening includes haemagglutination, enzyme linked immunosorbent assay (ELISA), radioimmunoassay, and latex or gelatin particle agglutination.

## Mandatory screening tests:

1. Hepatitis B surface antigen.
2. Antibody to hepatitis C virus.
3. Antibody to Treponema pallidum (syphilis).
4. Antibody to HIV-I and HIV-II.

## Optional tests (selected recipients):

e.g. antibody to cytomegalovirus in immunosuppressed patients.

## Tests under review:

- Antibody to HTLV-I (now mandatory in United States).
- HIV antigen.
- Antibody to Plasmodium falciparum (malaria).

In addition, the quality control of microbiological screening for transfusion is difficult because the occurrence of donations positive for hepatitis B virus, HIV, or syphilis is rare. In contrast to blood grouping, in which every sample produces a "positive" result of some sort, in microbiological screening tests most donor serum samples are negative. Great vigilance is therefore required in carrying out the routine screening tests. In low prevalence populations even an apparently low rate of false