



Blood transfusion

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INTRODUCTION:

A blood transfusion is a routine medical procedure in which donated blood is provide to you through a narrow tube placed within a vein in your arm.

This potentially life-saving procedure can help replace blood lost due to surgery or injury. A blood transfusion also can help if an illness prevents your body from making blood or some of your blood's components correctly.

Blood transfusions usually occur without complications. When complications do occur, they are typically mild.

Purpose of Blood Transfusion:

- To replace blood lost during surgery or injury.
- To improve blood counts in patients with anemia.
- To provide specific blood components such as red blood cells, Platelets or plasma.
- To treat bleeding disorders or coagulation factor deficiencies.
- To support patients undergoing certain medical treatments, such as chemotherapy or bone marrow transplantation.

Blood components:

Blood has several components, including; red cells, platelets, plasma, cryoprecipitate, and granulocytes.

Blood fractionation: - is the process of splitting whole blood, or separating it into its component parts, usually by centrifuging the blood.

The resulting components are:

A clear solution of upper blood plasma (which can be separate into its own fractions)

The buffy coat, which is a thin layer of white blood cells (leukocytes), mixed with platelets in the middle,

Red blood cells (erythrocytes) at the bottom of the centrifuge tube.

Serum separation tubes (SSTs): are tubes used in phlebotomy that contain silicone gel. Upon centrifugation, the silicone gel forms a layer on top of the tunica buffy, allowing blood plasma to be remove more efficiently for testing and related purposes.



Figure 1
Red Blood Cells



Figure 2
Platelets



Figure 3
Fresh Frozen Plasma

Blood Compatibility:

Blood type compatibility is crucial to prevent adverse reactions

during transfusion. The major blood groups are A, B, AB, and O, with each group classified as Rh-positive or Rh-negative.

The ABO and Rh blood group systems determine blood compatibility. For example, blood type A can receive A or O blood, but not B or AB blood.

Blood Donation and Testing:

Blood donors undergo screening to ensure the safety of the blood supply. This includes medical history assessment and laboratory tests to detect infectious diseases.

After donation, blood undergoes processing and testing for compatibility, blood type, infectious diseases (such as HIV, hepatitis, and syphilis), and other markers.

Transfusion Procedure:

Your blood will be test before a transfusion to determine whether your blood type is A, B, AB or O and whether your blood is Rh positive or Rh negative. The donated blood used for your transfusion must be compatible with your blood type.

Vital signs must be monitor during and after the transfusion to detect any adverse reactions.

Tell your health care provider if you have had a reaction to a blood transfusion in the past.

Risks and Complications:

Blood transfusions are generally considered safe, but there is some risk of complications. Mild complications and rarely severe ones can occur during the transfusion or several days or more after.

More reactions that are common include allergic reactions, which might cause hives and itching, and fever.

Blood borne infections

Blood banks screen donors and test donated blood to reduce the risk of transfusion-related infections.

Other serious reactions

Also rare, these include:

Acute immune hemolytic reaction: The immune system attacks the transfused red blood cells because the donor blood type is not a good match. The attacked cells release a substance into blood that harms kidneys.

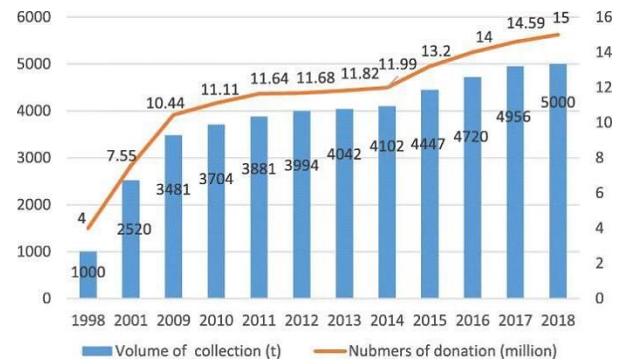
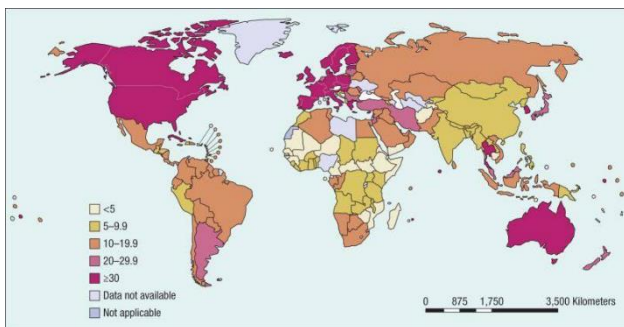
Delayed hemolytic reaction: Similar to an acute immune hemolytic reaction, this reaction occurs more slowly. It can take one to four weeks to notice a decrease in red blood cell levels.

Graft-versus-host disease. In this condition, transfused white blood cells attack your bone marrow. Usually fatal, it is more likely to affect people with severely weakened immune systems, such as those being treated for leukemia or lymphoma.

Future Trends:

Advances in blood banking techniques, such as pathogen reduction technology and personalized blood products, aim to improve transfusion safety and efficacy.

Research is ongoing to develop alternatives to blood transfusion, including synthetic blood substitutes and stem cell-based therapies.



Methodology:

The study design:

Statistical by use average, median, percentage type of researches based on collecting data by conducting questionnaire

Sample size:

95 samples are taken from Imam Al-Sadiq Hospital, Al-Hilla Surgical and Maternity Hospital in March 2024.

Data collection:

Data were collected by allowing participants to fill out a questionnaire, and included demographic information, their age and gender, their blood type, the number of previous transfusions, the reasons for the transfusion (surgery, bleeding, after chemotherapy, severe anemia or other), ...and in which ward the blood was received (surgical ward or Internal Medicine, Oncology, Obstetrics), and the type of blood he received may be (packed red blood cells, platelets, FFP, Cryo), as well as information about the level of hemoglobin before and after the transfer, and if he developed any symptoms during or after the transfer, including rash, cough, etc.) Moreover, information about coagulation profile before and after receiving FFP or cryo.

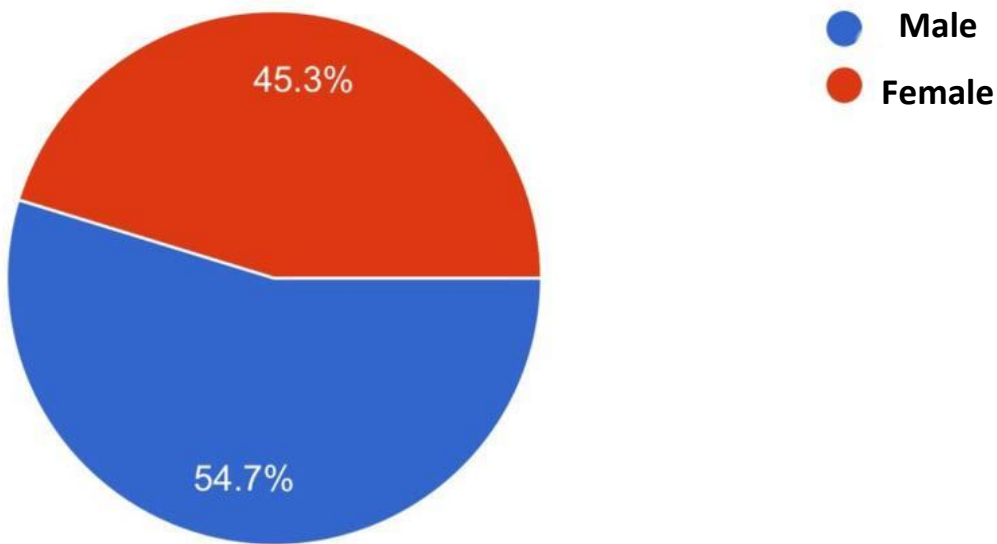
Results:

Table 1. Relation between blood groups and complications

Blood groups	Frequency (number of patients)	Number of patients with complication	Percentage of complication %	Number of patients with non-complication	Percentage of non-complication%.
A+	27	9	36%	18	25.71%
O+	21	6	24%	15	21.42%
B+	17	3	12%	14	20%
O-	11	2	8%	9	12.85%
AB+	10	2	8%	8	11.42%
A-	6	2	8%	4	5.71%

B-	2	1	4%	1	1.42%
AB-	1	0	0%	1	1.42%
Total	95	25	100%	70	99.95%

The complications is most common at group **A+** and less common at group **AB -** .



Gender

Chart 1. A relationship between sex and blood transfusion

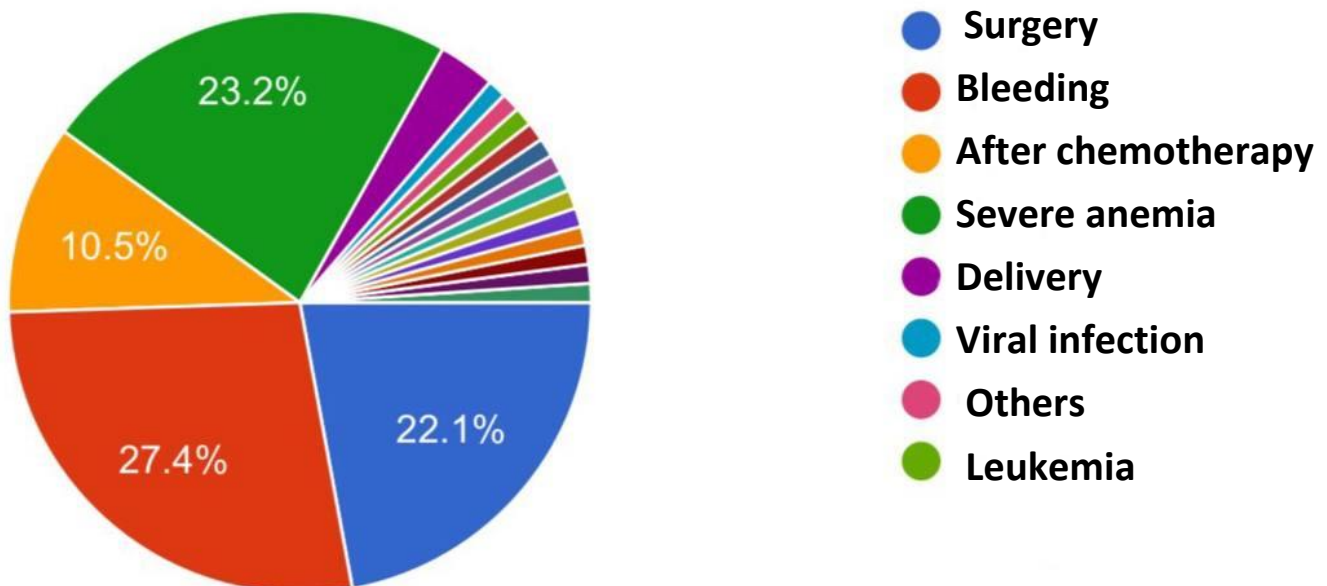


Chart 2. Indication of blood transfusion in Babylon hospitals

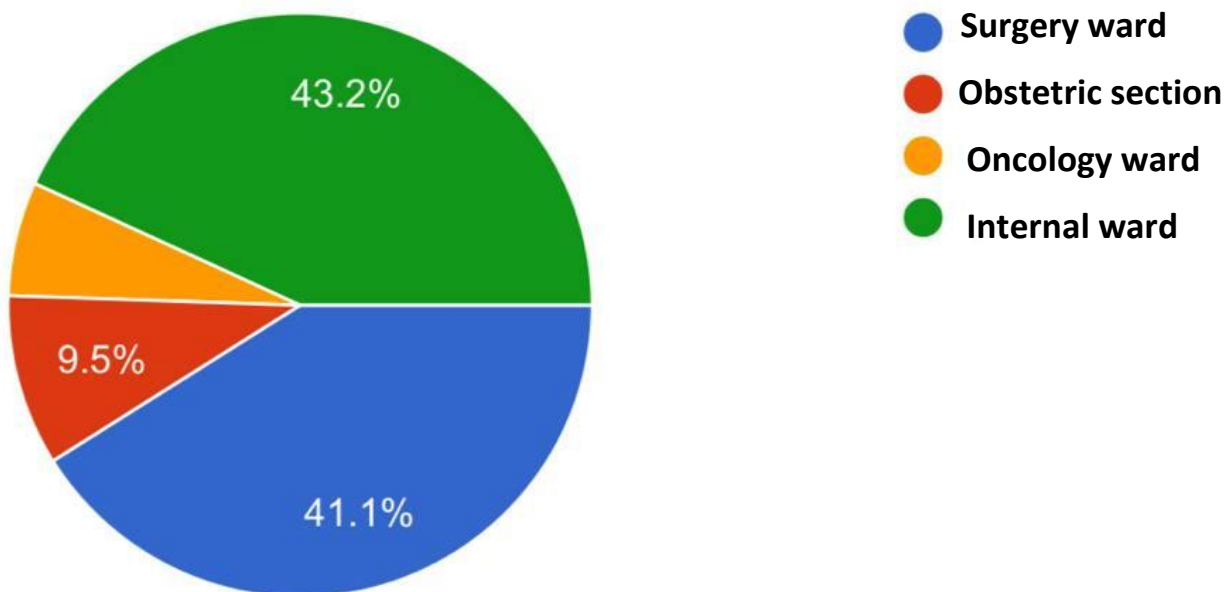


Chart3. Blood transfusion in the wards of Babylon hospitals.

Therefore, the surgical ward, followed by internal medicine, in Babylon hospitals are the ones in greatest need of blood products

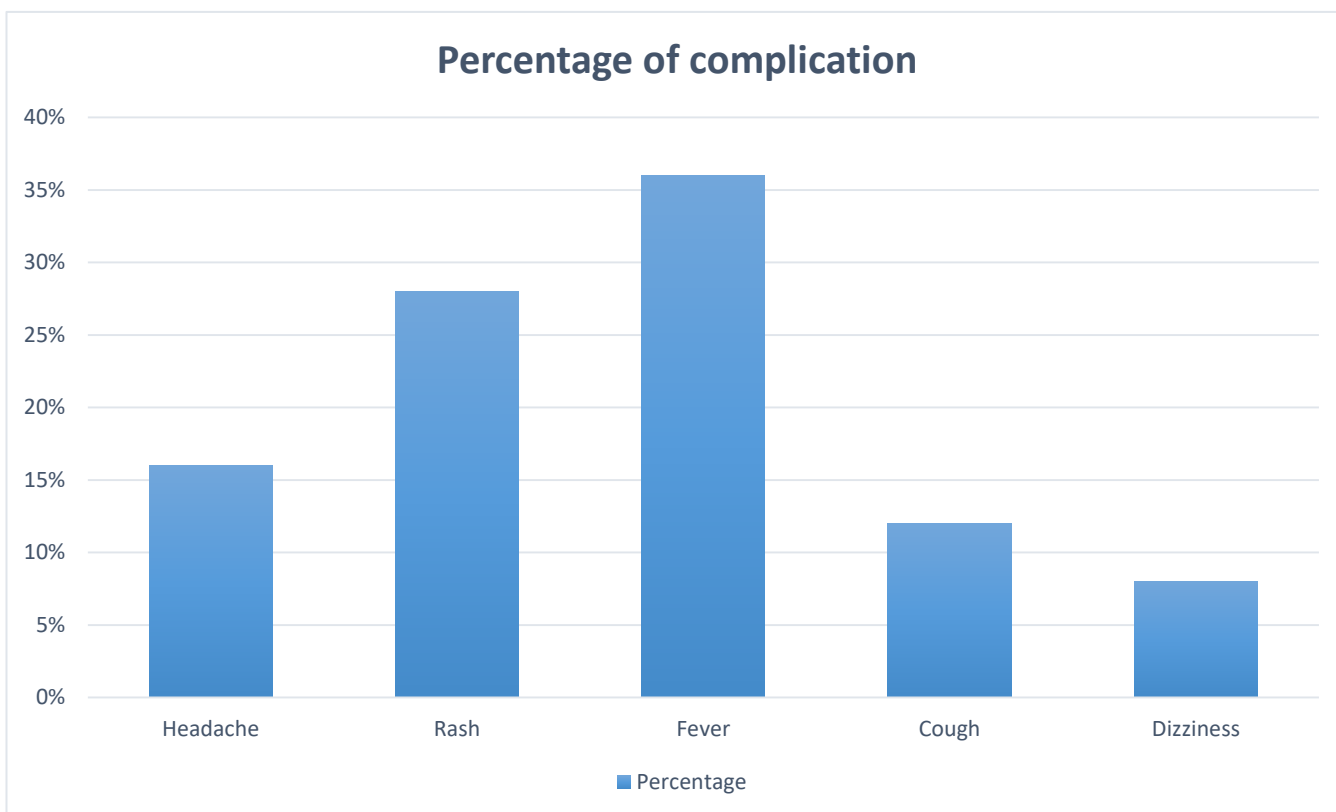


Chart 4. Percentage of blood transfusion complications

The most common complications with blood transfusion is fever and less common is dizziness

Discussion:

In our study a total of **95** cases , were collected of which **25** are patients with complications with blood transfusion (**26.3%**) , and **70** are patients without complications (**73.7%**).

We noticed the most common complications is fever (**36%**) and less common is dizziness (**8%**).

In our research, there are **52 (54.7%)** male gender patients and **43 (45.3%)** female gender patients.

In our research , the indication of blood transfusion in Babylon hospitals is bleeding (**27.4%**) , followed by severe anemia (**23.2%**) , surgical intervention (**22.1%**) and least chemotherapy (**10.5%**) and others (**16.8%**) ..

We noticed in Babylon hospitals the wards most need to blood products are internal ward (**43.2%**), surgical ward (**41.1%**), and other ward (**15.7%**).

We noticed that the most common types of blood products used in Babylon hospitals are packed RBC (**88.4%**) and other products (**11.6%**).

In our research, the percentage of complications with patients (**A+**) is (**36%**), and the rate of complications is lower or almost non-existent in patients of this blood group (**AB-**).

Conclusion:

Our study provides a baseline about indication of blood transfusion and its complications. Although blood transfusion is a life-saving procedure for many patients, it brings significant downtime and complications that can be avoid with some important procedures and tests. Blood transfusion today is safer than it was previously due to measures implemented to improve the quality of blood supply and reduce the risk of transfusion-borne diseases. These include conserving limited resources and costs, improving blood ordering and use methods to reduce waste of blood and laboratory resources, and, by studying improved procedures and protocols, to continue efforts.

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