بسم الله الرحمن الرحيم

Shendi University

Faculty of Graduate Studies and Scientific Research

Research about:

Assessment of Nurses Knowledge about Blood Transfusion Reactions at Elmak Nimer University 2016

A thesis submitted as partial fulfillment for requirement of M.S.c of medical surgical nursing sciences

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December - 2016

الآيـة

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قال تعالى :

﴿ وَفِي أَنفُسِكُمْ أَفَلَا تُبْصِرُونَ * وَفِي السَّمَاء رِزْقُكُمْ وَمَا تُوعَدُونَ ﴾

صدق الله العظيم

سورة الذاريات - الآيات (21 – 22)

Dedication

I have dedicated this research to my dear parents
Who gave me all efforts and facilities to my study from childhood until adulthood.
Father & Mother
To the soul of my heart really you are terrific and gentleman and thank you for supporting through out the process of completing this degree
My husband
To my children you are treasures from god and I'm blessed
(Braa & Omer)
Who are teaching me giving without take and patience without tedium.
To brothers & sisters
Also I would like to dedicate it to my remaining brothers and sisters for their continuous assistance and help.
To all my friends:
Those who precede me and no longer with me,
Those who precede me and are still among me,
Those with me,
My teachers
And to those who will follow me.

Acknowledgment

First the greatest thanks to God Almighty

Allah.

Special thanks to my supervisor:

Dr: Yousif Mohammed Yousif

For his support, guideline and patience, thanks a lot for him.

Finally I would like to thanks all of the people who help me in this research

مـلـخص الـبـحث

أجريت هذه الدراسة الوصفية بمستشفى المك نمر الجامعي في الفترة من أغسطس حتى ديسمبر 2016م لتقييم مفهوم الممرضين عن التفاعلات الناتجة عن نقل الدم وتضمنت الدراسة مئة ممرض واختيرت العينة عشوائيا وتم جمع البيانات بواسطة استبيان مكون من خمسة عشر سؤال وتم تحليل البيانات عن طريق التحليل الإحصائي للحزم الإحصائية للعلوم الاجتماعية تم عرضها في جداول وأشكال بيانية.

أوضحت الدراسة أن أكثر من ثلثي مجتمع الدراسة لديهم معرفة جيدة بكيفية التعامل مع التفاعلات الناتجة عن نقل الدم بنسبة (62%) كما أن ثلثي الممرضين (66%) لديهم معرفة بالتدخل الجيد، وطرق الوقاية.

أوصت الدراسة أن هنالك حوجة لوضع برنامج تعليمي عن التفاعلات الناتجة عن نقل الدم واستمرار هذا البرنامج لزيادة مستوى معرفة الممرضين، وتنظيم ورشة عمل لتعليم الوقاية من التفاعلات المحتمل حدوثها.

Abstract

This descriptive study carried out in Elmek Nimer university hospital in period extend from August to December 2016 to assess nurses knowledge regarding blood transfusion reactions. 100 nurses were chosen randomly, data was collected by questionnaire contain 15 question and analysis manual and show in table, figures.

The study found that about two third of study group (62%) had good knowledge about how to deal with blood transfusion reactions, and most of them (66%) had good knowledge about intervention and all of them (66%) had good knowledge about intervention of blood transfusion reactions.

The study recommended that a need for educating program require by head nurse about blood transfusion reactions and take continuously to increase level of knowledge of nurses. And to develop workshop which educate nurses to prevent susceptible reactions.

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Chapter One

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1.1 Introduction

Blood transfusion reactions is one essential and important but dangerous parts of today's medicine in which if appropriate measures have not been done. Adverse reactions to the transfusion of should be reported to blood bank personnel as soon as possible speed is essential in such situations because of the possible life-threatening nature of acute transfusion reactions. The evaluation of all adverse reactions to transfusion of the medical staff of the blood bank and the notification of such a reactions by the patient unit serve as a request for blood bank physician consultation. Reactions may be separated into reactions that present in proximity to the transfusion and those that present at some time subsequent to the transfusion. Suspected post-transfusion disease, which may present at a considerable time following transfusion, must also be reported to the blood bank .A blood bank physician should be consulted regarding the evaluation of patients with reactions, in the case of a mild urticarial and febrile reactions, with no other signs or symptoms attributable to blood transfusion. It may possible to reinitiate the blood transfusion such a decision must be arrived at through consultation between the physician reporting the reaction and a blood bank physician. Fatal reactions may occurs .acute hemolytic reaction &allergic reactions are among the most important and most prevalent transfusion reactions that happen shortly after the beginning and can lead to considerable mortality and morbidity. [(1)]

1.2 Justification

One hemolytic transfusion reaction occurs transfused units of packed red blood cells, where as non haemolytic febrile reactions and minor allergic reactions. One anaphylactic reaction occurs units. The risk of transfusion-related hepatitis B, the risk for hepatitis C, and the risk of transfusion-related HIV infection.

1.3 Objectives

1.3.1 General objective:

Assessment of nurse's knowledge about blood transfusion reactions.

1.3.2 Specific objectives:

- To identify nurses knowledge about acute transfusion reaction.
- To identify nursing intervention for the patient with blood transfusion reaction.
- To identify knowledge of nurses about their role regarding complication of blood transfusion reactions.

2. Literature review

Blood transfusion reactions are adverse responses to the infusion of any blood component, including red cells, white cells, platelets, plasma, cryoprecipitate, or factors. They may be classified as acute (within 24 hours of administration) or delayed (occurring days, weeks, months, or even years later). They range from mild allergic reactions that may be treated easily to fatal hemolytic reactions. It is important to note that almost all fatal hemolytic reactions are attributable to human error. Blood transfusion reactions can be mediated by the immune system or by non immune factors [(2)].

The immune system recognizes red blood cells, platelets, white blood cells, or immunoglobulin as "non-self" because the donor's blood carries foreign proteins that are incompatible with the recipient's antibodies. Typing, screening, and matching of blood units before administration eliminates most incompatibilities, but all potential incompatibilities cannot be screened out in the matching process.

One hemolytic transfusion reaction occurs per 40,000 transfused units of packed red blood cells, whereas non hemolytic febrile reactions and minor allergic reactions occur in 3% to 4% of all transfusions. One anaphylactic reaction occurs per 20,000 transfused units. The risk of transfusion-related hepatitis B is 1 per 50,000 units transfused, the risk for hepatitis C is 1 per 3000 to 4000 units transfused, and the risk of transfusion-related HIV infection is 1 per 150,000 units transfused. Non immune factors are usually related to improper storage. Complications to transfusion reactions include acute bronchial spasm, respiratory failure, acute tubular necrosis, and acute renal failure. The most severe reactions can cause anaphylactic shock, vascular collapse, or disseminated intravascular coagulation (DIC). Also, current research shows that patients who receive transfusions have an increased risk of infection because the transfusion depresses the immune [(3)].

Blood transfusion reaction:

Is an adverse reaction to blood transfusion therapy that can range is severity from mild symptoms to a life threatening condition. [4]

Types:

Blood transfusion reaction can be classified based:

On the timing of onset to:

Acute reaction:-occurs in24hours of the start of the transfusion.

Delayed reaction:- occur more than 24hours after the start of transfusion.

Pathophysiological mechanism to:

Immune reactions:

typically involve antibody reaction between donor and recipients cells.

Non immune reactions: caused by the properties of the different component within the sorted blood. [7]

Risk factors:

- History of past transfusion reactions.
- Pregnancy.
- Medical condition(such as sickle cell anemia [8]

Causes:

-Infusion of ABO incompatible whole blood, red blood cells.

-Antibodies in recipient plasma attach to antigens on transfusion red blood cells causing red blood cells destruction.

-Sensitization to donor white blood cells platelets, or plasma proteins.

- sensitivity to foreign plasma proteins.

-Infusion of IgA protein.

- Fluid administration faster than the circulation can accommodate.

-Transfusion of bacterially infected blood component.

-Reaction between ant leukocyte antibodies and recipients leukocytes. [3]

Genetic considerations:

Blood types are heritable. A person with blood type A must have inherited one or two copies of the A allele. The resulting genotype would be either AA or AO. Someone who is blood type B inherited one or two copies of the B allele and could have a genotype of either BB or BO. A person with blood type AB must have both the A and the B alleles, resulting in the AB genotype, and the genotype of a person who is type O must be OO. Each parent donates one of their two

ABO alleles to each child. The Rh factor allele is inherited independently. An Rh_person has one or two Rh_alleles with a genotype of Rh_/Rh_or Rh_/Rh-. An Rh- person has a genotype of Rh-/Rh. (1)

Gender, ethnic/ racial, and life span considerations:

Infants and the elderly are more likely to experience problems of fluid overload with transfusion, and children are more likely to develop transfusion-related HIV infections than adults. The incidence of transfusion reactions does not appear to be based on gender. Non hemolytic febrile reactions and extravascular hemolytic reactions are more common in females who have been pregnant. Ethnicity and race have no known effect on the risk of blood transfusion reaction.(1)

Assessment and nursing management:

Assessment:

History:

Individuals who report a history of numerous allergies or previous transfusions should be monitored more carefully since they are at higher risk for reaction. A history of cardiovascular disease should be noted because those patients need to be monitored more carefully for fluid overload. Note also if a patient has a history of Raynaud's disease or a coldagglutinin problem, because, before being administered and with physician approval, blood needs to be warmed. Once the transfusion is in process, the patient may report any of the following signs of

transfusion reaction: heat or pain at the site of transfusion, fever, chills, chest tightness, lower back pain, abdominal pain, nausea, difficulty in breathing, itching, and a feeling of impending doom. [1]

Focused assessment:

Assess level of consciousness, orientation, and vital signs (temperature, HR, RR, BP).

Assess saturation of oxygen via pulse oximetry if available.

If patient on telemetry or cardiac monitor, assess rhythm strip.

Assess skin for color, turgor, moistness. [6]

Physical examination:

A change in any vital sign can indicate the beginning of a transfusion reaction. Note if the urine becomes cloudy or reddish (hemolysis). Observe any change in skin color or the appearance of hives. Be alert for signs of edema, especially in the oropharynx and face. Auscultate the lungs before beginning the transfusion, and note any baseline adventitious. [1]

Diagnostic high lights:

In the event of a transfusion reaction, immediately stop the transfusion. Send the unit of blood, or empty bag and tubing if the infusion is complete, along with samples of the patient's blood and urine to the lab for analysis. Blood type and cross-matching are repeated to determine if mismatched blood was administered

Other Tests:Blood culture to rule out bacterial infection; urinalysis for presence of protein; serum bilirubin; haptoglobin; complete blood count; prothrombin time; partial thromboplastin time; fibrinogen; calcium; serum electrolytes. [1]

electrocardiogram tests. [1]

Safety TIP:

Every unit of blood, even of the same blood type , is unique and can trigger a blood transfusion reaction, careful monitoring with every transfusion is necessary.[2]

Management:

Treat shock if present.

Draw blood samples for serologic testing.

Maintain blood pressure with IV calloid solutions give durities.

Insert indwelling urinary catheter.

Give anti pyretic as prescribed .

Avoid aspirin in thrombocytopenic patients.

Give anti histamine, corticosteroid as directed.

Do not restart transfusion if fever or pulmonary symptoms develop.

Initiate cardio pulmonary resustation if indicated.

Have epinephrine ready for injection.

Obtain culture of patient blood .

Treat septicemia as directed antibodies IV fluid vasopressers. [3]

Documentation guidelines:

• Response to transfusion: Description of symptoms; severity of symptoms; adequacy of airway, breathing, and circulation; location and description of any skin changes, vital signs, including temperature; complaints of pain or itching.

• Termination of transfusion: Amount infused; amount returned to blood bank; laboratory specimens sent; timing of reaction from start of transfusion. [1]

Complications associated with transfusion:

The ill-effects which may complicate a transfusion can be classified as follows: (1) Pyrogenic.(2) Contamination of blood. (3) Citrate intoxication.(4) Transmission of Disease. (5) Allergic.(6) Haemolytic. (7) Circulatory overload.

Pyrogenic:

These reactions are generally caused by the presence of the products of bacterial growth in the anti-coagulant solution, or in the sets used in collection or administration of the blood. Improperly cleaned equipment, in which dried blood or protein still remains, will have the same effect. They may be brought on, however, by factors in the donor plasma which are themselves pyrogenic,5 by minor haemolyticre actions, or by contamination of the blood. The principal characteristic is fever commencing during, or shortly after, the transfusion and lasting for some hours. This is usually accompanied by headache, restlessness, and chills, while in severe cases rigors, nausea, and vomiting, may be present. The blood pressure rarely falls. The most important factor in prevention of these reactions is the constant preparation of clean, pyrogen-free, sterile, equipment and anticoagulant.

It has been pointed out that warm in the patient thoroughly both before and during the transfusion will cut down the incidence. Warming the bottle, on the other hand, is both dangerous, and without advantage, in most instances. There is no increase in febrile reaction following the use of preserved blood asopposed to freshly drawn blood.4 Alleviation of symptoms may be procured by slowing down the rate of transfusion, and some authors recommend the intravenous injection of 10% calciumgluconate into the other arm.

2-Citrate intoxication:

It is generally agreed that in adults even large amounts of citrated blood administered over a short period of time are unlikely to cause symptoms such as tetany, or reduced clotting power, in the recipient. Mollison suggests that harmful effects are unlikely with a dosage below 330 mgm. di-sodiumcitrate per kilogram per hour. With the Canadian Red Cross anti-coagulant, a rate of not more than 70 c.c. of blood per kilogramper hour should be administered, which is equivalent to four litres of blood per hour in an average sized adult. In infants and young children

the possibility of tetany is less remote. In replacement transfusions, and whenever relatively large volumes of blood have to be administered, the use of packed cells is an advantage. The removal from the bottle of the majority of the citrate-pla. [9]

3-Contamination of blood:

It is possible that at the time of collection some bottles of blood may be contaminated. The bactericidal properties of freshly-drawn blood remove this threat however, and cultures taken in the first twenty four hours are invariably sterile.[9]
. The bacteria usually enter the bottle from the donor's skin which, though "disinfected" at the time of collection, is probably seldom rendered completely sterile. [13]

Contamination may also arise from improperly sterilized equipment. "Batches" of blood in the commercial sense of the term are non-existent, and therefore cannot be tested before release as are manufactured parenteral solutions. To imposea sterility test on each bottle of blood both impracticable and even dangerous. In practice, the above potential sources of contamination can be eliminated by meticulous' attention to technique during all phases of equipment preparation, and during collection of the blood. Gross infection of the blood will lead to a fulminating type of septicaemia, while slight contamination may cause only the symptoms of a "febrile" reaction. Blood is such an excellent culture medium that it must be subjected to adequate refrigeration between 35 and 400 F.because at these temperatures few bacteria have the power of multiplication and the donorerythrocytes are best preserved. Therefore, while one bottle of a series is being transfused, the others should be kept in the refrigerator.

4. Transmission of disease.

-Homologous serumjaundice, with an incubation period of between 35 and 150 days, is relatively rare following thetransfusion of whole blood but remains a hazardto the recipients of dried plasma or serum. Irradiation of plasma by ultra-

violet light at thetime of 'the drying process has diminished thefrequency of this disease in large-pool plasma,but has noteradicated itThe blood of donors who have ever hadmalaria, or who have recently been in malariousareas, should not be used as whole blood. Themalarial parasites are saito survive at refrigeration temperature for days or even weeks.3 Everyprecautionmust be taken to exclude such personsas donors, although to use their blood fo plasma production is reasonably safe. The presumptive Kahn test should be performed on all donations of blood. Bottles with apositive test may safely be used in plasma pools as it is reasonably certain that the spirochaetesdo not survive for more than seventy-two hours at refrigeration temperature, and certainly nothrough the freeze-drying of plasma processing. A syndrome variously called "exogenoushemochromatosis" and "transfusional haemosiderosis" might be mentioned here. Some patientsreceiving multiple transfusions over a period of time for chronic anremia develop tissuechanges.

are the end result of the deposit and subsequentirritating action of excess amounts of iron in the parenchymatous tissues. It has been suggestedthat cellular degenerative processes and local nutrient deficits, possibly due to the underlying anamia, may be partially responsible for the tissue siderosis and fibrosis. (10)

5-Allergy:

The characteristics are urticaria angioneurotic cedema, or asthma, often accompanied by fever, headache, restlessness, epigastric discomfort, and vomiting. The cause may beeither the response of an allergic recipient to an

antigen in the donor plasma, or the transfer of sensitivity from an allergic donor toa normalrecipient. It is commonly supposed that an allergic reaction on the part cif the recipient is solely attributable to the donor blood. Maunsell8 transfusing both allergic and non-allergic subjects with dried serum found that the majority of the allergic recipients developed urticaria while no reaction was shown by the control subjects. Skin-tests with dried serum yielded much the same result. It would seem then, that allergic reactions depend upon an abnormality in the recipient rather than

in the donor; the exception being the passive transfer of antibody from donor to recipient, not usually manifest at the time of transfusion, and rare, because of exclusion of donors in an active stage of allergy.

6. Hemolysis:

A hemolytic reaction is the result of the transfusion of incompatible blood, or of blood already hemolyzed. By incompatible is means that any antibody-antigen reaction which appreciably shortens the life span of either the transfused cells or of the recipient's own red cells. A bottle of blood contains erythrocytes of all ages. On reaching the recipient, the most aged commence to be eliminated, and gradually in linear progression all the transfused cells are destroyed, until at about one hundred days after the transfusion, on an average, no transfused cells can be demonstrated in the recipient's circulation. Depending upon the serological circumstances, the donor cells may be eliminated completely within a few hours, a few days, a week, or more. Very rapid destruction of donor cells occurs principally in the presence of an iso-hemolysin found normally in about 20% of persons, and only within the ABO system. Complete destruction of donor cells within a few days can be brought about by high titre antibody against the antigens of the ABO, Rh, and MNS systems, Kell, Duffy, and others of the lesser known groups. The severity of symptoms will vary to a great extent with the speed of elimination of the transfused cells, for upon this depends the degree of hemoglobinemia and hemoglobinuria. With an active hamolysin in the circulation intra-vascular haemolysis will occur giving rise to gross hiemoglobinuria, and its attendant symptoms. hemolysin present, heemoglobinaemia is likely to occur only when the rate of red cell destruction overloads the normal mechanism for converting hiemoglobin into bilirubin. The activity of the haemolytic mechanism may also be linited by depletion of complement or iso-antibody in therecipient,16 which might account in part for the absence of severe symptoms when a large volume of ABO incompatible blood is administered, a phenomenon occasionally seen. Delayed

destruction of the donor cells is the more usual finding, fortunately. Mollison3' 9divides this group into those cases in which incompatibility is evident, though mild, at the time of transfusion, and those cases in whom evidence of incompatibility is only to be found after an interval of perhaps a week. In the first type, there may be signs of a febrilereaction perhaps with jaundice which soon disappears. The heemoglobin shows little or no increase following the transfusion. It has been suggested that in such cases a weak antibody is present which causes an immediate but slight increase in the rate of elimination of the donor cells. After a few days, as a result of the stimulus of the incompatible blood, the recipient forms more antibody which accelerates the elimination of the transfused blood. In the second type there are usually no symptoms at the time of transfusion. The halmoglobin does not show the anticipated rise and after a short interval it may commence to fall. In such acase, the recipient responds after an interval to the stimulus of the incompatible blood, produces antibody, and an increased rate of destruction of the transfused cells results. These two types of reaction are easily missed clinically. Post-transfusion haemoglobin determination should point to their presence.Muirhead13 in a valuable study of transfusion reactions, investigated nine cases in whom ahiemorrhagic state developed following transfusion of incompatible blood. Five of these were surgical patients in whom profuse oozing of blood was demonstrated either during, or shortly following, the transfusion. The etiology remainsunkn C'Nn, although it was thought that an increase in heparin-like substance, or a sensitivity to heparin, might be partially responsible. There are at least 30,000 combinations of blood groups to any of which both donor and recipient may belong. Standard cross-matching only considers eight of these combinations, because, fortunately, antibodies are infrequently produced among the lesser known groups. Cross-matching, there fore, cannot completely exclude incompatibility, but, if it is directed primarily at the ABO and Rh systems, one can be' reasonablycertain of avoiding a heemolytic reaction. This statement is only true,

however, if a sensitive technique is employed. For instance, using anti-D sera of different strengths, Dodge" showedthat the simple, and still frequently used, salineslide or tile technique showed as compatible 60%v of samples which the more sensitive tubemethod using bovine albumin named incompatible.The latter method will also demonstrateincompatibility caused by most of the rarergroups. The indirect anti-human globulin test is the most sensitive of all, but is not practicablefor testing any large volume of specimens. Thistest is, however, used as a check on the routine ethod employed in cases who have pteviouslyreceived many transfusions.

No matter how accurate and sensitive the laboratory technique may be, the result of the test is predicated upon the cross-match specimencoming from the right patient. In the past few years, we have come across several instances of severe hamolytic reactions directly attributable to an apparently correctly labelled specimen coming from a different patient altogether. The result was that the recipient was transfused with unmatched blood of another group. Of course, laboratory, or clerical error will lead to the same unfortunate result, but this is unlikely with fully trained methodical technicians. Despite the fact that most authorities agree that haemolytic reactions are nowadays almostinvariably associated with Rh incompatibility,9 most transfusion services and hospital blood banks have difficulty in supplying, from time to time, at short notice, all of the large volume of Rh negative blood which some Rh negative patients require during surgery. Female Rh negative recipients must always be transfused with Rh negative blood because of the chance that "sensitization" will cause neonatal haemolytic disease in future children. On the other hand where the transfusions are closely spaced, and where a sensitive cross-match technique is used, the use of Rh positive blood to transfuse Rh negative male recipients appears justifiable when Rh negative blood is not immediately forthcoming, and the patient requires transfusion without delay. (11)

7- Circulatory overload.

-Overload of the circulatory system is the commonest of the serious ill-effects which may follow transfusions. In any patient who shows signs of diminished cardio vascular reserve, care in the rate and total volume of the transfusion should be taken. [12]

Particular, cases of chronic severe anaemia should be watched. It is also possible to over-transfus ethe circulation in young infants and children.

The characteristics of such a reaction are dyspncea, cyanosis, and perhaps a dry cough, during or shortly after the transfusion. Engorgement of the cervical veins is a reliable sign. Pulmonary oedema is terminal.Three methods of prevention have been put forward. Mollison3 suggests that warming the patient will have the effect of increasing the vital capacity. As part of the increase in blood volume produced by transfusion may be accommodated by the pulmonary circulation, then if the vital capacity is increased, the risk of cardiac overload may be diminished. It has also been suggested that to have the patient sitting up in bed rather than lying recumbent will be of help, as well as making engorgement of the cervical veins evident should it occur. The rate of transfusion should, of course, be slow, between 0.5 c.c. and 1 c.c. per pound of body weight per hour, and the total volume administered in one day should be restricted to 500 c.c. This will be of no disadvantage if packed cells are used. [13]

Stabilizing and monitoring:

Document specific reaction.

Return unused portion of blood product to blood bank for analysis.

Administer prescribed medications and oxygen.

Continue to monitor VS, temperature, respiratory status, level of consciousness, and urine output.

Chart patient status, and convey to physician or nothing per oral. [1]

Nursing interventions:

If it is suspected that atransfusion reaction is occuring the nurse should stop the transfusion and cell the physician immediately.

Stop the transfusion and call the physician immediately.

Intravenous line is kept open with a saline solution with new tubing is started to keep the vein patent.

The physician and blood bank are immediately notified

A nurse remains with the patient for reassurance and monitoring of symptoms and vital signs.

If a blood incompatibility is suspected, the unused blood and blood tubing is returned to the blood bank for testing.

The blood bag and tubing are saved not thrown a ways should be sent to the culture.

The patients blood is drawn for plasma hemoglobin culture and retyping.

A urine sample is collected as soon as possible and sent to the laboratory for hemoglobin determination and observing of urine voiding.

The blood bank is notified that a suspected transfusion reaction has occurred.

Monitor vital signs and urine output.

Treat symptoms per physician order. [(2)]

Psychosocial:

Blood bank protocols have lowered the risk of human immunodeficiency virus (HIV) transmission from more than 25,000 cases before 1985 to a risk of 1 in 50,000 to approximately 1 in 150,000 currently. In spite of the decreased risk, many patients worry about contracting HIV when they need blood products. In reality, the risk of hepatitis B and C is much higher. If a blood transfusion reaction occurs, the fears and anxieties are compounded and may warrant specific interventions. [(1)]

Prevention:

Typing, screening, and matching of blood units before administration eliminates most incompatibilities, but not all of them. If a transfusion reaction does occur, stop the transfusion immediately. The severity of the reaction is usually related to the amount of blood received. Begin an assessment to determine the severity and type of reaction. In minor reactions (urticaria or fever), the transfusion may be restarted after discussion with the physician and after giving the patient an antipyretic, antihistamine, or anti-inflammatory agent. Ongoing monitoring during the rest of the transfusion is essential. If the patient develops anaphylaxis, the patient's airway and breathing are maintained with oxygen supplement, intubation, and mechanical ventilation if needed meticulously verify and document patient identification from sample collection to component infusion. Prescreening of potential blood donors is essential.

After the blood has been collected, the blood group and subgroup including Rh Typing are identified and blood is tested for syphilis and hepatitis.

Most of the serious reactions that now occur during transfusions are the result of human error, safeguards include the following .

-Blood must be kept cold until ready is use.

-Blood that has remained at room temperature for more than 30 minute should not be returned to refrigeration for reissue.

-Blood should be administered with in a 4 hours period.

-The unit of blood be labeled with the patients name, and the label must be checked against the patients wristband before the blood is given.

All blood products should be administered through filters.

The patient must be monitored through out the blood transfusion.

Treat prophylactic ally with antihistamines.

Adjust transfusion volume and flow rate based on patient size and clinical status. [3]

Independent:

Adhere strictly to the policies regarding typing, cross-matching, and administering blood. Make sure that the recipient's blood sample is correctly labeled when it is sent to the laboratory. Check each unit before administration to make sure that it is not outdated, that the unit has been designated for the correct recipient, that the patient's medical records' number matches the number on the blood component, and that the blood type is appropriate for the patient. All patients should have their identification band checked by two people before the transfusion is begun. Notify the blood bank, and withhold the transfusion for even the smallest discrepancy when checking the blood with the patient identification. Maintain universal precautions when handling all blood products to protect yourself, and dispose of used containers appropriately in the hazardous waste disposal.

Begin the transfusion at a rate of 75mL or less per hour. Remain with the patient for the first 15 minutes of the transfusion to monitor for signs of a hemolytic reaction. If the patient develops a reaction, stop the transfusion immediately; evaluate the adequacy of the patient's airway, breathing, and circulation; take the patient's vital signs; notify the physician and blood bank; and return the unused portion of the blood to the blood bank for analysis. If the patient develops chills, monitor the patient's temperature, and cover him or her with a blanket unless the temperature is above 102°F. Remain with the patient and explain that a reaction has occurred from the transfusion. If the patient has excessive fears or concerns about the risk of HIV or hepatitis infection, provide specific information to him or her and arrange for a consultation as needed with either a physician or a counselor. [1]

Discharge and home health care guidelines:

Follow – up .Teach the patient to report any signs and symptoms of a delayed reaction, such as fever, jaundice, pallor, or fatigue. Explain that these

reactions can occur anytime from 3 days after the transfusion to several months later.

Explain that the patient should notify the primary healthcare provider if she or he develops any discomfort in the first few months after transfusion. Attributing these signs to specific diseases may make the patient unnecessarily anxious, but the patient should know to notify the healthcare provider for anorexia, malaise, nausea, vomiting, concentrated urine, and jaundice within 4 to 6 weeks after transfusion (hepatitis B); jaundice, lethargy, and irritability with a milder intensity than that of hepatitis B (hepatitis C); or flulike symptoms (HIV infection). [1]

Overview of Blood:

The primary function of blood is to supply oxygen and nutrients as well as constitutional elements to tissues and to remove waste products. Blood also enables hormones and other substances to be transported between tissues and organs. Problems with blood composition or circulation can lead to downstream tissue malfunction. Blood is also involved in maintaining homeostasis by acting as a medium for transferring heat to the skin and by acting as a buffer system for bodily pH.

The blood is circulated through the lungs and body by the pumping action of the heart. The right ventricle pressurizes the blood to send it through the capillaries of the lungs, while the left ventricle repressurizes the blood to send it throughout the body. Pressure is essentially lost in the capillaries, hence gravity and especially the actions of skeletal muscles are needed to return the blood to the heart. Blood circulation from the heart to the lungs [10].

Gas Exchange:

Oxygen (O2) is the most immediate need of every cell and is carried throughout the body by the blood circulation. Oxygen is used at the cellular level as

the final electron acceptor in the electron transport chain (the primary method of generating ATP for cellular reactions).

Oxygen is carried in the blood bound to hemoglobin molecules within red blood cells. Hemoglobin binds oxygen when passing through the alveoli of the lungs and releases oxygen in the warmer, more acidic environment of bodily tissues, via simple diffusion [(9)].

Carbon dioxide (CO2) is removed from tissues by blood and released into the air via the lungs. Carbon dioxide is produced by cells as they undergo the processes of cellular respiration (particularly the Kreb's Cycle). The molecules are produced from carbons that were originally part of glucose. Most of the carbon dioxide combines with water and is carried in the plasma as bicarbonate ions. An excess of carbon dioxide (through exercise, or from holding ones breath) quickly shifts the blood pH to being more acidic (acidosis). Chemoreceptors in the brain and major blood vessels detect this shift and stimulate the breathing center of the brain (the medulla oblongata). Hence, as CO2 levels build up and the blood becomes more acidic, we involuntarily breathe faster, thus lowering CO2 levels and stabilizing blood pH. In contrast, a person who is hyperventilating (such as during a panic attack) will expire more CO2 than being produced in the body and the blood will become too alkaline (alkalosis). Human Physiology/Blood physiology [(2)] .

Blood Composition:

Blood is a circulating tissue composed of fluid plasma and cells (red blood cells, white blood cells, platelets).

Anatomically, blood is considered a connective tissue, due to its origin in the bones and its function. *Blood* is the means and transport system of the body used in carrying elements (e.g. nutrition, waste, heat) from one location in the body to another, by way of blood vessels.

Blood is made of two parts:

1. Plasma which makes up 55% of blood volume.

2. Formed cellular elements (red and white blood cells, and platelets) which combine to make the remaining 45% of blood volume.

Plasma production:

Plasma is made up of 90% water, 7-8% soluble proteins (albumin maintains bloods osmotic integrity, others clot, etc), 1% electrolytes, and 1% elements in transit. One percent of the plasma is salt, which helps with the pH of the blood. The largest group of solutes in plasma contains three important proteins this include *albumins*, *globulins*, and *clotting proteins*.

Albumins are the most common group of proteins in plasma and consist of nearly two-thirds of them (60-80%). They are produced in the liver. The main function of albumins is to maintain the osmotic balance between the blood and tissue fluids and is called *colloid osmotic pressure*. In addition, albumins assist in transport of different materials, such as vitamins and certain molecules and drugs (e.g. bilirubin, fatty acids, and penicillin).

Globulins are a diverse group of proteins, designated into three groups: gamma, alpha, and beta. Their main function is to transport various substances in the blood. Gamma globulins assist the body's immune system in defense against infections and illness.

Clotting proteins are mainly produced in the liver as well. There are at least 12 substances, known as "clotting factors" that participate in the clotting process. One important clotting protein that is part of this group is *fibrinogen*, one of the main components in the formation of blood clots. In response to tissue damage, fibrinogen makes fibrin threads, which serve as adhesive in binding platelets, red blood cells, and other molecules together, to stop the blood flow. (This will be discussed in more detail later on in the chapter.) *Plasma* also carries Respiratory gases; CO2 in large amounts(about 97%) and O2 in small amounts(about 3%), various nutrients(glucose, fats), wastes of metabolic exchange(urea, ammonia), hormones, and vitamins. Picture of red blood cells [(2)].

Red Blood Cells:

Red blood cell (erythrocyte) also known as "RBC's". RBC's are formed in the **myeloid tissue** or most commonly known as red bone marrow, although when the body is under severe conditions the yellow bone marrow, which is also in the fatty places of the marrow in the body will also make RBC's. The formation of RBC's is called **erythropoiesis** (*erythro / red; poiesis / formation*). Red blood cells lose nuclei upon maturation, and take on a biconcave, dimpled, shape. They are about 7-8 micrometers in diameter.

There are about 1000x more red blood cells than white blood cells. RBC's live about 120 days and do not self repair. RBC's contain hemoglobin which transports oxygen from the lungs to the rest of the body, such as to the muscles, where it releases the oxygen load. The hemoglobin gets it's red color from their respiratory pigments. Human Physiology/Blood physiology [3]

Main Component:

The main component of the RBC is hemoglobin protein which is about 250 million per cell. The word hemoglobin comes from hemo meaning blood and globin meaning protein. This is the protein substance of four different proteins: polypeptide globin chains that contain anywhere from 141 to 146 amino acids. Hemoglobin also is responsible for the cell's ability to transport oxygen and carbon dioxide. This hemoglobin + iron + oxygen interact with each other forming the RBC's bright red color. You can call this interaction by product oxyhemoglobin. Carbon Monoxide forms with hemoglobin faster that oxygen, and stays formed for several hours making hemoglobin unavailable for oxygen transport right away. Also a red blood cell contains about 200 million hemoglobin molecules.

If all this hemoglobin was in the plasma rather than inside the cells, your blood would be so "thick" that the heart would have a difficult time pumping it through. The thickness of blood is called viscosity. The greater the viscosity of

blood, the more friction there is and more pressure is needed to force blood through.

White Blood Cells:

There are two main types of WBCs involved in the adaptive immune response antigen presenting cells (ABCS). Not pathogen. Specific (16. 8. 2016)

Platelets:

A 250 ml bag of newly collected platelets. Platelets, also called thrombocytes, are membrane-bound cell fragments. Platelets have no nucleus, they are between one to two micrometers in diameter, and are about 1/10th to 1/20th as abundant as white blood cells. Less than 1% of whole blood consists of platelets. They result from fragmentation of large cells called Megakaryocytes - which are cells derived from stem cells in the bone marrow. Platelets are produced at a rate of 200 billion per day. Their production is regulated by the hormone called Thrombopoietin. The circulating life of a platelet is 8–10 days. The sticky surface of the platelets allow them to accumulate at the site of broken blood vessels to form a clot. This aids in the process of hemostasis ("blood stopping"). Platelets secrete factors that increase local platelet aggregation (e.g., Thromboxane A), enhance vasoconstriction (e.g., Serotonin), and promote blood coagulation (e.g., Thromboplastin). Human Physiology/Blood physiology. [(5)]

ABO Group System:

The ABO blood group is represented by substances on the surface of red blood cells (RBCs). These substances are important because they contain specific sequences of amino acid and carbohydrates which are antigenic. As well as being on the surface of RBCs, some of these antigens are also present on the cells of other tissues. A complete blood type describes the set of 29 substances on the surface of RBCs, and an individual's blood type is one of the many possible combinations of blood group antigens. Usually only the ABO blood group system and the presence

or absence of the Rhesus D antigen (also known as the Rhesus factor or RH factor) are determined and used to describe the blood type. Over 400 different blood group antigens have been found, many of these being very rare. If an individual is exposed to a blood group antigen that is not recognized as self, the individual can become sensitized to that antigen; the immune system makes specific antibodies which binds specifically to a particular blood group antigen and an immunological memory against that particular antigen is formed. These antibodies can bind to antigens on the surface of transfused red blood cells (or other tissue cells) often leading to destruction of the cells by recruitment of other components of the immune system. Knowledge of a individual's blood type is important to identify appropriate blood for transfusion or tissue for organ transplantation.

Blood Group AB individuals have both A and B antigens on the surface of their RBCs, and their blood serum does not contain any antibodies against either A or B antigen. Therefore, a individual with type AB blood can receive blood from any group (with AB being preferable), but can only donate blood to another group AB individual. AB blood is also known as "Universal receiver."

Blood Group A individuals have the A antigen on the surface of their RBCs, and blood serum containing IgM antibodies against the B antigen. Therefore, a group A individual can only receive blood from individuals of groups A or O (with A being preferable), and can donate blood to individuals of groups A or AB.

Blood Group B individuals have the B antigen on their surface of their RBCs, and blood serum containing IgM antibodies against the A antigen. Therefore, a group B individual can only receive blood from individuals of groups B or O (with B being preferabe), and can donate blood to individuals of groups B or AB.

Blood group O individuals do not have either A or B antigens on the surface of their RBCs, but their blood serum contains IgM antibodies against both A and B antigens. Therefore, a group O individual can only receive blood from a group O individual, but they can donate blood to individuals of any ABO blood group (ie A,

B, O or AB). O blood is also know as "Universal donor." Human Physiology/Blood physiology 7

Blood group inheritance Mother/Father O A B AB:

O O O, A O, B A, B

A O, A O, A O, A, B, AB A, B, AB

B O, B O, A, B, AB O, B A, B, AB

AB A, B A, B, AB A, B, AB A, B, AB

IA and IB are dominant over i, so ii people have type O, IAIA or IAi have A, and IBIB or IBi have type B. IAIB people have both phenotypes because A and B are codominant, which means that type A and B parents can have an AB child. Thus, it is extremely unlikely for a type AB parent to have a type O child (it is not, however, direct proof of illegitimacy): the cis-AB phenotype has a single enzyme that creates both A and B antigens. The resulting red blood cells do not usually express A or B antigen at the same level that would be expected on common group A or B red blood cells, which can help solve the problem of an apparently genetically impossible blood group [(3)].

Rh Factor:

Many people have the Rh Factor on the red blood cell. Rh carriers do not have the antibodies for the Rh Factor, but can make them if exposed to Rh. Most commonly Rh is seen when anti-Rh antibodies cross from the mothers placenta into the child before birth. The Rh Factor enters the child destroying the child's red blood cells. This is called Hemolytic Disease.

Compatibility in Blood/Plasma Transfusions:

Blood transfusions between donor and recipient of incompatible blood types can cause severe acute immunological reactions, hemolysis (RBCT destruction), renal failure, shock, and sometimes death. Antibodies can be highly active and can

attack RBCs and bind components of the complement system to cause massive hemolysis of the transfused blood.

A patient should ideally receive their own blood or type-specific blood products to minimize the chance of a transfusion reaction. If time allows, the risk will further be reduced by cross-matching blood, in addition to blood typing both recipient and donor. Cross-matching involves mixing a sample of the recipient's blood with a sample of the donor's blood and checking to see if the mixture agglutinates, or forms clumps. Blood bank technicians usually check for agglutination with a microscope, and if it occurs, that particular donor's blood cannot be transfused to that particular recipient. Blood transfusion is a potentially risky medical procedure and it is vital that all blood specimens are correctly identified, so in cross-matching labeling is standardized using a barcode system known as ISBT 128. Human Physiology/Blood physiology [8].

3. Methodology

3.1 Study design:

This research was descriptive cross sectional design hospital based study done to assess nurses knowledge about blood transfusion reaction during period from August to November 2016.

3.2 Study area:

Shendi town it is bounded by Khartoum state to south, Eldamer locality to the north, river Nile to west & located at 172km to Khartoum, most people in Shendi working agricultural & some industrial & other works.

In Shendi there are two hospitals Elmek Nimer university hospital &teaching hospital.

3.3 Study setting:

Elmek Nimer hospital was establish in 2002 and there are 121nurses in hospital and consist general units of medicine, pediatric, obstetric, cardiac units, dialysis unit, and surgery and dialysis.

3.4 Study population:

Including nurses in Elmak Nimer hospital during the two shift work.

Exclusion criteria:

- National service.
- Training.
- Nurses on holiday.

3.5 Sampling:

All nurses were involved in the study.

3.6 Sample size:

100 were participated in the study.

3.7 Data collection tool:

By using questioner designed by researcher based on the available literature review composed of 15 questions close (1-15) about blood transfusion reaction.

3.8 Data collection technique:

Data collected during two weeks in the 8 am to 12 pm at morning and afternoon night shift every nurses was filled the questions by hem self no missing and no refusing.

3.9 Data analysis:

The data was analyzed by (SPSS) version 22 analysis the collected data, organized, categorized, tabulated in tables using frequencies and percentage inform of table.

3.10 Ethical consideration:

The study was approved to by the conducted by the research institute above by the faculty.

Permeation has been taken from head quarter of the hospital the purpose of study has been explained clearly and verbally to the purpose of study and they have chance to stop any time they wishes.

4. Results

Table (1): Distribution of study group according to their age:

Item	Frequency	Percent
20-25 years	38	38%
26-30 years	39	39%
31- 35 years	16	16%
More than 5 years	7	7%
Total	100	100%

Above table showed 38% of sample age from 20-25, 39% of sample age from 26-30,17% of sample age from 31-35, 7% of sample >35 years .

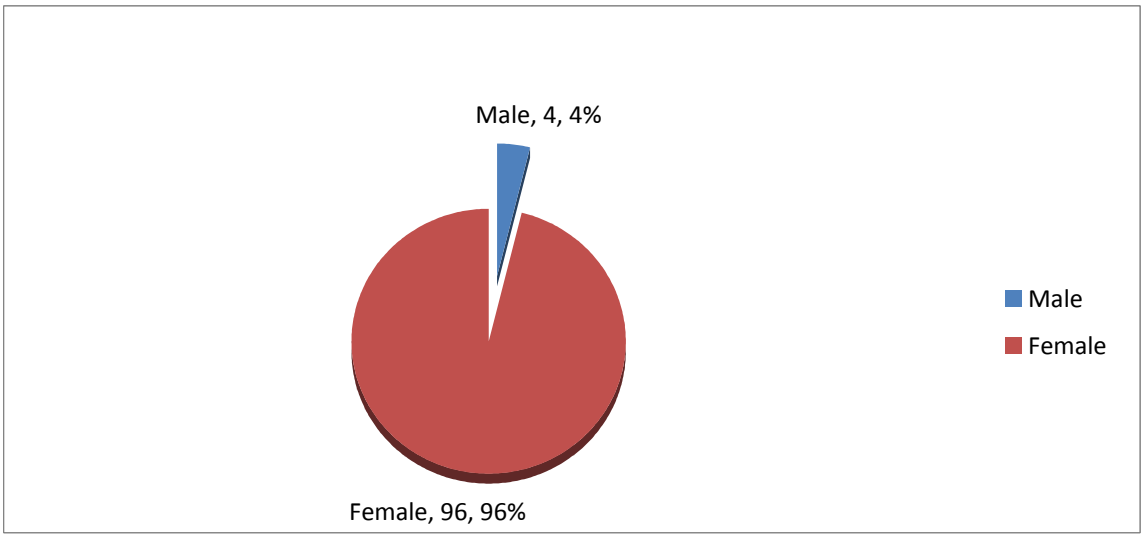

Figure (1): Distribution of study group according to their sex:

Above figure 96% female,4% male.

Table (2): Distribution of study group according to their experience:

	Frequency	Percent
Less than 1 years	9	9%
1-3 years	39	39%
3-5 years	20	20%
More than 5 years	32	32%
Total	100	100%

Above table showed that 9% of nurse experience <1 years, 39% of nurse experience 1-3 years. 20% of nurse experience 3-5 years, 32% of nurse >5 years .

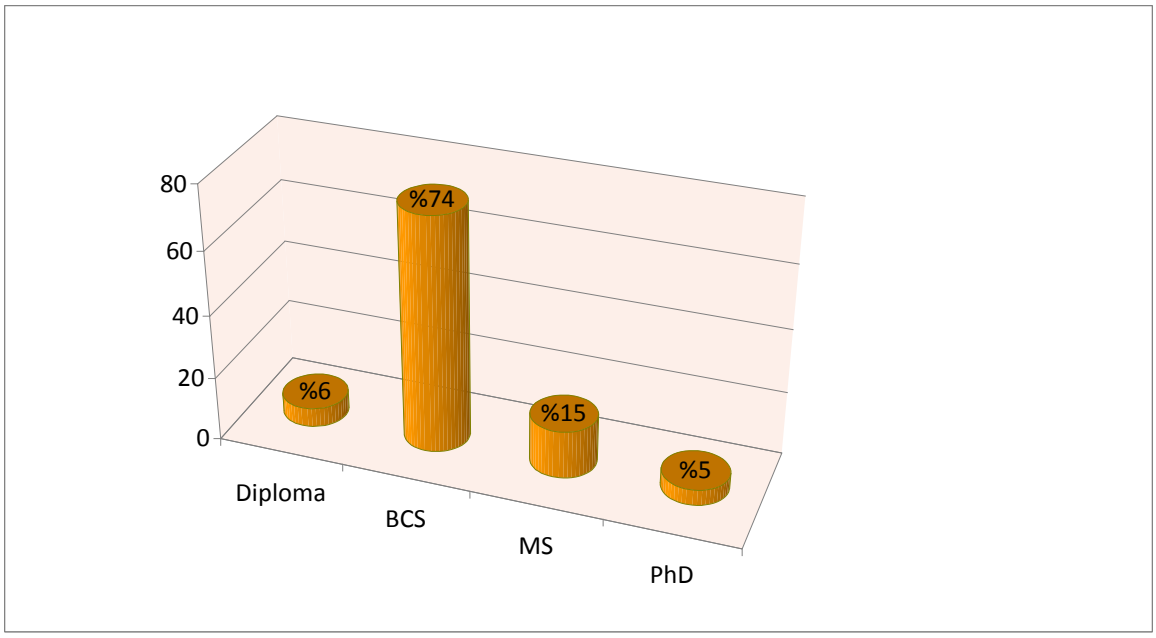

Figure (2) Distribution of study group according to their certificate:

BCS: bachelor.

MS: master

PhD: philosophy degree.

Above figure showed that 6%of nurse diploma,74 of nurse % BCS,15% of nurse MS,5% of nurse PHD.

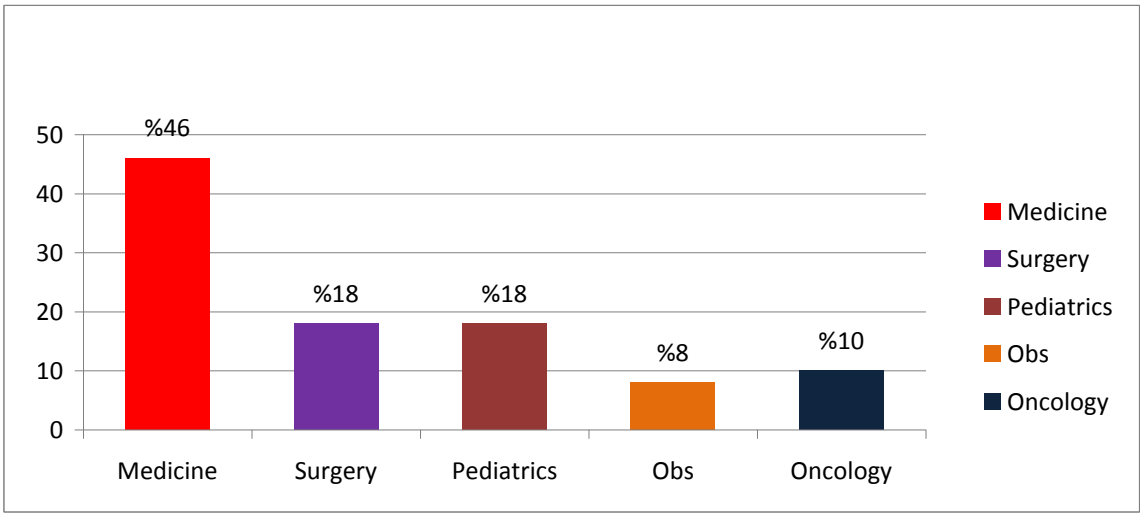

Figure (3): Distribution of study group according to department where they work:

Above figure showed that 46% of nurse department medicine, 18% of nurse s in surgery,18% of nurse department pediatric, 8% nurse department obs,10% of nurse department oncology .

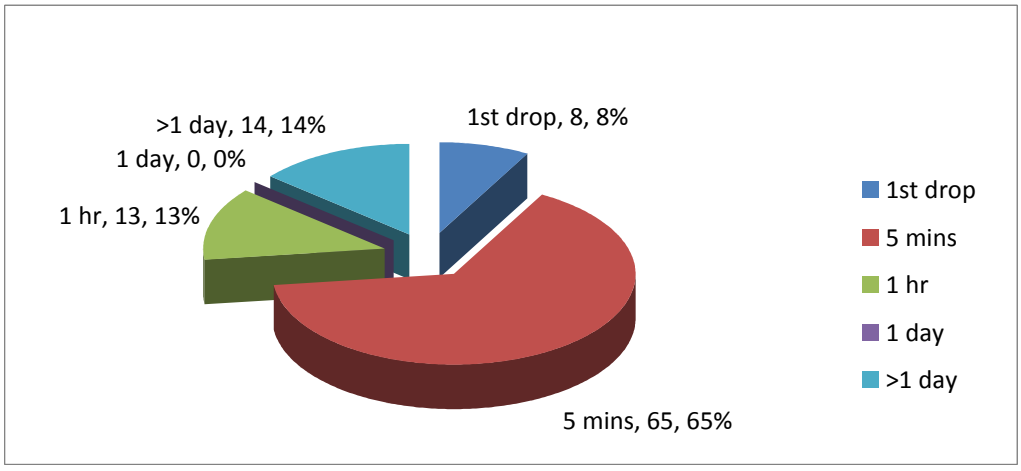

Figure (4): Time of reaction where relay occur according to study group:

8% of nurse the occurrence 1st drop,65% of nurse occurrence 5 minute,13%of nurse the occurrence 1hr,o% of nurse the occurrence 1day,14%of nurse the occurrence >1day.

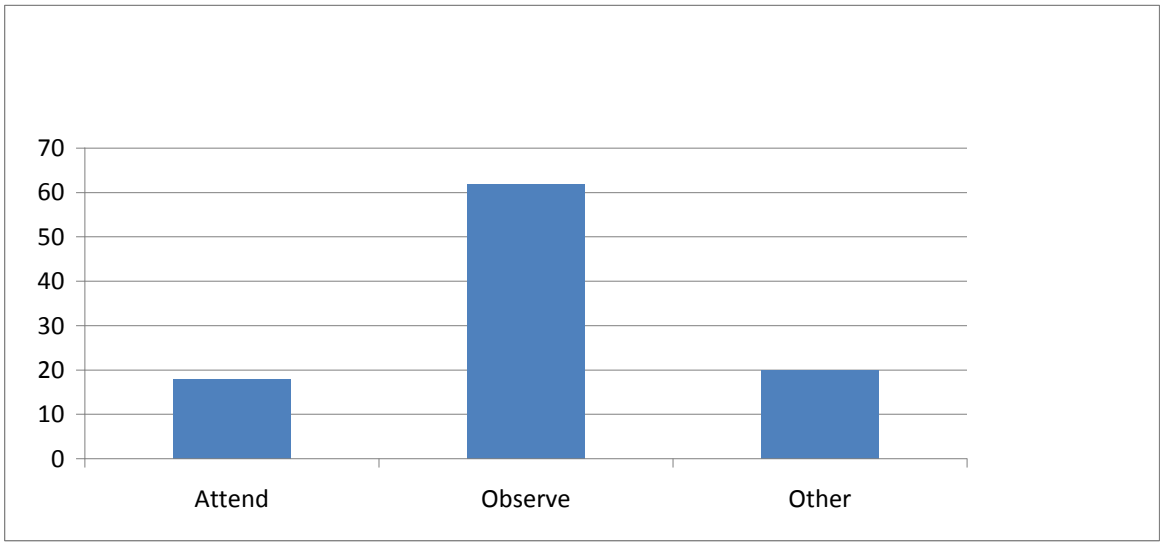

Figure (5) Distribution of study group according to dealing with blood transfusion in the first half hr.

* other: check vital signs.

Call the doctor.

46% of nurse sudden,5% of nurse delayed, 49% of nurse both .

Table (3) Distribution of study group according to their knowledge of indication of blood transfusion:

Item	Frequency	Percent
Chronic disease	5	5%
congenital	7	7%
Acute blood loss	33	33%
Other	55	55%
Total	100	100.0

* other: DIC, malignancy, coagulation disorder.

5% of nurse chronic, 7% of nurse, congenital, 33% of nurse the indication is acute blood loss,55% of nurse other (coagulation disorder ,DIC, malignancy)

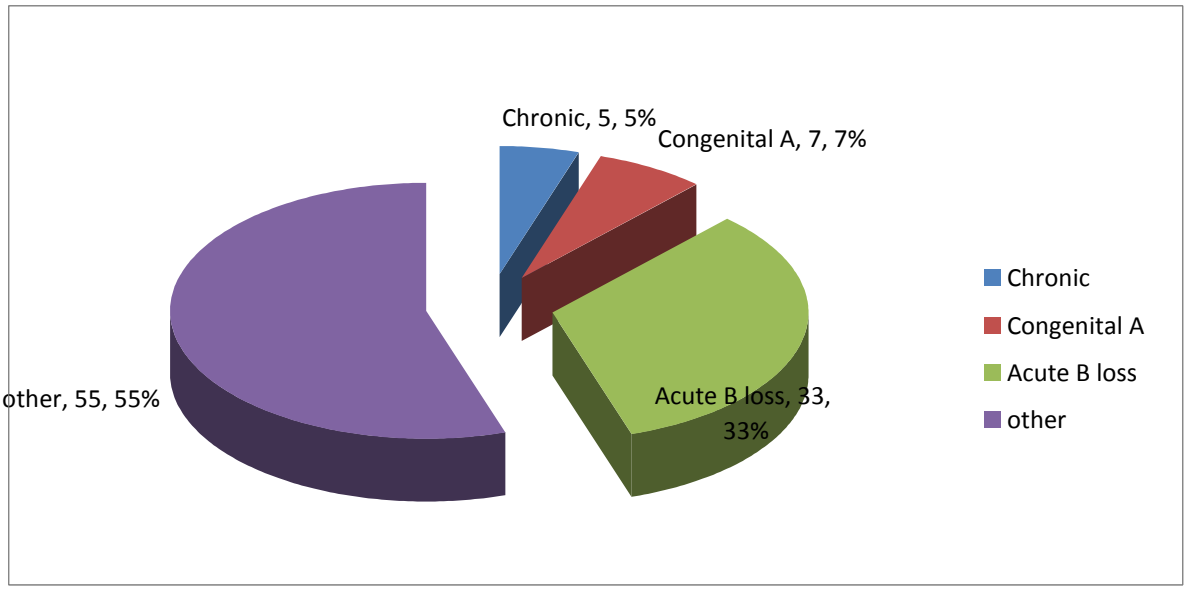

Figure (6) Distribution of study group according to the indication of blood transfusion:

* other: DIC, malignancy, coagulation disorder.

5% of nurse chronic,7% of nurse, congenital, 33% of nurse the indication is acute blood loss, 55% of nurse other (coagulation disorder, DIC, malignancy).

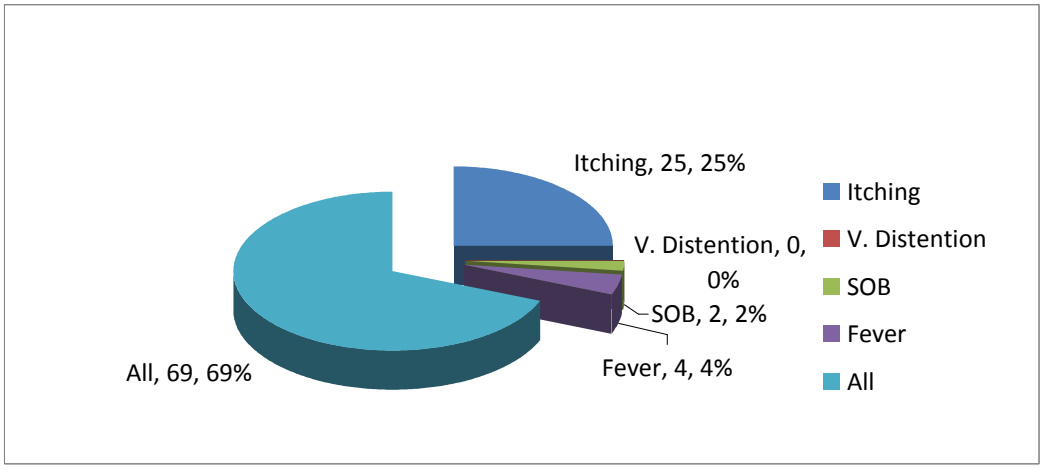

Figure (7) Distribution of study group according to the common symptoms of blood transfusion according to the knowledge of study group:

Above figure showed that 25% of nurse itching, 0% vain distention, 2% of nurse SOB ,4% of nurse fever,69% of nurse all of above.

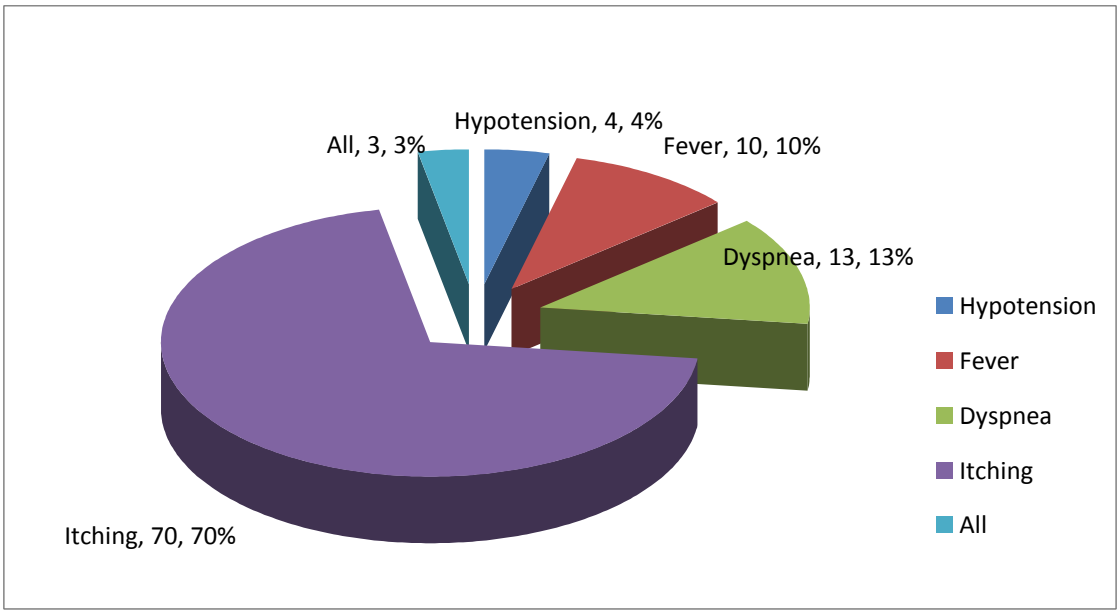

Figure (8) Distribution of study group according to common sign:

Above figure 4% hypotention,10% of nurse fever, 13% of nurse dysponea, 70% of nurse itching, 3% all of above.

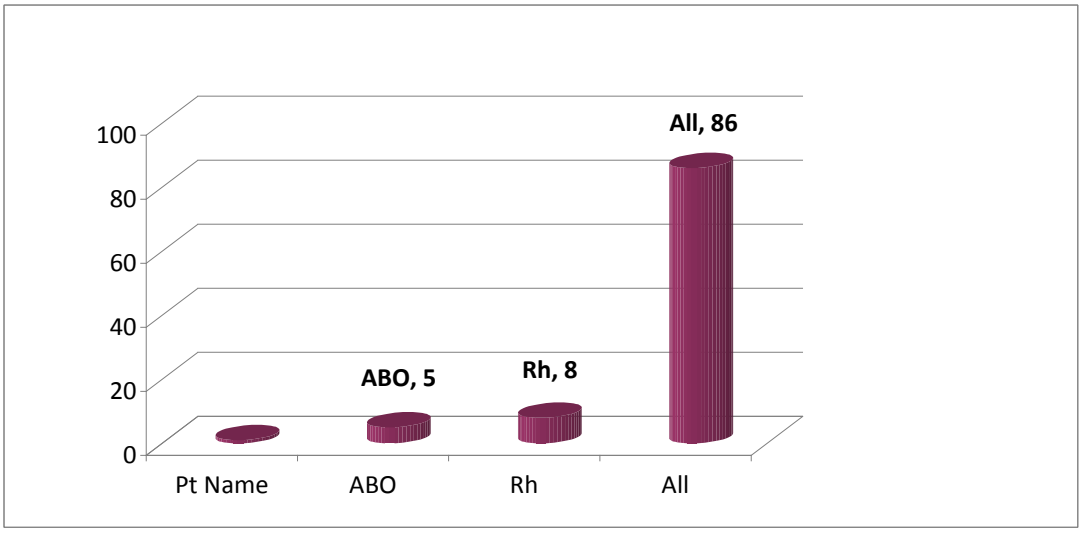

Figure (9) Distribution of study group according to predicted factors for decrease blood transfusion reaction according to knowledge.

Above figure showed that 1% of nurse PT name, 5% of nurse ABO, 8% of nurse RH ,86% all of above.

Table (4) Correlation between knowledge of nurse about Indication of blood transfusion reaction and academic degree

Academic		Indication of blood transfusion				Total	Asymp. Sig. (2-sided)
		Chronic disease	congenital	Acute blood loss	other		
Diploma	Count	5	1	0	0	6	.000
	% of Total	5.0%	1.0%	0.0%	0.0%	6.0%	
BCS	Count	0	6	33	35	74	.000
	% of Total	0.0%	6.0%	33.0%	35.0%	74.0%	
MS	Count	0	0	0	15	15	.000
	% of Total	0.0%	0.0%	0.0%	15.0%	15.0%	
PHD	Count	0	0	0	5	5	
	% of Total	0.0%	0.0%	0.0%	5.0%	5.0%	
Total	Count	5	7	33	55	100	
	% of Total	5.0%	7.0%	33.0%	55.0%	100.0%	

p. value = .000

Table (5) Correlation between knowledge of nurse about symptoms reaction and academic degree:

Academic		The common symptoms reaction				Total	Asymp. Sig. (2-sided)
		Itching	S.o.B	fever	All of above		
Diploma	Count	6	0	0	0	6	.006
	% of Total	6.0%	0.0%	0.0%	0.0%	6.0%	
BCS	Count	19	2	4	49	74	.000
	% of Total	19.0%	2.0%	4.0%	49.0%	74.0%	
MS	Count	0	0	0	15	15	.000
	% of Total	0.0%	0.0%	0.0%	15.0%	15.0%	
PHD	Count	0	0	0	5	5	
	% of Total	0.0%	0.0%	0.0%	5.0%	5.0%	
Total	Count	25	2	4	69	100	
	% of Total	25.0%	2.0%	4.0%	69.0%	100.0%	

P value = .000

Table (6) Correlation between knowledge of nurse about signs and academic degree:

Academic		The common sing					Total	Asymp. Sig. (2-sided)
		Hypotension	Fever	Dysponea	Itching	Other		
Diploma	Count	4	2	0	0	0	6	.000
	% of Total	4.0%	2.0%	0.0%	0.0%	0.0%	6.0%	
BCS	Count	0	8	13	53	0	74	.000
	% of Total	0.0%	8.0%	13.0%	53.0%	0.0%	74.0%	
MS	Count	0	0	0	15	0	15	.000
	% of Total	0.0%	0.0%	0.0%	15.0%	0.0%	15.0%	
PHD	Count	0	0	0	3	2	5	
	% of Total	0.0%	0.0%	0.0%	3.0%	2.0%	5.0%	
Total	Count	4	10	13	71	2	100	
	% of Total	4.0%	10.0%	13.0%	71.0%	2.0%	100.0%	

P value = .000

Table (7) Correlation between knowledge of nurse how to prevent blood transfusion reaction and their year's experience:

Years experience		How to prevent blood transfusion reaction				Total	Asymp. Sig. (2-sided)
		Patient name	ABo	Rh	All of above		
1 years	Count	1	5	3	0	9	.012
	% of Total	1.0%	5.0%	3.0%	0.0%	9.0%	
1-3 years	Count	0	0	5	34	39	.022
	% of Total	0.0%	0.0%	5.0%	34.0%	39.0%	
3-5 years	Count	0	0	0	20	20	.011
	% of Total	0.0%	0.0%	0.0%	20.0%	20.0%	
More than 5 years	Count	0	0	0	32	32	
	% of Total	0.0%	0.0%	0.0%	32.0%	32.0%	
Total	Count	1	5	8	86	100	
	% of Total	1.0%	5.0%	8.0%	86.0%	100.0%	

P value = .012

Table (8) Correlation between practice of nurse intervention and their year's experience:

Years experience		The intervention blood transfusion				Total	Asymp. Sig. (2-sided)
		Observe	Stop Bt	Continuous with cautious	All of above		
1 years	Count	3	6	0	0	9	.000
	% of Total	3.0%	6.0%	0.0%	0.0%	9.0%	
1-3 years	Count	0	39	0	0	39	.000
	% of Total	0.0%	39.0%	0.0%	0.0%	39.0%	
3-5 years	Count	0	20	0	0	20	.000
	% of Total	0.0%	20.0%	0.0%	0.0%	20.0%	
More than 5 years	Count	0	2	1	29	32	
	% of Total	0.0%	2.0%	1.0%	29.0%	32.0%	
Total	Count	3	67	1	29	100	
	% of Total	3.0%	67.0%	1.0%	29.0%	100.0%	

P value = .000

5.1 Discussion

Blood transfusion is one of a very important medical practice which save a lot of patient.

Blood transfusion reaction can occur in many patient and it can be very muffled to be very sever reaction which can cause death.

Despite the major predicated factor before transfusion reaction can occur. The reaction is one of the essential and important but dangerous part of today's medicine in which an inappropriate measures have been done.

This was descriptive study done at period from August to November 2016 to assess nurse knowledge and practice about blood transfusion reaction in Elmek Nimer university hospital.

The study showed more than one third (38%) of study group their age between (26 – 30 years), and majority (96%) of them were female.

The study clarified that about two third (65%) of study group their knowledge about blood transfusion reaction occur during the first 5 mints of blood transfusion, and less than half (49%) of study group their knowledge about the onset of blood transfusion reaction good, this agree with literature review (Acute reaction occur in 24 hr of the start of transfusion, delayed reaction occur more than 24 after the start of blood transfusion). [8]

The study reflect that about two third (62%) of study group their knowledge about role of nurse with dealing of blood transfusion reaction observing, this result lead to high performance and adequate care of patient the study showed that all (100%) of nurse their knowledge were good about blood transfusion reaction this result pursuit of professional practices, most of them were BCS degree.

On other hand the study reflect that, about more than one third (39%) their year of experience (1 – 3 years) while the majority (74%) of the BCS degree. The study presented that about less than half (46%) of study group their work in

medicine department, and the study showed that all (100%) of study group they attend blood transfusion.

This study result accommodate with their educational level (BCs degree) the study showed that more than half (55%) of study group were good knowledge about blood transfusion indication (DIC, coagulation disorder malignancy).

The study reflect that about more than two third (69%) of study group their knowledge about symptoms of blood transfusion reaction (itching vein distension, SOB, fiver) while about more than two third (70%) were good knowledge about common sign of blood transfusion reaction (itching).

The study clarified that majority (86%) of study group were adequate knowledge about prevention of blood transfusion reaction this result was good result accommodate with previous study. (the majority of nurses lacked awareness of the issue of patient preparation before leaving the ward for blood collection. The result also indicated that 87.5% of nurses was would act on incomplete medical order and that (91%) lack knowledge of basic ABO terminology (American International of contemporary research).

The study presented that about two third (66%) of study group were adequate knowledge about their intervention about blood transfusion reaction, this result lead to high performance and adequate knowledge of intervention.

The correlation analysis was details brake down illustrating the correlation between sixth of independent variable; level of education, number of year of experience on question (10; do you know the indication of blood transfusion.), question 11(indication of blood transfusion), question 12(common symptoms of blood transfusion reaction), question 13 (common sings of blood transfusion reaction), question 14 (how to prevent blood transfusion reaction), question 15 (the intervention reaction).

There was high significant between level of education (knowledge), common singe and symptoms of blood transfusion reaction (p;.000) (74%).

Were bachelor degree.

The level of education appeared high significant (p: .000) (74%) knowledge of nursing about indication of blood transfusion .

Year of experience had significant (p:.012) (86%) affect on prevention of blood transfusion reaction, high significant with intervention of blood transfusion reaction (p: .000) (39%).

5.2 Conclusion

Based on finding of presented study was concluded that most study group had BCS degree and most of them work in medicine department, about tow third of study group had good knowledge with dealing of blood transfusion reaction. all of nurse their knowledge were good about known of blood transfusion reaction .all of nurse had attend blood transfusion, about tow third of study group had good knowledge about blood transfusion reaction occurrence, more than half of study group good knowledge about indication of blood transfusion, more than tow third of study group had good knowledge about sign and symptoms of blood transfusion reaction.

The majority of study group were adequate knowledge about prevention of blood transfusion reaction.

5.3 Recommendations

1. Based on the study finding and conclusion, the following recommendations are required to be implemented by head nurse.
2. There is a need for educational program about blood transfusion reaction and take continuously to increase level of knowledge of nurses about blood transfusion reaction.
3. And to develop workshop which educate nurses to prevent susceptible reaction.

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Shendi University

Faculty of nursing sciences

Questionnaire about assessment of nurses' knowledge regarding blood transfusion reaction in Elmek Nimer

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1-Age:

a) 20-25years ( ) b) 26-30 years ( ) c) 31-35years ( ) d) more tha35 years ( )

2-Sex:

a) Male ( ) b) female ( )

3- Year experience:

a) less than1year ( ) b) 1-3years ( ) c) 3-5years ( ) d) more than 5years ( )

4- Academic certification:

a) Deploma ( ) b) BCS ( ) c) MS ( ) d) PHD ( )

5-Department:

a) medicine ( ) b) surgery ( ) c) pediatric ( ) d) obse ( )

e) oncology ( )

6- Do you attend blood transfusion:

a) Yes ( ) b) No ( )

7- When the reaction occur:

a) first drop ( ) b) 5 minutes ( ) c) 1 hour ( ) d) 1 day ( )

e) other ( )

8- The reaction blood transfusion:

a) sudden ( ) b) delayed ( ) c) a & b ( )

9- How to deal with blood transfusion is the first half hour:

a) attend ( ) b) observe ( ) c) other ( )

10- Do you know the indication blood transfusion:

a) Yes ( ) b) No ( )

11- Indication of blood transfusion:

a) chronic disease ( ) b) congenital ( ) c) acute blood loss ( )

d) other ( )

12- The common symptoms of blood transfusion:

a) itching ( ) b) vein distention ( ) c) S.O.B ( ) d) fever ( )

e) all of above ( )

13- The common sign:

a) hypotension ( ) b) fever ( ) c) dysponea ( ) d) itching ( )

14- How to prevent blood transfusion reaction (check):

a) patient name ( ) b) ABO ( ) c) Rh ( ) d) all of above ( )

15- The intervention blood transfusion reaction:

a) observe ( ) b) see ( ) c) stop blood transfusion ( )

d) continuous with cautious ( ) e) all of above ( )