

*Original Research Article*

# Assessment of Nurses' Practices Regarding Blood Transfusion

Haseena Majeed, Kousar Parveen, Muhammad Hussain, Muhammad Afzal and  
Dr. Sayed Amir Gilani

## Abstract

Defence Road, Bhotian Chock,  
University of Lahore, Lahore

\*Corresponding Author's E-mail:  
Haseenashehzad5@gmail.com

Nurses play a vital role in certifying blood transfusion safety as the nursing team is accountable for inspection of data to avoid errors, providing information about blood transfusion, identifying transfusion reactions and documentation of the procedure. The purpose of this study was to assess the nurses' practices regarding blood transfusion procedure. It was a descriptive observational study conducted from February 2020 to May 2020 in two hospitals of Lahore. Participants were registered nurses, selected through random sampling technique and data was collected through direct observation. Sample size was 200, margin of error was 0.5% and confidence level was 95%. Results showed less than 50% staff nurses done appropriate practices before collection of blood bags from blood banks, and checks in the blood bank. More than 50% of nurses did appropriate practices before initiation of blood transfusion and less than half of the nurses did proper practices after initiation of blood transfusion. This study showed nurses average and poor practices regarding blood transfusion procedure as more than half of the nurses took less than 50% score. It is a need to organize educational programs, workshops and seminars to refresh and retain the knowledge to improve the nurses' practices regarding blood transfusion.

**Keywords:** Assessment, Observation, Nurses, Practices, Blood transfusion

## INTRODUCTION

Nurses are primary handlers in the process of blood transfusion because they are involved at every step of transfusing blood. Adverse reaction during blood transfusion can be caused by the error of doctors, nurses and blood bank technicians (Panchawagh et al., 2020)

A Nurse plays a vital role in certifying blood transfusion safety as the nursing team is accountable for perceiving the blood transfusion indications, inspection of data to avoid errors, providing information about blood transfusion, identifying transfusion reactions and documentation of the procedures. The process of blood transfusion needs expertise and trained professionals to maintain patient safety as it is a critical process. The patients admitted for blood transfusion are directly cared for by nursing professionals. Nursing team is responsible for exact blood storage and its identification without any mistake (Tavares et al., 2015)

Standard guidelines and policies are available in different countries. These guidelines explain major processes of practice of blood transfusion including donor's blood screening for infectious diseases, exploring the need of transfusion, ABO compatibility tests, patient identification (name, blood group, hospital admission number and ward name etc.). These guidelines tell that a patient should be closely observed for the first 15 minutes as transfusion started. (Sapkota et al., 2018)

Collegiate Board Resolution (CBR) of June 11, 2014 of National Health Surveillance Agency and Decree of 158 of February 4, 2016 of the ministry of Health regulated the standards for blood transfusion activities like heamotherapeutic procedures, establishment of hemothe-rapy requirements and endorse the need of professional's qualification and training involved in blood transfusion. The process of blood transfusion need trained and skilled

people to implement this function properly (Duarte et al., 2017).

In the process of blood transfusion, blood and its components transfused to save the life of the patient. Although blood transfusion improves a patient's health, it is a life threatening process. Nurses play an important role during blood transfusion. Nurse's practice regarding safe blood transfusion is reliant on nurse's awareness and skills. Trained and skilled nurses reduce the risk of blood transfusion. There are five phases during administration of blood transfusion. Four phases linked with nursing performance which contains preparation before taking blood from the blood bank, collection of blood bags, pre-transfusion actions and after transfusion activities to sustain safety of patient. Preparation phase includes the checking of the written prescription of the physician. This provides adequate information about blood transfusion indication, its hazards and benefits. Second phase is collection of blood from the blood bank and it is significant in order to increase patient safety. Nurse should correctly match the patient's identification information on the blood bag and collection slip to inhibit blood incompatibility. Special blood carrier box should be used for blood transportation from blood bank to ward. Prior to blood transfusion, two approved persons checked the compatibility of the blood. Vital signs of the patient must be checked. This is a very delicate step to blood transfusion safety because it is the last chance to intrude any inappropriate blood component. In post transfusion activities, when blood transfusion starts, blood infusion rate must be slow in the first 15 minutes. Nurse should keep the patient under observation to check any sign of reaction. Blood transfusion must be finished in four hours. Intravenous normal saline and morphine 1mg/ml is recommended during blood transfusion but no more medication is allowed. Nurse must be alert about any symptoms of blood reaction and its management to save patients life (Elhy et al., 2017)

Central or peripheral venous catheters can be used for the transfusion of blood components. Flow rate can be adjusted through narrow lumen catheters and PICC (peripherally inserted central catheters). Administration set with a 170 to 200  $\mu$ m integral mesh filter should be used for blood transfusion. According to current guidelines, blood administration set should be changed after 12 hours to minimize the bacterial infection risk.(Berkowitz et al., 1987)

There are many intravenous solutions but isotonic saline (0.9%) is suggested to use with blood. Other intravenous solutions cause problems like red blood cells hemolyzed in 5% dextrose water. Calcium containing i/v solutions, for example Ringer Lactate, can cause clot formation in blood.

Viability of RBC's maintained at controlled temperature of  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Bacterial growth also stop at this temperature. According to UK Guidelines for blood bank for storage if it is out of controlled temperature more

than 30 minutes. The reason is that the component warms up when the blood pack is out of controlled temperature storage. This enhances the proliferation of bacteria. Warm ambient temperature, even for little time period exposure, enhances the risk of proliferation of bacteria. Warm temperatures also affect the quality of RBCs (Brunskill et al., 2012).

Indications, advantages and risk factors should be informed to the patient prior to blood transfusion and consent should be taken appropriately by the staff nurse (Court et al., 2011).

## Background

Blood transfusion is a medical procedure used for the treatment of anemia. Globally, the blood transfusion trend is increasing. In 2012, 85 million units of blood were done and 2016, 112.5 million donations have been done. Although blood transfusion is beneficial, it might be risky also because different adverse reactions can occur during this process. According to the report of serious hazards of blood transfusion (SHOT) 2015, 3288 blood reaction cases were reported. Of 3288 cases, 77.7% cases occurred due to human mistakes and only 10% were non-preventable like allergy, fever etc. 166 cases were reported with major morbidity and 26 deaths were reported. The reported morbidities included hemolytic blood transfusion reaction, infection transmitted through blood transfusion, and incompatible blood transfusion. These complications occurred due to inappropriate blood transfusion practices (Sapkota et al., 2018)

## Problem statement

Previous studies revealed that nurses 'knowledge and practices regarding blood transfusion procedure are inappropriate. This study is conducted to analyze the nurse's practices regarding blood transfusion as it is a lifesaving as well life-threatening process.

## Purpose of the study

The purpose of the study was observation of nurses' practices regarding blood transfusion process.

## Research Question

1. Determine nurses' practices prior to the collection of blood bags from blood banks?
2. Determine nurses' practices in the blood bank while collecting blood bags?
3. Assess nurses' practices after the delivery of a blood bag to the ward?

4. Assess nurse's practices from initiation of blood transfusion till first 15 minutes.?

## Conceptual Definitions

### Nurses' Practice

Actual application or use of standards guidelines of any procedure by nurses.(Berman et al., 2017)

### Blood transfusion

Blood transfusion is a medical procedure of adding healthy blood in patient's body through intravenous line after any illness or injury (Agerstrand et al., 2020)

### Operational Definition

#### Nurses' practice

Use of standard guidelines and policies regarding nursing procedures.

### Blood transfusion

It is a medical procedure in which healthy blood is given to the patient who needs blood after any illness.

### Scope of the study

This study will evaluate the nurses' practices regarding blood transfusion in two hospitals (A, B).

### Limitations

The limitation of this study is that data is collected from two hospitals only. So results may not be generalized to all hospitals. Sample size is short and data is collected in short duration.

## LITERATURE REVIEW

A study conducted by Sapkota et al, in Nepal 2018. In this study, sample size was n= 86. In 53.2% cases, >2 hours were taken from dispatching blood from the blood bank till initiation of transfusion. Patient's relative kept blood in the ward in an unprotected manner in most of the cases. Reasons of blood transfusion explained to the patient or relatives only in 8.2% cases, associated risks were explained in 2.4% cases and advantages of transfusion

were explained in only 4.7% cases. At the initiation of blood transfusion vital signs assessment was done only in 2 to 4% of the cases. This study shows poor practices regarding blood transfusion in Nepal. There is a need to improve the quality system and quality management in the area of blood transfusion practices.(Sapkota et al., 2018)

Khetan et al, done a study about blood transfusion practices in 2018. It was an observational study. Total 104 observations were made in 25 wards during the study. Observations divided in preanalytical phase and post analytical phase. In the preanalytical phase 80.6% participants were unaware of institute guidelines regarding blood transfusion, 67.35% participants were done inappropriate sampling practices and 56.7% participants did prescription related mistakes. In the post analytical phase, 72% participants did not take consent before blood transfusion and blood pack storage and disposal problems were also found. The results of this study concluded that healthcare professionals should be aware of blood transfusion guidelines and policies. Clinical staff compliance to blood transfusion guidelines requires regular audits. (Khetan et al., 2018)

Another study conducted by Encan and Akin in 2019. The study results revealed that 75.4 participants knew that only (0.9% NaCl) solution can be used simultaneously with blood transfusion. 66.7% participants responded that before blood transfusion initiation only one nurse should check the blood bag. Most of the nurses were unaware of double checking of tags on the blood bags. These tags include patient details like name, registration number, blood group RH factor, cross match test, expiry date, and compatibility approval. In this study, only 33.3% nurses double checked the blood bags before the beginning of blood transfusion. This shows poor practices of nurses regarding blood transfusion process. The study results highlights the necessity of arranging educational programs for nurses to improve blood transfusion practices in clinical area.(Encan and Akin, 2019)

A descriptive study with quantitative approach is done by Rais et al., in 2016 in order to monitor the blood transfusion process in a public hospital. Data was collected about total time for blood transfusion, vital sign monitoring and blood reactions. 1012 participants were examined, 53.4% participants did inappropriate practices. 6% participants start blood transfusion after 30 minutes of dispatching from the blood bank and 9.3% participants did not do vital sign monitoring. This study has a limitation that it was a retrospective study done in a single institution. The study concluded that There is a need to produce strategies to make sure the right and continuous filling of blood transfusion forms. Because it is necessary for observing, analyzing and continuous improvement of blood transfusion practices. This study identified the documentation failure that can lead to happening of adverse events associated with blood administration (Reis et al., 2016).

A cross sectional study conducted in Qazvin hospital in

2019. 124 nurses participated in this study. Participants were selected through random sampling technique. Pre transfusion and post transfusion aspects were analyzed in this study. 9.58% was the mean score of knowledge and 38.96% was the mean score of performance. Relationships are examined by variance analysis. A significant relationship was found between knowledge and performance of the subjects. (Nemati et al., 2019)

## METHODOLOGY

### Study Design

It was a descriptive observational study.

### Settings

The study took place at two hospitals (A, B) in Lahore. Observations were made in intensive care units, Gynae, medical and surgical wards because frequent blood transfusions occurred in these wards. Practically it was not possible to observe the complete 4 hours blood transfusion process. Observation was started 10 minutes before the blood collection from the blood bank until 15 minutes the initiation of blood transfusion. During this period, nurse's practices about different aspects of the blood transfusion process were observed. Participants were unaware regarding observation

### Duration of Study

The duration of the study was four months, from February 2020 to May 2020.

### Target population

The target population of the study was registered nurses of both hospitals (A, B).

### Sample Size

Sample size was calculated through an online sample size calculator. Target population was 412, sample size was 200, confidence level was 95% and margin of error was 5%. A list of names of 412 registered nurses taken from the nursing department of both hospitals. Each name allotted a serial number from 1 to so on. These serial numbers were entered on SPSS software and the computer is instructed to select a random sample. Random sampling avoids biasness and increase the generalizability of

results to target population.

### Sampling Technique

A simple random sampling technique was used to collect data.

### Sample Selection

#### Inclusion Criteria

1. In this study only registered nurses included.
2. Registered nurses working in ICU, Gynae Surgical and Medical wards were included
3. Nurses who were willing to participate in this study.

#### Exclusion Criteria

1. Nurse managers, nursing assistants and new nurses with the experience of less than 3 months were excluded.
2. Nurses who were not willing to participate in this study.

### Instrument

A checklist developed and used by Erdil and Bayraktar (2000) and Hijji B et al. (2010) was selected to observe the nurses during the blood transfusion process. The checklist consisted of four sections. First section was preparation before the collection of blood from blood bank, second was checks in the blood bank, third was dispatching of blood from blood bank before the initiation of blood transfusion, and forth was activities after the initiation of blood transfusion.

### Reliability

The reliability of the instrument was checked by Crohn alpha which is 0.83.

### Ethical Considerations

- Written approval was taken from the participants.
- Data collected from the participants was kept confidential.
- Participants remained unspecified throughout the study.
- It was informed to the participants that there is no risk or harm during the study.
- It was also informed to participants that they can withdraw at any time during the process of the study.

Table 1. Demographic Data

Age	Qualification	Experience	Duty	Shift
21-30y	33.5%	MSN 3%	3m- 1y 15%	Morning 27%
31-40y	42%	BSN 7%	1-5y 33%	Evening 73%
41-50y	24.5%	G.nursing 90%	6-10y 21%	----- ----
-----	-----	----- ----	11-15y 27%	----- ----
-----	-----	----- ----	16-20y 4%	----- ----

Table 2. Before blood collection

Practices	Yes	No
1. Venous access is available.	37.5%	62.5%
2. Patency of line is checked with appropriate solution.	30%	70%

Table 3. Blood bank

Practices	Yes	No
1. Nurses performed checks in the blood bank.	30%	70%
2. Nurses use special box to transport blood from Blood bank to the ward.	14%	86%

- Data was kept under key and lock. In the laptop it was kept under password.

### Data Collection Procedure

Demographic data include nurse's age, qualification, experience and duty shift. A checklist developed and used by Erdil and Bayraktar (2000) and Hijji B et al., (2010) was selected to observe the nurses during blood transfusion process. The check list contained 26 questions. One point was given to right practice and 0 point was given to the wrong or inappropriate practice. 0-25% scores considered poor practices, 26-50% scores considered average practices, 51-75% scores considered good practices and 76-100% scores considered excellent practices.

### Data Analysis Procedure

Demographic and observational data was entered on computer software SPSS, version 20. One point will be given to right practice and 0 point will be given to the wrong or inappropriate practices.

### Dependent Variable

Nurses' practice is a dependent variable.

### Independent Variable

Blood transfusion is an independent variable.

## RESULTS

A total of 200 staff nurses were observed while doing blood transfusion. Demographic data is demonstrated in table no (1). 33.5% staff nurses were 21-30 years old, 42% were 31-40 years old and 24.5% were 41-50 years old. Only 3% staff nurse were MSN degree holders, 7% were BSN and 90% were General Nursing degree holders. 15% staff nurses have 3 months to 1-year experience, 33% have 1-5 years' experience, 21% have 6-10 years' experience, 27% have 11-15 years' experience and 4% have 16-20 years' experience. 27% staff nurses were observed in morning shift and 73% were observed in evening shift (Table 1).

Blood transfusion process is divided into four phases. First preparatory phase includes two questions. 37.5% staff nurses did venous access before blood transfusion and 62.5% did not. 30% staff nurses checked the patency of line with normal saline before blood transfusion and 70% did not (Table 2).

In the second phase of blood transfusion staff nurses collect blood from the blood bank. 30% staff nurses performed checks in the blood bank and 70% did not done. 14% staff nurses used a special box to transport blood from the blood bank to the ward and 84% did not do this.

Third phase contained fifteen questions to observe the nurse's practices. 35% of the staff nurses wrapped the blood pack with linen, gauze or blanket and 65% did not do this. 34% staff nurses administered blood within 10 to 30 minutes after collecting from the blood bank but 66% took more than 30 minutes. 34% staff nurses performed double checks at nursing stations and 66% did not. 73% staff nurses informed reasons and benefits of blood transfusion to the patient and 27% did not do this. 86% staff nurses informed the patient about reaction symptoms

**Table 4.** Before initiating the blood transfusion

Practices	Yes	No
1. Wrapped the blood pack with linen/ gauze or blanket.	35%	65%
2. Blood administered within 10-30 minutes after removal from blood bank.	34%	66%
3. Two registered nurses performed checks at nursing station.	34%	66%
4. Informed the patient about reasons and benefits of B.T.	73%	27%
5. Informed the patient about reaction symptoms of B.T.	86%	14%
6. Wore gloves.	61.5%	38.5%
7. Asked the patient to state his name for identity.	91.5%	8.5%
8. Asked the patient to state his date of birth.	13%	87%
9. Checked the patient ID band.	25%	75%
10. Compared the information on blood bag and prescription Chart.	80%	20%
11. Record pulse before blood transfusion.	80%	20%
12. Record Blood Pressure before blood transfusion.	95.5%	4.5%
13. Record Temperature of the patient before blood transfusion.	95%	5%
14. Used appropriate blood transfusion set.	98.5%	1.5%

**Table 5.** After initiating the blood transfusion

Practices	Yes	No
1. Transfused 30 ml blood in the first 15 minutes of initiation.	93.5%	6.5%
2. The nurse remained with patient for the first 15 minutes of transfusion for any possible reaction.	16.5%	83.5%
3. Record temperature after first 15 minutes of blood transfusion initiation.	12%	88%
4. Record pulse after first 15 minutes of blood transfusion initiation.	15%	85%
5. Transfusion completed within 4 hours.	42.5%	57.5%

and 14% did not do this. 61.5% staff nurses wore gloves to transfuse blood to the patient and 38.5% did not do this. 91.5% staff nurses asked the patient to state his/her name for identity checks and 8.5% did not do this. 13% staff nurses asked the patient to state his/her date of birth for identity checks and 87% did not do this. 25% staff nurses checked the patient ID band and 75% did not do this. 80% staff nurses compared the information on blood bags and prescription chart and 20% did not do this. 80% staff nurses record the pulse of the patient before blood transfusion and 20% did not do this. 95.5% staff nurses record the blood pressure of the patient before blood transfusion and 4.5% did not do this. 95% staff nurses record temperature of the patient before blood transfusion and 5% did not record. 98.5% staff nurses used appropriate blood transfusion set and 1.5% did not use appropriate set (Table 4).

Fourth phase of blood transfusion process includes the nurse's practices after initiation of blood transfusion. 93.5% staff nurses start the blood transfusion at slow speed in the first fifteen minutes and 6.5% did not do this. 16.5% staff nurses remained with the patient for the first fifteen minutes of transfusion for any possible reaction and 83.5% did not do this. 12% staff nurses record temperature of the patient after the initiation of blood transfusion and 88% did not record. 15% staff nurses record the pulse of the patient after initiation of transfusion and 85% did not record it. 42.5% staff nurses completed the blood transfusion within 4 hours and 57.5% did not do this (Table 5).

## DISCUSSION

The present study included 200 staff nurses. All nurses are female. Majority of the nurses were 31-40 years old. Most of the nurses were General nursing diploma holders. Majority of the nurses have 6-15 years' experience. Most of the nurses were observed in the evening shift.

The checklist used in this study was divided into four phases. First phase was related to nurses' practices before blood collection from the blood bank. The results showed poor practices of nurses as majority of the nurses did not have venous access before blood collection from the bank and less than half of the nurses checked the patency of I/V line with an appropriate solution (table 2). Another study done by Hijji et al. (2010) showed the same results as the majority of the nurses did not have venous access and also did not check the patency of the I/V line through an appropriate solution.

The second phase was related to collection of blood from the blood bank. The results showed poor practices as the majority of the nurses did not perform checks in the blood bank and only in a few cases a box was used to transport blood packs from blood bank to the ward. A study done by Sapkota et al. (2018) revealed the same results. In this study patient's relatives collect blood from the blood bank with bare hands and no special box was used to carry blood from blood bank to the wards.

The third phase was nurses' practices before initiation of blood transfusion. The results showed that majority of

The nurses did not administer blood within 10-30 minutes after removal from the blood bank. In a study done by Sapkota et al. (2018), the majority of the staff nurses administered blood in >2 hours after removal from the blood bank. Less than half of the nurses were unaware of double check of the blood bag at the nursing station. The study of Encan and Akin (2019) also revealed the same results as the majority of the staff nurses did not do a double check of the blood bag. In this study majority of the staff nurses informed reasons, benefits and reactions symptoms of the blood transfusion. A study done by Khetan et al. (2018) showed opposite results, as the minority of the nurses take consent of the patient. In this study majority of the staff nurses take vital signs before initiation of blood transfusion while Rais et al. (2016) study showed contrary results as majority of the staff nurses did not take vital signs before blood transfusion. More than half of the staff nurses wore gloves before initiation of blood transfusion while Hijji et al. study showed that less than half of the nurses wore gloves.

The fourth phase was related to nurses' practices after initiation of blood transfusion. The results showed that the majority of the nurses start blood transfusion slowly in the first fifteen minutes. The Majority of the nurses remained with the patient in the first fifteen minutes of initiation of blood transfusion. Less than half of the nurses completed blood transfusion within four hours. The rate of vital sign record was very low. Same results showed in another study done by Sapkota et al. in 2018.

## CONCLUSION

This study shows that the nurses' practices regarding blood transfusion are suboptimal. Nurses practices before blood collection from the blood bank score average percentage. The results show that the nurses' practices in the blood bank, while collecting blood bags are poor. Nurses' practices before initiation of blood transfusion score good percentages except few points. And nurses' practices after initiation of blood transfusion are poor because the majority of the nurses score poor percentages. It is a need to organize educational programs, workshops and seminars to refresh and retain the knowledge to improve the nurses' practices regarding blood transfusion.

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