

## KNOWLEDGE OF PROTOCOL AND HAZARDS OF BLOOD TRANSFUSION AMONG NURSES IN TERTIARY CARE HOSPITALS IN KARACHI, PAKISTAN

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### ABSTRACT

Blood transfusion is a potentially hazardous procedure and errors can lead to many complications or even death may occur. Nurses must have updated knowledge of blood transfusion, protocol, and nursing practices. To assess the knowledge of protocol and Hazards of Blood Transfusion among Nurses in tertiary care hospitals in Karachi, Pakistan, A descriptive cross-sectional study design and a Simple random sampling technique was adopted. The data was collected from eight different hospitals through a lucky draw. Knowledge protocol and hazards of 400 nurses were evaluated through a questionnaire consisting of socio-demographic and blood transfusion-related. Data was analyzed on SPSS 21 version, A total of 400 participants were evaluated. 55.3% were male and 44.8% were female. 63% of nurses knew about O-ve universal blood group donors. 51% knew about the frequency of blood donation. 53.5% knew RBCs storage in the blood bank at +2 degrees C to +6 degrees C. 92.8% knew blood products should be visually inspected before transfusing to the patient. 64.8% were aware to closely monitor the patient for the first 15 minutes. 59% knew the patient should be under close observation during a blood transfusion, In this study, most of the nurses had a basic knowledge related to blood transfusion and its protocol. However the critical knowledge about transfusion was not up to the mark.

**Keyword:** Knowledge; Blood; Transfusion; Training; Nurses

### INTRODUCTION

A blood transfusion reaction could be a life-threatening event if nurses do not have proper knowledge of the blood transfusion can harm the patient and can be life-threatening its reaction is a serious complication while the transfusion of red blood cells given by the immune system is known as hemolysis. When the body naturally destroys the older RBCs they do not work correctly, due to this condition Peoples suffer from anaemia having the signs and symptoms such as dizziness, fatigue, headache and shortness of breath. Multiple factors that increased hemolysis such as extrinsic and intrinsic are because by RBCs. Nurses can play a vital role during blood transfusion efficiently with the

updated knowledge, which can be used for different kinds of medical conditions eg. Cancer, anaemia, haemophilia, thrombocytopenia, sickle cell anaemia, pregnancy, and bleeding disorders. Moreover, white blood cells are not transfused usually, but it's also part of the immune system which fights against organisms. In blood yellowish colour fluid is plasma which contains important material for good health and platelets to prevent bleeding. People can die from human errors that are why nurses must have the current updated knowledge related to blood transfusion. Every year globally millions of people undergo this process and the purpose of its replace the lost blood components. Human error-related risk had

been reported in transfusion 85%. Nurses' knowledge in this regard plays an important role to save the life of individuals [1]. Safe blood transfusion can increase blood oxygenation capacity in patients with anaemia, correct lipoproteinemia, provide blood exchange, and transport oxygen to tissues, to restore bleeding and coagulation disorders. Blood transfusion is important and lifesaving in acute or chronic conditions. Sometimes it is difficult to diagnose overlapping symptoms when reactions occur, even in acute and delayed blood transfusions. Blood is an essential element for human life that has no substitute for human survival. It is a safe medical procedure in which blood or blood products are given to the patient intravenously. Observation of possible adverse reactions of blood transfusion is common and is about 46.8%, and non-febrile haemolytic transfusion reaction was 28% in 2019 in Karachi Pakistan. It has vital functions because blood is a living tissue and consists of a specific structure. Lack of knowledge of blood transfusion among nurses continues to be a real threat to the patient's life. The most frequent causes of errors during the transfusion of blood inadequate clinical practices are incorrect blood group transfusions (ABO incompatibility), inappropriate storage conditions, and unconfirmed patient identity. During the preparation and storage of blood, the main objective is to preserve the vitality and functions of cells in the blood products and components, prevent physical and chemical changes, and reduce the spread of bacteria and viruses in it. Limited knowledge and lack of standard guidelines for blood transfusion can be the result of the availability of the identification of blood groups, anticoagulation problems, development of sterile techniques, and overcoming equipment problems and lack of technical skills, a new branch of science called "transfusion medicine has emerged". However, blood or blood products transfusion is the riskiest procedure and requires proper attention, updated knowledge and skills. In earlier days' transfusion used was as whole blood but in modern medical practices commonly used only components of blood such as red blood cells, fresh frozen plasma clotting, and platelets. The purposes of transfusion are to increase and replace missing

blood components (erythrocytes, thrombocytes, leukocytes, clotting factors, plasma, and proteins).

Complications regarding transfusion are still problems due to human errors and are sometimes under-reported. To reduce unnecessary and unsafe blood transfusion practices to improve patient safety and outcomes. Decreasing the risk of adverse events such as errors, transfusion reactions, and transmission of the disease is very important to follow the guidelines of blood transfusion.

### LITERATURE REVIEW

The study was conducted by Noor Haslina Mohd Noor, Noor Hafiza Saad, Muhammad Khan, et al, in October 2021. Blood Transfusion Knowledge among Nurses in Malaysia: A University Hospital Experience. Nurses play an important role in transfusion safety and quality. Nurses have 75% prior knowledge of pre-transfusion, pre-medication 68%, about terminologies knowledge was 67.5%. Post-transfusion nursing responsibilities had 44.5% of complications were aware 55.0%. Although 90.0% had awareness related to the policy. Another study was conducted by Petraka E, Kritsioti M, et al, Assessment the knowledge of blood transfusion in Iranian nurses of Tehran's hospitals in Iran 2021. Knowledge score was 24% to 85% nurses were not aware fully of pre-transfusion. 48% had wants further pieces of training in haemovigilance. Another study was done by suhrud J. Panchawagh, Sameer Melinkeri, Malathi J. Panchawagh, Assessment of Knowledge and Practice of Blood Transfusion among Nurses in a Tertiary Care Hospital in India 2020. 80% of responses were correct for those who have 1-5 years of working experience as compared to those who have less than 1 year of experience. A study was conducted by Raj Bharath Rudrappan, Evaluating the Knowledge and Practices of Nurses and Paramedics in Blood Transfusion Services – A survey in the states of Tamil Nadu and Pondicherry, India in 2019. As per this study, nurses had 75% and laboratory technicians were known for about 67% of correct practices. Another study was conducted by A Akyol, Assessing Knowledge of Nurses on Blood Transfusion in Turkey in 2019. Pre-training

scores were 51% and post-training scores 85.4% respectively. A study conducted by M Borhany, N Anwar, H Tariq et al, Acute blood transfusion reactions in a tertiary care hospital in Pakistan – an initiative towards haemovigilance in august 2019. The findings of this study are (0.15%) adverse transfusion reaction was documented. Allergic reactions were 46.8% and febrile non-haemolytic transfusion reaction was 28%. A study was conducted by Khetan D, Katharia R et al, Assessment of bedside transfusion practices at a tertiary care centre, a step closer to controlling the chaos in north India 2018. In this study, 33 doctors and 71 staff nurses were interviewed and 80.6% have not aware of institutional policy. 67.3% had an about improper sampling. 72% were known related to improper storage of blood products. Another study was done by Amir Shamshirian, Zahra Alirahimi et al, Knowledge and Awareness of Nursing Students on Blood Transfusion in Iran 2017. 33.4% of student nurses were aware of related knowledge. Overall knowledge about 25.9% of students’ nurses had knowledge and awareness regarding blood transfusion. Nunes da Silva KF, Dagma Duarte R and et al, Blood transfusion in Intensive Care Units: knowledge of the nursing team in Brazil 2017. The average knowledge is about 50.4%. Moreover, pre and post-transfusion results were 48.3%, 52.2% and 58.3%.

A retrospective study was conducted by Gupta M, Kumar R, Gupta S, and Kaur A in India in 2015. In this study, 0.42% of blood transfusion reactions were reported and 54.2% of febrile non-

hemolytic reactions occurred. 36.3% allergic reaction was reported.

**METHODOLOGY**

A descriptive cross-sectional study design was conducted in different tertiary care (public and private) hospitals in Karachi from August 2022 to February 2023. A simple random sampling technique was done for this study and selected eight different hospitals through a lucky draw. The inclusion criteria of this study were Staff nurses who have 1 year of experience working in bedside hospitals and excluded participants with less than 1 year of experience working. The frequency was 50% and the confidence interval was 95% and the calculated sample size was 400. The data collection tool was a semi-structured questionnaire was used consisting of demographic, and knowledge related to the hazards of blood transfusion. Informed consent was taken from each participant. The data had analysed on SPSS version 21 after cleaning.

**RESULTS**

A total of 400 sample size of staff nurses participated in this study with 100% responses. Analyzation of data with different variables. The questionnaire consists of two parts, one is demographic and the second is knowledge protocol of blood transfusion. Study variables are composed of knowledge and protocol based. It consisted of different multiple-choice questions along with single correct answers. The Ethical Review Committee (ERC) approval was obtained from the department.

**Table 1**  
*Knowledge of Protocol and Hazards Blood Transfusion*

Variable	Count%
<b>Which is a universal blood group donor? (n=400)</b>	
O +ve	18 (4.5)
O -ve	252 (63)
AB +ve	128 (32)
AB ve	2 (0.5)
<b>The frequency of blood donation could be every _____ month. (n=400)</b>	
1 Month	4 (1.0)
2 Month	163 (40.8)
3 Month	204 (51)
4 Month	29 (7.3)
<b>In the blood bank, at what temp are the RBCs stored? (n=400)</b>	

+2 degrees C to +6 degrees C	214 (53.5)
-2 degrees C to -6 degrees C	115 (28.8)
+7 degrees C to +8 degrees C	68 (17)
+9 degrees C to +10 degrees C	3 (0.8)
<b>Do you know the assigned nurse should be aware that written orders are complete including the name of the blood unit, the number of units, time, and duration of transfusion? (n=400)</b>	
Yes	180 (45)
No	204 (51)
Sometimes	13 (3.3)
Not know	3 (0.8)
<b>Which diseases can be transferred by blood transfusion? (n=400)</b>	
Dengue Fever	4 (1.0)
Hepatitis A, B, C, E Virus	51 (12.8)
HIV	78 (19.5)
All of the above	267 (66.8)
<b>Before starting a blood transfusion, what will you check? (n=400)</b>	
Right Patient, MR #, Blood Group	74 (18.5)
Vital signs	16 (4.0)
A, B	304 (76)
Obtain small bore I/v access	6 (1.5)
<b>Do you think Blood products should be visually inspected by a nurse before transfusing to the patient? (n=400)</b>	
Yes	371 (92.8)
No	16 (4.0)
Sometimes	9 (2.3)
Not know	4 (1.0)
<b>Do you think the assigned nurse should be aware of closely monitoring the patient for the first _____ minutes? (n=400)</b>	
5 minutes	62 (15)
15 minutes	259 (64.8)
10 minutes	31 (7.8)
30 minutes	48 (12)
<b>An assigned nurse will monitor vital signs every 15 minutes for the first hours, every 30min for 2 hours, then what hourly for the rest of the transfusion? (n=400)</b>	
15 minutes	35 (8.8)
3 hours	104 (26)
1 hour	245 (61.3)
Not know	16 (4.0)

<b>Most common cause of a blood transfusion reaction is _____.</b> (n=400)	
ABO Incompatibility	52 (13)
Human error	10 (2.5)
Improper identification	32 (8.0)
All of above	306 (76.5)
<b>Before starting a transfusion, what precautions will you take?</b> (n=400)	
Inappropriate transfusions	14 (3.5)
Identification error	30 (7.5)
Right Patient, MR #, Blood Group	340 (85)
Not known	16 (4.0)
<b>During a blood transfusion, what will you monitor?</b> (n=400)	
Vital signs before transfusion	40 (10)
Vital signs after the 15 minutes	81 (20.3)
Observed periodically	64 (16)
Signs of blood reaction	215 (53.8)
<b>How many times do you monitor the patient during blood transfusion?</b> (n=400)	
1 time	13 (3.3)
2 time	26 (6.5)
4 time	149 (37.3)
8 time	212 (53)
<b>After the issuance of blood from the blood bank. How soon should the blood be given to the patient?</b> (n=400)	
Start Immediately	25 (6.3)
Within 15 minutes	102 (25.5)
Within 30 minutes	246 (61.5)
Within 01 hour	27 (6.8)
<b>Do you think during blood transfusion patients should be under close observation?</b> (n=400)	
Yes	236 (59)
No	3 (0.8)
Sometime	161 (40.3)
Not know	Nil
<b>Delayed administration of blood can be refrigerated again within 30 minutes after the issuance of the blood bank.</b> (n=400)	
Yes	155 (38.8)
No	61 (15.3)
Sometime	174 (43.5)
Not know	10 (2.5)

<b>Transfusion should always be given fast to the patient. (n=400)</b>	
Yes	30 (7.5)
No	280 (70)
Sometime	85 (21.3)
Not know	5 (1.3)
<b>Do you think informed consent should be taken before a blood transfusion? (n=400)</b>	
Yes	226 (56.5)
No	12 (3.0)
Sometime	157 (39.3)
Not know	5 (1.3)
<b>If you saw there was a cloudy/foamy appearance in the blood bag, what should you do? (n=400)</b>	
Can Start	16 (4.0)
Return to the blood bank	356 (89)
Allow for completion within 4 hours	17 (4.3)
Not known	11 (2.8)
<b>What do you do, if you double puncture the blood bag by mistake and it starts leaking? (n=400)</b>	
Start transfusion	12 (3.0)
Return to the blood bank	365 (91.3)
Allow for completion within 4 hours	3 (0.8)
Not know	20 (5.0)

The result had shown that the demographic profile of male participants was 221 whereas female nurses 179. Table 1 shows results related to universal blood group donors (63%) with correct responses while regarding the frequency of blood donation every three months (51%), about RBCs stored in the blood bank at +2 degrees C to +6 degrees C (53.5%). (51%) had the incorrect response of written orders, nurses were aware of diseases (66.8%) of caused by blood transfusion. 76% of nurses had the right answer. About (92.8%) visually inspected blood products by nurses before starting the patient, nurses were correct regarding the close monitor for the first 15 minutes (64.8%), and (61.3%) of respondents were aware of hourly monitor vital signs for the rest of the transfusion. Incorrect response of common reaction was (76.5%) and regarding precaution, nurses knew about the patient name, MR#, and blood group (85%). While blood transfusions are related to signs of a reaction

(53.8%). Nurses knew how many times do you monitor the patient (53%) and (61.5%) were aware start of transfusion within 30 minutes. (59%) staff nurses were correct patients should be close observation while transfusion and (43.5%) knew about delayed administration of blood can be refrigerated again within 30 minutes. (70%) had not to answer transfusion should be always given fast to the patient. They knew (56.5%) informed consent was taken earlier before a blood transfusion. (89%) of nurses knows regarding a blood bag should be returned to the blood bank if its appearance is foamy or cloudy whereas (91.3%) of respondents have a double punctured blood bag by mistake returned to the blood bank.

**DISCUSSION**

This study reveals some gaps in the knowledge protocol and hazards of blood transfusion among nurses in tertiary care hospitals in Karachi, Pakistan.

In this study, 63% majority of nurses knew about universal blood group donors compared to 82.2% of nurses who were incorrect about universal blood group donors which were conducted in India and other studies only 20%. In another study, 51% of participants knew about the frequency of blood donation should be every three months in another study 84.6% were correct, and 80% of respondents were correct about the duration between the two donations. 53.5% were aware of RBCs stored in the blood bank in contrast to other study nurses 47.3% of nurses were aware. The assigned nurse should be aware 45% of written orders are complete including the name of the blood unit, the number of units, time, and duration of transfusion compared with another study which was conducted in Malaysia the respondent of that 82.5% of patients ensured detail about blood rights. 66.8% were aware of the diseases caused by transfused by blood transfusion compared with another study 63% were correct in India. Before starting a blood transfusion 76% of nurses know what will you check another study showed that 94.7% of respondents were correct and in other studies, only 33.4% were correct among nursing students in Iran. 92.8% of nurses knew about blood products should be visually inspected by a nurse before transfusing to the patient. About close monitoring, 64.8% of nurses knew the related first fifteen minutes correlated with the study conducted in Tehran, Iran 46% of nurses physically observe the patient's first 10-15 minutes for blood transfusion adverse reactions. In this study, 61.3% of nurses knew to monitor vital signs 1 hour after 2 hours. Only 13% of nurses knew about ABO incompatibility the most common cause of blood transfusion relatively 73.3% were correct in another study published in India and in another study 64% of nurses knew the most common cause of fatal transfusion reaction. Regarding precautions will you take before starting the blood transfusion 85% of nurses are aware. 85% of nurses knew about precautions during a blood transfusion, 79.5% were aware of this question and 98.4% of nurses were correct in an Indian study. The majority of nurses 53.8% knew about signs of reaction observed periodically while the transfusion. 53% of nurses knew how many times to monitor the patient during a blood transfusion. They knew how soon should the blood be given within 30 minutes 61.5%. 59% of nurses knew during blood transfusion

patients should be under close observation and another question 40.3% of nurses sometimes have blood bags refrigerated again within 30 minutes 81.1% were correct regarding in India patients should be in eyesight during transfusion. 70% of nurses knew blood was not given always fast to the patient. 56.5% knew informed consent should be taken before a blood transfusion 97.8% knew about consent being taken before a blood transfusion. 89% of them knew the blood bag should be returned to the blood bank if the appearance is cloudy or foamy and similar in another study 76% of nurses knew about it. 91.3% of nurses knew the bag should be returned to the blood bank due to leaks caused by a double puncture comparable with comparable 25.1% of respondents were correct.

### **CONCLUSION**

Blood transfusion could be a life-threatening or fatal condition for the patient and nurses must know the protocol of blood transfusion that prevents, and avoid such reactions. Findings of this study most of the nurse's basic knowledge gaps and protocols are related to blood transfusion. Deficient knowledge of blood transfusion protocol must be added to the nursing curriculum. Improvement of nurses' knowledge skills and assessment should be checked to improve good quality care during a blood transfusion under the supervision of nursing managers.

### **RECOMMENDATION**

Awareness of updated knowledge regarding blood transfusion and its protocol to the nurses during the orientation program and ongoing basis training. Refresher courses for the new staff nurses. Continuing nursing education and training sessions for in-service nurses are very necessary. Develop policies and procedures for the nurses to transfuse blood as per the policy. Protocols and procedures should be placed in the ward.

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