

## Original Article

# ASSESSING THE LEVEL OF KNOWLEDGE AND PRACTICE REGARDING BLOOD TRANSFUSION AND ITS COMPLICATIONS AMONG STAFF NURSES WORKING AT B & C MEDICAL COLLEGE TEACHING HOSPITAL AND PURBANCHAL CANCER HOSPITAL, BIRTAMODE, JHAPA, NEPAL

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### ABSTRACT

**Background:** Blood transfusion is a liquid transplant. Nurses are having more responsibility in many aspects of the transfusion process such as taking and labeling blood samples, collection of blood from the blood bank, short term storage in ward areas, checking, administering, documenting transfusion process and monitoring of the patient, it is vital that they are thorough and methodical in all tasks related to transfusion to ensure patients safety and must be aware of the steps necessary at each stage to safeguard the patient. Nurses are responsible not only for the actual administration of the blood product and monitoring of the patient during its administration but they also need to efficiently identify and manage any potential transfusion reactions. It is important to remember that transfusion reactions can occur during the actual blood transfusion as well as for days and weeks following the administration of the blood product. Although blood transfusion reactions are rare, it is important that any nurse who administers a blood product be aware of potential reactions and knows how to manage these reactions safely and effectively.

**Methods:** This is a descriptive study to assess the knowledge and practice regarding blood transfusion and its complications.

**Results:** Forty-four percent (44%) of the nurses had obtained Proficiency Certificate Level (PCL) Nursing and Health Assistant (HA) degree qualification. Forty percent (40%) of the nurses had one year of experience. Forty percent of the nurses worked in general ward at the hospital. Almost 80% of the nurses (79%) of the nurses stated that they attended Continuing Nursing Education regarding blood transfusion. 59% of total respondents have adequate knowledge.

**Conclusions:** Continuous Nursing Education for the improvement of nurses' knowledge and skills as well as routine monitoring should be carried out to ensure safe practice in blood transfusion.

**Keywords:** Blood Transfusion, Practice, Nurses

### INTRODUCTION

Blood transfusion is a vital, life-saving process in patients with both acute and chronic conditions, aiming to replace lost components of the blood. Millions of people all over the world undergo this process every year, and, generally, it is considered as safe, however, not beyond adverse effects including immunological complications or transfusion-transmitted infection<sup>1</sup>. Many human error-associated risks have been reported in blood transfusion processes, which comprise approximately 85% of the total preventable hazards<sup>2</sup>. The acute hemolytic reaction is one of these consequences, resulting in a fatality that is mainly caused due to ABO incompatibilities<sup>1</sup>. The incidence of

blood transfusion is increasing globally, which has increased from 85 million units of transfusion in 2012<sup>3</sup> to 112.5 million donations in 2016<sup>4</sup>. Despite its beneficial effects, blood transfusion procedure might be with risks at times that cause many adverse events. It may cause acute or delayed complications like development of acute hemolytic reaction, transfusion reaction, febrile reaction, and septic reaction. It carries the risk of Transfusion-Transmissible Infections (TTI) including HIV, hepatitis viruses; syphilis, malaria, and Chagas disease<sup>5,6</sup>. A total of 3,288 cases were reported in the Serious Hazard of Blood Transfusion (SHOT) report in the year 2015. Of the total SHOT cases, 77.7%

of errors resulted from mistakes or “human factors,” and only 10% were not preventable (mostly allergic/febrile reactions). The number of cases with major morbidity was 166 and the total deaths reported was 26 cases<sup>6</sup>. The reported major morbidities were hemolytic transfusion reactions, Transfusion Associated Circulatory Overload (TACO), and Transfusion-Transmitted Infection, Transfusion-Related Acute Lung Injury (TRALI), ABO-incompatible transfusion, and transfusion of incorrect blood product<sup>7</sup>. These complications could have occurred because of errors in blood transfusion practice. Out of several factors for these errors, the majority could be the difficulty in the transportation of the blood constituent from the blood bank to the hospital, knowledge gap and lack of cross-checking practice at the bedside, and lack of regular monitoring of the patients during and after the transfusion process<sup>8</sup>. In Nepal, there is a lack of appropriate blood transfusion policies and guidelines. Although the National Guideline For Blood Transfusion was formulated in the year 2008, whose main highlights were on the selection of blood donors and blood donation criteria but lacked a specific protocol on safe blood administration procedures<sup>9</sup>.

## METHODS

This descriptive study was done in the B & C Medical College Teaching Hospital and Purbanchal Cancer Hospital, Birtamode, Jhapa, Nepal in accordance with the institution’s ethical committee’s guidelines. Ethical approval was obtained from the ethics committee (IRC.0082022). Informed consent for all samples was prior obtained to data collection. The nurses were introduced to the aim of the study, and confidentiality was guaranteed. The study population comprised 100 nurses, working in two hospitals, who met the inclusion criteria. A convenience sampling technique was used to form the study sample and aimed for a study population of 100 nurses. The questionnaire was distributed from 22 February till 23 February and collected back on 25 February 2022. Self-administered questionnaire included questions on the demographic characteristics of the nurses i.e. Age, Professional Education Qualification, Clinical Experience, departments, and Continuing Nursing Education. The questionnaire comprised 25 questions. The Knowledge regarding Blood Transfusion Questionnaire consisted of a total of 10 questions, knowledge regarding its complications consisted of 4 questions, practice

regarding blood transfusion consisted of 7 questions, and practice regarding complications consisted of 4 questions. The questionnaire had been developed by the researchers.

A pilot test was conducted on a group of nurses (n = 15) working in the medical and surgical units to test the reliability and utility of the questionnaire. Following the pilot study, a final version of the questionnaire was issued to the study participants as the pilot study had indicated that the tool was simple to use and apply. The questionnaire included four sections: Knowledge regarding Blood Transfusion, practice regarding blood transfusion, knowledge regarding its complications, and Practice regarding complications.

In the questionnaire, each correctly answered item scored 1 point and each incorrect answer scored 0 points. The questionnaire scores ranged from 1 to 25 points.

Descriptive statistics such as frequencies, arithmetic mean, standard deviation, and percentages were used in data analysis. For statistical analyses, the SPSS version 20 Statistical software was used.

## RESULTS

### DEMOGRAPHIC VARIABLES

Forty-four percent (44%) of the nurses had obtained PCL Nursing and HA degree qualifications. Forty percent (40%) of the nurses had one year of experience. Forty percent (40%) of the nurses worked in the general ward at the hospital. Almost 80% of the nurses (79%) of nurses stated that they attended Continuing Nursing Education regarding blood transfusion.

A semi-experimental study found that the area is significant difference in the mean score of the nurses’ level of knowledge before and after education.<sup>9</sup>

In a study, a statistically significant association was found between nurses’ knowledge and demographic variables i.e. age, professional qualification, clinical experience, the approximate number of blood transfusions performed, and in-service training programs attended regarding blood transfusion and practice with demographic variables.<sup>10</sup>

Table 1. Shows demographic variables.

**TABLE 1: DEMOGRAPHIC VARIABLES**

Demographic variables	Frequency (N)=100	Percentage (%)
1. Age		
<20 years	4	4
20-24 years	54	54
>24 years	42	42
2. Professional education qualification		
ANM/CMA	39	39
PCL NURSING/HA	44	44
B.SC. NURSING/ BN	17	17
3. Clinical experience		
<1 year	40	40
1-3 years	26	26
>3years	34	34
4. Departments		
Critical Care Unit(ICU, PICU, CCU, NICU, post-operative ward)	30	30
Emergency Department		10
General ward	10	40
Oncology department	40	11
Operation theatre	11	6
Maternity ward	6	3
	3	
5. Continuing Nursing Education(CNE)		
Yes	79	79
No	21	21

**LEVEL OF KNOWLEDGE****TABLE 2: DISTRIBUTION OF ACCURACY OF ANSWERS TO ALL QUESTIONS (N=100)**

S.N.	QUESTIONS	CORRECT ANSWER	
		(N)	(%)
1.	Universal Donor	94	94
2.	Diseases Transferred Through Blood Transfusion	90	90
3.	Most Common Cause Of Blood Transfusion Reactions	22	22
4.	During Blood Transfusion Should The Patient Be Within Your Eyesight At All Times	9	9
5.	Time Of Blood Transfusion After Issue	50	50
6.	Refrigerate The Blood Bag Again After It Is Administered Once	89	89
7.	Blood Transfusion To HIV Patients	90	90
8.	Informed Consent Before Blood Transfusion	95	95
9.	Indication For Warming Of Blood Before Transfusion	37	37
10.	Cannula Preferred For Blood Transfusion In Adults	8	8
11.	Monitoring During Blood Transfusion	92	92
12.	Frequency to Monitor The Patient	91	91
13.	Instructions Given To The Patients Before Starting The Blood Transfusion	84	84
14.	Check Before Starting Blood Transfusion	88	88
15.	Precautions to Take For Yourself Before Starting Transfusion	41	41
16.	Actions If There Was A Cloudy/Foamy Appearance In The Blood Bag	91	91
17.	Right thing to do If You Accidentally Double Puncture The Blood Bag And It Starts Leaking While Hooking	41	41
18.	Actions to Do If The Patient Shows Signs Of Fever And Chills	92	92
19.	Actions to do if You Notice That 2hrs After Transfusing Of Properly Matched Blood, The Patient Starts Having Tachycardia, Hypotension And Dyspnea.	88	88
20.	Hazards Of Mismatched Blood Transfusion	52	52
21.	TRALI Transfusion Reaction	92	92
22.	Need To Collect Urine Sample After Allergic Reaction Due To BT	56	56
23.	Medication Prescribed For Treating Anaphylaxis Reaction	69	69
24.	Most Frequently Reported Error In Blood Transfusion	31	31
25.	Fluid Retention in blood transfusion	62	62

**TABLE 3: THE DISTRIBUTION OF RESPONDENTS ACCORDING TO LEVEL OF KNOWLEDGE**

SCORE	LEVEL OF KNOWLEDGE	NO. OF RESPONDENTS	% OF RESPONDENTS
1-8	INADEQUATE	0	0
9-16	AVERAGE	41	41
17-25	ADEQUATE	59	59
TOTAL		100	100

**TABLE 4: ASSOCIATION OF LEVEL OF KNOWLEDGE AND DEMOGRAPHIC VARIABLES**

SN	DEMOGRAPHIC VARIABLES	df	CHI-SQUARE	INFERENCE
1	Age	1	0.05	NS
2	Professional Education Qualifications	1	0.01	S
3	Clinical Experience	1	0.22	NS
4	Departments	1	3.14	NS
5	Continuing Nursing Education(CNE)	1	0.06	NS

## DISCUSSION

Blood transfusion is a life-saving practice. Although blood transfusion aids in the clinical condition of the patient, unsafe practices may occur, resulting in serious hazards and adverse reactions. Nurses in blood transfusion therapy require evidence-based professional knowledge and skills. Improving nurses' blood transfusion knowledge and enhancing their competence to perform transfusion therapy, is likely to improve the clinical skills of transfusion therapy and decrease transfusion-related hazards and adverse reactions. In the process of ensuring safe blood transfusion, knowledge, monitoring and safe practices are of great importance.

This study revealed that nurses had an adequate level of knowledge regarding blood transfusion, its complications and practice regarding blood transfusion and its complications.

In this study ninety-four percent of respondents have adequate knowledge regarding universal donors. A similar study was done, where they found that nurses scored nearly 70% on questions related to blood grouping and Rh antigens<sup>11</sup>.

This study shows that respondents have inadequate knowledge regarding the pretransfusion procedure. In a study, the least known questions related to the changing of blood transfusion sets, the most frequent cause of blood transfusion reactions, and immunological blood transfusion reactions. New graduates or inexperienced nurses, those working in medical units, and those who did not often implement blood transfusions needed more support to improve their knowledge levels ( $p < 0.05$ )<sup>12</sup>.

Principles for safe blood transfusion are important for minimizing possible blood transfusion reactions. The current study found that the least correctly answered question involved the preferred size of the cannula for blood transfusion in adults. The results showed that nurses did not have sufficient knowledge regarding the causes of the most frequently reported error in blood transfusion. Another study reported that nurses had good knowledge of the signs and symptoms of blood transfusion and monitored patient vital signs prior to, during, and after blood transfusion (83.4%)<sup>13</sup>.

Another study found that 33% of nurses had limited knowledge of blood transfusion reactions, and 60% were minimally aware of the symptoms of blood transfusion reactions. Nurses should be trained to perform safe methods of blood transfusions, and Continuing Nursing Education and in-service training should be repeated frequently.<sup>14</sup>

This study shows average knowledge about practice regarding complications.

In a study, nurses were found to have insufficient knowledge of post-transfusion reaction development. Similarly, a study found that nurses had poor knowledge; especially in regard to recognition of adverse transfuse on-related reactions following transfusion (40%)<sup>14</sup>.

In this study, respondents had inadequate knowledge regarding blood warming. The blood-warming procedure is one of the most important steps in transfusion because the increased temperature is associated with hemolysis, which leads to fever, coagulopathy, and renal insufficiency, sometimes causing death. Only one-third of our nurses answered correctly for each indication of blood warming (exchange transfusion of infants, rapid transfusion, and patients with cold agglutinin)<sup>15</sup>.

In this study respondents had adequate knowledge regarding the need for informed consent before blood transfusion. A survey on blood transfusion informed consent among healthcare givers and patients found that transfusion hazards were more likely to be understated. Most nurses at Oxford University Hospital reported that they clarified the need for blood transfusion to the patients<sup>16</sup>

One study found a statistically significant relationship between nurses' knowledge in terms of the work setting and the type of qualifications. In the current study, the general ward nurses had better knowledge about safe blood transfusion than nurses who worked in other departments. This result may be associated with the different patient populations and the characteristics of departments.<sup>17</sup>

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Nurses require in-service training to improve their knowledge of safe blood transfusion practices, specifically because blood transfusion sets are the most frequent cause of blood transfusion reactions and adverse reactions associated with blood transfusion<sup>13</sup>

## CONCLUSIONS

Nurses' knowledge and skills are fundamental to developing and strengthening the quality of blood transfusion procedures. Continuous Nursing Education for the improvement of nurses' knowledge and skills as well as routine monitoring should be carried out to ensure safe practice in blood transfusion.

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