

## Assessment of Nurses' knowledge and Practice for Caring of Children Undergoing Blood Products Transfusion

Mona Eid Hussien Elbaqary<sup>1</sup>, Zeinab Fathy El-Sayed<sup>2</sup>, Bothayna Nader Sadek<sup>3</sup>

<sup>1</sup>Nursing specialist at El- Sheikh Zayed hospital.

<sup>2</sup>Professor of Pediatric Nursing, Faculty of Nursing, Ain Shams University-Cairo-Egypt.

<sup>3</sup>Assistant Professor of Pediatric Nursing, Faculty of Nursing, Ain Shams University-Cairo-Egypt.

### Abstract

**Background:** Nursing care for children undergoing blood products transfusion is centered on their knowledge and practice about blood products, through assessment, and the application of infusion parameters. **Aim of the study:** to assess nurses' knowledge, practice for caring of children undergoing blood products transfusion. **Research design:** A descriptive design was utilized. **Subject:** a purposive sample of 150 nurses working in Pediatric Units Ain Shams University Hospitals. **Tools:** (1) structured questionnaire format to assess nurses' knowledge for caring of children undergoing blood products transfusion. (2) Observational checklist to assess nursing practice for caring of children undergoing blood product transfusion. **Results:** more than one third of the studied nurses had poor knowledge and more than half of them had incompetent practice for caring of children undergoing blood products transfusion. **Conclusion:** Nurses had unsatisfactory level of knowledge and practice for caring of children undergoing blood products transfusion. There was statistically significant relation between total knowledge, total practice and their demographic characteristics. **Recommendations:** Establish in-service training programs for continuous updating nurses' knowledge about blood product transfusion, Providing of on job training programs for staff nurses about blood products transfusion.

**Keywords:** blood transfusion, children, nurses, knowledge, practice.

### Introduction

Blood and its products are very valuable especially in saving lives of children patients. Blood components are expensive and their preparation is limited. Therefore, they should be correctly selected and used by all means. The aim of blood and blood products transfusion is to provide suitable and safe blood products to achieve best clinical outcomes (Clarke, 2017).

Transfusions occur commonly in pediatrics, particularly preterm neonates, those with hematologic malignancies or disorders, and critically ill children in pediatric intensive care units. In some high-risk intensive care populations, almost 5% of the pediatric patients receive at least one transfusion during the length of their stay (Daniels, 2014).

Blood and blood products transfusion have vital role in saving lives,

there is no substituting product for human blood including packed red blood cells, fresh frozen plasma, platelets, cryoprecipitate and whole blood. However, it is associated with many risks by making mistakes in blood transfusion and insufficient control of children who receive blood during the transfusion are among causes of death (*Berryman et al., 2016*).

The transfusion process is complex, involving many interlinking chains of events, and a multidisciplinary group of health professionals with different levels of awareness and understanding of transfusion practice. The role of nurse is evolving as an integral part of efforts to optimize appropriate use of blood components, reduce procedural risks and improve transfusion practice generally (*Bielby et al., 2018*).

Nurses play a significant role in correct and safe transfusion of blood and its components. Nursing care for children undergoing blood products transfusion is centered on their knowledge about the various blood products, through assessment and the application of accurate infusion parameters. However, awareness of the signs and symptoms of early and late transfusion reactions is also key for reducing complications (*Turney, 2015, Carven et al., 2017*).

### **Significant of the study**

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Children are a vulnerable patient group, and many have special blood products transfusion requirements such as thalassemia major, and those following

intensive chemotherapy for hematological malignancy or cancer. Blood products transfusion can be a life-saving therapy, but it can result in many adverse effects. Approximately 1% of all transfusions lead to some type of adverse reaction. Transfusion of blood products in the pediatric units need to be strictly regulated to avoid the inherent risks of transfusion. Therefore nurse is one of the most important members caring for children undergoing blood product transfusion (*Rai et al., 2016*). So, assessment of nurses' knowledge and practice regarding blood product transfusion is very important for enhancing care given to those children.

### **Aim of the study**

#### **This study aims to:**

Assess nurses' knowledge and practice for caring of children undergoing blood products transfusion.

### **Research Questions**

1. What are the levels of nurses' knowledge regarding care of children undergoing blood products transfusion?
2. Do the nurses have competent practice regarding care of children undergoing blood products transfusion?

### **Subjects and Methods**

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#### **Research design:**

A descriptive research design was utilized in carrying out the study.

#### **I -Technical design**

#### **Research Setting:**

The study was conducted at the Pediatric Units at children's hospital affiliated to Ain Shams University. As it locates in a vital place, covering large

area of the country and receiving the largest number of sick children received blood product transfusion.

### A. Subjects:

The purposive sample composed of 150 nurses who provided direct care for children undergoing blood products transfusion in pediatric units from above mentioned setting under the following inclusion criteria nurses who provide direct care for children undergoing blood products transfusion, their experience more than three months in the unit.

A purposive sample composed of 150 children who received blood products in the time of data collection.

### B. Tools of data collection:

Two tools were used in the current study as following:

**Tool I: A structured Questioner format (Appendix II):** This tool was developed by the researcher in an Arabic language and divided into three parts as follows:

**Part I:** Characteristics of the nurses included: (age, marital status, qualification, years of experience and attendance of educational course).

**Part II:** Characteristics of the children undergoing blood products transfusion in pediatric units such as (age, gender, diagnosis, cause for blood product transfusion, type of blood product transferred to the child and history of blood transfusion).

**Part III:** Nurses' knowledge regarding caring of children undergoing blood products transfusion. This part was developed by the researcher after reviewing the recent and relevant literature, divided into 4 parts as the following:

- **First part** was covering nurses' knowledge regarding blood, its components, functions and indication of transfusion of blood and its products consist of 16 questions, 1 open end question and 15 MCQ.

- **Second part** was covering nurses' knowledge about preparations of the blood products consist of 6 MCQ.

- **Third part** was covering nurses' knowledge regarding caring for children undergoing blood products transfusion consist of 32 questions. 11 true or false and 4 MCQ covering nursing care before blood product transfusion, 11 true or false and 3 MCQ covering nursing care during blood product transfusion, 3 MCQ covering nursing care after blood products transfusion.

- **Fourth part** was covering nurses' knowledge regarding nursing role for dealing with complications resulting from blood product transfusion consist of 9 questions, 4 MCQ and 5 true or false.

### ❖ Scoring system:

It was graded according to the correct answers were given a score of (1) mark and incorrect answers or unknown were given a score of (0) mark. A total score was 63 marks. Actual knowledge of the nurses was categorized into < 60% poor, 60% - < 75% average, ≥ 75% good knowledge.

**Tool (II): Observational checklist (Appendix III):** It was adopted from (*Gwee et al., 2015*), (*Cowell, 2015*) & (*World Health Organization, 2016*) to assess nurses' practice regarding caring of children undergoing blood products transfusion It composed of 106 statements covering the following:

- Checklist for intravenous insertion (26 steps).
- Checklist for blood sampling (22 steps).
- Checklist for blood products transfusion (58 steps) includes: (consent, collection of blood products bag, transfusion of packed red blood cells, transfusion of platelets, transfusion of fresh frozen plasma, child monitoring and procedure for reporting adverse reactions).

#### ❖ Scoring system:

Classified as follows; done correctly step was given a score of 1 mark and done incorrectly or not done was given a score of 0 mark. A total score for the checklist was 125 mark. Actual practice of the nurses was categorized into <90% revealed incompetent practice, ≥ 90% revealed competent practice.

## II- Operational design

The operational design included preparatory phase, content validity, reliability, pilot study and field work.

### • Preparatory phase:

It included reviewing of related literature and theoretical knowledge of various aspect of the study using journals, periodicals and text books to develop tools for data collection.

### • Validity and reliability:

**Content validity** was tested by 3 experts in pediatric nursing from Faculty of Nursing Ain Shams University. The expertise reviewed the tools for clarity, relevance, comprehensiveness, and simplicity; minor modifications were done.

**Reliability** of the study tools was scaled as follows: The reliability for this

questionnaire was 0.834 by Alpha Cronbach.

### **Ethical consideration:**

Approval of the study protocol was obtained from Ethical Committee in the Faculty of Nursing at Ain Shams University before starting the study. The researcher clarified the objective and aim of the study to the nurses included in the study. The researcher assured maintaining anonymity and confidentiality of the subject data. Nurses were informed that they allowed choosing to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reasons.

### **Pilot study:**

A pilot study was carried out on 10% (n= 15 nurses) of the total sample size working in pediatric units prior to the data collection period to clarify applicability of the tools and time consumed. The nurses who were included in the pilot study were included to the sample because no modification was done after conducting pilot study.

### **Field work:**

The purpose of the study was simply explained to the nurses who agree to participate in the study prior to data collection. The actual work of this study started and completed within five months from *February, (2019)* and was completed by the end of *June, (2019)*. Data were collected by the researcher during nurse's interview 2 day/week (Saturday, Sunday), at morning and afternoon shifts in the previous mentioned settings. The questionnaires were distributed to all studied nurses, the researcher was approached each individual nurse who was selected to clarify any unintelligible questions, each nurse has completed the

questionnaire in the presence of the researcher. Each questionnaire took about 15 to 20 minutes to complete. The practice was evaluated through observation during actual care of nurses' by using check list. The time needed for completing the tools was about 45 minutes for every nurse.

### III- Administrative Design

To carry out this study, the necessary approval was obtained from hospital directors. A letter was issued for director of children's hospital from Dean of the Faculty of Nursing at Ain Shams University explaining the purpose of the study to obtain the permission for conducting this study.

### IV- Statistical Design

The collected data were organized, tabulated, and statistically analyzed using Statistical Program for Social Science (SPSS) version 20.0 to assess nurses' level of knowledge and practice regarding caring of children undergoing blood product transfusion. Data were presented in tables and graphs. Statistical presentation and analysis of the present

## Results

**Table (1):** shows that, 50.7% of the studied nurses age ranged between 20: <30 years with a mean age of  $31.45 \pm 5.12$  years, more than half (54%) of them were single while, 40% had technical Nursing Institute. As regards their years of experience, 46% of them had years of experience ranged between 5: <10 years with a mean  $7.26 \pm 3.08$  years.

**Table (2):** show that, more than one third (39.4%) of the studied nurses had poor knowledge, 31.3% of them had average knowledge, while 29.3% of them had good knowledge regarding caring of children undergoing blood products transfusion with

study was conducted using the mean ( $\bar{X}$ ), standard Deviation (SD), chi-square ( $X^2$ ) and Linear Correlation Coefficient ( $r$ ) tests.

The observed differences and associations were considered as follows:

- Probability (P-value)
  - P-value  $>0.05$  was considered insignificant.
  - P-value  $<0.05$  was considered significant
  - P-value  $<0.001$  was considered significant
- $\bar{X}$  and SD for quantitative data: age, years of experience.
- Frequency and percentage for qualitative data: qualification, previous courses, knowledge and practice level.
- Chi-square ( $X^2$ ) test of significance was used in order to compare proportions between two qualitative parameters.
- Linear Correlation coefficient ( $r$ ) was used for detection of correlation between two quantitative variables in one group. statistically significant differences ( $P = 0.030$ ).

**Table (3):** shows that, 58% of the studied nurses have incompetent practice regarding caring of children undergoing blood products transfusion with statistically significant difference ( $p = 0.014$ ).

**Table (4):** Shows that, there is statistically significant deference between nurses' knowledge and their age, marital status, qualification and years of experience. While there is insignificance between nurses' knowledge and receiving training courses in blood transfusion.

**Table (5):** Shows that, there is highly statistically significant deference

between nurses' practice and their age, marital status, qualification, years of

experience and having training course in blood transfusion.

**Table (1):** Number and Percentage Distribution of the Studied Nurses According to their Characteristics (n= 150).

Items	No.	%
<b>Age (years)</b>		
Less than 20	22	14.7
20: <30	76	50.7
30: <40	42	28.0
≥40	10	6.7
<b>Mean±SD</b>	31.45±5.12	
<b>Marital status</b>		
Single	81	54.0
Married	62	41.3
Divorced	2	1.3
Widowed	5	3.3
<b>Qualification</b>		
Secondary School Nursing Diploma	48	32.0
Specialized Nursing Diploma	5	3.3
Technical Nursing Institute	60	40.0
Bachelor degree	37	24.7
<b>Years of experience</b>		
Less than 1	12	8.0
1: <5	47	31.3
5: <10	69	46.0
≥10	22	14.7
<b>Mean±SD</b>	7.26±3.08	

**Table (2):** Number and Percentage Distribution of The Studied Nurses' Total Knowledge Regarding Caring of Children Undergoing Blood Products Transfusion (n=150).

Total knowledge	No.	%	Chi-square	
			X <sup>2</sup>	P-value
Good	44	29.3	6.874	0.030*
Average	47	31.3		
Poor	59	39.4		
Total	150	100.0		

**Table (3):** Number and Percentage Distribution of the Studied Nurses' Total Practice Regarding Caring of Children Undergoing Blood Products Transfusion (n= 150).

Total practice	No.	%	Chi-square	
			X <sup>2</sup>	P-value
Competent	63	42.0	6.000	0.014*
Incompetent	87	58.0		
Total	150	100.0		

**Table (4):**Relation between Studied Nurses' Total Knowledge and their Characteristics.

Items	Good		Average		Total knowledge Poor		Total 150	Chi-square	
	No. 44	29.3%	No. 47	31.3%	No.59	39.4%		X <sup>2</sup>	P-value
<b>Age (years)</b>									
Less than 20	9	40.9	10	45.5	3	13.6	22	25.162	<0.001**
20: <30	13	17.1	19	25.0	44	57.9	76		
30: <40	17	40.5	14	33.3	11	26.2	42		
≥40	5	50.0	4	40.0	1	10.0	10		
<b>Marital status</b>									
Single	26	32.1	17	21.0	38	46.9	81	13.281	0.039*
Married	14	22.6	28	45.2	20	32.3	62		
Divorced	1	50.0	1	50.0	0	0.0	2		
Widowed	3	60.0	1	20.0	1	20.0	5		
<b>Qualification</b>									
Secondary School Nursing Diploma	20	41.7	16	33.3	12	25.0	48	19.647	0.003*
Specialized Nursing Diploma	0	0.0	5	100.0	0	0.0	5		
Technical Nursing Institute	15	25.0	17	28.3	28	46.7	60		
Bachelor degree	9	24.3	9	24.3	19	51.4	37		
<b>Years of experience</b>									
Less than 1	3	25.00	7	58.3	2	16.7	12	19.026	0.004*
1: <5	10	21.3	18	38.3	19	40.4	47		
5: <10	22	31.9	12	17.4	35	50.7	69		
≥10	9	40.9	10	45.5	3	13.6	22		
<b>Attendance of training courses in blood transfusion</b>									
Yes	14	34.1	8	19.5	19	46.3	41	3.666	0.160
No	30	27.5	39	35.8	40	36.7	109		

**Table (5):** Relation between Studied Nurses' Total Practice and their Characteristics.

Items	Competent		Total practice incompetent		Total 150	Chi-square	
	No.63	42%	No.87	58%		X <sup>2</sup>	P-value
<b>Age (years)</b>							
Less than 20	2	9.1	20	90.9	22	31.710	<0.001**
20: <30	24	31.6	52	68.4	76		
30: <40	29	69.0	13	31.0	42		
≥40	8	80.0	2	20.0	10		
<b>Marital status</b>							
Single	48	59.3	33	40.7	81	30.367	<0.001**
Married	10	16.1	52	83.9	62		
Divorced	2	100.0	0	0.0	2		
Widowed	3	60.0	2	40.0	5		
<b>Qualification</b>							
Secondary School Nursing Diploma	21	43.8	27	56.3	48	17.116	<0.001**
Specialized Nursing Diploma	2	40.0	3	60.0	5		
Technical Nursing Institute	15	25.0	45	75.0	60		
Bachelor degree	25	67.6	12	32.4	37		
<b>Years of experience</b>							
Less than 1	2	16.7	10	83.3	12	45.092	<0.001**
1: <5	4	8.5	43	91.5	47		
5: <10	39	56.5	30	43.5	69		
≥10	18	81.8	4	18.2	22		
<b>Attendance of training courses in blood transfusion</b>							
Yes	28	68.3	13	31.7	41	16.012	<0.001**
No	35	32.1	74	67.9	109		

## Discussion

Regarding to nurses age, the present study shows that more than half of the studied sample their age ranged between 20: <30 years, this explains that most of those nurses were newly graduated, young and still in early stage of their professional life. while nurses' above 40 years old represent the lowest percentage, this finding was in agreement with (*Sayed et al., 2018*) who conducted a study about auditing and re-auditing nursing care for children receiving blood transfusion and reported that majority of nurses aged from 20 to <35 years.

Concerning nurses' marital status, the current study revealed that, more than half of the studied nurses were single. This result inconsistent with (*Saif Al-Nasr et al., 2016*) who conducted a study about nurses' performance regarding

caring of patients undergoing blood transfusion and revealed that nearly two thirds of the studied nurses were married.

Concerning nurses' qualifications, the current study revealed that, more than one third of the studied nurses had technical nursing institute. This finding came in the same lines with (*Hendy et al., 2017*) who conduct a study about nursing performance regard caring for patients undergoing blood transfusion: exploratory descriptive study and found that, more than half of the studied nurses were diploma nurses (secondary school diploma & technical institute diploma).

Regarding years of experience, the current study indicated that, nearly half of the studied nurses had experience ranged from 5 to 10 years, this finding was in agreement with (*Salem, 2019*) who conducted a study on the effect of

implementing nursing intervention program on nurses' knowledge and practice regarding children undergoing blood transfusion and reported that 60% of the studied nurses had 5-10 years of experience in pediatric medicine units.

As regard to training courses, the result of the present study showed that, nearly three quarters of the nurses didn't attend training course regarding blood products transfusion. This result is in agreement with (*Hendy et al., 2017*) who reported that almost all nurses didn't attend training courses.

As regards to nurses' total knowledge regarding caring of children undergoing blood products transfusion, the current study shows that more than one third of the studied nurses had poor knowledge, nearly one third of them had average knowledge, while, more than one quarter had good knowledge regarding caring of children undergoing blood products transfusion. Similarly, (*Dubey, 2013; Silva et al., 2017; Duarte et al., 2017*) had revealed that nurses' overall blood transfusion knowledge scores had been poor to moderate in general.

As regards to nurses' total practice regarding caring of children undergoing blood products transfusion table (20), the current study shows that, more than half of the studied nurses had incompetent practice regarding caring of children undergoing blood products transfusion with statistically significant difference ( $p = 0.014$ ). This finding was in the same line with (*Hendy et al., 2017*) who revealed that the majority of nurses showed unsatisfactory level of practice regarding to management of patients undergoing blood transfusion.

Concerning relation between total knowledge and their characteristics, this study shows that, there is highly

statistically significant deference between nurses' knowledge and their age, marital status, qualification and years of experience. This was in the same line with (*Encan and Akin, 2019*) who revealed that there were statistically significant differences between the knowledge questionnaire scores in relation to age ( $p < .05$ ). And the total questionnaire scores of nurses aged 26 years and older were higher than for nurses younger than 26 years of age. And this result agreed with (*Abd Elhy, 2017*) who conducted a study about nurses' knowledge assessment regarding blood transfusion to ensure patient safety and reported that knowledge among those with more experience was significantly higher.

On the other hand, there is insignificance between nurses' knowledge and attending training courses in blood transfusion. In the same line with (*Betty et al., 2016*) who conducted a study about assess the knowledge regarding blood transfusion among staff nurses and nursing students in NMCH, and found that there was no significant difference regarding presence to educational program before.

As regards to relation between total practice and their characteristics, the current study revealed that there is highly statistically significant deference between nurses' practice and their age, marital status, qualification, years of experience and attending training course in blood products transfusion. In the same line with (*Elghazawy et al., 2019*) who reported that there was a significant relation between total practice score of nurses and their educational level and their years of experience in pediatric blood transfusion, while, this result was inconsistent with (*Khalil et al., 2013*) who showed that there was no significant

difference between nurses' practice scores with age and years of experience.

### **Conclusion**

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**Based on findings of the current study, it can be concluded that:**

More than one third of the studied nurses had poor knowledge regarding caring of children undergoing blood products transfusion and more than half of them had incompetent practice regarding caring of children undergoing blood products transfusion. There was a positive correlation between studied nurses' total knowledge and their total practice. There was statistically significant relation between studied nurses' total knowledge, total practice, and their characteristics as regards: age, marital status, qualification, years of experience and receiving training courses in blood transfusion.

### **Recommendation**

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**Based on the findings of the present study, it recommended that:**

- Establish in-service training programs for continuous updating nurses' knowledge about blood product transfusion
- Providing of on job training programs for staff nurses about blood products transfusion.
- Further studies should be replicated in different hospitals setting to generalize the results.
- Ongoing assessment and evaluation of nursing staff performance in infection control skills with blood transfusion procedure.

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