Blood transfusion in Intensive Care Units: knowledge of the nursing team*

Transfusión de sangre en Unidades de Cuidado Intensivo: conocimiento del equipo de enfermería

Hemotransfusão em Unidades de Terapia Intensiva: conhecimento da equipe de enfermagem

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Abstract

Objective: To assess the knowledge of nursing team professionals in the Intensive Care Units of blood transfusion and related factors associated with it.

Methodology: Cross-sectional, quantitative study, which was carried out in three hospitals. The non-systematic sample included 104 nursing professionals working in the Intensive Care Units of these health institutions. For data collection, a checklist instrument developed and validated by the authors was used.

Results: The overall *knowledge* score registered an average of 50.4%. The factors associated with knowledge were as follows: *Training and/or guidance and monitoring of the protocols/directions to carry out the transfusion process*; *Frequency of blood transfusion procedures carried out by professionals*; and *The self-confidence factor*. For *etapa pré-transfusão, etapa de transfusão* and *etapa póst-transfusão* stages, the results were 48.3%, 52.2%, and 58.3%, respectively.

Conclusions: This study identified that, on the one hand, nursing professionals possess increased knowledge of post-transfusion complications; and, on the other, that self-confidence, use of protocols, training programs, and having only one job are factors associated with increased knowledge and with vigilance during the procedure.

Descriptors: Blood Transfusion; Nursing, Team; Knowledge; Intensive Care Units (source: DeCS, BIREME).

Resumen

Objetivo: Evaluar el conocimiento de los profesionales del equipo de enfermería de Unidades de Cuidados Intensivos sobre transfusión de sangre y los factores asociados a ésta.

Metodología: Se trata de un estudio transversal y cuantitativo, el cual se realizó en tres hospitales. La muestra, no sistemática, se constituyó por 104 profesionales de enfermería que laboran en las Unidades de Cuidados Intensivos de estas instituciones de salud. Para la recolección de los datos, se utilizó un instrumento de tipo *check-list* desarrollado y validado por las autoras.

Resultados: La puntuación global de *conocimiento* presentó una media de 50,4%. Los factores asociados al conocimiento fueron *Entrenamiento u orientación y seguimiento de protocolos/directrices para llevar a cabo el proceso de transfusión*; *Frecuencia de los procedimientos de transfusión de sangre realizados por el profesional*; y *El factor autoconfianza*. Para las etapas: *etapa pré-transfusão, etapa de transfusão* y *etapa póst-transfusão*, los resultados fueron 48,3%, 52,2% y 58,3%, respectivamente.

Conclusiones: El presente estudio evidenció no sólo que los profesionales de enfermería poseen un mejor conocimiento de las complicaciones postransfusionales, sino también que la auto-confianza, el uso de protocolos, los programas de entrenamiento y tener sólo un empleo son factores asociados a un mejor conocimiento y a la vigilancia durante la realización del procedimiento.

Descriptores: Transfusión Sanguínea; Grupo de Enfermería; Conocimiento; Unidades de Cuidados Intensivos (fuente: DeCS, BIREME).

Resumo

Objetivo: Avaliar o conhecimento dos profissionais da equipe de enfermagem de Unidades de Terapia Intensiva sobre hemotransfusão e fatores associados.

Metodologia: Trata-se de um estudo transversal e quantitativo, realizado em três hospitais. A amostra, não sistemática, foi constituída por 104 profissionais de enfermagem que atuavam nas Unidades de Terapia Intensiva dessas instituições de saúde. Para a coleta de dados, utilizou-se um instrumento do tipo *checklist* desenvolvido e validado pelas autoras.

Resultados: O escore geral médio de *conhecimento* foi de 50,4%. Os fatores associados ao conhecimento foram: *Treinamento ou orientação e seguir protocolos/diretriz para a realização do processo transfusional*; *Frequência de procedimentos de hemotransfusão realizados pelo profissional*; e *O fator auto-confiança*. Para as etapas: etapa pré-transfusão, etapa de transfusão e etapa póst-transfusão, os resultados foram 48,3%, 52,2% e 58,3%, respectivamente.

Conclusões: O presente estudo evidenciou que os profissionais de enfermagem possuem melhor conhecimento das complicações pós-transfusionais e que a auto-confiança, o uso de protocolos direcionadores, os programas de treinamento e ter apenas um emprego são fatores associados com melhor conhecimento e vigilância durante a realização do procedimento.

Descritores: Transfusão de Sangue; Equipe de Enfermagem; Conhecimento; Unidades de Terapia Intensiva (fonte: DeCS, BIREME).

Introduction

Blood transfusion is a procedure conducted frequently in hospitals, especially in Intensive Care Units (ICUs), as a vital technology. However, it can result in immediate or late complications, requiring qualified personnel who are knowledgeable in the procedure to carry out the transfusion safely (1-3).

Due to the occurrence of numerous transfusion incidents within hospitals, studies have shown the importance of assessing the knowledge of the professionals who participate in this procedure. The constant updating of knowledge of team members responsible for blood transfusion, especially the nursing team, is required to maintain patient safety during the process (4-6).

The analysis of the knowledge of hemotransfusion processes becomes important in order to subsidize training and to change the protocol in the policies that govern the norms of hemotherapy transfusion processes, in addition to impacting on the reduction of transfusion accidents. The knowledge of the nursing team predisposes to great or poor quality of patient care that can result in serious complications. Finally, it is worth emphasizing that false knowledge can result in harm to the patient (7).

Based on this information, the objective of this study is to assess the knowledge of nursing team professionals in the ICUs of blood transfusion and the factors associated with it.

Materials and Methods

Study design

This is a cross-sectional study with a quantitative approach, which carried out in three hospitals in southern Brazil.

Setting and sample

Three reference hospitals with high transfusion demand were selected for this study. The hospitals together had a staff of 123 professional nurses in the period in which the survey was con-

ducted. The first hospital, called "Hospital I", is a large teaching hospital, offering both general and high-complexity care to the public. The second hospital, called "Hospital II", is a large, non-profit hospital specialising in oncology, which provides care to private, insured patients, and works collaboratively with the Sistema Único de Saúde (SUS). Lastly, the third one, called "Hospital III", is a general teaching hospital that provides care for the privately and publicly insured.

The sample size calculation considered a coefficient of determination a priori (R^2 = 0.13) in a multiple linear regression model with three predictors; of significance or error of type I (α = 0.05), and error of type II (β = 0.1), with a priori statistical power of 90% and having a minimum sample size of $n = 99$ subjects. The final sample consisted of 104 nursing team professionals meeting the eligibility criteria for this study (see Figure 1).

Figure 1. Population eligible to participate in the study
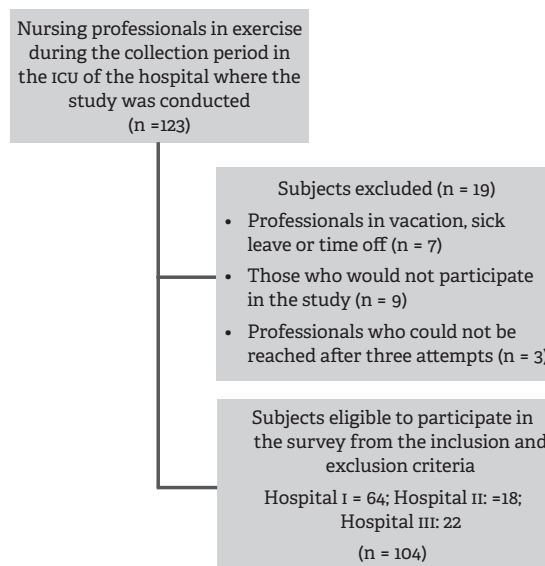
The inclusion criteria were as follows: nurses working in the ICU of hospitals used in this study; those who provided direct patient care; and those who were on the duty roster in the months during which the data was collected. Professionals excluded were those who were absent on the day of the interview due to vaca-

tion, sick leave, a day off, or who could not be reached after three attempts.

Ethical consideration

This study was approved by verdict n.º 2434/2013 and all of the study participants signed a free and informed consent form after receiving the study information.

Measurements/Instruments

A checklist (8) was used, which was prepared by the authors by means of the Resolução da Diretoria Colegiada (RDC) n.º 57/2010 (9), the Agência Nacional de Vigilância Sanitária (ANVISA), the Ministério da Saúde (MS), n.º 1353/2011 (10), and the manual *Hemoterapia: condutas para a prática clínica* (11). The content validity of the checklist was determined by evaluation experts working in Haemotherapy who were inserted in academia. For the analysis of internal consistency, the Cronbach's α was used. The survey consists of questions related to personal and professional data, and 35 questions about blood transfusion. It has a single-answer questions system, getting one point per issue. Questions about blood transfusion are divided into three stages: 1st stage: Etapa Pré-transfusão (EPT); 2nd stage: Etapa Transfusão (ET); and 3rd stage: Etapa Pós-Transfusão (EPOT) (8).

Data collection/Procedure

Data collection occurred from April 2013 to November 2014 in the three hospitals used in this study, in the morning, afternoon and night with all of the nurses working in the health institutions.

Data analysis

Data were entered into a Microsoft Excel® electronic spreadsheet, from the Microsoft Windows XP® program, by double entry. The verification of consistency, consolidation, and validation was carried out. For processing and analysis, data were then transported to the Statistical Package for the Social Sciences (SPSS) program, version 20.0.

A bivariate analysis was conducted using the Student's *t*-test for dichotomous categorical variables, the Pearson correlation coefficient for quantitative variables, and multiple linear regression. Statistically significant associations were those with $p \leq 0.05$. Pearson correlation considered *weak* ($0 \leq |r| < 0.3$), *moderate* ($0.3 \leq |r| < 0.5$), and *strong* ($0.5 \leq |r| < 1.6$) (12) relationships. The criterion for inclusion of predictors in multiple regression considered the level of significance $\alpha = 0.05$.

In regression analysis, the level of statistical significance was $p \leq 0.01$, to calculate the three stages of transfusion. For the knowledge of professionals score, related to parts III and IV of the data collection instrument, a formula derived from other studies (8) was used, in which the number of items correctly answered is divided by the total number of items and multiplied by 100.

Results

The sample consisted of 104 nursing professionals with an average age of 36.22 years: a minimum of 22.00, and a maximum age of 58.00 years. With regard to gender, the sample women were at 89 participants (85.6%). In respect of educational institution, 63 professionals (60.6%) came from the private sector. Among the 104 professionals, 64 (61.5%) had institutional linkage with Hospital I, 18 (17.3%), with Hospital II, and 22 (21.2%), with Hospital III; 2 professionals (1.9%) had institutional linkage both with hospitals I and II, and 3 (2.9%), both with hospitals II and III. Table 1 shows mean training time, time working in the institution, and time working in the current ICU in months.

Table 1. Characterisation of the professional aspects of nurses

Variable	Mean (months)	Median (months)	SD* (months)	Min. (months)	Max. (months)
Vocational Training Time	125.1	97.5	81.7	4.0	331.0
Professional Exercise Time	116.0	91.5	86.1	9.0	339.0
Practice Time at the Institution	84.5	65.5	76.8	0	329.0
Practice Time in Unity	58.0	42.0	55.3	0	220.0

* Standard Deviation (SD)

Source: research data, 2017.

The number of times the professional carried out blood transfusion was 3.30 times a month, with a minimum of 0 and a maximum of 40.00. 31 (29.8%) of the interviewees reported obtaining a certain amount of postgraduate courses and 1 (1.0%) reported obtaining a master's degree. The results showed that 10 (9.6%) professionals participated in a scientific event involving hemotransfusion. Furthermore, it was found that 89 (85.6%) of the professionals said they had received some training or guidance; 54 (51.9%) answered that they participated in a specific training program; and 29 (27.9%) participated in specific training courses on blood transfusions.

In accordance with searching for information in the scientific literature, 72 (69.2%) of professionals said they seek to inform themselves or ask questions about blood transfusion. With regard to the rules adopted in transfusion practice, 71 (68.3%) of them reported that they tend to adopt in their conduct the "Procedimento Operacional Padrão" (POP) manual; 4 (3.8%), that they adopt the Ministério da Saúde ordinance n.º 1353 and POP; 3 (2.9%), that they adopt the RDC n.º 153; 2 (1.9%), that they adopt the RDC n.º 57; 2 (1.9%), that they adopt the Ministério da Saúde ordinance n.º 1353; 2 (1.9%), that they adopt the RDC 57 and POP; 1 (1.0%), adopts the RDC n.º 153 and POP; and 19 (18.3%), that neither adopt nor follow any rules or guidelines.

With reference to security for transfusion process completion, 96 (92.3%) of professionals reported that they feel safe to carry out transfusion process. The mean knowledge of the three hospitals was 50.4%, with a minimum of 20.0% and a maximum of 77.1%. Table 2 shows the general knowledge scores and the three stages of transfusion for the ICU nursing professionals of the institutions under study.

In accordance with bivariate analysis, Table 3 shows the association between scores and the three stages and dichotomous variables.

As shown in Table 4, it was statistically significant only for the number of blood transfusions performed in the month there for the numerical variables. Three predictors were highlighted in the linear regression analysis: training received or specific orientation for blood transfusion; participates in specific blood transfusion training; and self-confidence (see Table 5).

Table 2. Knowledge scores of blood transfusion in the ICU of hospitals (I, II, and III) under study

Frequency Distribution	Mean (%)	Median	SD*	Min. (%)	Max. (%)
Hospitals I, II, and III					
General Score	50.4	51.4	11.7	20.0	77.1
Score in 1st Stage	48.3	50.0	18.2	0.0	100.0
Score in 2nd Stage	52.2	54.2	11.7	20.8	75.0
Score in 3rd Stage	58.3	66.7	31.8	0.0	100.0
Hospitals I					
General Score	52.8	54.3	10.4	26.0	74.0
Score in 1st Stage	50.7	57.1	15.7	0.0	86.0
Score in 2nd Stage	54.4	54.2	11.2	21.0	75.0
Score in 3rd Stage	62.5	66.7	28.8	0.0	100.0
Hospitals II					
General Score	42.5	44.3	11.5	20.0	57.0
Score in 1st Stage	38.3	42.9	19.9	0.0	71.0
Score in 2nd Stage	44.7	47.9	11.3	25.0	63.0
Score in 3rd Stage	48.5	50.0	32.1	0.0	100.0
Hospitals III					
General Score	51.9	51.4	12.9	29.0	77.0
Score in 1st Stage	52.4	50.0	20.8	29.0	100.0
Score in 2nd Stage	53.5	54.2	10.9	33.0	71.0
Score in 3rd Stage	55.6	66.7	39.6	0.0	100.0

*Standard Deviation (SD)

Source: research data, 2017.

Table 3. Correlation between the overall score and the three transfusion stages and socio-demographic/professional variables (t-test)

Variables / Score	General Score Mean SD*	Score 1st Stage Mean SD	Score 2nd Stage Mean SD	Score 3rd Stage Mean SD
Gender				
Female	50.5 12.2	48.5 18.8	52.3 11.8	57.7 31.7
Male	50.1 8.8	47.6 13.9	51.4 11.3	62.2 33.0
p	0.903	0.867	0.783	0.611
Type of Educational Institution				
Public	53.0 10.3	50.2 16.0	54.8 10.3	62.6 31.8
Private	48.8 12.4	47.2 19.5	50.5 12.3	55.6 31.7
p	0.077	0.412	0.066	0.271
Others Employments				
Yes	46.3 14.3	43.3 21.8	48.6 13.5	50.0 36.9
No	52.1 10.2	50.4 16.2	53.6 10.6	61.7 29.0
p	0.048	0.073	0.078	0.127
Received training and guidance				
Yes	51.9 11.2	50.4 16.7	53.3 11.4	61.0 31.1
No	41.9 11.5	36.2 22.2	45.3 11.3	42.2 32.0
p	0.002	0.005	0.013	0.033
Participation in Specific Training for Haemotransfusions				
Yes	54.2 10.0	52.1 15.2	55.2 10.6	69.1 28.1
No	46.4 12.3	44.3 20.2	48.9 12.1	46.7 31.6
p	0.001	0.027	0.006	< 0.001
Participation in Specific Improvement Course for Haemotransfusions				
Yes	54.0 9.8	51.2 16.9	55.3 10.6	67.8 25.9
No	49.1 12.2	47.2 18.6	50.9 11.9	54.7 33.2
p	0.055	0.317	0.088	0.036
Participation in Special Scientific Event for Haemotransfusions				
Yes	49.1 13.4	45.7 21.1	52.1 11.8	50.0 36.0
No	50.6 11.6	48.6 17.9	52.2 11.8	59.2 31.4
p	0.715	0.632	0.982	0.385
Post-graduation degree				
Yes	55.3 11.2	55.3 18.0	56.7 10.9	62.4 33.0
No	48.4 11.4	45.4 17.5	50.2 11.6	60.9 31.3
p	0.005	0.010	0.009	0.401
Search Information on Literature/Clarify Doubts				
Yes	50.7 12.1	55.3 18.0	56.7 10.9	62.4 33.0
No	49.9 11.1	45.4 17.5	50.2 11.6	56.6 31.3
p	0.761	0.378	0.786	0.5061
Feels self-confident to the completion of the transfusion process				
Yes	51.6 11.0	50.0 16.4	53.2 11.2	59.4 31.8
No	36.4 12.2	28.6 26.4	39.1 10.2	45.8 30.5
p	<0.001	0.056	0.001	0.248
Adopt any standard and/or guideline				
Yes	51.7 10.9	49.7 17.4	53.2 11.0	61.2 30.4
No	44.8 14.0	42.1 20.5	47.4 13.7	45.6 35.5
p	0.020	0.098	0.048	0.053

*Standard Deviation (SD)

Source: research data, 2017.

Table 4. Correlation between the overall score and the three transfusion stages and professional variables (Pearson)

Variables / Score	General Score r p	Score 1st Stage r p	Score 2nd Stage r p	Score 3rd Stage r p
Number of Blood Transfusions Conducted/Month	0.270 0.006	0.139 0.161	0.282 0.004	0.149 0.132
Formation Time	0.095 0.338	0.133 0.179	0.087 0.380	-0.025 0.804
Exercise Professional Time	0.145 0.141	0.169 0.086	0.111 0.264	0.075 0.447
Practice Time at Institution	0.180 0.067	0.132 0.182	0.183 0.063	0.061 0.536
Practice Time at Unity	0.140 0.156	0.157 0.112	0.144 0.144	-0.030 0.762
Number of Participation in Specific Training	0.075 0.452	0.015 0.876	0.067 0.496	0.102 0.303
Number of Employment	-0.174 0.078	-0.167 0.090	-0.125 0.208	-0.158 0.108

Source: research data, 2017.

Table 5. Association between general scores and the transfusion stages and the predictor variables

Variable	Score			
	General Score β p	Score 1st Stage β p	Score 2nd Stage β p	Score 3rd Stage β p
Received Training and Guidance	0.197 0.063	0.224 0.031	0.159 0.113	0.085 0.393
Participation in Specific Training for Haemotransfusions	0.218 0.028	0.116 0.263	0.166 0.100	0.295 0.004
Self-confidence	0.346 > 0.001	0.316 0.001	0.324 0.001	0.114 0.248

Source: research data, 2017.

Discussion

The average age of professionals of our study was 36.22 years, which is consistent with a study from the Emirate of Abu Dhabi hospitals, with a mean of 36.00 years (7). With respect to gender, a research conducted in Portugal corroborates our data, since its results show that 80.9% of the respondents were female (13). The literature consulted demonstrates that women hold many of the nursing positions, with a percentage of more than 90.0%, but we are seeing a marked increase in the number of men joining this profession (14).

With regard to employment, a study addressed by the Research Nursing Profile in Brazil reports that nurses are working exhaustive hours, sometimes as many as triple shifts, even though they are still underpaid (14). These conditions alter the professional quality of life, and therefore it should be considered.

In the present study, the average training and professional time was approximately 10.00 years. In the same way, a study from Portugal found that 44.7% of the participants had 1 to 10 years of professional experience (13). A study in India that reported 5.00 to 10.00 years of experience with transfusion medicine, working in urban blood centers and obtaining additional training, resulted in a significantly higher knowledge score (15).

In terms of time of performance in the sector, the scientific literature consulted points out the importance of the activities in the institution: the smaller the institution is, the longer the turnover in service. Professional training by itself cannot facilitate the professional-patient relationship. Continuity of caring and learning sector routine is important (16). Reflecting on the professional conduct of the nurse and the principles that guide the profession, to give value to the professional experience and promote permanent training can positively influence quality of care, reduction of damages, and greater guarantee of safety for the patient. These factors are essential to the blood transfusion process.

In accordance with the administration of blood transfusions, our study found that the mean frequency of transfusion is 3.30 times/month. A study carried out in the ICU of a Jordan hospital indicated that, during the six months of data collection, 89.0% of nurses administered transfu-sions at a frequency from one to four times, up to twelve times in a month (17). In Niamey, a study proved that the greater the frequency of performing transfusions is, the greater the knowledge of transfusion practices of the professionals interviewed (18).

The three predictor variables of this study were: *Trained or specific guidance for blood transfusion*; *Participation in specific training for blood transfusion*; and *Self-confidence to the procedure*, which meet the discussions in the literature involving the theme (8, 17). It is worth emphasizing the need to encourage the training and qualification of these professionals from the training courses (19, 20).

In regard to training or guidance from the institution to perform blood transfusion, 85.6% of professionals interviewed stated they had received some. This finding differs from results found in studies of other countries, such as India, wherein 80.1% of the participants did not received any special training in transfusion medicine (15). In the study carried out in the ICU of a Jordan hospital, 92.4% of nurses said they have never received guidance on the procedure (17).

Receiving training and constant guidance can be a key factor in keeping practice safe. In a recent study in Scotland, although no difference founded concerning knowledge, there was a small but statistically significant decrease in the degree of emphasis of the respondents on the importance of comprehension aspects regarding transfusions after an elapsed time (21).

With regard to training programs, skills improvement, and participation in a specific training event, a study conducted in the ICU of the university hospital of Minas Gerais reported that 60.0% of nurses who participated in the survey said they have already received training within the institution (22).

In respect of post-graduate students, the study carried out in the ICU of a Jordan hospital showed that 4.0% of nurses interviewed obtained a master's degree (17). This finding diverges from our study, in which 29.8% of the respondents reported having some expertise and only 1.0% reported holding a master's degree. In this sense, there are still barriers to access to training programs in Brazil, mainly due to asymmetric

offers of the geographical regions and areas of knowledge (23).

Regarding the adoption of the POP in transfusion practice, a study in the Public Teaching Hospital in Curitiba, Brazil, highlighted the importance of the procedure. POP creates a standardisation of procedures and techniques as well organising the nursing service with detailed guidelines, enabling better patient care. Furthermore, it has an educational purpose (24).

In accordance with security for the transfusion process completion, our study found that most professionals feel safe during the procedure. However, a study in Parana Teaching Hospital identified nurses' reaction to pre-transfusion measures. Many (46.0%) nurses said they "sometimes" felt safe, and 21% of them did not feel safe and thus they are more likely to conduct inappropriate pre-transfusion measures, causing harm to the patient (25).

In terms of knowledge of the three stages of the transfusion, a mean response of the three hospitals was 50.4%, with a minimum of 20.0% and a maximum of 77.1%. Corroborating these data, the study carried out in the ICU of a Jordan hospital obtained knowledge scores ranging from 14.0% to 70.0%, in which 62.0% obtained scores of 50.0% or higher (17).

The mean knowledge in the 1st stage (*pré-transfusão*) was 48.3%. This finding is confirmed by a study carried out in a Paraná Hospital, which found that 63.0% of professionals performed to identify the labels of pre-transfusion sample tubes at the nursing station not following what is recommended in the legislation (25).

Regarding the 2nd stage (*transfusão*), the mean of knowledge was 52.2%, corroborating the findings consulted in the literature. Our study identified professional error related to the administration of concomitant transfusion medications in 46.0% of respondents; 30.0% reported errors in patient observation and use of a device; 8.0% reported errors in the identification of the blood component bag and identification data with the name, registration number and blood type in the medical record (26).

For its part, the 3rd stage (*post-transfusão*), which related to the immediate transfusion complications, showed mean knowledge score of 58.3%. This finding reveals that the professionals of the three hospitals have better knowledge to identify signs and symptoms of an immediate transfusion reaction than in the other two stages of the transfusion process. A study in a Paraná Hospital found that 67.0% of professionals sometimes recognise signs and symptoms indicative of transfusion reactions, and 25.0% of them do not recognise the signs and symptoms. Therefore, the adverse event is not always correctly reported (25).

Another study in Rio Grande do Sul, Brazil, identified a deficiency in some points of care, demonstrating a gap between the identification and the conduct of the nurses in the face of an adverse reaction to transfusion. In this sense, the authors consider that one of the objectives of the institutions is to develop strategies with permanent education programs, aiming the promotion of care without errors and damages and improving the quality of care to the patient during the transfusion process (27).

In regard to bivariate analysis, the professional nurses who had no other employment contracts, received training or guidance in transfusion practices, participated in specific training for blood transfusion, participated in a specific improvement course for blood transfusion, and/or had postgraduate degree had higher knowledge scores in relation to other professionals. The study carried out in a Parana Teaching Hospital demonstrated the importance of nurses having training in transfusions, checking the current legislation, and being updated in the specific knowledge of this practice. These practices are vital, since the transfusion of blood components and blood products is a complex process that is not without risk, and it requires the expertise of trained professionals (25).

With regard to participation in a specific course of improvement for blood transfusion and postgraduate courses, a study on the panorama of nursing education in Brazil claims that these forms of education are of great relevance. Hospitals have the primary duty to train and qualify their employees to meet the demands of the health sector. These increasingly complex demands require that employees have the appropriate knowledge in order to carry out patient care with safety and quality (28).

An integrative review that considered articles published between the years 2005 and 2009 in Brazil highlighted the role of nursing in the practice of transfusion. The study emphasizes hemo-

therapy as a specialized area that requires specific care and knowledge on the part of health professionals, especially, of nursing team, with the possibility of minimizing the risks to health (29). Difficulties reported in this review accentuate the need for permanent training programs, which supports the findings and discussions of the present study. The professional who "adopts any standard and/or guideline" gains better knowledge in 3rd stage. A study in a public teaching hospital, with nurses working in a care or management area, corroborates this finding (24). Studies show that the use of POP allows the standardisation of performed care and greater security against enforcement procedures, which enables the homogenization of the techniques used (24).

The variable *Feels safe to perform blood transfusion* performed marginally better than the score in 1st stage. A study conducted in the ICU of an university hospital from city of Natal-RN, Brazil, identified that the knowledge of professionals was more satisfactory in 1st stage and 2nd stage, with 51.8% and 55.5%, respectively (22). The findings show that the more professional knowledge the nurse has about a procedure, the safer the person feels while performing it. A study carried out in ICU of a municipal hospital in southern Brazil pointed out the need to understand the alternatives for blood transfusion and the coverage of factors related to it. The nursing team in the study, despite reporting having experience with transfusion procedures, reported that they had not received formal training. The authors argue that the caring given to critical patients is complex and delicate, emphasizing the importance of the role of nursing in the transfusion process (30).

Conclusion

This study showed a lack of knowledge of transfusion process of professionals working in the ICU. It was evident that the nursing professionals demonstrated better knowledge of the complications that immediately follow transfusion than of the 1st stage and 2nd stage. Self-confidence, the use of protocols/guidelines and guidance/training programs, and having only one job were the factors associated with better knowledge and awareness.

This study emphasises the importance of transfusion procedure for nurses, which is not without risk and requires qualified personnel. ICU manag-

ers are responsible for coordinating the transfusion team, guiding immediate transfusion reactions safely, and conducting continuing education.

Our study puts stress on the importance of increased investment in relation to training using specific courses within hospitals more frequently. Continued assessment of the quality of care provided to patients is also necessary. More studies focusing on blood transfusion and the knowledge of professionals of it are necessary.

Although the present study is limited by the fact that it was carried out with a single assessment —which is characteristic of a cross-sectional study design—, there was no compromise in the achievement of the proposed objectives. This study was able to describe some important trends, setting the stage for new studies.

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