Original Article

Nurses' knowledge of blood transfusion in neonate

Saberes do enfermeiro para o cuidado no processo transfusional em recém-nascidos

Conocimiento de los enfermeros para cuidado en el proceso de transfusión en recién nacidos

Estefânia de Oliveira Cherem[a]
Valdecyr Herdy Alves[b]
Diego Pereira Rodrigues[c]
Fernanda Dalabella Lisboa Souza[a]
Juliana Vidal Vieira Guerra[b]
Vivian Linhares Maciel[c]

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ABSTRACT

Objective: To analyze nurses' knowledge of blood transfusion in neonates in a neonatal intensive unit care.

Methods: A descriptive and exploratory qualitative study conducted in two hospitals in the city of Belo Horizonte, Minas Gerais. The participants were 15 nurses who performed their activities in the neonatal intensive unit care, from August to December 2014. Data was subjected to thematic content analysis.

Results: The category created was divided into the following sub-categories, namely: nurses' care during blood transfusion: care during blood transfusion monitoring; a different perception of nurses regarding responses to blood transfusion and notification: the essence of care.

Conclusion: The identification of nurses' knowledge of blood transfusion, it is possible to promote their capacity for quality and safety of care related to the transfusion process in newborns.

Keywords: Blood transfusion. Neonatal nursing. Patient safety. Neonatal Intensive care units.

RESUMO

Objetivo: Analisar o conhecimento do enfermeiro acerca do processo transfusional para o cuidado do recém-nascido na unidade de terapia intensiva neonatal.

Métodos: Estudo descritivo, exploratório, qualitativo, realizado em dois hospitais da cidade de Belo Horizonte, Minas Gerais. Participaram 15 enfermeiras atuantes na unidade de terapia intensiva neonatal, no período de agosto a dezembro de 2014. Os dados foram submetidos à análise de conteúdo na modalidade temática.

Resultados: A categoria formada resultou nas seguintes subcategorias, a saber: A atenção do enfermeiro durante a transfusão sanguínea: cuidados no acompanhamento transfusional; A perspectiva de um olhar diferenciado do enfermeiro diante das reações transfusionais e das notificações: a essência do cuidado.

Conclusões: Com a identificação do conhecimento do enfermeiro neonatologista a respeito do processo transfusional, é possível promover a sua capacitação tendo em vista a qualidade e a segurança dos cuidados relacionados ao processo transfusional em recém-nascidos.

Palavras-chave: Transfusão de sangue. Enfermagem neonatal. Segurança do paciente. Unidades de terapia intensiva neonatal.

RESUMEN

Objetivo: Analizar el conocimiento del enfermero sobre el proceso de transfusión para cuidar del recién nacido en la Unidad de Cuidados Intensivos Neonatales.

Métodos: Estudio cualitativo exploratorio descriptivo, realizado en dos hospitales en la ciudad de Belo Horizonte, Minas Gerais. Participaron 15 enfermeras que trabajaron en la Unidad de Cuidados Intensivos Neonatales, en el período de agosto a diciembre de 2014. Los datos fueron sometidos a análisis de contenido en la modalidad temática.

Resultados: La categoría transmitida resultó en las siguientes subcategorías, a saber: la atención de la enfermera durante la transfusión de sangre: el cuidado de la transfusión de monitoreo; La perspectiva de una visión diferente de la enfermera antes de las reacciones transfusionales y notificaciones: la esencia de la atención.

Conclusión: La identificación de los conocimientos de la enfermera neonatóloga sobre el proceso de transfusión, es capaz de promover su formación con miras a la calidad y seguridad de la atención relacionada con el proceso de transfusión en los recién nacidos.

Palabras clave: Transfusión sanguínea. Enfermería neonatal. Seguridad del paciente. Unidades de cuidado intensivo neonatal.

[a] Hospital Sofia Feldman. Belo Horizonte, Minas Gerais, Brasil.

[b] Universidade Federal Fluminense (UFF). Niterói, Rio de Janeiro, Brasil.

[c] Centro Universitário Anhanguera. Niterói, Rio de Janeiro, Brasil.

INTRODUCTION

The present study is part of a master's degree dissertation on maternal-infant care at the medical school of Universidade Federal Fluminense focused on nurses' knowledge of blood transfusion in a neonatal intensive care unit[1].

Newborns admitted to neonatal intensive care units (NICUs) are a group of patients with proportionally higher rate of consumption of blood products. Blood transfusion in neonatology differs from blood transfusion in adults because of the following characteristics: neonates are more sensitive to cold, are at higher risk of tissue hypoxia have immune cell immaturity, peculiar hematological physiology and newborn pathologies (RN)[2]. Therefore, nurses' knowledge on the procedure is key to the delivery of appropriate care.

Transfusion of blood components and blood products is a relevant technology in modern treatments. When used appropriately and under conditions of significant morbidity or mortality that cannot be prevented or effectively controlled otherwise, it can save lives and improve the health of newborns[1].

The transfusion therapy that involves the use of donated blood is regulated by Law No. 10,205, of March 21, 2001, that provides stipulations on the collection, processing, storage, distribution and use of blood, blood components and derivatives, as well as on the implementation of these activities[3]. Thus, blood transfusion deserves special attention of the medical and the nursing teams, since physicians make the decisions regarding the use of blood transfusion and the nursing staff is responsible for monitoring the process[4].

It is a complex treatment that requires monitoring of health professionals, particularly the nurses that provide direct care to neonates. These nurses must have appropriate knowledge on blood transfusion to be able to perform it safely, and intervene in any potential complications[5], as provided in Resolution No. 306 of 25 April 2006, of Brazil's National Nursing Council (COFEN) that established the standards for nurse's conduct in hemotherapy services, according to which blood transfusion must be done by a well-trained and qualified nursing team. Also, nurses have the competence and responsibility to plan, coordinate, supervise and evaluate hemotherapy services in health units[6], to ensure the high quality of blood and blood components/blood products collected and transfused[7].

Nurses must be familiar with the type of care delivered during blood transfusion and take the appropriate measures to reduce damage in the case of transfusion reactions[5]. Therefore, in a study with nurses from a university hospital in São Paulo, most of them said they were not well informed on the subject, and, many were aware of the benefits of transfusion, though not of the risks involved in blood transfusion in neonates[8].

Undoubtedly, the transfusion therapy is a process that, even when appropriately recommended and administered, involves health risks. So, it is important to observe the blood therapy cycle that begins with the donor selection, serology and immunohematology, processing and fractionation of plasma, dispensation, transfusion and post transfusion evaluation[9].

However, many nurses feel unprepared to provide the appropriate care to neonates who need blood transfusion[9].

In recent years, there has been an increase in Brazilian scientific production on nursing care during blood transfusion in neonates, especially since 2001, with the promulgation of Law No. 10,205, dated March 21, 2001, which regulates the collection, processing, storage, distribution and dispensation of blood and its components and derivatives[3]. Research on the various aspects of nursing care related to blood transfusion therapy in newborns is essential to support the public policies of neonatal care, in line with COFEN Resolution No. 306 of 25 April 2006[7] that stipulates that nurses must be able to intervene in newborn care. But despite the increased number of publications, there are still few studies on care to neonates undergoing blood transfusion.

By focusing on blood transfusion therapy in neonatal intensive care unit (NICU), the present study provides an important contribution, since this population requires specialized and continuous care. Thus, the following guiding question was posed: How much do nurses working in NICU know about blood transfusion?

In this regard, the present study aims to analyze nurses' knowledge about the transfusion process in the care of newborns in a neonatal intensive care unit.

METHOD

Descriptive, exploratory study with a qualitative approach that aims to contribute to the efficacy and safety of blood transfusions in neonatal intensive care units.

The participants were 15 nurses from neonatal units of two hospitals in Belo Horizonte, state of Minas Gerais. The following inclusion criteria were established in the study: nurses should be specialists in neonatology and provide

direct patient care in the health unit. The exclusion criteria were as follows: nurses in managerial positions position and absent from work due to maternity leave, vacation or sickness at the time of data collection. Nurses who met the inclusion criteria were verbally invited to participate in the study and subsequently selected.

Data collection was conducted from August to December 2014, with the use of semi-structured interviews, containing open-ended and closed-ended questions on the blood transfusion process at the NICU. The interviews occurred in a private, comfortable room, ensuring the confidentiality of the participants. After approval of all the subjects, the testimonies were recorded on digital device. Subsequently, the interviews were transcribed in full by the researcher in order to ensure the reliability of the statements. Thematic content analysis was used in the collected data[10].

After the interviews were transcribed, the Record Units (RU) were used as a strategy to organize the data. Colorimetric technique was used to identify and group the related RUs, which allowed an overview of the theme. The interviews resulted in the following RUs: monitoring of blood transfusion; rate of infusion of blood components; measurement of vital signs after ten minutes of infusion; Nurses actions to manage blood transfusion reactions and reporting. These RUs, in turn, justified the construction of the thematic unit: *nursing care during blood transfusion*, which led to the following category: *The perspective of care during transfusion: nurse's knowledge*. This category was divided into two subcategories, namely: *nurse's attention during blood transfusion: care in transfusion monitoring; a different perception of nurses regarding reactions to blood transfusion and notification: the essence of care*.

The stipulations of Resolution No. 466/2012 of Brazil's National Health Council (CNS) were observed. All participants signed the Informed Consent Form before the interviews. Also, the project was approved by the Research Ethics Committee (CEP) of the Medical School of University Hospital Antonio Pedro (HUAP) of Universidade Federal Fluminense (UFF), under Protocol No. 624,384 / 2014 and CAAE No 25871814.1.0000.5243.

RESULTS AND DISCUSSION

The perspective of care during blood transfusion: nurses' knowledge

The peritransfusion period comprises blood management, monitoring of the procedure and checking on vital signs[11]. Thus, nurses play a critical role in the transfusion process because of their high level of responsibility in the care provided to the patients. During blood transfusion, newborn infants may experience several types of unexpected reactions [12]; So, the nurses responsible for monitoring these patients should be able to perform the procedure[13], to ensure safe care to them.

Nurses' attention during blood transfusion: care provided in the transfusion period

As adverse reactions may occur early in transfusion, neonates should be carefully monitored as early as possible. This is consistent with a recommendation of the Ministry of Health (MS), according to which health professionals should monitor newborns closely during the first 10 minutes of the transfusion[14]. The respondents expressed their compliance with this recommendation in their statements:

> *Monitor and check on vital signs of the newborn during the first 10 minutes, checking again for complications. I always recommend that the limb used for peripheral venous access should be visible at all times to allow detection of any abnormality, and the newborn should be monitored throughout the procedure. [PS1]*

> *After ten minutes, we check on vital signs e.g. temperature, blood pressure, heart rate and respiratory rate again. Then the infant should be checked for any changes in their medical condition. So, the newborn should be closely monitored at all times, especially during the first 10 minutes of the transfusion. I ask permission to check for any infiltration. [PS6]*

> *I must check on vital signs again after 10 minutes of infusion, monitor the child at that moment. Then I check temperature, blood pressure, heart rate and respiratory rate. I must find out if the pediatrician has prescribed any diuretic for administration during the infusion. If any complication is detected, the process must be immediately interrupted. [PS10]*

Nursing professionals should monitor the patients during the first minutes of blood transfusion to be able to recognize and act on early signs and symptoms, and reduce any possible damage caused by an adverse reaction. The professionals should begin the infusion of blood components to ensure a satisfactory peripheral

venous access, control infusion flow after checking the clinical conditions of the newborn, checking for any possible risks of fluid overload (rapid dose infusion)[3] and paying attention to the presence of swelling at or around the IV access[15].

As aforementioned, monitoring the newborn during the first minutes of blood transfusion allows for early detection of adverse reactions. In this regard, vital signs may improve the monitoring of newborns undergoing blood transfusion, "warning" nurses involved in patient care about possible transfusion reactions[11]. Therefore, newborns should be kept under surveillance by nurses to facilitate the early detection of possible transfusion reactions, in accordance with Ordinance 1. 353 of June 13, 2011 of Brazil's Ministry of Health[16].

Another crucial aspect in blood transfusion is infusion time, which should not exceed 4 hours for any blood component. If at 4 hours transfusion is not complete, infusion should be discontinued and the blood bag discarded, as recommended by the above regulation[16] because of the adverse effects of room temperature on blood cell quality and bacterial growth[17].

The following statements show that nurses are aware of the infusion time and of the particularities of blood components:

> *Newborns should be closely monitored throughout the blood transfusion. Check for any possible complication, and if it is the case, immediately report it to the pediatrician and keep on monitoring the newborn. Red cell concentrates are infused in 3 hours, platelets and plasma within 1 hour, not exceeding 4 hours. [PS3]*

> *Any complication in the process must be investigated for assessment of the transfusion reaction. No antibiotics should be administered during blood transfusion. The red cell concentrate infuses within 3 hours, the platelets, as well as the plasma, within 2 hours. No transfusion should exceed 4 hours. [PS9]*

> *When red cell concentrate is prescribed in this hospital, infusion time is always 3 hours, and I know that no transfusion should exceed 4 hours. If this occurs, the blood bag must be discarded and a new one should be used. [PS12]*

The respondents were found to be aware of the infusion time, observing the infusion time of each blood component. These nurses meet the legal standards established by the Ministry of Health, allowing a safe transfusion process.

A different perception of nurses regarding transfusion reactions and notifications: the essence of care

The respondents mentioned the following signs and symptoms that can be experienced by neonates in transfusion reactions: saturation fall, abnormal heart and respiratory rates; erythema; skin rash; tremors; cyanosis; hyperemia, hypothermia, anaphylactic shock, among others. Although they did not mention all the signs, they were able to recognize the signs and symptoms experienced by neonates associated to a transfusion reaction and were aware that infusion should be immediately interrupted in such cases:

> *During blood transfusions, I always advise the technician to be attentive to signs of transfusion reaction, such as saturation fall, change in heart rate, temperature, erythema, anaphylactic reaction. If these signs are detected, transfusion should be discontinued. [PS5]*

> *I think the possible reactions are hypertension, hypotension, saturation fall, hyperthermia, tachycardia, bradycardia, hypothermia, shock, cardiac arrest. If something happens during the transfusion procedure, blood transfusion should be immediately discontinued. [PS13]*

> *If any complication is detected, transfusion should always be discontinued. These complications include hypertension, increased temperature, skin rash, tremors, skin reactions, hemodynamic changes as cyanosis. [PS14]*

The health professionals were attentive to the vital signs of their patients or to any complication that might suggest transfusion reaction. Early detection of adverse events is a strategy to minimize damage to the health of neonates, and nurses should intervene as quickly as possible because when a blood component is administered, the above mentioned transfusion reactions may occur during the process, immediately or later[18]. Therefore, it is essential that nurses are aware of the three "Rs": **R**ecognize, **R**espond to and **R**eport transfusion reactions (19), to be able to take the necessary actions as soon as possible. Some statements follow:

> *I ask the technician to interrupt the transfusion and I immediately inform the pediatrician on what hap-*

pened, sot that the doctor takes the appropriate measures. I ask the technician to closely monitor the patient and I do the same. If a patient's blood sample must be drawn, I collect the blood sample and monitor the process. [PS4]

When a transfusion reaction is detected, I immediately stop the transfusion. I've already asked someone to report a transfusion reaction to the pediatrician. The patient is monitored. The blood bag and blood type is checked. If necessary, I ask someone to keep this bag for further analysis. Then, someone contacts the lab and takes the appropriate measures. [PS8]

If a transfusion reaction is suspected, the procedure must be immediately interrupted and will only be restarted then the suspicion is discarded. The neonate must be closely monitored, and if there are any changes in vital signs, it is necessary to establish if they are related or not to the blood transfusion. I send the blood bag to the laboratory for analysis. [PS10]

We emphasize the importance of nurses' appropriate response to transfusion reactions, because these health professionals must be able to take the necessary measures to mitigate any possible damage to the patients when their signs and symptoms are associated with transfusion reaction. Even when the respondents did not observe all the steps recommended by the Ministry of Health[2], most of them said they would immediately interrupt transfusion in case of reaction, according to Ordinance No. 1, 353, of 2011[16]. Since the first core competency of nurses is focused on patient care, they should be able to correctly identify all transfusion reactions, in order to take the necessary measures as quickly as possible[20].

Therefore, institutional actions aimed to train health professional on blood transfusion are necessary, ensuring patient safety and delivery of safe and appropriate, care. Thus, permanent health education in health units should be committed to the training of nursing professionals regarding the operational procedures of blood transfusion in neonates.

When a transfusion reaction is suspected, the following measures should be taken by the nurse: immediate interruption of blood transfusion, venous access kept permeable with saline solution at 0, 9%; identification of blood components at the bedside of the patient, as well as the proper administration of this component to the patient, according to a medical prescription. Also, the vital signs of the patient must be measured, and the complication must be reported to the doctor; puncture of a second venous access on suspicion of a serious transfusion reaction; the reaction must be informed to the hemotherapy service; a blood sample of the newborn must be collected and sent to the hemotherapy service, as well as the blood bag and the IV infusion filter; collect and send samples of blood and/or urine must be collected and submitted to the laboratory, if requested by the doctor[21].

Another important aspect concerns reporting to the Hematology Service, because all health services that perform blood transfusions must prepare standard operating procedures (SOP) to be implemented in the detection, treatment, prevention and reporting of adverse events related to transfusion[14]. A Transfusion Incident Investigation and Report Form (FIT) must be filled to report transfusion reactions to the hemotherapy service. The nurses' statements corroborate this information and indicate their knowledge about reporting of adverse reactions, as follows:

In addition to taking all the necessary measures when I detect a transfusion reaction, e.g. interrupt the infusion, report the fact to the doctor, check the blood bag again, I always fill out a reporting sheet, which is the transfusion incident form. I also contact the HICC here.[PS2]

I'm aware of the form (FIT) that must be filled if a transfusion reaction is suspected. I just don't know if this form must be filled by me or by the pediatrician. But, I always fill the form because I know this is important. [PS11]

When the patient has symptoms that may be associated with a transfusion reaction, I remind the staff to fill out the FIT and contact the blood bank of the hospital and HEMOMINAS, for the appropriate routine measures. [PS15]

Based on the collected data, we conclude that the respondents are aware of the need to report transfusion reactions. The FIT must be properly completed, since it includes essential information for the analysis of the transfusion incidents and consequently to the development of preventive and corrective measures.

The nurses are the health professionals who report most transfusion reactions[21]. So, they should be familiar with the process of reporting such adverse events.

FINAL CONSIDERATIONS

Nurses were found to have satisfactory knowledge about the transfusion process, but do not take important measures recommended by the relevant legislation, such as: checking all data on the blood bag label and patients' vital signs and symptoms when a transfusion reaction is suspected, and filling out the FIT**.** These measures were properly identified by the respondents but not implemented, as stipulated by the legislation. On the other hand, the respondents were found be fully aware of the need to monitor newborns during the first 10 minutes of the transfusion.

Since most respondents were not familiar with the recent developments in the transfusion process, nurses should receive appropriate training on transfusion therapy, especially those who work in NICUs .

Therefore, further studies are needed to contribute to improve nursing research and teaching, in order to generate new knowledge on nursing practices, in particular the training of neonatologist nurses. Recent research on nursing care in transfusion therapies, aimed to produce new knowledge on this field, will contribute to the training of nurses at the different levels of formation (undergraduate, graduate and post-graduate studies), resulting in the provision of appropriate patient care during the blood transfusion procedure. It should be stressed that blood transfusions are routinely performed in adult and pediatric patients.

The present study aims to contribute to the improvement of nursing care, according to the Brazilian legislation on transfusion therapy, as well as encourage debate on care related to blood transfusion in patients admitted to neonatal intensive care units.

One limitation of this study is that the sample consisted only of nursing professionals. Nursing technicians and managers were not interviewed. Further studies on the subject targeted to these populations are suggested to obtain insight on their routines.

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Corresponding author:
Diego Pereira Rodrigues
E-mail: diego.pereira.rodrigues@gmail.com

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