ADEQUACY OF THE ACTIVITIES IN “BLOOD PRODUCTS ADMINISTRATION”, OF THE NURSING INTERVENTIONS CLASSIFICATION, FOR ADULT PATIENTS

ABSTRACT

Introduction: prevention and/or early identification of transfusion-associated reactions rely on safe, evidence-based vigilance and direct care by nurses. Blood Products Administration, an intervention in the Nursing Interventions classification (NIC), comprises 27 activities that have not been previously validated. Objective: to evaluate the adequacy of the activities in the NIC intervention Blood Products Administration for adult patients. Methods: the adequacy of Blood Products Administration activities for adult patients was evaluated by 73 critical care nurses of a private hospital. Activities with weighted ratios (WR) ≥0.80 but >0.50 were labeled as minor. Activities with WR ≥0.80 were classified as major. Activities with WR <0.50 were discarded. Additionally, the activities within their classifications as major or minor were typified by the researchers in six subgroups: Baseline care, Care throughout transfusion, Care after transfusion, Care throughout & after transfusion, Baseline care, care throughout & care after transfusion and Care after reaction. Results: 22 activities were classified as major, four were classified as minor (two were baseline care activities, one activity regarding care throughout transfusion and one regarding care after transfusion) and one was considered nonessential (Obtain blood sample and first voided urine specimen after a transfusion reaction). Conclusions: in the opinion of critical care nurses, the adequacy of most activities in Blood Product Administration was supported. A few changes to some activities’ writing could improve clarity and accuracy. Our results can contribute to future content validation studies with larger samples of nurses from different backgrounds, such as Oncology nurses.

Keywords: Blood Transfusion; Blood Component Transfusion; Validation Studies as Topic; Nursing Care.

RESUMO

Introdução: a prevenção e/ou identificação precoce de reações transfusionais dependem de vigilância e cuidados diretos realizados pelos enfermeiros de forma segura e baseada em evidências. A Administração de Hemoderivados, uma intervenção na Classificação de Intervenções de Enfermagem, compreende 27 atividades que não foram validadas anteriormente. Objetivo: avaliar a adequação das atividades da intervenção da Classificação das Intervenções de Enfermagem Administração de Hemoderivados para pacientes adultos. Métodos: a adequação das atividades da Administração de Hemoderivados para pacientes adultos foi avaliada por 73 enfermeiros intensivistas de um hospital particular no Brasil. Atividades com médias ponderadas ≥0,80 e >0,50 foram classificadas como secundárias. Atividades com médias ponderadas ≥0,80 foram classificadas como principais. Atividades com razões ponderadas <0,50 foram consideradas não essenciais. Além disso, as atividades, dentro de suas classificações como principais ou secundárias, foram tipificadas pelos pesquisadores em seis subgrupos: cuidado basal, cuidado durante transfusão, cuidado após transfusão, cuidados durante e após transfusão, cuidados solo, durante e após transfusão e cuidado após reação. Resultados: 22 atividades foram classificadas como principais, quatro foram classificadas como secundárias (dois cuidados basais, um cuidado durante e um cuidado após transfusão) e uma foi considerada não essencial (obter amostra do sangue)

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e amostra da primeira urina após a reação à transfusão). Conclusões: na opinião dos enfermeiros intensivistas, a adequação da maioria das atividades da intervenção NIC Administração de Hemoderivados foi apoiada. Algumas mudanças na redação de algumas atividades podem melhorar a clareza e a precisão. Nossos resultados podem contribuir para futuros estudos de validação de conteúdo com maiores amostras de enfermeiros de diferentes especialidades que realizam transfusões rotineiramente, como enfermeiros oncologistas.

Palavras-chave: Transfusión de Sangre; Transfusión de Componentes Sanguíneos; Estudios de Validación como Asunto; Cuidados de Enfermería.

INTRODUCTION

Although it is a life-saving and life-sustaining procedure, blood transfusion can be potentially associated with adverse effects. The most common reactions are allergic and febrile-associated reactions and some less common and severe reactions include transfusion-associated acute lung injury (TRALI), transfusion-associated circulatory overload (TACO), anaphylaxis, sepsis and acute hemolytic reaction. Based on data received from 25 countries, the International Haemovigilance Network’s ISTARE, an online database for surveillance of adverse reactions and adverse events associated with donation of blood and transfusion of blood components, found an incidence of adverse events of 75 per 100,000 components issued, of which 25% were severe.

A previous study found a 1.1% prevalence (n=102) of cardiopulmonary, hemolytic, septic, hypotensive, or anaphylactic reactions to 4,857 blood products transfusions at four academic tertiary care hospitals. Nevertheless, only three cases of TACO or TRALI were reported to the transfusion service although there were clinical notes on the possibility that cardiopulmonary symptoms could be associated with the transfusion in 27 charts.

In this context, prevention and/or early identification of transfusion-associated reactions rely on safe, evidence-based care vigilance and direct care by nurses, a major segment of professionals working in the healthcare industry, especially those working in critical care, where transfusion is a frequent practice.

In order to identify nurses’ contributions to the outcomes of patients submitted to blood components transfusion, it is interesting that standardized nursing languages are used in electronic health records, including nursing diagnoses, interventions and outcomes. Standardized nursing languages facilitate data exchange in and between clinical settings, facilitates the continuity of care, thereby contributing to patient safety.

Blood Products Administration (code 4030), defined by the Nursing Interventions Classification (NIC) as the Administration of blood or blood products and monitoring of patient’s response, comprises 27 activities for that purpose. Some examples of activities are Verify that blood products has been prepared, typed and cross-matched (if applicable) for the recipient; Monitor vital signs (e.g. baseline, throughout and after transfusion); Monitor for transfusion reactions; Avoid transfusion of more than one unit of blood or blood product at a time, unless necessitated by recipient’s condition and Administrator saline when transfusion is complete.

Uma vez que a experiência clínica em enfermagem deve ser valorizada em estudos de validação e os enfermeiros intensivistas realizam transfusão sanguínea diariamente, este estudo tem como objetivo avaliar a adequação das atividades da intervenção NIC Administração de Hemoderivados para pacientes adultos, segundo a opinião de enfermeiros assistenciais.
Methods
This was a methodological study, which submitted the activities of the NIC intervention Blood Products Administration to evaluation by critical care nurses regarding adequacy. The study was performed from February to May 2017.

The population consisted of 120 nurses working in critical care units of a level-3 Joint Commission International-accredited private hospital located in São Paulo, SP, Brazil. The inclusion criteria were: a minimum of 2-years’ experience in direct patient care and working in the hospital for more than 3 months. The exclusion criteria were: professionals who were away from their activities on vacation or due to leaves. By applying the inclusion and exclusion criteria, the sample consisted of 73 nurses (15 did not accept to participate, one was not eligible according to the inclusion criteria and 31 were on vacation or on leave).

The variables of interest consisted of: A) the participants’ profile (gender, age, time since graduation, time working in the nursing profession, time working at the institution, theoretical and practical education (classes, courses, training) on nursing prescription, NIC interventions, on NANDA-I diagnoses); B) The nurses’ opinion about the adequacy of the nursing activities comprised by the NIC intervention Blood Products Administration.

The main researcher explained the objectives of the study to the nurses during their shifts and handed them a data collection instrument and an Informed Consent Form. The nurses were asked to rate each activity of Blood Product Administration on a five-point Likert scale regarding its adequacy to the intervention.

The results were analyzed according to Fehring’s Content Validation Model, which was adapted for nursing interventions. Weighted ratios were calculated for each activity as follows: 1 = 0.25; 2 = 0.50; 3 = 0.75; and 5 = 1. Activities with weighted ratios less than 0.80 but greater than 0.50 were labeled as minor. Activities with weighted ratios equal to or greater than 0.80 were classified as major. Activities with weighted ratios less than 0.50 were discarded.

Additionally, the activities within their classifications as major or minor were typified by the researchers in six subgroups, based on their teaching and research experience and on the Guideline on the Administration of Blood Components by the British Committee for Standards in Haematology. Baseline care (n=11); Care throughout transfusion (n=4); Care after transfusion (n=3); Care throughout & after transfusion (n=3); Baseline care, care throughout & care after transfusion (n=2); Care after reaction (n=2).

Descriptive statistics were used to analyze the nurses’ characteristics. The research project was approved by the Research Ethics Committee of the Hospital (Protocol 2.047.766) and complies with the Declaration of Helsinki.

Results
The nurses participating in the study had a mean age of 35.3±6.4 years (24–53 years old), a mean time since graduation of 7.8±4.6 years (2–30 years), work experience as nurses of 7.4±6.1 years (2–30 years), and 9.3±5.7 years working in the institution as nurses (1–21.3 years). Most were female (n=57, 78%), had received theoretical and practical training on the NANDA-I classification (n=71, 97.2%) and nursing prescriptions (n=71, 97.2%) and 63 (86.3%) were familiar with NIC. Fifty-five nurses (75%) also had specialist titles in addition to a baccalaureate and four (5.5%) had a master’s degree.

Table 1 presents the weighted ratios of each activity of the NIC Hemoderivatives Administration intervention.

Twenty-six (96.2%) of 27 activities were considered adequate for Blood Product Administration by the critical care nurses. Twenty-two activities (81.4%) had a weighted score equal to or greater than 0.80, thereby considered as major for adult patients.

Table 1 - Weighted Ratios and classification of the activities comprising the NIC Intervention Blood Products Administration

<table>
<thead>
<tr>
<th>Activities</th>
<th>Weighted ratio</th>
<th>Classification</th>
<th>Tipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verify correct patient, blood type, Rh type, unit number, and expiration date, and record per agency protocol</td>
<td>1.00</td>
<td>Major</td>
<td>Baseline care</td>
</tr>
<tr>
<td>Monitor vital signs (e.g. baseline, throughout and after transfusion)</td>
<td>1.00</td>
<td></td>
<td>Baseline care, care throughout &amp; care after transfusion</td>
</tr>
<tr>
<td>Monitor for transfusion reactions</td>
<td>1.00</td>
<td></td>
<td>Care throughout &amp; after transfusion</td>
</tr>
<tr>
<td>Verify physician’s orders</td>
<td>0.99</td>
<td></td>
<td>Baseline care</td>
</tr>
<tr>
<td>Obtain or verify patient’s informed consent</td>
<td>0.99</td>
<td></td>
<td>Baseline care</td>
</tr>
<tr>
<td>Instruct patient about signs and symptoms of transfusion reactions (itching, dizziness, shortness of breath, and/or chest pain)</td>
<td>0.99</td>
<td></td>
<td>Baseline care</td>
</tr>
</tbody>
</table>

Continue...
Those included most baseline care activities, all but one activity regarding Care throughout transfusion, all activities typified as Care throughout & after transfusion; all but one activity performed after transfusion; both activities focusing on Baseline care, care throughout & care after transfusion and one activity after a reaction.

Four activities (14.8%) had a weighted ratio less than 0.80 but greater than 0.50 and were therefore considered as minor activities for these patients: two were baseline care activities (Prepare an IV pump approved for blood product administration, if indicated, Prime the administration system with isotonic saline), one was an activity regarding care throughout transfusion (Change filter and administration set at least every 4 hours), and one was typified as care after reaction (Administer saline when transfusion is complete).

One activity (3.8%) performed after a reaction had a weighted ratio less than 0.05, which was considered nonessential for the care of adult patients: Obtain blood sample and first voided urine specimen after a transfusion reaction.

**DISCUSSION**

This study found that most activities comprised by the NIC intervention Blood Products Administration were considered adequate by critical care nurses, professionals who perform blood transfusion on a daily basis. The only activity deemed as nonessential is performed after a transfusion-associated reaction. All activities considered adequate are performed before, throughout and after transfusion and after a transfusion-associated reaction. Therefore, Blood Products Administration encompasses the importance of prevention, vigilance and action taking along the transfusion process.

Because all activities classified as major are in concordance with the Infusion Nurses Society’s (INS) Infusion Therapy...
Standards of Practice for transfusion therapy, this section will focus on those activities deemed as minor and the one activity considered as nonessential, namely Prepare an IV pump approved for blood product administration, if indicated. Prime the administration system with isotonic saline, Change filter and administration set at least every 4 hours, Administer saline when transfusion is complete and Obtain blood sample and first voided urine specimen after a transfusion reaction.

Prepare an IV pump approved for blood product administration, if indicated is a controversial activity. The INS makes the following recommendation with a level four evidence strength: “Electronic infusion devices (EIDs) can be used to deliver blood or blood components without significant risk of hemolysis of RBCs. EIDs that have a labeled indication for blood transfusion should be used. Follow the manufacturers’ directions for use.” This recommendation is based on The American Association of Blood Banks Technical Manual and on a laboratory study.

However, a recent integrative literature review found that RBCs can be damaged when packed RBCs and whole blood are delivered through infusion pumps, especially linear peristaltic pumps. No EIDs are used for blood transfusion in the institution where this study was carried out. Priming the administration system with isotonic saline is also a controversial activity, tradition-guided rather than an evidence-based practice. According to Kessler, those in favor of priming argue that there is an easier evacuation of air bubbles, prevention of damage to blood cells falling upon the mesh filter and quicker saline-diluted blood flow. Nevertheless, the author argues that “correct filling of the drip chamber and tubing should prevent bubbles from forming, and the mesh filter causes little damage to RBCs and other blood components” and “[…] RBCs are sufficiently diluted to flow readily through the tubing without further saline dilution.” Also, some detriments are also pointed out, such as delays, increase in infused fluid volume, and a possible increase in cost.

Although it is widely used in hospital settings, priming of the infusion system is advocated neither by the INS nor by the British Committee for Standards in Haematology. The hospital where this study was performed does not use any priming solutions for transfusions.

Change filter and administration set at least every 4 hours was possibly considered a minor activity because changing filter and changing the administration set might not need to be recommended as two different activities. Blood transfusion tubing is not currently used for more than four hours after removal of the blood component of a controlled temperature environment due to the risk of bacterial growth. However, multiple, consecutive packs of compatible blood can be transfused with the same set, whereas filters should be changed after two or as much as four transfused units because of retained micro aggregates and cell debris. Therefore, e.g., when five packs of fresh frozen plasma are to be transfused, the same infusion set could be used for up to four hours, but the filter could not be used more than four times, as per institution policy.

Administering a small amount of saline when transfusion is complete is recommended in order to ensure full blood delivery and maintain venous access patency. Because of this indication, we believe that “Administer saline when transfusion is complete should be changed to “Flushing venous access device with saline when transfusion is complete” to be more accurate.

Obtain blood sample and first voided urine specimen after a transfusion reaction was considered a nonessential activity by the nurses, possibly because the Brazilian Ministry of Health requires these actions only when a hemolytic reaction, TRALI, anaphylaxis or sepsis are suspected. When an urticarial reaction or fluid overload occur – which happens more commonly – there is no indication for specimen collection. Therefore, “if indicated” should be added to this activity for accuracy.

Finally, an observation of the authors regarding the intervention label in Brazilian Portuguese should be made. The translation that would be conceptually more adequate to the original “Blood Products Administration” is Administração de Produtos Sanguíneos, because it can include both the transfusion of blood derivates and blood components. Blood derivates include products generated by plasma fractioning through physical-chemical processes (e.g., albumin and coagulation factors concentrate). Blood components, on the other hand, are obtained through total blood, one by one, through physical processes, such as centrifuging and freezing (e.g., packed red blood cells, frozen fresh plasma, platelet concentrate).

Our results are limited due to the exclusive evaluation of the current NIC content. No other possible activity in the literature was submitted to evaluation. Nevertheless, the critical care nurses frequently perform blood products transfusion in a JCI-accredited hospital, which is a high-achieving organization regarding excellence.

CONCLUSION

In the opinion of critical care nurses, the adequacy of most activities in Blood Product Administration was supported. A few changes to some activities’ writing could improve clarity and accuracy. Our results can contribute to future content validation studies with larger samples of nurses from different backgrounds, such as Oncology nurses.

REFERENCES


