TEXTO & CONTEXTO ENFERMAGEM
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DEVELOPMENT AND VALIDITY OF AN ALGORITHM FOR PLANNING INTRAVENOUS MEDICATION ADMINISTRATION IN INFANTS

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ABSTRACT

Objective: to develop and validate the content of an algorithm for planning intravenous medication administration in infants.
Method: this is a methodological study of technology development and validity. A scoping review was carried out, which supported the creation of an algorithm by the researchers and its subsequent validity by 13 expert nurses, which took place between November 2021 and March 2022. Items with a Content Validity Index ≥ 0.8 were considered acceptable.
Results: thirty-one references were included in the scoping review, organized into five categories: “recommendation for intravenous access”, “polypharmacy-related care”, “care prior to intravenous medication administration”, “venous catheter handling-related care” and “medication infusion-related care”. This division supported the algorithm development, which was validated after three rounds, with an overall Content Validity Index of the instrument of 0.91.
Conclusion: algorithm validity indicates reliability and accuracy of its content.

DESCRIPTORS: Neonatology. Neonatal nursing. Nursing care. Patient safety. Intravenous infusions. Validation study.

HOW CITED: Costa ACL, Mendes LA, Santos LM, Marcatto JO, Corrêa AR, Kusahara DM, Manzo BF. Development and validity of an algorithm for planning intravenous medication administration in infants. Texto Contexto Enferm [Internet]. 2024 [cited YEAR MONTH DAY]; 33:e20230262. Available from: https://doi.org/10.1590/1980-265X-TCE-2023-0262en

ELABORAÇÃO E VALIDAÇÃO DE ALGORITMO PARA O PLANEJAMENTO DA ADMINISTRAÇÃO DE MEDICAMENTOS INTRAVENOSOS EM NEONATOS

RESUMO

Objetivo: elaborar e validar o conteúdo de um algoritmo para o planejamento da administração de medicamentos intravenosos em neonatos**.**
Método: estudo metodológico de elaboração e de validação de tecnologia. Foi realizada a revisão de escopo que subsidiou a elaboração do algoritmo pelas pesquisadoras e sua posterior validação por 13 enfermeiros especialistas, a qual ocorreu entre novembro de 2021 e março de 2022. Foram considerados aceitáveis os itens com Índice de Validade de Conteúdo ≥ 0,8.
Resultados: foram incluídas 31 referências na revisão de escopo, organizadas em cinco categorias: "indicação de acesso intravenoso", "cuidados relacionados à polifarmácia", "cuidados prévios à administração de medicamentos intravenosos", "cuidados relacionados à manipulação do cateter venoso" e "cuidados relacionados à infusão de medicamentos". Essa divisão subsidiou a elaboração do algoritmo, que foi validado após três rodadas, com Índice de Validade de Conteúdo geral do instrumento de 0,91.
Conclusão: a validação do algoritmo indica confiabilidade e precisão do seu conteúdo.

DESCRITORES: Neonatologia. Enfermagem Neonatal. Cuidados de Enfermagem. Segurança do Paciente. Infusões Intravenosas. Estudo de Validação.

DESARROLLO Y VALIDACIÓN DE UN ALGORITMO PARA LA PLANIFICACIÓN DE LA ADMINISTRACIÓN DE MEDICAMENTOS INTRAVENOSOS EN NEONATOS

RESUMEN

Objetivo: desarrollar y validar el contenido de un algoritmo para la planificación de la administración de medicamentos intravenosos en neonatos.
Método: se trata de un estudio metodológico de desarrollo y validación de tecnología. Se realizó una revisión de alcance que apoyó la creación del algoritmo por parte de los investigadores y su posterior validación por 13 enfermeras especialistas, que se llevó a cabo entre noviembre de 2021 y marzo de 2022. Se consideraron aceptables los ítems con un Índice de Validez de Contenido ≥ 0,8.
Resultados: se incluyeron 31 referencias en la revisión de alcance, organizadas en cinco categorías: "indicación de acceso intravenoso", "cuidados relacionados con la polifarmacia", "cuidados previos a la administración de medicamentos intravenosos", "cuidados relacionados con la manipulación del catéter venoso" y "cuidados relacionados con la infusión de medicamentos". Esta división apoyó el desarrollo del algoritmo, que fue validado después de tres rondas, con un Índice de Validez de Contenido global del instrumento de 0,91.
Conclusión: la validación del algoritmo indica confiabilidad y precisión de su contenido.

DESCRIPTORES: Neonatología. Enfermería neonatal. Cuidado de enfermera. Seguridad del paciente. Infusiones intravenosas. Estudio de validación.

INTRODUCTION

Seriously ill or premature newborns (NB) require hospitalization in Neonatal Intensive Care Units (NICU), where they receive specific care and treatments to help restore their health. To ensure adequate NB care, it was necessary to incorporate technologies and innovations, such as intravenous therapy (IVT), the main method for medication administration in hospitalized NBs[1]. However, such therapy is not without risks, and adverse events (AEs) related to medication use account for more than 30% of AEs that occur in the NICU[2-3]. It is worth noting that AEs can occur at any stage of the process, and between 26.9% and 63% of these events occur during medication administration[3-4].

AEs associated with medication can result in unfavorable outcomes, prolonged hospitalization and increased costs associated with healthcare[2-4]. It should be noted that medication administration is one of the last moments of the medication process, and the development and implementation of effective barriers to preventing AEs is crucial[1]. Thus, this stage, which is predominantly carried out by the nursing team, requires professionals who perform it to have knowledge that guarantees safety in the process[1-2], especially when assisting unstable patients with greater care demands[4].

Therefore, investments must be made in technologies that help the care team make assertive, evidence-based decisions. Among these tools, algorithms[5] stands out, which have been incorporated into the health sector in recent years and have stood out as a form of organization, systematization and standardization of processes and techniques, guiding decision-making in care practice[5].

In relation to algorithm use in healthcare, its adoption can be cited as a strategy for early detection of sepsis[6] to prevent and treat friction injuries[7] and recommend appropriate treatment in situations of peripheral intravenous infiltration and extravasation in children[5]. Despite evidence of use of this technology in other areas, to date no algorithms have been identified that guide the IVT administration process in NBs, which reinforces the need for investment in this field of knowledge.

The construction and validity of an algorithm that systematizes intravenous medication administration in the neonatal context may assist nurses in safe and evidence-based planning of medication administration and parenteral nutrition, resulting in reduction of incidents and promotion of quality and safety of nursing care related to IVT. Furthermore, it can be used as a teaching resource regarding medication administration practices in the neonatal context. Thus, this study aimed to develop and validate the content of an algorithm for planning medication administration in infants.

METHOD

This is a methodological study of technology development and validity, developed in three phases. In the first phase, a scoping review was carried out to search for data available in the scientific literature, in order to find evidence that supported the algorithm construction, considering the following topics: neonatology, gestational age, infusion time and method, physicochemical characteristics of medications, type of catheter and polypharmacy. This review was registered on the Open Science Framework platform (https://osf.io/bgxw5/). In order to guide the search and data collection, the manual that guides the construction and development of scope reviews published by JBI in 2020 was used[8].

Initially, the research question was defined to direct the review using the mnemonic strategy Population, Concept and Context (PCC)[8], being P: infants; C: nursing care, which must be considered when planning and administering IVT; and C: neonatal ICU. The following research question was then defined: what care identified in the literature contributes to planning the safe administration of intravenous medications in neonatology?

Studies between 2011-2021 in English, Portuguese and Spanish were included. Reflection, repeated studies and those that did not answer the research question were excluded.

Subsequently, a search was carried out in the Medical Literature Analysis and Retrieval System online (MEDLINE) via PubMed, Latin American and Caribbean Literature in Health Sciences (LILACS), Nursing Database (BDENF), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane and Scopus Via Portal CAPES, between March and September 2021, by two researchers and with the assistance of a librarian.

To obtain studies in virtual databases, the following search strategy was used: Neonatology OR *Neonatologia* OR *Neonatología;* AND Infusions, Intravenous OR *Infusões intravenosas* OR *Infusiones Intravenosas;* AND Nursing Care OR *Cuidados de Enfermagem* OR *Atención de Enfermería*. In order to expand the scope of results, the researchers searched the reference lists for studies that were not retrieved in the databases following the same inclusion criteria, in addition to manuals and guidelines from the last ten years that address "IVT in infants", including care and recommendations during medication infusion, as the specificities to be considered depending on the type of intravenous access and use of multiple medications simultaneously.

In this regard, 31 references were considered in the scoping review, and the selection process is described in Figure 1.

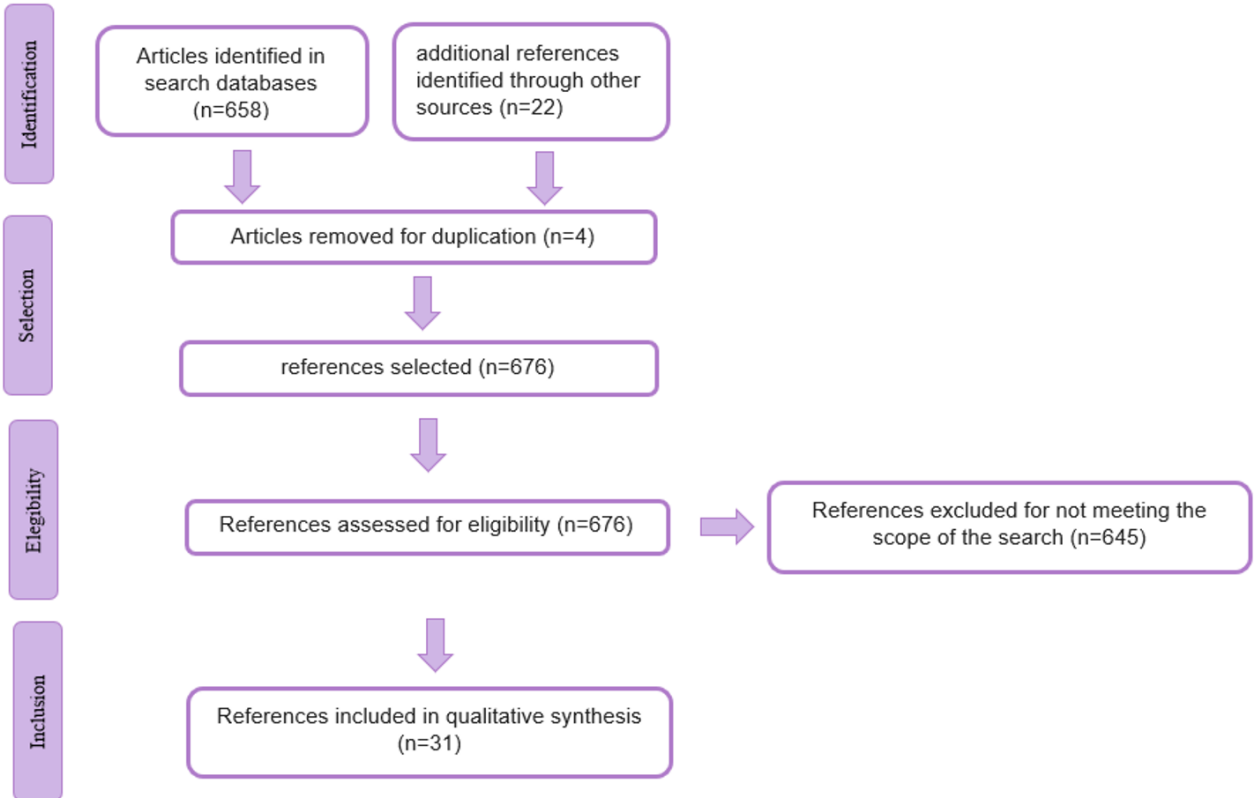


Figure 1 – Review article selection process flowchart.

Data extraction occurred manually by two researchers who assessed the materials independently, and selection was made by reading titles and abstracts, followed by reading the texts. The selected materials were organized into categories.

In phase 2, the algorithm was developed by the main researcher with the help of a professional trained in graphic design on the LucidChart® web platform through the link: https://www.lucidchart.com/. The process of building the first version of the algorithm took place between October and November 2021 after fortnightly meetings involving the researchers of this study. The algorithm was divided into five chunks, namely: "recommendation for intravenous access", "polypharmacy-related care",

"care prior to intravenous medication administration", "venous catheter handling-related care" and "medication infusion-related care". Furthermore, symbols were adopted to demarcate the beginning and end of the algorithm, the actions to be executed, the decisions with output flow, the direction to be followed and the connections between stages.

Subsequently, in phase 3, the algorithm was subjected to content and appearance validity, in order to identify whether the concepts were presented appropriately and whether they were representative for care practice, such as whether there was harmony between the aesthetic representation (appearance) and the information conveyed[9-10].

Nurses specializing in neonatology and/or child health and with expertise in IVT were selected as participants. The definition of population took place in October 2021, through a search on the *Plataforma Lattes*, selecting the resumes of 28 professionals with an emphasis on child health with the term "IVT" in the description and who had their resume updated in the 12 months prior to selection. The snowball technique was also used, i.e., a non-probabilistic sample selection technique in which initial participants are selected, who, in turn, indicate new participants who meet the inclusion criteria and so on.

The previously identified professionals were classified and chosen based on Fehring criteria[11], which were adapted to the area of neonatology and/or child health and considering the following items: academic training; specialization; academic productions; professional experience; and experience in creating educational material. The maximum score achievable by each professional was 15, with those with a score greater than or equal to five being considered eligible.

As for the number of experts involved in the validity process, the recommendation for the participation of six to 20 professionals was used[12]. Initially, an invitation was sent by email to 35 experts containing the research objective, description of data collection instrument and guidance on how to complete this instrument.

After sending the invitation, experts who agreed to participate in this stage of the research received a Google Forms® link containing: (1) Informed Consent Form (ICF); (2) form containing information about professional sociodemographic, academic and occupational characteristics; (3) the algorithm in PDF format; (4) questionnaire based on a Likert-type scale, in which participants expressed their degree of agreement for each algorithm item[13].

Data collection took place between November 2021 and March 2022 through a questionnaire developed in Google Forms®. The questions in this questionnaire were constructed considering behavioral, objectivity, simplicity, clarity, relevance, accuracy, variety, modality, typicality, credibility, breadth and balance criteria[10].

The Likert scale adopted for assessment has three degrees of agreement[13-14], with 1= Disagree, 2= Partially agree and 3= Completely agree. Items marked as 3 = Totally agree were considered appropriate. Experts who marked items 1= Disagree or 2= Partially agree were encouraged to present justifications and suggestions so that the researchers could adapt the items and resend them for new assessment after adjustments[13-14].

Feedback to experts after each round occurred through a letter explaining the changes made according to suggestions and presenting items that were not validated and that required another round of analysis. Professional characteristic data were tabulated and analyzed regarding their frequency using descriptive statistics using the Statistical Package for Social Sciences (SPSS) version 19.0.

Experts' opinion regarding algorithm items was assessed according to the Content Validity Index (CVI). The CVI score was obtained through the proportion of items marked by participants as not relevant or not representative among the total number of responses[13-14]. The CVI of each item was considered acceptable when equal to or greater than 0.8[13-14]. Furthermore, the overall CVI of the instrument was calculated by obtaining the mean CVI of each item divided by the number of items.

Finally, this study was approved by the *Universidade Federal de Minas Gerais* Research Ethics Committee. The judges voluntarily agreed to participate after their consent to the ICF on a digital platform (Google Forms®).

RESULTS

In the scoping review stage, 680 documents were found. Of these, 31 references were selected, which contained information about the main care with IVT. The information found was grouped into five categories, namely: “recommendation for intravenous access”, “polypharmacy-related care”, “care prior to intravenous medication administration”, “venous catheter handling-related care” and “medication infusion-related care”. The algorithm entitled “Elaboration and validity of the content of an algorithm for planning medication administration in infants” was built based on these categories.

It is noteworthy that 14 experts agreed to participate in algorithm assessment; however, there was a loss between the second and third round of the validity process, totaling 13 at the end of the study.

As for the profile of experts, 13 (92.9%) were female. The median age was 44 years old (minimum 30 and maximum 60); the median training time in years was 21 (minimum of six and maximum of 37); and the median time working in neonatology or pediatrics was 19 years (minimum of five and maximum of 37). Furthermore, half of judges had a doctoral degree as their highest academic degree. Regarding professional occupation, 92.9% worked in more than one area of nursing, with the concomitant exercise of research and teaching being the most frequent (50%). It should be noted that 84.6% of judges worked in teaching, 69.2% in research, 46.1% in care, and 30.8% held management positions. To achieve a CVI greater than or equal to 0.8 during validity, three assessment rounds were necessary. The time for experts to return between rounds was initially 15 days, extending up to 30 days. In the first two, experts considered that the algorithm contained information that needed adjustments in writing for better understanding by readers. Furthermore, they suggested reorganizing the information in order to make the instrument more logical and self-explanatory. Experts then pointed out the need to recompose the visual structure, such as increasing the font adopted and spacing between information, such as changing the colors used. Table 1 shows the CVI referring to algorithm items in chunks 1 and 2 for each round.

Chunk 1, as it is the general assessment of the algorithm’s content, presented the largest number of items. In chunks 1 and 2, eight items were validated in the first round, nine in the second and two in the last. Table 2 shows the CVI referring to algorithm items in other chunks.

In chunks 3, 4 and 5, ten items were validated in the first round, nine in the second and two in the last. Furthermore, in chunk 3, the item “The content of this chunk meets the objective proposed by the algorithm” presented a CVI of 1.0 in the second round, as did the item “The sequence of instructions in this chunk favors its use in practice”, in chunk 4, and item “The content has a logical organization”, in chunk 5.

At the end of the third round, all items in the algorithm were validated, with the exception of a chart that contained information about the characteristics of the medications most frequently used in neonatology. This item would be complementary to the algorithm, but was excluded considering that the complexity of information could compromise its understanding. Regarding other items, 17 were validated in the first round, 18 in the second, and 4 in the third. The overall CVI of the instrument in the first round was 0.78, in the second round, 0.90, and in the last round, 0.91.

The validated algorithm is presented in Figure 2.

Table 1 – Content Validity Index of items assessed in chunks 1 and 2 in the validity process of "Algorithm for planning medication administration in infants". Belo Horizonte, MG, Brazil, 2022. (n=13)

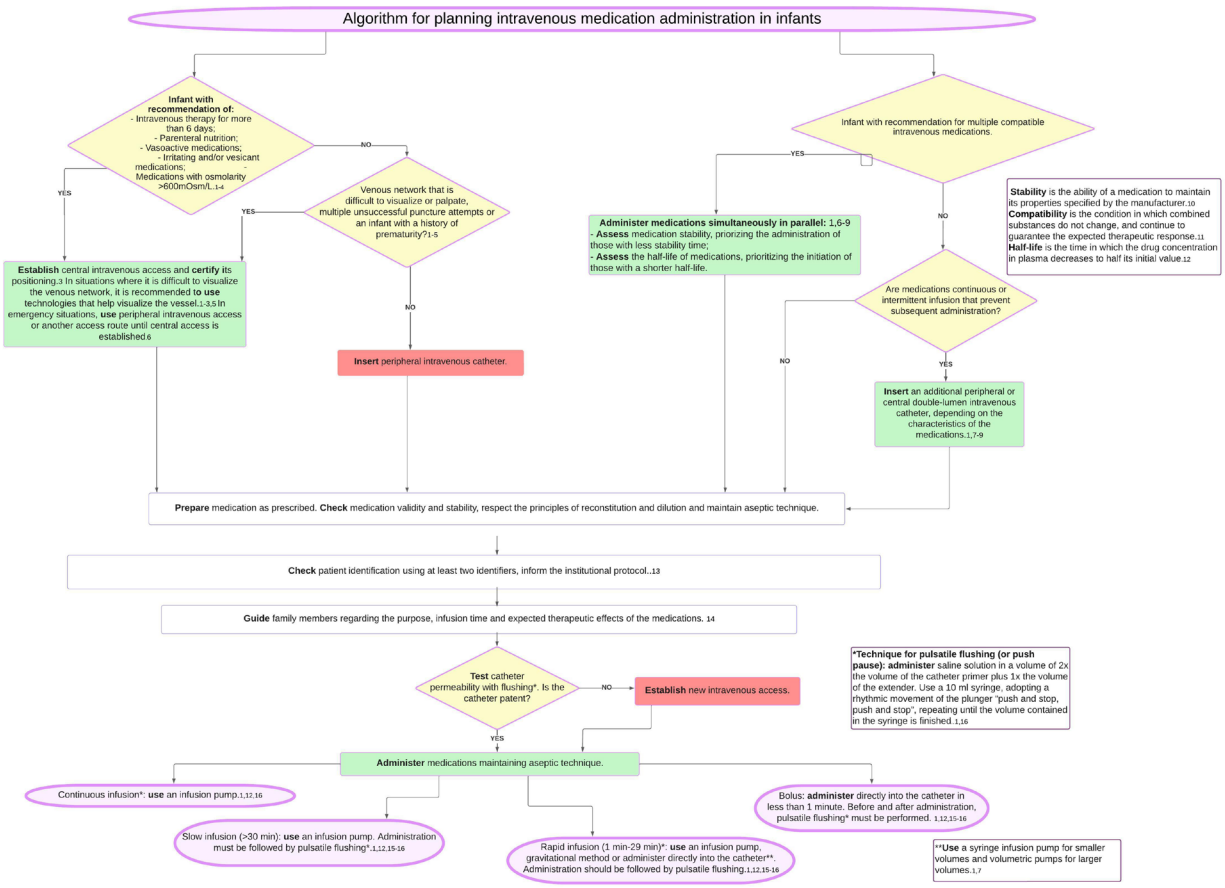
Questions	CVI* 1st round (n=14)	CVI* 2nd round (n=14)	CVI* 3rd round (n=13)
Chunk 1 – Assessment of the algorithm's full content			
1. The visual presentation is attractive and organized.	0.71	0.79	1.00
2. The algorithm's sequence of instructions favors its use in practice.	0.64	1.00	-
3. The selected colors are attractive.	0.71	0.71	0.85
4. The language used is appropriate.	0.79	0.93	-
5. The information is clear and does not create ambiguity.	0.57	0.86	-
6. The content has a logical organization.	0.86	-	-
7. The content meets the objective proposed by the algorithm.	0.86	-	-
8. The content is scientifically adequate and up to date.	0.86	-	-
9. The instrument is easy to use.	0.93	-	-
10. The algorithm is applicable to the practice of professionals dealing with IVT in neonatology.	0.86	-	-
11. I feel motivated to use the algorithm.	0.93	-	-
12. I would indicate the algorithm to be used in services.	0.86	-	-
13. The use of this technology can optimize nursing professionals' working time.	0.79	1.00	-
14. A chart containing information about the characteristics of the medications most frequently used in neonatology can help professionals involved in care (a section of the chart showing the information contained about the main medications used in neonatology is sent).	0.71	0.79	item excluded after 2nd round.
Chunk 2 – Assessment of content related to recommendation of intravenous therapy for infants			
1. The sequence of instructions in this chunk favors its use in practice.	0.71	0.93	-
2. The language used in this chunk is appropriate.	0.64	0.93	-
3. The content of this chunk has a logical organization.	0.93	-	-
4. The information and conduct guided in this chunk are clear and do not generate ambiguity.	0.64	0.86	-
5. The content of this chunk meets the objective proposed by the algorithm.	0.79	1.00	-
6. The conduct highlighted in this chunk is appropriate.	0.71	0.93	-

*CVI: Content Validity Index

Table 2 – Content Validity Index of items assessed in chunks 3, 4 and 5 in the validity process of "Algorithm for planning medication administration in infants". Belo Horizonte, MG, Brazil, 2022. (n=13)

Questions	CVI* 1st round (n=14)	CVI* 2nd round (n=14)	CVI* 3rd round (n=13)
Chunk 3 – Assessment of content related to conduct when several medications are prescribed for infants			
1. The sequence of instructions in this chunk favors its use in practice.	0.86	-	-
2. The language used in this chunk is appropriate.	0.79	0.79	0.92
3. The content of this chunk has a logical organization.	0.93	-	-
4. The information and conduct guided in this chunk are clear and do not generate ambiguity.	0.64	0.93	-
5. The content of this chunk meets the objective proposed by the algorithm.	0.71	1.00	-
6. The conduct highlighted in this chunk is appropriate.	0.79	0.93	-
Chunk 4 – Assessment of content relating to conduct in medication administration			
1. The sequence of instructions in this chunk favors its use in practice.	0.71	1.0	-
2. The language used in this chunk is appropriate.	0.86	-	-
3. The content of this chunk has a logical organization.	1.0	-	-
4. The information and conduct guided in this chunk are clear and do not generate ambiguity.	1.0	-	-
5. The content of this chunk meets the objective proposed by the algorithm.	0.86	-	-
6. The conduct highlighted in this chunk is appropriate.	0.71	0.86	-
Chunk 5 – Assessment of what is contained in the general care framework			
1. The language used in this chunk is appropriate.	0.64	0.93	-
2. The visual presentation is attractive and organized.	0.5	0.86	-
3. The selected colors are attractive.	0.86	-	-
4. The information and conduct guided in this chunk are clear and do not generate ambiguity.	0.57	0.71	0.85
5. The content has a logical organization.	0.79	1.0	-
6. The content is scientifically adequate and up to date.	0.86	-	-
7. The procedures contained in this chunk cover important points that must be considered during IVT.	0.79	0.93	-
8. The conduct contained in this chunk is appropriate.	0.86	-	-
9. If you have identified a reference that could be added to this algorithm, please cite it here:	-	-	-

*CVI: Content Validity Index



General care during administration of intravenous medications

Confirm the 9 rights of medication: patient, medication, dose, pharmaceutical form, route, time, action, record, monitoring.17

Catheter-related care

- Clean the hands before and after handling devices, **use gloves** and **disinfect** the connections before handling by rubbing them with a swab or sterile gauze containing 70% isopropyl alcohol or alcoholic chlorhexidine for 15-20 seconds.1,7-8
- The caps must be changed after each use, with the exception of needle-free connectors, which must be changed together with the infusion system or if they become dirty.1,7-8
- **Consider the internal volumes** of infusion devices to plan infusion to avoid residual volume of medication inside the devices.1,7

Infusion-related care

- **Fill in the identification label** of the current medication and date the respective connections.1,7,18-19 Equipment, extension cords, and three-way taps must be changed every 96 hours in the case of continuous infusions and every 24 hours for parenteral nutrition and intermittent medications.1,7,18-19
- If intravenous access is changed, complete equipment and devices must be changed.1,7,18-19
- Double-check the programming of infusion pumps and potentially dangerous medications, such as opioids, vasoactive agents and concentrated electrolyte solutions.1,7,20-21

In case of multiple infusions through the same route, **keep medication with the highest flow rate** in the connection closest to the catheter.1

- In case of urgency to start a medication for continuous use, **fill the internal volume** of the infusion devices as recommended by the manufacturer of the infusion pump used.1,7
- **To interrupe** infusion medications/solutions and intervene according to the cause, such as infiltration or extravasation of medication, presence of air in infusion devices, signs of allergic reaction and other complications.1
- In case of infiltration or extravasation, **consult** the institutional protocol or algorithm developed by Santos *et al.*, 2021.22

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Figure 2 - Validated algorithm.

DISCUSSION

This study met the objective of developing and obtaining content validity evidence of an algorithm for planning IVT administration in infants. Content validity is an essential stage in its development, verifying how much the included items correspond to the theoretical construction that underpins the instrument, which can contribute to promoting patient safety during healthcare[15].

During validity, experts suggested visual modifications, reallocation of information, adoption of eye-catching colors to associate information with recommended behaviors, and adjustment of language used to the proposed objective. Adapting the content produced to health communication strategies favors the visualization and reading logic of the algorithm, facilitating conveying the message and generating greater understanding by those involved[16].

Regarding the algorithm content, adjustments were made according to experts' suggestions. Care during intravenous medication administration in parallel was covered in less detail in the studies that included the scoping review due to their high level of detail. Hence, information was included also considering experts' expertise level.

Regarding recommendations for intravenous access and recommendations regarding the criteria for choosing the type of intravenous access according to IVT, it is understood that they are well established in the literature. Therefore, the changes made to this topic concern the reorganization of information with a view to simplifying understanding and providing objectivity to the instrument. It should also be noted that the recommendation for using venous network visualization technologies to assist in venous catheter insertion was included, as this contributes to increasing the overall success rate during device insertion when compared to just vessel visualization and palpation[17-19]. It is also worth noting that the number of attempts should not exceed two per professional and four in total, and reassessment of the type of access is recommended if necessary[18-21].

Furthermore, it was specified in the algorithm that, in urgent situations, such as in cases where immediate infusion of vasoactive drugs is essential to maintain infants' lives, intravenous access other than the central one can be used for administering these medications[21-22]. In this context, the umbilical route is preferred when clinical instability is identified in the delivery room or in the first hours after birth. After this period, peripheral intravenous access or intraosseous access is prioritized until a safe central access is established[22].

Regarding drug therapy for NBs, it is known that those admitted to the NICU can receive up to 20 intravenous medications per day of hospitalization[23] and that at least 2.6 (± 0.8) medications are prescribed for each hospitalized NB[24]. It is also noteworthy that many of these medications are off-label[25]. These factors increase the chance of errors and unwanted drug reactions and interactions[23-24], which demands prevention actions.

With respect to drug incompatibility, when it involves continuous or intermittent infusion medications that prevent subsequent administration, an additional peripheral or central double-lumen intravenous catheter must be inserted[18-19,21,26]; this choice must consider medication characteristics, information that was emphasized after experts' recommendation. Furthermore, another suggestion included were the definitions of compatibility, stability and half-life, considering that they should integrate the scope of nurses' knowledge and are factors to be considered during IVT[27].

In relation to infection prevention-related care, it is reinforced that asepsis when preparing medications is linked to lower rates of catheter-associated infections[18]. In this regard, to control infections, it must be ensured that catheter handling is preceded by venous line device disinfection, a detailed factor in the algorithm. Active disinfection of connections must occur by rubbing with a swab or sterile gauze containing 70% isopropyl alcohol or alcoholic chlorhexidine for 15 to 20 seconds[18-19,26].

Concerning the frequency of changing venous line devices, it was indicated that equipment, extenders and three-way taps, such as needleless connectors that were not disconnected from the circuit, are changed every 96 hours, in the case of continuous infusions, and every 24 hours, in the case of parenteral nutrition of intermittent medications and vasoactive drugs (the aim of which is to be uninterrupted)[18-19]. Evidence indicates that exchanges lasting less than this period are related to higher rates of bloodstream infections; the same phenomenon occurs when this period exceeds seven days[18-19]. It should be noted that the extender and all three-way stopcocks that are connected to the intravascular access must be replaced following the deivce validity with a shorter replacement period[18-19].

As for the infusion of medications itself, it is noteworthy that it is the topic with the largest number of references found during the scoping review, covering information that was also highlighted by experts. Among the recommendations, there is the need to consider the internal volume of infusion devices when planning IVT, since the volume of medication prescribed may not consider the volume that will be retained within the infusion devices (called dead volume)[18-19].

Furthermore, it is recommended that, before and after intermittent medication administration and during continuous IVT, intravenous catheter patency be checked by means of pulsatile flushing at regular intervals[18-19]. However, there is evidence of low adherence among professionals to this procedure, especially before and after intermittent medication administration [27]. For this reason, the details of this technique were included as suggested.

With regard to devices that assist in intravenous medication administration, the algorithm followed literature recommendations, indicating the use of an infusion pump to administer medications with rapid, slow or continuous infusion[18-19]. In the algorithm, it was also highlighted that, if any complication is identified during IVT, such as medication infiltration or extravasation, presence of air in infusion devices, signs of allergic reaction and other complications, the solution must be stopped immediately and the intervention carried out according to the cause[20]. In cases of infiltration and extravasation, it was recommended to adopt an algorithm developed with the aim of treating such problems[5].

After validity, the algorithm presented evidence that guides nurses' decision-making when planning IVT administration in NBs. However, during its construction process, gaps were found regarding the topic of parallel drug infusion and polypharmacy in infants, which points to the need to produce robust scientific evidence on this subject. Another limitation of this study is the adoption of an intentional sample and a snowball strategy for sample selection, in addition to the loss of a judge between the second and third rounds of validity, but it is worth noting that the number of participants final still respected what was proposed by the methodological framework used.

Finally, it is reinforced that this algorithm is aimed at nurses who, in turn, plan nursing care. However, the entire team must be included in the decision-making process, in addition to guiding and directing them regarding the conduct for each NB.

CONCLUSION

"Algorithm for planning medication administration in infants", developed based on a previous scope review, obtained validity of its content and appearance, promoting the reliability and adequacy of constructed contents as well as their harmonization.

In this regard, it was possible to create a tool that can contribute to the nursing work process in assisting hospitalized infants who require IVT, promoting safety and quality in its implementation and maintenance.

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NOTES

ORIGIN OF THE ARTICLE

Article extracted from the dissertation - "*Elaboração e validação do conteúdo de um Algorithm for planning medication administration in infants*", presented to the Graduate Program in Nursing, *Universidade Federal de Minas Gerais*, in 2022.

CONTRIBUTION OF AUTHORITY

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ACKNOWLEDGMENT

To the experts who contributed to the algorithm validity process.

APPROVAL OF ETHICS COMMITTEE IN RESEARCH

Approved by the Ethics Committee in Research of the *Universidade Federal de Minas Gerais* Research Ethics Committee, under Opinion 4.839.074/2021 and Certificate of Presentation for Ethical Consideration 47140921.3.0000.5149.

CONFLICT OF INTEREST

There is no conflict of interest.

EDITORS

Associated Editors: Melissa Orlandi Honório Locks, Maria Lígia dos Reis Bellaguarda.
Editor-in-chief: Elisiane Lorenzini.

TRANSLATED BY

Letícia Belasco.

HISTORICAL

Received: September 20, 2023.
Approved: March 05, 2024.

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