ORIGINAL ARTIGO

REVISTA ENFERMAGEM ATUAL IN DERME

VALIDATION OF GRAPHIC PROTOCOL AS A TECHNOLOGICAL PRODUCT IN NURSING FOR SAFETY IN CHILD VACCINATION

VALIDACIÓN DEL PROTOCOLO GRÁFICO COMO PRODUCTO TECNOLÓGICO EN ENFERMERÍA PARA LA SEGURIDAD EN LA VACUNACIÓN INFANTIL

VALIDAÇÃO DE PROTOCOLO GRÁFICO COMO PRODUTO TECNOLÓGICO EM ENFERMAGEM PARA SEGURANÇA EM VACINAÇÃO INFANTIL

[1]Erica Rayane Galvão de Farias
[2]Cleonice Andrea Alves Cavalcante
[3]Elisângela Franco De Oliveira Cavalcante
[4]Leiliane Teixeira Bento Fernandes
[5]Antônia Danielly Moura de Souza
[6]Rosiane Davina da Silva
[7]Gabriela Assunção da Costa Mafra Souza

[1]Universidade Federal do Rio Grande do Norte, Escola de Saúde, Programa de Pós-graduação em Enfermagem. Natal, Rio Grande do Norte, Brazil. Orcid: https://orcid.org/0000-0002-0192-7700.
[2]Universidade Federal do Rio Grande do Norte, Escola de Saúde, Programa de Pós-graduação em Saúde e Sociedade. Natal, Rio Grande do Norte, Brazil. Orcid: https://orcid.org/0000-0003-1237-7393.
[3]Universidade Federal do Rio Grande do Norte, Escola de Saúde, Programa de Pós-graduação em Saúde e Sociedade. Natal, Rio Grande do Norte, Brazil. Orcid: https://orcid.org/0000-0002-3578-0153.
[4]Universidade Federal do Rio Grande do Norte, Escola de Saúde. Natal, Rio Grande do Norte, Brazil. Orcid: https://orcid.org/0000-0003-2643-5638.
5Universidade Federal do Rio Grande do Norte, Escola de Saúde. Natal, Rio Grande do Norte, Brasil. Orcid; https://orcid.org/0000-0001-7454-5511.
[6]Universidade Federal do Rio Grande do Norte, Doutorado em Saúde Coletiva, Programa de Pós-graduação em Saúde Coletiva. Natal, Rio Grande do Norte, Brazil. Orcid: https://orcid.org/0000-0002-2478-8969.
[7]Universidade Federal do Rio Grande do Norte, Escola de Saúde. Natal, Rio Grande do Norte, Brazil. Orcid; https://orcid.org/0009-0006-0023-7878.

Autor correspondente
Erica Rayane Galvão de Farias
Campus Universitário - Lagoa Nova, Natal - RN, Brazil. 59078-970, contato: +55(84) 996047248, e-mail: erikaraiannes@gmail.com.

Submission: 19-06-2024
Approval: 31-03-2025

ABSTRACT
Aim: To validate the content and appearance of a graphic protocol for organizing the work process of the nursing team aimed at safe care in the vaccination of children under 1 year of age. **Method:** Cross-sectional, descriptive, methodological study with a quantitative approach, conducted in a capital of northeastern Brazil. Data collection took place between July and October 2021, through a virtual form sent to the participants' email addresses. The sample included 14 judges in the first round and 10 judges in the second round of the Delphi method. The data were manually tabulated and analyzed using simple descriptive statistics with the support of Excel, and the scores given by the judges allowed for the calculation of the Content Validation Coefficient. **Results:** The results were considered valid with at least 80% agreement among the evaluators. After creating and formatting the graphic protocol, we proceeded to the Delphi stage with contributions from the experts, aiming to validate both the content and appearance based on criteria of behavior, objectivity, simplicity, clarity, relevance, accuracy, variety, modality, typicality, credibility, breadth, and balance. The degree of agreement reached among the experts and the validation of the content and presentation resulted in a final score of 0.97. **Conclusion:** Based on the analysis of the experts, it can be concluded that the developed graphic protocol proved to be an important technology in health and nursing, supporting and strengthening the safety of vaccine administration in children under 1 year of age.
Keywords: Biomedical Technology; Nursing; Vaccination; Patient Safety; Child.

RESUMEN
Objetivo: Validar el contenido y la apariencia de un protocolo gráfico para organizar el proceso de trabajo del equipo de enfermería con el objetivo de brindar un cuidado seguro en la vacunación de niños menores de 1 año. **Método:** Estudio transversal, descriptivo, de tipo metodológico, con enfoque cuantitativo, realizado en una capital del noreste brasileño. La recolección de datos se llevó a cabo entre julio y octubre de 2021, mediante un formulario virtual enviado a las direcciones electrónicas de los participantes. La muestra incluyó a 14 jueces en la primera ronda y a 10 jueces en la segunda ronda del método Delphi. Los datos fueron tabulados manualmente y analizados mediante estadísticas descriptivas simples con el apoyo de Excel, y las puntuaciones otorgadas por los jueces permitieron el cálculo del Coeficiente de Validación de Contenido. **Resultados:** Los resultados fueron considerados válidos con al menos un 80% de acuerdo entre los evaluadores. Después de la creación y formateo del protocolo gráfico, procedimos a la etapa Delphi con las contribuciones de los expertos, con el objetivo de validar tanto el contenido como la apariencia, basándonos en criterios de comportamiento, objetividad, simplicidad, claridad, relevancia, precisión, variedad, modalidad, tipicidad, credibilidad, amplitud y equilibrio. El grado de acuerdo alcanzado entre los expertos y la validación del contenido y la presentación resultaron en una puntuación final de 0,97. **Conclusión:** Basado en el análisis de los expertos, se puede concluir que el protocolo gráfico desarrollado se reveló como una importante tecnología en salud y enfermería, apoyando y fortaleciendo la seguridad en la administración de vacunas en niños menores de 1 año.
Palabras clave: Tecnología Biomédica; Enfermería; Vacunación; Seguridad del Paciente.

RESUMO
Objetivo: Validar o conteúdo e a aparência de protocolo gráfico para organização do processo de trabalho da equipe de enfermagem com vistas ao cuidado seguro na vacinação de crianças menores de 1 ano. **Método:** Estudo transversal, descritivo, do tipo metodológico, com abordagem quantitativa, realizado em uma capital do nordeste brasileiro. A coleta ocorreu entre julho e outubro de 2021, por meio de formulário virtual enviado para o endereço eletrônico dos participantes. A amostra incluiu 14 juízes na primeira rodada e 10 juízes na segunda rodada Delphi. Os dados foram tabulados manualmente e analisados por estatística descritiva simples com apoio do *Excel*, bem como as pontuações atribuídas pelos juízes possibilitaram o cálculo do Coeficiente de Validação de Conteúdo. **Resultados:** Os resultados foram considerados válidos mediante a concordância de no mínimo 80% entre os avaliadores. Após a criação e formatação do protocolo gráfico, procedemos à etapa Delphi com as contribuições dos especialistas, visando validar tanto o conteúdo quanto a aparência, com base nos critérios de comportamento, objetividade, simplicidade, clareza, relevância, precisão, variedade, modalidade, tipicidade, credibilidade, amplitude e equilíbrio. O grau de concordância atingido entre os especialistas e a validação do conteúdo e apresentação resultaram em uma pontuação final de 0,97. **Conclusão:** Com base na análise dos especialistas, pode-se concluir que o protocolo gráfico desenvolvido se revelou como uma importante tecnologia em saúde e enfermagem de apoio e fortalecimento para segurança na administração de vacinas em crianças menores de 1 ano.
Palavras-chave: Tecnologia Biomédica; Enfermagem; Vacinação; Segurança do Paciente; Criança.

REVISTA ENFERMAGEM ATUAL IN DERME

INTRODUCTION

Patient Safety has been widely debated in recent decades, becoming a crucial component for improving the quality of health services. The starting point for this discussion dates back to the publication of the report entitled "To Err is Human: Building a Safer Health System", which highlighted the problems related to harm caused by medical care to patients in the United States. Therefore, it is essential to establish concepts related to patient safety and propose measures to mitigate the risks and adverse events associated with this issue[1].

In the Brazilian context, the approach to Patient Safety gained prominence after the publication of Ordinance No. 529/2013, which established the National Patient Safety Program. The general objective of this program is to improve health care in all health facilities in the country. The ordinance defines patient safety as the reduction, to an acceptable level, of the risk of unnecessary harm resulting from medical care[2].

An intervention study carried out in a Basic Health Unit in the interior of the state of São Paulo, Brazil, deserves to be highlighted in this scenario. The study observed 164 doses of vaccines prepared and administered to 51 users, and thus it was possible to identify the most frequent errors, which were related to the techniques: Failure to prepare the immunobiological in a clean and dry place (57%), Failure to perform the pain reduction technique (91%), Failure to observe the occurrence of adverse events (91%), Failure to use the Z technique for intramuscular administration (48%) [3].

In addition, another national study, when evaluating the incidence of immunization errors in the public health service in the state of Minas Gerais, observed that children under 4 years of age, with a higher proportion for those under 1 year of age, were the most affected[4]. Furthermore, international studies developed in Europe and the United States, between 2018 and 2019, with the proposal to describe the characteristics of immunization errors, also found a higher incidence of errors in children under 1 year of age[5-6].

There is also a concern regarding the knowledge of professionals working in vaccination rooms. The level of knowledge is often lower than expected and, when they do have knowledge, they often do not apply it in practice, indicating poor adherence. In addition, several inadequacies were identified in these rooms, such as lack of hand hygiene, errors in the preparation and administration of vaccines, unsatisfactory reception and other problems that can compromise patient safety[5].

Surveillance of adverse events is also a relevant aspect in this context, given the low underreporting, which has been mandatory since 2014. This type of surveillance is vital, since many adverse events are preventable and their occurrence can harm the expected result of immunization, in addition to negatively influencing the population's confidence in vaccines. Therefore, the adoption of protocols

REVISTA ENFERMAGEM ATUAL IN DERME

based on scientific evidence is essential to ensure the quality of care and minimize errors[6-7].

It is worth noting that this type of tool must have good formal quality, be easy to read, valid, reliable, its content must be based on levels of scientific evidence and must be correctly used and with effective proof. Therefore, a rigorous process of construction, adaptation to the local reality and implementation is necessary[8].

Recent studies have shown that the structuring of protocols in graphic format has become something of great representativeness in health care, in the computerized times that we live in, as they represent a health management technology that provides systematic guidelines that direct workers. Without disregarding that the graphic presentation facilitates rapid understanding through the global vision of the process, since it uses standardized symbology for its elaboration[6-9].

Thus, considering that the product resulting from this research is classified as a Health Management Technology. Therefore, Health Management Technology is defined as a systematic set of theoretical and applied practices, validated and used in the management of health care and services[10].

Therefore, the research problem is: what are the necessary elements for validating a graphic protocol for organizing the nursing team's work process with a view to providing safe care for vaccinating children under 1 year of age?

To this end, the objective of the study was to validate the content and appearance of a graphic protocol for organizing the nursing team's work process with a view to providing safe care for vaccinating children under 1 year of age.

METHODS

This is an applied research with a quantitative approach, aimed at validating the content and appearance of a graphic protocol, carried out between July and October 2021.

Validation by the judges occurred through the evaluation of the appearance and content of the graphic protocol for organizing the work process of the nursing team with a view to safe care in the vaccination of children under 1 year of age, based on the findings mapped in a Scoping Review, which has been published and will be included in the list of references of this work after it is accepted for publication, in view of the confidentiality required at this submission stage.

The graphic protocol was created through an online graphic editing platform called Canva. This platform, available by subscription, allows the creation of visual elements using ready-made templates or customized layouts. With the help of Canva, it was possible to structure both the content and the design of the protocol. Initially, a pre-designed educational infographic template was chosen, which had a light background and black letters. The relevant items were arranged horizontally and highlighted in blue and red, aiming to improve the reader's understanding.

REVISTA ENFERMAGEM ATUAL IN DERME

The protocol was structured in the sequence defined by these authors, so the findings were arranged in three distinct sections: before, during and after the administration of the vaccine. Each stage of the good practices described in the protocol was enriched with a corresponding image, providing a visual approach that facilitated the assimilation of the information and the understanding of the message conveyed.

In addition, in each topic, the level of evidence associated with the findings was detailed, highlighting the relevance of the information in the context of the study and in the formulation of the product. The inclusion of this level of evidence underscores the importance of basing the protocol on solid scientific data, ensuring the reliability and effectiveness of the recommended practices.

For the first stage of validation, the selection of judges was carried out. Following the model proposed in other studies[11-13], it was decided to use the Delphi technique to enable the validation process and subsequent refinement. This stage aimed to obtain consensus among experts in a given area, who, geographically separated and anonymous, are able to contribute individually to the problem proposed by the researcher. It is important to note that the judges would primarily be selected based on their Lattes CV. However, during the selection period, the website experienced instabilities that prevented full access to the information. Therefore, a criterion of intentionality of the searches was established, and tutors from the ImunizaSUS project were invited. The ImunizaSUS program is the result of a partnership established between the National Council of Municipal Health Departments (CONASEMS) and the Ministry of Health, and is administered by the São Leopoldo Mandic College (SLMANDIC). Its main objective is to promote continuing education over a period of 10 months, aiming at the improvement of more than 94 thousand professionals who work in the health area. Seventy-four potential judges were invited by email, containing the purpose of the research, the justification for their election, and instructions for completing and returning the responses to the data collection instrument. The list of tutors' emails was requested from the ImunizaSUS project management via email, which promptly responded positively to our request.

After 14 of them responded positively, the Informed Consent Form (ICF) and the link to the Google Forms were sent, with a response deadline of 15 calendar days. The sample included 14 judges with a single Delphi. Higher education professors from public and private institutions and nursing assistants working in the field of immunization with at least one year of experience were included. The exclusion criteria were as follows: failure to submit the questionnaires within the pre-established deadline or inadequate completion of the questionnaires.

The validation of the content and appearance of the graphic protocol by the judges was based on 12 psychometric evaluation criteria[13], which were presented in a Google

REVISTA ENFERMAGEM ATUAL IN DERME

form. The answers to the questions were distributed on a three-point Likert scale, ranging from “adequate”, “partially adequate” and “inadequate”. A value of one to three was established for each of the items, with one being inadequate, two being partially adequate and three being adequate. For each question, there was also a space for suggestions through an open question.

Based on the answers, the second Delphi round was held, in which the judges explained the reasons for the cases considered inadequate, and based on the suggestions described, the content and appearance were adjusted, eliminating the need for another round. The judges were also given explanations, when requested, regarding the conduct established in the protocol.

The experts' answers were manually tabulated and statistically analyzed in Microsoft Excel 2010, through which the scores attributed to each item analyzed were checked. Based on the judges' evaluation, the Content Validation Coefficient (CVC) was verified.

The variables analyzed were: behavior, objectivity, simplicity, clarity, relevance, precision, variety, modality, typicality, credibility, breadth and balance. To validate the content and appearance of the protocol, the CVC was applied, which measures the proportion of understanding of certain aspects, based on the sum of the scores given by the judges for each item, divided by the total number of participating judges[14].

The literature presents different possibilities for calculating the CVC, as well as for establishing its minimum level of agreement. The index score can be calculated by adding the items judged as relevant. In the case of this study, the judgment was considered adequate by the total number of judges. The calculation of the CVC for the instrument, as a whole, was performed based on the sum of all CVC, calculated separately, for both the appearance and content criteria, divided by the number of items in the instruments. By consensus, a minimum CVC agreement index of 0.80 was considered, both for the evaluation of each item and for the overall evaluation of the instrument[14].

The research contemplated the ethical precepts in investigations with human beings and complies with the guidelines for procedures in research with any stage in a virtual environment, aiming to preserve the protection, security and rights of research participants[15].

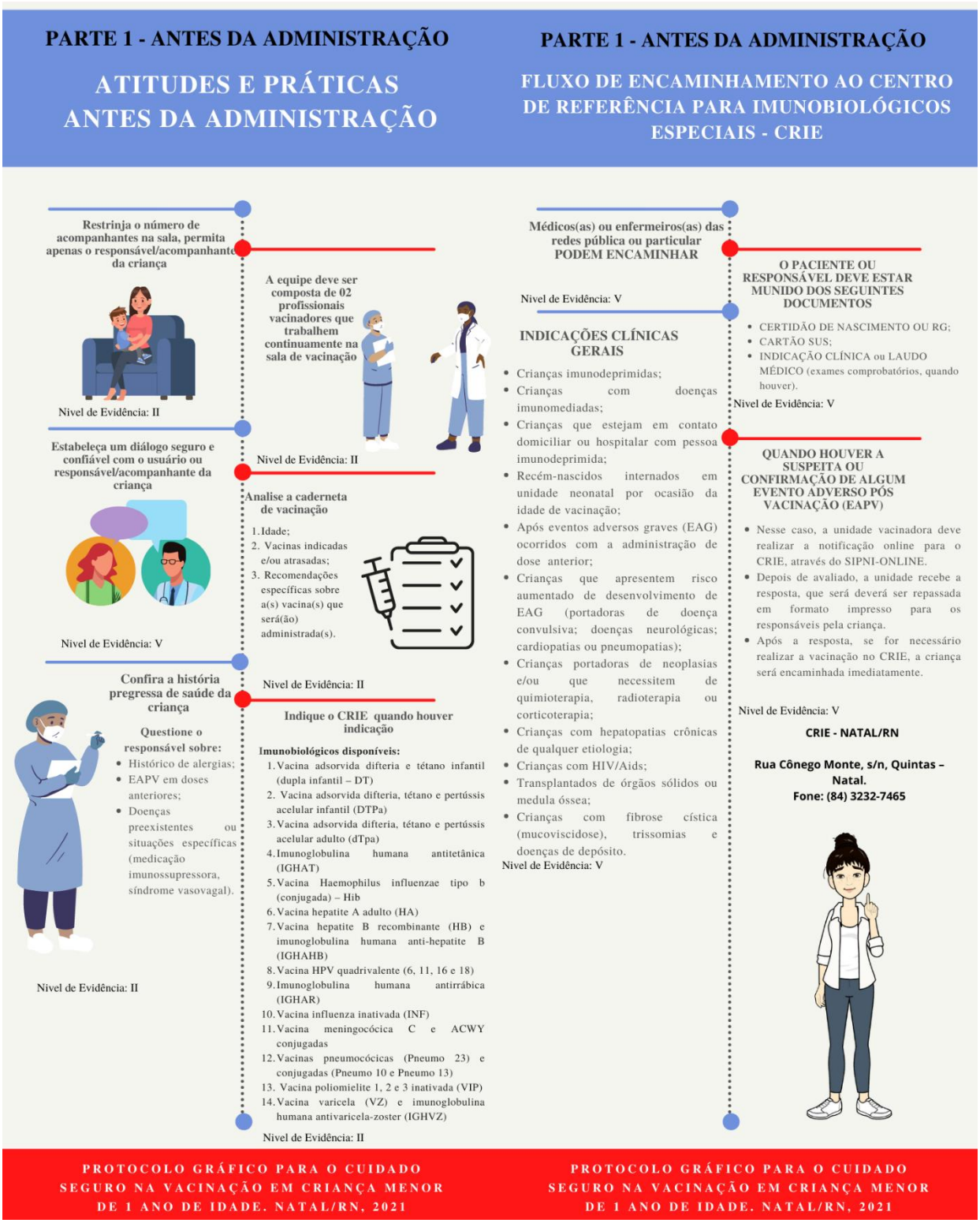
RESULTS

The only Delphi round had the participation of 14 judges, of which 13 (92.86%) were female, and one (7.14%) was between 28 and 60 years old (mean = 41.92 and median = 40). Within the scope of the judges' field of activity, there was a predominance of those who combine teaching and care, represented by six (43%) subjects, followed by five (36%) with only care work and three (21%) only in teaching [12-14].

REVISTA ENFERMAGEM ATUAL IN DERME

The protocol was constructed with seven pages, and at the end of the validation it was maintained. Its final version can be seen in Figure 1.

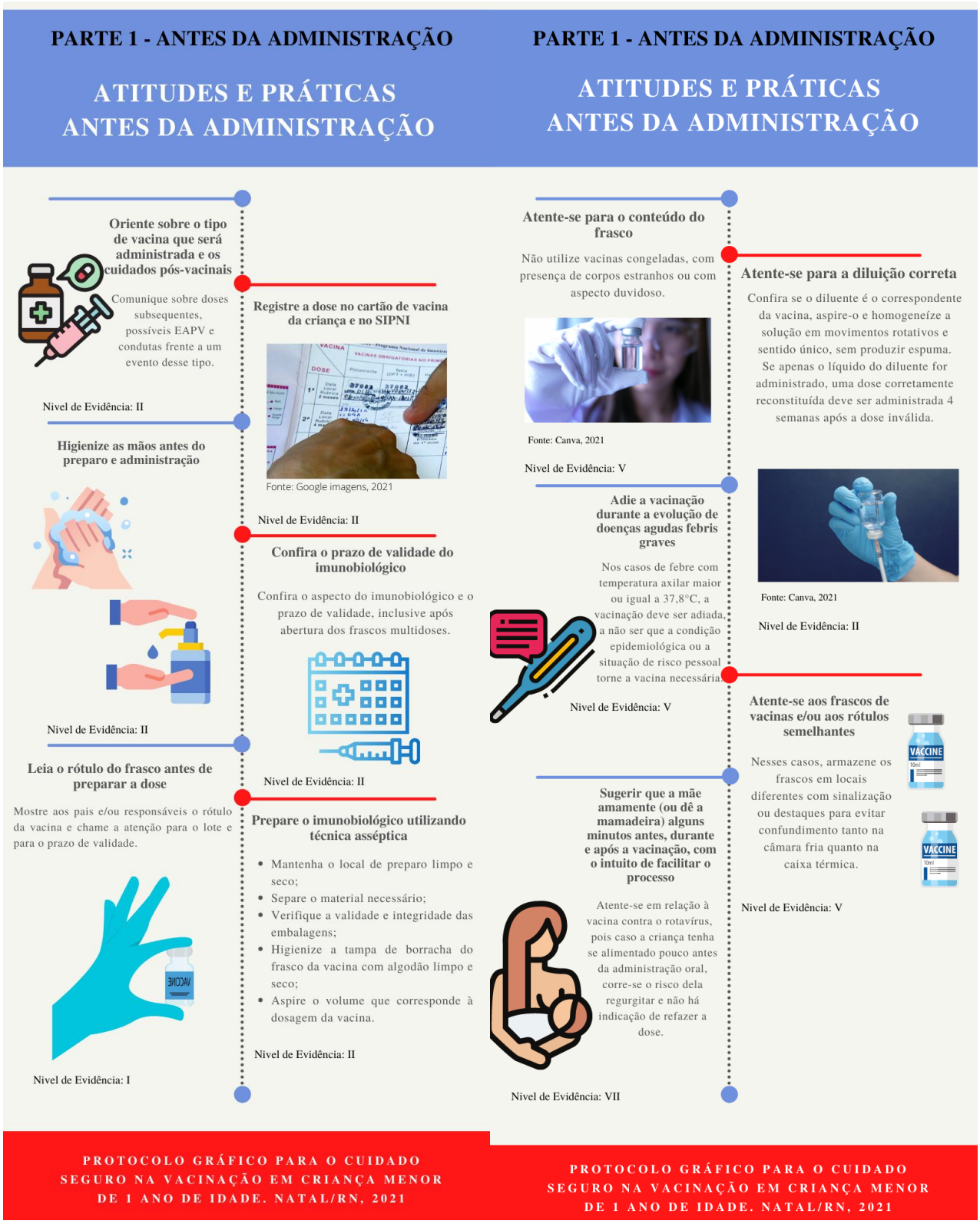
Figure 1 – Graphic protocol for organizing the work process of the nursing team with a view to safe care in the vaccination of children under 1 year of age, Natal, RN, 2024



Source: The authors (2024).

REVISTA ENFERMAGEM ATUAL IN DERME

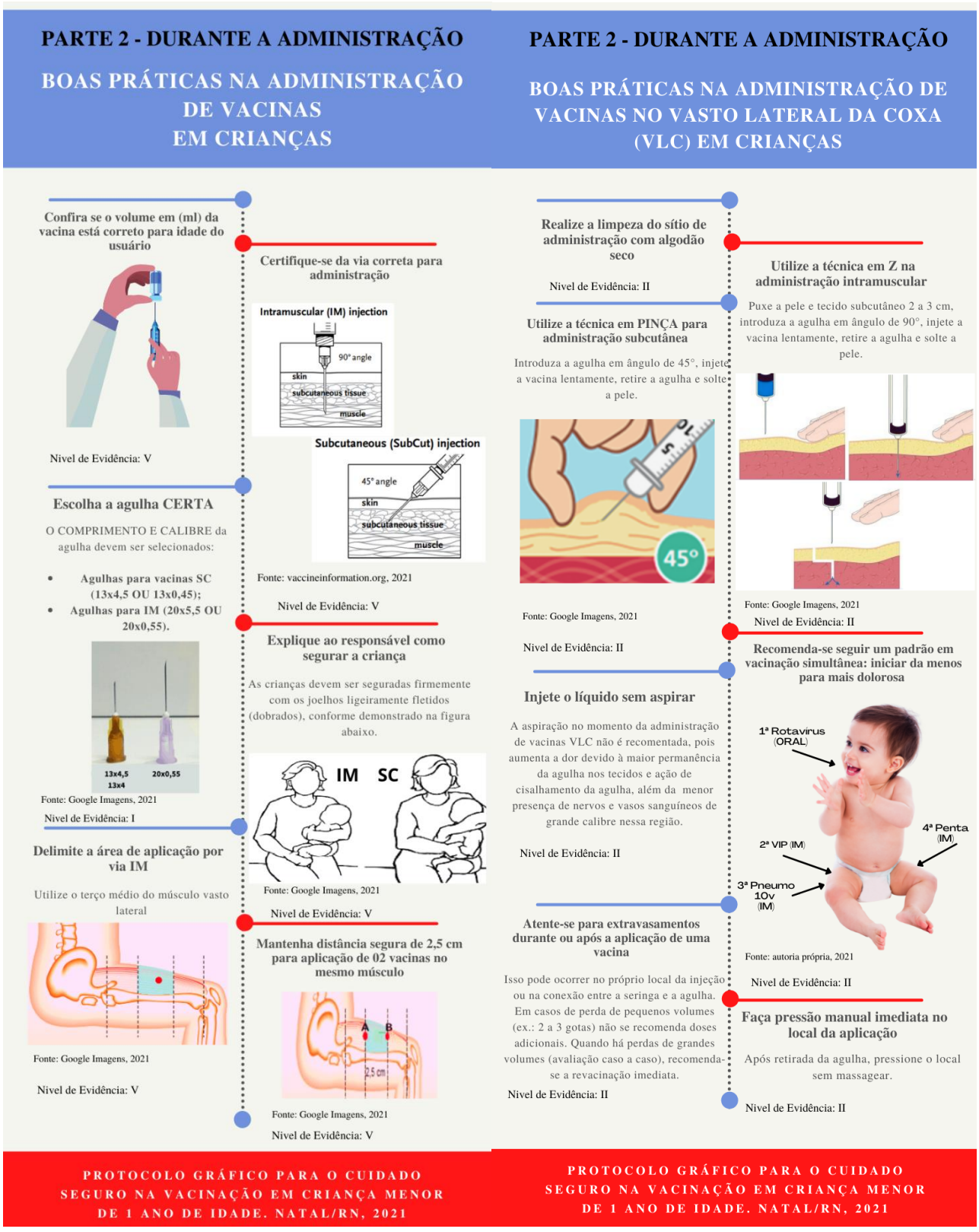
Figure 2 – Graphic protocol, part 1 – before administration



Source: The authors (2024).

REVISTA ENFERMAGEM ATUAL IN DERME

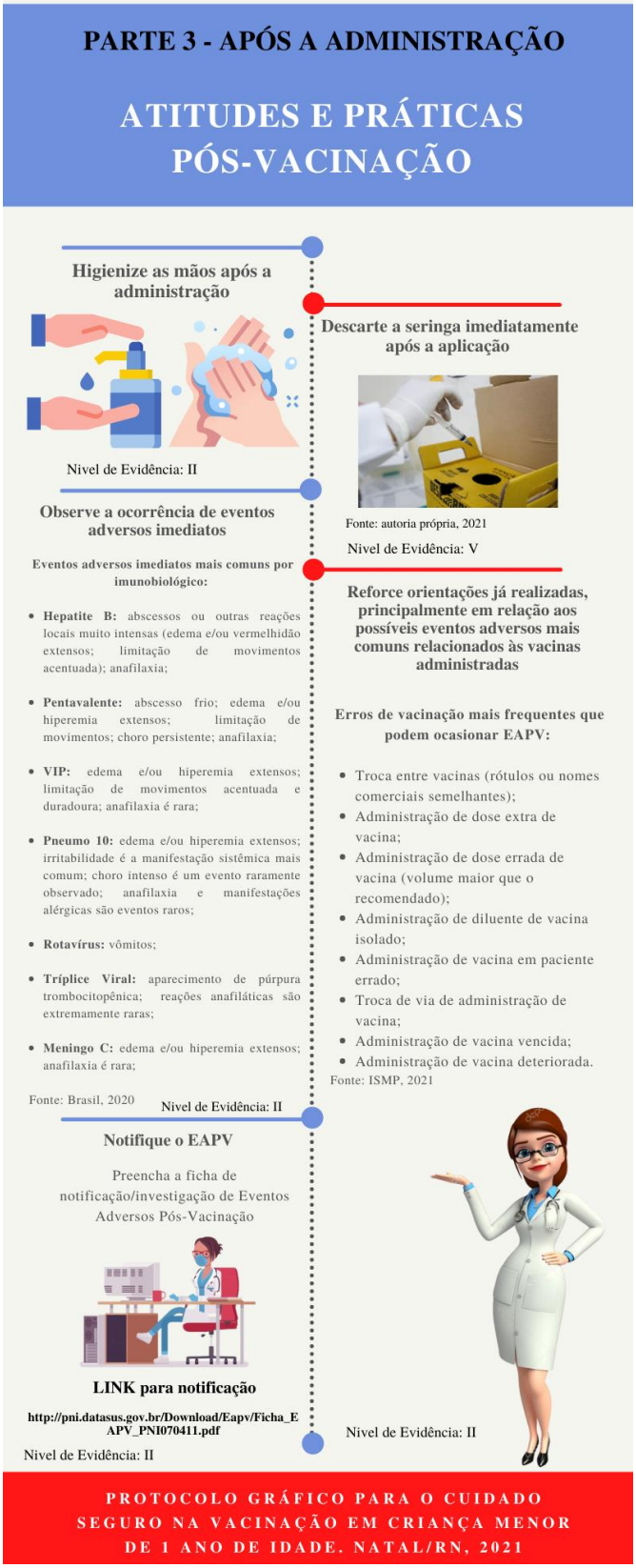
Figure 3 – Graphic protocol, part 2 – during administration



Source: The authors (2024).

REVISTA ENFERMAGEM ATUAL IN DERME

Figure 4 – Graphic protocol, part 3 – after administration



Source: The authors (2024).

REVISTA ENFERMAGEM ATUAL IN DERME

Regarding the approach to the topic, the average time that participants had experience in the subject ranged from 1 to 38 years, however, the average was 14.21 years. Regarding the values obtained in the protocol validation process by the judges, all criteria indicated levels of agreement of 0.85% in content and 0.85% in appearance, as shown in table 1.

Table 1 – CVC and Agreement Values for Delphi Stage I for Validation of the Content of the Graphic Protocol, Natal, RN, 2024

Adapted Pasquali Criteria	Final Item CVC in Content Validation	Agreement (%)	Final Item CVC in Appearance Validation	Agreement (%)
Behavior	0,92	85,71	0,93	85,71
Objectivity	0,98	85,71	0,98	85,71
Simplicity	0,98	85,71	0,98	85,71
Clarity	0,93	85,71	0,93	85,71
Relevance	1,0	85,71	1	85,71
Precision	0,95	85,71	0,95	85,71
Variety	0,95	85,71	0,95	85,71
Modality	1	85,71	1	85,71
Typicality	0,98	85,71	0,98	85,71
Credibility	0,98	85,71	0,98	85,71
Amplitude	0,93	85,71	0,93	85,71
Balance	0,97	85,71	0,98	85,71
CVC Total	0,97	85,71	0,97	85,71

Source: The authors (2024).

Even though the agreement value (CVC ≥ 0.8) was considered valid in the first round, the judges' suggestions were evaluated for permanence and proposals for improvements through relevance analysis, and the protocol was submitted to a second round. Table 1 presents the recommendations and justifications.

Table 1 – Judges' suggestions regarding the Delphi I round and adopted definitions. Natal/RN, 2024

Judges' Suggestions	Item Status (Accepted/Not Accepted) Responses to Suggestions	Responses to Suggestions
Validação do Conteúdo		
Replace the title of the protocol "Graphic protocol for safe care in childhood vaccination" with "Graphic protocol for safe care in vaccination in children under 1 year of age".	Accepted	In this way, the title was in line with the objective and the research problem.
Add an item regarding expiration dates to be checked before starting the routine in the vaccination room.	Accepted	It was considered relevant, and given that the finding, with level of evidence II, was found in the scoping review, the request was accepted.

REVISTA ENFERMAGEM ATUAL IN DERME

Add an item regarding the recommended technique for inserting the needle bevel into the vial, with the aim of keeping it sharp, without leaving the tip blunt.	Not Accepted	No findings were obtained that corroborated the inclusion of this item, based on the Scoping review.
Add to the “Before vaccination” section the temperature control of the refrigerator(s), the systematic checking of the thermometers +2°C and +8°C (ideal: set point +5°C). And that the temperature is checked at least at the beginning and end of the work day. With each reading, the temperature checked on the thermometer is recorded on the form attached to the refrigerator door.	Not Accepted	It is considered that the item suggestion requires the inclusion of other activities that go beyond the proposed objective.
Include a specific item for Administration of Special Vaccines - CRIE	Not Accepted	It is considered that the item suggestion requires the inclusion of other activities that go beyond the proposed objective.
Replace the description “Do not administer the vaccine to children with fever” with “Postpone vaccination during the course of severe acute febrile illnesses”.	Accepted	It was accepted because the proposed expression, removing the word “no”, softened the passage without losing the meaning of the original information.
Add two graphs to the item "Suggest that the mother breastfeeds the child before, during and after": one before, to reassure the child before the application, and another after the vaccination.	Not Accepted	It is considered that the item suggestion requires the inclusion of other activities that go beyond the proposed objective.
In the “Post-Vaccination Attitudes and Practices” step, separate the Post-Vaccination Adverse Events for a chart with this topic only. The BCG Adverse Event Following Vaccination (AEFI) was missing.	Not Accepted	It is considered that the item suggestion requires the inclusion of other activities that go beyond the proposed objective, since the focus is on minimizing immunization errors and not AEFI. And with regard to the inclusion of the BCG vaccine, it is not part of the reality of the vaccination room for which such protocol was designed.
Add something for when symptomatic medication for fever or pain is necessary, as instructed by your pediatrician.	Not Accepted	No findings were obtained to support the inclusion of this item, based on the Scoping review.
Appearance Validation		

REVISTA ENFERMAGEM ATUAL IN DERME

Change the image of the application of IM and SC techniques to others in Portuguese, considering that many of our professionals do not recognize the English language.	Not Accepted	It was decided to include images that illustrate the need to maintain a 90-degree angle in relation to the skin when applying intramuscular injections, while for the subcutaneous route, the appropriate angle is only 45 degrees. It is worth noting that this information was originally presented in English in the original study and it was not the objective to translate the text contained in the images for validation purposes, therefore, the English version was maintained in these images.
I recommend replacing the image of the person with the "little hat", representing nursing, with another that represents modern nursing.	Accepted	Accepted because technologies and innovations for the advancement of practices and science in health and nursing require images that truly represent them.
In part 3 of the protocol, in the item "Attitudes and practices after vaccination", I suggest inverting images 1 and 2 so that you can better follow the logic of the process.	Accepted	Image 1 refers to hand hygiene. And image 2 refers to the disposal of syringes. This makes the logic of the process clearer.

Source: The authors (2024).

After the adjustments suggested by the judges, the second Delphi stage was carried out and, if CVC ≥ 0.99 was achieved, the graphic protocol was considered valid and, therefore, ready for use for the proposed purpose.

Table 2 – CVC and Agreement values for Delphi Stage II for validation of the Content and appearance of the Graphic Protocol, Natal, RN, 2023.

Adapted Validation Criteria Pasquali et al.	Final Item CVC in Content Validation	Agreement (%)	Final Item CVC in Appearance Validation	Agreement (%)
Behavior	0,99	100	0,99	100
Objectivity	1	100	1	100
Simplicity	1	100	1	100
Clarity	0,99	100	0,99	100
Relevance	0,99	100	0,99	100
Precision	1	100	1	100
Variety	1	100	1	100
Modality	0,99	100	0,99	100
Typicality	1	100	1	100

REVISTA ENFERMAGEM ATUAL IN DERME

Credibility	0,99	100	0,99	100
Amplitude	1	100	1	100
Balance	0,99	100	0,99	100
CVC Total	0,99	100	0,99	100

Source: The authors (2024).

DISCUSSION

The graphic protocol developed was structured based on indicators that cover the phases before, during, and after vaccine administration. These indicators were outlined based on the findings evidenced in the selected literature.

The first part of the protocol, addressing attitudes and practices prior to administration, comprised twenty-one items. The second part, entitled "Good practices in administering vaccines to children", consists of thirteen items, and finally, the third part, called "Attitudes and practices after vaccination", contains five items in its structure. Each of these parts guides health professionals involved in the handling and administration of immunobiologicals, with the purpose of reducing the occurrence of errors throughout this process[16].

In this context, it is important to highlight the influence of work flows and processes in minimizing the occurrence of errors. For this reason, health services need to have an organization with clearly defined work processes to manage incidents and promote a culture of patient safety[17].

For this reason, understanding the diversity of information and sources related to the vaccination process, this protocol aims to summarize the stages of reception, screening, registration, guidance, preparation and administration of immunobiologicals. The reception, screening and guidance stages highlight the active participation of the parent or guardian in the vaccination process, aiming to address vaccine hesitancy, which consists of delaying or refusing recommended vaccines. This hesitancy may occur due to the lack of dialogue that conveys trust in the health professionals involved[17-18].

Studies indicate that health professionals are the main reliable source of information about vaccines. This is because, when there is a firm recommendation, the probability of a patient getting vaccinated increases four to five times. It is important to note that some parents may have doubts or concerns regarding vaccination, hence the importance of professional preparation to answer these questions[19].

The initial stages that make up good vaccination practices encompass the entire process of handling, preparation and administration, aiming to minimize immunization errors. Errors at this stage can have several consequences, such as inadequate immunological protection, potential harm to the patient, costs, inconveniences and a decrease in confidence in the health system. In this sense, it is

REVISTA ENFERMAGEM ATUAL IN DERME

essential to encourage health professionals to report errors, ensuring that the situation and those involved will be treated fairly, without fear of punishment or humiliation[20].

Finally, the final steps focus on attitudes and practices after vaccination, highlighting the identification of potential adverse reactions that may arise immediately after the vaccine is administered, such as severe allergic reactions and syncope. In addition, health professionals must fill out the notification and investigation form for Adverse Events Following Vaccination, sending it to the Immunization Coordination or the reference Surveillance Service in the municipality[21].

In order to validate the content and appearance, it was decided to use the Delphi technique, widely used to obtain the evaluation of experts on a specific topic, without the need for direct communication. It is recognized in this study that the experts contributed to adjusting the content and appearance, providing significant suggestions in the proposed construction, using their expertise and qualifications to carry out a careful analysis of the elements that make up the graphic protocol[22].

Regarding the experts participating in the validation of the content and appearance of the graphic protocol, the average experience in the immunization area was 14 years. The knowledge of the professionals involved in this field is crucial for the effectiveness and viability of this work. In addition, Nursing is enriched as a discipline through the creation of Health Management Technologies developed with rigorous methodology and evaluated by experts in the field[23].

With regard to performance, there was a predominance in the care area, indicating a strong involvement of care nurses with the practices and results of research focused on their area of activity. This can contribute to the development and improvement of the scientific bases that underpin the profession[24].

During the process of validating the content and appearance of the protocol, the expectation was to reach a minimum consensus of 80%. However, the content and appearance validity rates exceeded 92%, and in some criteria, such as relevance, modality, typicality and credibility, they reached 100%. This high level of agreement was the result of a rigorous process of operational definition and protocol construction, supported by scientific evidence compiled in the Scoping Review that supported this study. In the context of health, tools such as this offer a comprehensive view of the care process and assist health professionals in providing quality care and in complex decisions, ensuring patient safety[24-25].

Finally, some suggestions from experts were incorporated to improve the instrument. These include changes to the title, checking the expiration date before starting the routine in the vaccination room, replacing the description "Do not administer the vaccine to children with fever" with "Defer vaccination during the course of severe acute febrile illnesses", and replacing and reorganizing some images to improve understanding of the protocol steps. However, other suggestions were not accepted, since they went beyond the objectives of this study.

REVISTA ENFERMAGEM ATUAL IN DERME

CONCLUSIONS

In short, the relevance of the graphic protocol is highlighted, as it aims to organize the work process of the nursing team with a view to providing safe care in the vaccination of children under 1 year of age.

Technology advances health and nursing practices by offering a validated graphic protocol that improves the work process of the nursing team, especially with regard to the safety of vaccination of children under 1 year of age. This graphic protocol provides clear and objective guidelines, ensuring safe care through criteria such as behavior, objectivity, simplicity, clarity, relevance, precision, variety, modality, typicality, credibility, breadth and balance. The validation of the content and appearance of this protocol by experts resulted in a high score of 0.97, highlighting its importance as an essential technology for nursing practice and for the safety of children during vaccination.

Furthermore, the items that constituted the graphic protocol, supported by the selected studies that supported its creation and structuring, demonstrated a high level of importance and a satisfactory evidence base. Furthermore, the experts' contributions were of paramount importance, as they enabled the construction of an instrument suited to the healthcare reality, using more coherent flows and terminology. Thus, it is believed that this graphic protocol will serve as a valuable support for professional practice, providing a secure basis for activities carried out in vaccination rooms.

Regarding the limitations of the validation process, the initial difficulty in contacting the experts stands out, since the Lattes Platform was unstable, requiring the search for other approaches. The alternative was to invite experts already involved in the ImunizaSUS project. In addition, some experts were lost from the research panel due to the slow or lack of feedback on the materials sent. It is recommended that more research be conducted on this topic, aiming to improve the performance of health professionals involved in childhood vaccination.

REFERENCES

1. Reis AT, Silva CR. Segurança do paciente. Cad Saúde Pública [Internet]. 2016 [cited 2021 Jul 17];32(3):eRE020316. Available from: https://doi.org/10.1590/0102-311XRE020316. Doi: 10.1590/0102-311XRE020316.
2. Brasil. Portaria N°529, de 1 de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP). Diário Oficial da União. 2013 Apr 2; 1(1 seção 1):1-43.
3. Nunes MB, Teixeira TC, Gabriel CS, Gimenes FR. Impact of Plan-Do-Study-Act cycles on the reduction of errors related to vaccine administration. Texto contexto - enferm [Internet]. 2021 [cited 2021 Jul 15];30:e20200225. Available from: https://doi.org/10.1590/1980-265X-TCE-2020-0225. Doi: 10.1590/1980-265X-TCE-2020-0225.
4. Barboza TC, Guimarães RA, Gimenes FR, Silva AE. Retrospective study of immunization errors reported in an online information system. Rev Latino-Am Enfermagem [Internet]. 2020 [cited 2021 Aug 11];28:e3303. Available from: https://doi.org/10.1590/1518-8345.3343.3303. Doi: 10.1590/1518-8345.3343.3303.

5. Corrêa TB. Segurança do paciente na sala de vacinação [dissertation]. Uberaba: Universidade Federal do Triângulo Mineiro; 2018. 108p.

6. Medeiros SG, Lima AV, Saraiva CO, Barbosa ML, Santos VE. Avaliação da segurança no cuidado com vacinas: construção e validação de protocolo. Acta Paul Enferm [Internet]. 2019Jan [cited 2021 Aug 13];32(1):53–64. Available from: https://doi.org/10.1590/1982-0194201900008. Doi: 10.1590/1982-0194201900008.

7. Conselho Regional de Enfermagem de Sergipe. Rotinas para unidades de saúde [internet]. Aracaju: COREN; [2017] [cited 2021 Mar 4]. 3p. Available from: http://se.corens.portalcofen.gov.br/wp-content/uploads/2017/02/MODELO-PROTOCOLOS-ASSISTENCIAIS.pdf.

8. Pimenta CA, Pastana IC, Sichieri K, Solha RK, Souza W. Guia para a construção de protocolos assistenciais de enfermagem [Internet]. São Paulo: Conselho Regional de Enfermagem; 2017 [cited 2021 Sep 10]. 50 p. Available from: https://portal.coren-sp.gov.br/sites/default/files/Protocolo-web.pdf.

9. Saraiva CO. Avaliação da segurança do paciente no cuidado de enfermagem em Unidades de Terapia Intensiva Neonatais: uso de protocolo gráfico e checklist [thesis]. Natal: Centro de Ciências da Saúde, Universidade Federal do Rio Grande do Norte; 2019. 134 p.

10. Nietsche EA, Backes VM, Colomé CL, Ceratti RN, Ferraz F. Tecnologias educacionais, assistenciais e gerenciais: uma reflexão a partir da concepção dos docentes de enfermagem. Rev Latino-Am Enfermagem [Internet]. 2005May-June [cited 2021 Oct 15];13(3):344–53. Available from: https://doi.org/10.1590/S0104-11692005000300009. Doi: 10.1590/S0104-11692005000300009.

11. Gomes AT, Alves KY, Bezerril MS, Rodrigues CC, Ferreira MA Júnior, Santos VE. Validação de protocolos gráficos para avaliação da segurança do paciente politraumatizado. Acta Paul Enferm [Internet]. 2018 [cited 2021 Oct 21];31(5):504–17. Available from:_https://doi.org/10.1590/1982-0194201800071. Doi: 10.1590/1982-0194201800071.

12. Ferreira RC, Montanari FL, Ribeiro E, Correia MD, Manzoli JP, Duran EC. Elaboração e validação de instrumento de assistência de enfermagem para pacientes em unidades de terapia intensiva. Cogitare Enferm. [Internet]. 2018 [cited 2023 Aug 30];23(4): e57539. Available from: http://dx.doi.org/10.5380/ce.v23i4.57539. Doi: 10.5380/ce.v23i4.57539.

13. Pasquali L, organizator. Instrumentação psicológica: fundamentos e práticas. Porto Alegre: Artmed; 2013.

14. Marques JB, Freitas D. Método DELPHI: caracterização e potencialidades na pesquisa em educação. Pro.Posições [Internet]. 2018 May-Aug [cited 2021 Nov 20];29(2):389–415. Available from: https://doi.org/10.1590/1980-6248-2015-0140. Doi: 10.1590/1980-6248-2015-0140.

15. Brasil. Ministério da Saúde. Comissão Nacional de Ética em Pesquisa. Orientações para procedimentos em pesquisas com qualquer etapa em ambiente virtual. Diário Oficial da União [Internet]. 2021 Feb 24 [cited 2022 Oct 10]. Available from: https://arquivos.info.ufrn.br/arquivos/202115500883978698 4705aa6e85f1ba5/Orientacoes_Pesquisas_Virtuais.pdf.

16. Farias ER. Construção e validação de protocolo gráfico para o cuidado seguro na vacinação em criança menor de 1 ano de idade [dissertation]. Natal: Escola de Saúde, Universidade Federal do Rio Grande do Norte; 2021. 90f.

17. Mota RO, Brito EA, Souza TL, Farias LM, Matias EO, Lima FE. Preparo de medicamentos administrados via intramuscular na pediatria: atuação da equipe de enfermagem. Cogitare Enferm [Internet] 2016 Aug [cited 2021 Oct 15];21(5): 1-9. Available from: https://doi.org/10.5380/ce.v21i5.45619. Doi: 10.5380/ce.v21i5.45619.

18. Silva LL, Dias FC, Maforte NT, Menezes AC. Segurança do paciente na atenção primária à saúde: percepção da equipe de enfermagem. Esc Anna Nery [Internet]. 2022 [cited 2021 Oct 15];26:e20210130. Available from: https://doi.org/10.1590/2177-9465-EAN-2021-0130. Doi: 10.1590/2177-9465-EAN-2021-0130.

19. Souto EP, Kabad J. Hesitação vacinal e os desafios para enfrentamento da pandemia de COVID-19 em idosos no Brasil. Rev Bras Geriatr Gerontol [Internet]. 2020 [cited 2021 Oct 17];23(5):e210032. Available from: https://doi.org/10.1590/1981-22562020023.210032. Doi: 10.1590/1981-22562020023.210032.

20. Oku A, Oyo-Ita A, Glenton C, Fretheim A, Ames H, Muloliwa A et al. Communication strategies to promote the uptake of childhood vaccination in Nigeria: a systematic map. Global Health Action [Internet]. 2016 [cited 2021 Sep 15]; 9(1):30337. Available from: https://doi.org/10.3402/gha.v9.30337. Doi: 10.3402/gha.v9.30337.

21. Wolicki J, Miller E. Vaccine administration. In: Hall E, Wodi AP, Hamborsky J, Morelli V, Schillie S, editors. Centers for disease control and prevention: epidemology and prevention of vaccine-preventable diseases [Internet]. 14th ed. Washington, DC: Public Health Foundation; 2021 [cited 2023 Aug 31]. Available from: https://www.cdc.gov/vaccines/pubs/pinkbook/vac-admin.html.

22. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Boletim Epidemiológico [Internet]. 2020 Oct [cited 2023 Aug 31]; 51(34): 46 p. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/epidemiologicos/edicoes/2020/boletim-epidemiologico-vol-51-no34/view.

23. Silvino RC, Trida VC, Castro ADR, Neri LC. Construction and validation of the neonatal nutritional risk screening tool. Rev Paul Pediatr [Internet]. 2021[cited 2021 Sep 15];39:e2020026. Available from: https://doi.org/10.1590/1984-0462/2021/39/2020026. Doi: 10.1590/1984-0462/2021/39/2020026.

24. Silva ÍR, Leite JL, Trevizan MA, Silva TP, José SA. Conexões entre pesquisa e assistência: desafios emergentes para a ciência, a inovação e a tecnologia na enfermagem. Texto contexto - Enferm [Internet]. 2017 [cited 2021 Jul 8];26(4):e2470016. Available from:_https://doi.org/10.1590/0104-07072017002470016. Doi: 10.1590/0104-07072017002470016.

25. Pinheiro RV, Salomé GM, Miranda FD, Alves JR, Reis FA, Mendonça ARA. Algoritmos para prevenção e tratamento de lesão por fricção. Acta Paul Enferm. [Internet]. 2021 [cited 2021 Oct 15];34:eAPE03012. Available from: https://doi.org/10.37689/acta-ape/2021AO03012. Doi: 10.37689/acta-ape/2021AO03012.

Funding and Acknowledgements:

Universidade Federal do Rio Grande do Norte.

Own funding.

Authorship criteria (author contributions)

Erica Rayane Galvão de Farias1,2,3

Cleonice Andrea Alves Cavalcante1,2,3

Elisângela Franco De Oliveira Cavalcante1,2,3

Leiliane Teixeira Bento Fernandes1,2,3

Antônia Danielly Moura de Souza1,2

Rosiane Davina da Silva1,2

REVISTA ENFERMAGEM ATUAL IN DERME

Gabriela Assunção da Costa Mafra Souza 1,2

1. contributed substantially to the conception and/or planning of the study;
2. to obtaining, analyzing and/or interpreting the data;
3. as well as to the writing and/or critical review and final approval of the published version.

Scientific Editor: Ítalo Arão Pereira Ribeiro. Orcid: https://orcid.org/0000-0003-0778-1447