

## RESEARCH ARTICLE (ORIGINAL) 8

# The impact of the multifaceted intervention EPIQ on improving pain management in childhood vaccination

*Efeito da estratégia multifacetada EPIQ para melhoria da gestão da dor na vacinação em crianças*

*Efecto de la estrategia multifacética EPIQ para mejorar el manejo del dolor en la vacunación infantil*


Laise Escalianti Del'Alamo Guarda <sup>1</sup>

 <https://orcid.org/0000-0002-2084-0117>

Géssica Borges Vieira <sup>2</sup>

 <https://orcid.org/0000-0002-8556-5865>

Thaíla Correa Castral <sup>3</sup>

 <https://orcid.org/0000-0003-1319-0483>

Ananda Maria Fernandes <sup>4</sup>

 <https://orcid.org/0000-0002-7447-5071>

José Marcos de Jesus Santos <sup>1</sup>

 <https://orcid.org/0000-0001-5122-1469>

Adriana Moraes Leite <sup>1</sup>

 <https://orcid.org/0000-0001-8327-8718>

Laiane Medeiros Ribeiro <sup>5</sup>

 <https://orcid.org/0000-0002-5041-8283>

<sup>1</sup> University of São Paulo, College of Nursing at Ribeirão Preto, Ribeirão Preto, Brazil

<sup>2</sup> Dr. Miguel Riet Corrêa Júnior University Hospital (HU-FURG), Neonatal Intensive Care Unit (NICU), Rio Grande, Brazil

<sup>3</sup> Federal University of Goiás, Nursing School, Goiânia, Brazil

<sup>4</sup> Health Sciences Research Unit: Nursing (UICISA: E), Nursing School of Coimbra (ESENFC), Coimbra, Portugal

<sup>5</sup> University of Brasília, Campus Ceilândia, Federal District, Brazil

## Corresponding author

Laise Escalianti Del'Alamo Guarda

E-mail: [laiseescalianti@hotmail.com](mailto:laiseescalianti@hotmail.com)

Received: 05.10.21

Accepted: 31.05.22

## Abstract

**Background:** Knowledge Translation (KT) allows the efficient and dynamic use of scientific evidence in clinical practice.

**Objective:** To analyze the impact of a multifaceted KT intervention to train health care professionals in pain management in childhood vaccination.

**Methodology:** This quasi-experimental study was conducted between August and December 2017, with nine nursing professionals working in the vaccination rooms of two *Unidades Básicas de Saúde* (UBSs - Basic Health Units) of the Brazilian Federal District. The “Preparation” and “Implementation” phases of the multifaceted KT intervention Evidence-based Practice for Improving Quality (EPIQ) were conducted.

**Results:** The EPIQ phases allowed identifying the barriers to and facilitators of vaccination in children, establishing objectives and strategies, and improving health professionals’ knowledge. There was a 13.9% increase in the mean percentage of correct answers in the posttest ( $p = 0.036$ ), with the topic “Pain management” presenting the highest score of correct answers (92.8%).

**Conclusion:** Implementing the multifaceted KT intervention EPIQ improved the knowledge of pain management in childhood vaccination.

**Keywords:** professional training; knowledge translation; vaccination; pain management; pediatrics; education, nursing

## Resumo

**Enquadramento:** *Knowledge Translation (KT)* permite a aplicabilidade eficaz e dinâmica de evidências científicas na prática clínica.

**Objetivo:** Analisar o efeito de uma intervenção multifacetada baseada na KT para capacitação de profissionais de saúde na gestão da dor na vacinação em crianças.

**Metodologia:** Estudo quase-experimental realizado entre agosto e dezembro de 2017, com nove profissionais de enfermagem atuantes em salas de vacinação de duas Unidades Básicas de Saúde do Distrito Federal. Realizou-se as fases Preparação e Implementação da estratégia multifacetada *Evidence-based Practice for Improving Quality (EPIQ)*, na perspectiva da KT.

**Resultados:** As fases da EPIQ permitiram a identificação de barreiras e facilitadores na vacinação em crianças, além do estabelecimento de metas e estratégias e mudança no conhecimento dos profissionais. Houve um acréscimo de 13,9% no percentual médio de respostas corretas no pós-teste ( $p = 0,036$ ), sendo a temática “gestão da dor” a que apresentou maior efetividade (92,8%).

**Conclusão:** A utilização da estratégia multifacetada EPIQ, baseada na KT, melhorou a aquisição de conhecimentos relacionados à gestão da dor na vacinação em crianças.

**Palavras-chave:** capacitação profissional; transferência de conhecimento; vacinação; manejo da dor; pediatria; educação em enfermagem

## Resumen

**Marco contextual:** *Knowledge Translation (KT)* permite la aplicación efectiva y dinámica de la evidencia científica en la práctica clínica.

**Objetivo:** Analizar el efecto de una intervención multifacética basada en la KT para capacitar a los trabajadores de la salud en el manejo del dolor para la vacunación infantil.

**Metodología:** Estudio cuasi experimental realizado entre agosto y diciembre de 2017, con nueve profesionales de enfermería que trabajan en salas de vacunación de dos Unidades Básicas de Salud del Distrito Federal. Se llevaron a cabo las fases de preparación e implementación de la estrategia multifacética *Evidence-based Practice for Improving Quality (EPIQ)*, desde la perspectiva de la KT.

**Resultados:** Las fases de la EPIQ permitieron identificar las dificultades y los facilitadores de la vacunación infantil, además de establecer objetivos, estrategias y cambios en los conocimientos de los profesionales. Hubo un aumento del 13,9% en el porcentaje medio de respuestas correctas en la prueba posterior ( $p = 0,036$ ), y el tema “tratamiento del dolor” fue el que mostró una mayor eficacia (92,8%).

**Conclusión:** El uso de la estrategia multifacética EPIQ, basada en la KT, mejoró la adquisición de conocimientos relacionados con el manejo del dolor en la vacunación infantil.

**Palabras clave:** capacitación profesional; transferencia de conocimiento; vacunación; manejo del dolor; pediatria; educación en enfermería



**How to cite this article:** Guarda, L. E., Vieira, G. B., Castral, T. C., Fernandes, A. M., Santos, J. M., Leite, A. M., & Ribeiro, L. M. (2022). The impact of the multifaceted intervention EPIQ on improving pain management in childhood vaccination. *Revista de Enfermagem Referência*, 6(1), e21125. <https://doi.org/10.12707/RV21125>



## Introduction

The pain felt during vaccination and/or the fear of needles may contribute to vaccine rejection (Fontes et al., 2018). In 2015, the World Health Organization (WHO) issued for the first time a position paper on pain at the time of vaccination, recommending a range of scientific evidence-based interventions and presenting pain mitigation as one of the principles of good immunization practice (World Health Organization, 2015).

Blomqvist et al. (2019) noted that failure to prevent the occurrence of pain and its inadequate management are directly associated with short and long-term negative consequences. Repeated exposure to early life pain can change children's brain development, including hypersensitivity to pain and repercussions on motor and intellectual development (Christensen et al., 2020). Pain causes suffering during vaccination and negative physical and cognitive consequences throughout life. Thus, it is essential to assess, treat, and, whenever possible, avoid pain in this population (Boggini et al., 2021).

Several pain management strategies can be implemented to improve care quality in vaccination rooms at little or no cost. In infants, non-pharmacological approaches such as breastfeeding or skin-to-skin contact can be used comprehensively, as they do not require additional costs and/or special equipment. It is only necessary for the health care team to be prepared to apply these measures during care delivery (Harisson et al., 2016).

The studies on bridging the gap between scientific evidence and health care practices and policies have grown exponentially in recent years. Thus, conducting studies to apply the knowledge produced in practice is crucial. Strategies based on Knowledge Translation (KT) target the applicability of evidence in clinical practice, aiming at improving care and health care users' experience, and reducing costs (Balice-Bourgeois et al., 2020).

Producing knowledge is of little value if it is not applied. The use of vertical methodologies, such as the simple dissemination of knowledge at the end of a research study, through publications in journals or presentations in scientific events, does not guarantee that health professionals will effectively use it in their practice (Straus et al., 2009). Thus, the present study is justified by the need to bridge the gap between theory and professional practice, presenting innovative and more effective pain management practices. These practices must be implemented with adequate strategies, actively creating and implementing pain management training, documents, and internal policies, and involving all stakeholders in the process. This involvement makes a huge difference in the efficiency and effectiveness of the actual use of the knowledge acquired through KT strategies (Balice-Bourgeois et al., 2020).

Considering the significance of implementing effective strategies to improve care delivery to the population in question, the present study aimed to analyze the impact of a multifaceted KT intervention to train health professionals in pain management in childhood vaccination.

## Background

The Brazilian *Programa Nacional de Imunizações* (PNI - National Immunization Program) was established in 1973 to control and eradicate vaccine-preventable diseases (Gugel et al., 2021). In children, the vaccination schedule starts right after birth, and the first doses of some vaccines are given in the maternity ward. Childhood vaccination is crucial and necessary, bringing enormous benefits to individual and collective health. However, vaccination can be painful, and most individuals do not receive adequate treatment for mitigating vaccination-related pain, particularly during childhood (Fontes et al., 2018).

The American Academy of Pediatrics considers that there are significant gaps in the knowledge about the most effective way of preventing and relieving children's pain. This highlights the issue of the availability of safe therapies for the pediatric population and the constant need for searching and using therapies that mitigate or reduce pain in children (Lim & Godambe, 2017).

Several studies have searched for these therapies. However, few actions are conducted aiming at their actual use in routine care delivery. Thus, pain prevention during vaccination must include pharmacological and non-pharmacological pain management measures, health professional education, interprofessional collaboration, and organizational strategies (Balice-Bourgeois et al., 2020). In this context, the process of KT is available for the effective use of evidence in practice. The Canadian Institutes of Health Research defines KT as a "dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health (...), provide more effective health services and products and strengthen the health care system" (2020). The objectives of KT are to ensure that the benefits of the knowledge produced through research reach the most significant number of people and institutions, to evaluate the impact of these interventions in health promotion and harm reduction, and to replace or eliminate ineffective and costly therapeutic actions (Vieira et al., 2020).

The intervention Evidence-based Practice for Improving Quality (EPIQ) is frequently implemented to achieve the objectives of KT. This intervention consists of an interactive and multifaceted quality improvement strategy to change organizational culture and sustain behavioral changes. The intervention EPIQ allows customizing a strategy to improve user care based on local data/evidence and the involvement of the health professionals working in the services (Lee et al., 2015).

A systematic review by Balice-Bourgeois et al. (2020) aimed to determine the quality of the guidelines on pain management existing in the literature. The study highlighted that only four of the 17 guidelines included in the review contained different elements regarding implementation, evaluation, monitoring, and financial costs. Also, only one guideline used a KT model to adapt the different recommendations to each clinical setting. However, it is essential for literature to include successful implemen-

tation models that can be tailored to the specific needs of local contexts.

Almeida et al. (2018) evaluated from nurses' perspectives the feasibility, acceptability, and usefulness of a video with strategies for pain relief in infants. Although the health professionals knew about pain relief strategies, all participants considered the video helpful, easy to understand, and easy to apply in real situations. Dissemination strategies must be easily understood by the health team and easy to implement in routine care delivery, be cost-effective for the institutions, and demonstrate effectiveness in their application, providing users with a better experience (Vieira et al., 2020). Within this perspective, KT-based strategies have the requirements described for successful implementation.

## Hypothesis of investigation

The multifaceted KT intervention EPIQ increases the knowledge about children's pain management of nursing professionals working in vaccination rooms.

## Methodology

This is a study integrated into a broader research project entitled *Projeto Incríveis: intervenções para o alívio da dor em crianças na vacinação. Envolvimento e iniciativa para o SUS* (Project Incredible: interventions for pain relief in childhood vaccination. SUS – Brazilian Health Service - involvement and initiative), approved by the Research Ethics Committee of the proposing institution. Resolution No. 466/12 of the Brazilian National Health Council on research involving human beings was followed, and the professionals participating in the study signed informed consent forms.

This is a quasi-experimental research study without a control group and with a pre- and posttest design. Quantitative methods were used for collecting data in two *Unidades Básicas de Saúde* (UBSs - Basic Health Units) belonging to the Brazilian *Secretaria de Estado de Saúde do Distrito Federal* (SES/DF - Federal District Health Secretariat). The two UBSs were selected through convenience sampling and are part of the Primary Health Care network. The intervention lasted 5 months, from August to December 2017.

The target population was health professionals working in the vaccination rooms of the two UBSs mentioned above. The convenience (non-probability) sampling method was used. The professionals working in this sector were invited to form a work group. The inclusion of nursing professionals occurred voluntarily after the invitation. The study participants consisted of nine professionals working in the vaccination rooms of the UBSs, the service where the intervention was conducted. Although it seems to be a small number, all the professionals working in the vaccination rooms of both UBSs participated in the study as the research was focused on this specific health

unit sector. This strategy was defined to reach the most significant number of trained professionals per unit, to the detriment of a larger number of professionals from different UBSs. These would be less represented in their unit, compromising the work and reducing the effectiveness of the implementation process. Professionals on vacation or on leave of absence during the study were excluded. The present study was conducted in two phases: Preparation and Implementation (Stevens et al., 2011). The "Preparation" phase consisted of collecting baseline data, forming the *Conselho de Pesquisa e Prática* (CPP - Research and Practice Council), identifying the barriers and facilitators, and selecting scientific evidence related to the topic.

The Implementation phase included establishing the objectives and strategies, defining the topics to be addressed, and conducting the training sessions. CPP professionals guided the definition of the topics after the current scientific evidence was presented and discussed. The training sessions addressed the defined topics using the Microsoft PowerPoint slide presentation software and distributing printed materials. Before beginning the training session, a pretest was applied, containing seven questions related to the topic. A posttest was administered one week after the training session, and participants also had the opportunity to present and discuss their doubts about the topic.

The collected data were first entered into a Microsoft Excel sheet. They were entered twice to ensure data reliability and then exported to the IBM SPSS Statistics software, version 23.0. The pre- and posttest questions were grouped according to the total number of correct answers to obtain a more consistent data analysis.

The quantitative data analysis was done using descriptive statistics (mean, standard deviation, and absolute and relative/proportional frequency distribution). The Mann-Whitney test was used to compare the results between the (pre- and posttest) groups and the UBSs. The ANOVA (analysis of variance) was used to check the differences in the total number of correct answers according to the training sessions. The Tukey test was used to compare the differences between training sessions according to the total number of correct answers.

## Results

The results were presented in three sessions: "Identifying barriers and facilitators," "Establishing objectives and strategies," and "Changing professionals' knowledge through training."

### Identifying barriers and facilitators

Compiled during the first meeting with the CPP members, Table 1 presents health professionals' perceptions about the barriers to and facilitators of pain management in childhood vaccination. These contributed to the group's development of the strategies to implement. Issues favoring the implementation process were considered, as well as those that could pose obstacles.

**Table 1***Health professionals' perceptions of barriers to and facilitators of pain management in childhood vaccination in UBSs*

Barriers	Facilitators
<b><i>Physical Structure and Environment</i></b>	
<ul style="list-style-type: none"> <li>- The vaccination room was small, which hindered the researchers' and health professionals' presence;</li> <li>- The mothers' waiting room;</li> <li>- The lack of chairs for health professionals;</li> <li>- The presence of a man working in the unit that could make women feel inhibited.</li> </ul>	<ul style="list-style-type: none"> <li>- The use of printed and audiovisual materials in training sessions;</li> <li>- The dissemination of pain management-related information in the unit through pamphlets and posters;</li> <li>- The existence of a computer for the exclusive use of the vaccination room professionals to search for scientific articles.</li> </ul>
<b><i>Human Resources</i></b>	
<ul style="list-style-type: none"> <li>- The lack of adequate human resources (nursing technicians and nurses);</li> <li>- The lack of training on and awareness of pain management;</li> <li>- The team working exclusively in the vaccination room was understaffed;</li> <li>- The CPP members' work overload, which hindered weekly meetings.</li> </ul>	<ul style="list-style-type: none"> <li>- The team working in the vaccination room was fixed;</li> <li>- The training sessions on awareness of adequate pain management;</li> <li>- The offer of SES/DF certified training sessions;</li> <li>- The distribution of gifts and raffles among the CPP members and professionals of the unit.</li> </ul>
<b><i>Team Knowledge and Attitudes</i></b>	
<ul style="list-style-type: none"> <li>- The difficulties in putting the unit's protocols into practice;</li> <li>- The lack of standardization of pain relief techniques during vaccination;</li> <li>- The team valued traditional methods;</li> <li>- The difficulties in adapting the sector's norms and routines;</li> <li>- The limited knowledge of adequate pain assessment and management in vaccination;</li> <li>- The team's perception that the project's development and the researchers' presence in the vaccination room hindered their work.</li> </ul>	<ul style="list-style-type: none"> <li>- The team knew one of the researchers, as she had completed an internship at the unit;</li> <li>- The team was welcoming;</li> <li>- The nursing supervisor valued nursing knowledge;</li> <li>- The offer of SES/DF certified training sessions;</li> <li>- The distribution of gifts and raffles among the CPP members and professionals of the unit.</li> </ul>
<b><i>Continuity of pain relief interventions in childhood vaccination</i></b>	
<ul style="list-style-type: none"> <li>- The professionals' lack of continuity of adequate pain management interventions after the end of the research project;</li> <li>- The difficulties in maintaining the strategies adopted without the researchers.</li> </ul>	<ul style="list-style-type: none"> <li>- The project continued through an outreach project.</li> </ul>
<b><i>Team Training and Education</i></b>	
<ul style="list-style-type: none"> <li>- The lack of participation of the whole team in all the training sessions;</li> <li>- The participants were more interested in technical issues than in the human factor.</li> <li>- The difficulties in releasing staff during work hours to participate in training;</li> <li>- The high number of patients in the vaccination room prevented professionals from participating in training sessions.</li> </ul>	<ul style="list-style-type: none"> <li>- The offer of SES/DF certified training sessions.</li> <li>- The distribution of gifts and raffles among the CPP members and professionals of the unit, thus encouraging full participation in training sessions;</li> <li>- Some professionals were attending the undergraduate Nursing degree.</li> </ul>

*Note.* UBSs = *Unidades Básicas de Saúde (Basic Health Units)*; CPP = *Conselho de Pesquisa e Prática (Research and Practice Council)*; SES/DF = *Secretaria de Estado de Saúde do Distrito Federal (Brazilian Federal District Health Secretariat)*

### **Establishing objectives and strategies**

The objectives and strategies were established during the second meeting with the CPP members. The meetings were suggested to occur weekly, with pre-defined dates and locations. One of the UBSs had a room with adequate audiovisual resources to project the content prepared for the health professionals. The other UBS was under reno-

vation during the project's implementation period, and it was necessary to improvise a room using the research team's audiovisual resources.

The training topics were also defined in this meeting. After the selected materials were presented during the preparation phase, the topics professionals considered most relevant to their practice and subsequent applicability in



the work routine were discussed. The topics were: “Concept and physiology of pain;” “Pain assessment and the consequences of untreated pain;” and “Pain management.”

### Changing professionals’ knowledge through training

Table 2 presents the results obtained from the answers of the nine participating professionals. The total number

of correct answers on the posttest was 96, representing a 7.7% increase compared to the total correct answers on the pretest. The analysis of the correct answers separately showed that questions 1, 2, and 3 supported this increase. Questions 5 and 7 had the same number of correct answers, and question 6 revealed an 8.3% decrease in correct answers in the posttest (Table 2).

**Table 2**

*Frequency and percentage of correct answers according to the questions*

Variable	Pretest	%	Posttest	%
Question 1	15	41.67	16	44.44
Question 2	10	27.78	13	36.11
Question 3	11	30.56	16	44.44
Question 4	5	13.89	6	16.67
Question 5	15	41.67	15	41.67
Question 6	16	44.44	13	36.11
Question 7	17	47.22	17	47.22
		47.09		54.86
Total	89		96	

Table 3 provides the results of these groups’ means and standard deviation. The mean of the pretest group was 4.68, and the standard deviation was 1.45. In the posttest group, the mean was 5.65 and the standard deviation 1.11. The mean number of correct answers demonstrated that

the pretest group had 66.8% of correct answers, while the posttest group had a value of 80.7%. According to the Mann-Whitney test ( $p = 0.036$ ), this difference is significant, indicating a higher number of correct answers in the posttest.

**Table 3**

*Means and standard deviation of training sessions by comparing the total number of correct answers*

Training topic	Mean	Standard deviation
Concept and Physiology of Pain	5.09 b	0.94
Pain assessment and the consequences of untreated pain	4.27 b	1.28
Pain Management	6.50 a	0.71

*Note.* Different letters differ significantly from each other with  $p < 0.05$  (Tukey test)

The mean number of correct answers per session reached the following scores: 72.7% of correct answers in “Concept and physiology of pain”; 61% of correct answers in “Pain assessment and the consequences of untreated pain”; and 92.8% of correct answers in “Pain management,” which

had the highest score of the three topics. The ANOVA, in which the  $p$  value was less than 0.001, revealed differences between the session. Table 4 shows the results of the Tukey test performed to compare the differences between the training topics according to the total number of correct answers.

**Table 4**

*Tukey test to compare the differences between training sessions considering the total number of correct answers*

Training session	Dif.	Inf.	Sup.	<i>p</i>
Pain assessment and the consequences of untreated pain - Concept and Physiology of Pain	0.82	1.85	0.20	0.13
Pain Management - Concept and Physiology of Pain	1.41	0.28	2.53	0.01
Pain Management - Pain assessment and the consequences of untreated pain	2.23	1.18	3.28	0.00

*Note.* Dif. = mean difference; Inf. = lower limit of the confidence interval; Sup. = upper limit of the confidence interval; *p* = statistical significance.

Compared to the others, the training topic “Pain management” presented a difference in the *p* values. The professionals obtained better results in this topic, suggesting a higher learning level (Table 3). Another analysis was performed to compare the results according to the UBSs. The mean number of correct answers was 76.1% at UBS X and 69.5% at UBS Y. According to the Mann-Whitney test, the *p* value was 0.142 at UBS X and 0.175 at UBS Y, indicating that there was no significant difference between the units.

## Discussion

This study demonstrated that the training sessions constituting the multifaceted KT intervention EPIQ improved nursing professionals’ knowledge about pain management in childhood vaccination. It is worth noting that, although it is challenging to apply scientific evidence in clinical practice in the Brazilian context (Vieira et al., 2020), KT and the multifaceted intervention EPIQ constitute successful approaches for increasing health professionals’ work autonomy.

The nursing team’s vital and active participation throughout this study must also be highlighted, as these professionals acted as agents of change in the UBSs to implement good immunization practices. Nursing plays a central role in health knowledge production, also standing out in basic research, signaling the existence of new paradigms in Nursing education (Vattimo & Fonseca, 2019).

The successful applicability of evidence depends on using KT conceptual models that best fit the context of each setting (Vieira et al., 2020). Moreover, the KT framework shows the need for identifying the barriers to and facilitators of knowledge use. In this study, planning interventions required understanding the specific barriers to pain management in vaccination so that the content addressed in each training session could adequately overcome them. Also, it was necessary to identify the facilitators contributing to the applicability of scientific evidence in clinical practice (Kaufman et al., 2018). In this sense, the participation of the CPP members in identifying the barriers and facilitators was essential for the success of the activities, as only they, who experience the unit’s daily routine, can point out the needs and discussion points with greater precision and assertiveness. Furthermore, describing the barriers and facilitators contributed to defining the objectives and strategies to be implemented

in the units.

The approach used in this step was based on participants’ shared learning needs. Hunter et al. (2015) also used this approach in which, during the introductory meeting, participants, in collaboration with the facilitators, suggested and prioritized specific content for the following meetings. Thus, it is recommended that future training use collaborative approaches that include professionals in the improvement process so that interventions can obtain positive results. This will favor users’ greater understanding and interest in using such results in decision-making (Gagliardi et al., 2015).

While establishing the objectives and strategies, it was defined that the training session modality would be used for the applicability of evidence in the local context. KT-based strategies are used in contexts of pediatric pain to promote changes in the sectors and health professionals’ behaviors towards pain management. Most strategies present a multifaceted approach (Gagnon et al., 2016). Gagnon et al. (2016) showed that in-service training was often the primary KT method. This approach positively changed nursing professionals’ knowledge and attitudes, as demonstrated by several successful interventions (Gagnon et al., 2016). The results support that the KT-based training added knowledge on pain management in childhood vaccination.

This study described part of the multifaceted intervention EPIQ and demonstrated the need for the continuity of KT interventions to improve care delivery and effectively assess interventions’ sustainability. Thus, it is essential to carry out the steps for monitoring knowledge application, evaluating its impact, and maintaining its use. All interventions must foresee a follow-up period for conducting audits to determine the sustainability of the changes over time. In general, the literature has used six to twelve-month follow-up periods to demonstrate the short-term sustainability of interventions. Even so, it is worth noting that long-term sustainability is equally crucial (Gagnon et al., 2016).

This study had limitations. One limitation was the lack of funding from Brazilian funding agencies. Funding in Brazil is decreasing, and the competition for securing it is intense (Vieira et al., 2020). Thus, it was not possible to include other previously planned UBSs in the study due to the lack of financial and human resources (namely, research assistants to conduct the investigation). Another limitation was the lack of assessment of the competencies developed from the knowledge translated. A 6-month

follow-up would be necessary to assess how knowledge impacted the strategies used by professionals during vaccination. This was impossible due to the deadlines for completing the course.

## Conclusion

The multifaceted KT intervention EPIQ improved the acquisition of knowledge about pain management of nursing professionals working in childhood vaccination. This study's results must be shared, as this experience allows other researchers to adapt and use this tool in other contexts to promote effective changes in different work settings. Moreover, it will enable bridging the gap between knowledge and practice and delivering qualified and more humanized care.

Implementing continuing education activities in this format is essential for promoting positive changes in health professionals' work context. However, if these activities are done isolated, they may not be sufficient and/or sustainable. In this sense, other types and processes of updating and auditing must be carried out to maintain good practices in health services. Moreover, for KT to occur, it is necessary to apply individualized strategies, taking into account the context and experience of the users.

More extended studies are recommended to monitor these changes over time. This will allow for improving the strategies of sustainability, another major challenge that needs further exploration.

## Acknowledgment

This study was supported by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brazil (CAPES - Brazilian governmental agency for the expansion and consolidation of postgraduate studies) - Funding Code 001.*

## Authors contributions

Conceptualization: Guarda, L. E., Ribeiro, L. M.

Data curation: Guarda, L. E., Fernandes, A. M.

Formal Analysis: Guarda, L. E., Fernandes, A. M., Ribeiro, L. M.

Methodology: Guarda, L. E., Castral, T. C., Ribeiro, L. M.

Project administration: Ribeiro, L. M.

Validation: Castral, T. C., Vieira, G. B., Leite, A. M., Ribeiro, L. M.

Visualization: Guarda, L. E., Fernandes, A. M., Santos, J. M., Ribeiro, L. M.

Writing – original draft: Guarda, L. E.

Writing – review & editing: Guarda, L. E., Vieira, G. B., Castral, T. C., Fernandes, A. M., Santos, J. M., Leite, A. M., Ribeiro, L. M.

## References

Almeida, H. C., Candido, L. K., Harrison, D., & Bueno, M. (2018). *Seja Doce com os Bebês: Avaliação de vídeo instrucional sobre*

*manejo da dor neonatal por enfermeiros. Revista da Escola de Enfermagem da USP, 52*, e03313. <https://doi.org/10.1590/S1980-220X2017033903313>

Balice-Bourgois, C., Zumstein-Shaha, M., Vanoni, F., Jaques, C., Newman, C. J., & Simonetti, G. D. (2020). A systematic review of clinical practice guidelines for acute procedural pain on neonates. *The Clinical Journal of Pain, 36*(5), 390-398. <https://doi.org/10.1097/AJP.0000000000000808>

Blomqvist, Y. T., Gradin, M., & Olsson, E. (2020). Pain assessment and management in Swedish neonatal intensive care units. *Pain Management Nursing, 21*(4), 354-359. <https://doi.org/10.1016/j.pmn.2019.11.001>

Boggini, T., Pozzoli, S., Schiavolin, P., Erario, R., Mosca, F., Brambilla, P., & Fumagalli, M. (2021). Cumulative procedural pain and brain development in very preterm infants: A systematic review of clinical and preclinical studies. *Neuroscience & Biobehavioral Reviews, 123*, 320-336. <https://doi.org/10.1016/j.neubiorev.2020.12.016>

Canadian Institutes of Health Research. (2020). *Knowledge translation*. <https://cihr-irsc.gc.ca/e/29529.html>

Christensen, R., Chau, V., Synnes, A., Grunau, R. E., & Miller, S. P. (2021). Longitudinal neurodevelopmental outcomes in preterm twins. *Pediatric Research, 90*, 593-599. <http://dx.doi.org/10.1038/s41390-020-0840-7>

Fontes, V. S., Ribeiro, C. J., Dantas, R. A., & Ribeiro, C. O. (2018). Pain relief strategies during immunization. *Brazilian Journal of Pain, 1*(3), 270-273. <http://dx.doi.org/10.5935/2595-0118.20180051>

Gagliardi, A. R., Berta, W., Kothari, A., Boyko, J., & Urquhart, R. (2015). Integrated knowledge translation (IKT) in health care: A scoping review. *Implementation Science, 11*, Article number 38. <https://doi.org/10.1186/s13012-016-0399-1>

Gagnon, M. M., Hadjistavropoulos, T., Hampton, A. J., & Stinson, J. (2016). A systematic review of knowledge translation (KT) in pediatric pain: Focus on health care providers. *The Clinical Journal of Pain, 32*(11), 972-990. <https://doi.org/10.1097/AJP.0000000000000345>

Gugel, S., Girardi, L. M., Vaneski, L. M., Souza, R. P., Pinotti, R. O., Lachowicz, G., & Veiga, J. F. (2021). Percepções acerca da importância da vacinação e da recusa vacinal: Uma revisão bibliográfica. *Brazilian Journal of Development, 7*(3), 22710-22722. <https://doi.org/10.34117/bjdv7n3-135>

Harrison, D., Reszel, J., Bueno, M., Sampson, M., Shah, V. S., Taddio, A., Larocque, C., & Turner, L. (2016). Breastfeeding for procedural pain in infants beyond the neonatal period. *The Cochrane Database of Systematic Reviews, 10*(10), CD011248. <https://doi.org/10.1002/14651858.CD011248.pub2>

Hunter, J. P., Stinson, J., Campbell, F., Stevens, B., Wagner, S. J., Simmons, B., White, M., & van Wyk, M. (2015). A novel pain interprofessional education strategy for trainees: Assessing impact on interprofessional competencies and pediatric pain knowledge. *Pain Research & Management, 20*(1), e12-e20. <https://doi.org/10.1155/2015/159580>

Kaufman, J., Ryan, R., Walsh, L., Horey, D., Leask, J., Robinson, P., & Hill, S. (2018). Face-to-face interventions for informing or educating parents about early childhood vaccination. *The Cochrane Database of Systematic Reviews, 5*(5), CD010038. <https://doi.org/10.1002/14651858.CD010038.pub3>

Lee, S. K., Aziz, K., Singhal, N., & Cronin, C. M. (2015). The evidence-based practice for improving quality method has greater



- impact on improvement of outcomes than dissemination of practice change guidelines and quality improvement training in neonatal intensive care units. *Paediatrics & Child Health*, 20(1), e1–e9. <https://doi.org/10.1093/pch/20.1.e1>
- Lim, Y., & Godambe, S. (2017). Prevention and management of procedural pain in the neonate: An update, American Academy of Pediatrics, 2016. *Archives of Disease in Childhood-Education and Practice*, 102(5), 254-256. <http://dx.doi.org/10.1136/archdischild-2016-311066>
- Stevens, B. J., Abbott, L. K., Yamada, J., Harrison, D., Stinson, J., Taddio, A., Barwick, M., Latimer, M., Scott, S. D., Rashotte, J., Campbell, F., & Finley, G. A. (2011). Epidemiology and management of painful procedures in children in Canadian hospitals. *CMAJ: Canadian Medical Association Journal*, 183(7), E403–E410. <https://doi.org/10.1503/cmaj.101341>
- Straus, S. E., Tetroe, J., & Graham, I. (2009). Defining knowledge translation. *CMAJ: Canadian Medical Association Journal*, 181(3-4), 165-168. <https://doi.org/10.1503/cmaj.081229>
- Vattimo, M. F., & Fonseca, C. D. (2019). The translation of knowledge as a subsidy for the nursing practice. *Revista Brasileira de Enfermagem*, 72(3), 582-583. <https://doi.org/10.1590/0034-7167.2019720301>
- Vieira, A. C., Gastaldo, D., & Harrison, D. (2020). Como traduzir o conhecimento científico à prática?: Conceitos, modelos e aplicação. *Revista Brasileira de Enfermagem*, 73(5), e20190179. <https://doi.org/10.1590/0034-7167-2019-0179>
- World Health Organization. (2015). Reducing pain at the time of vaccination: WHO position paper—September 2015. *Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire*, 90(39), 505-510.