

# From insights to impact: leveraging implementation science to improve neonatal pain practices

De percepções a resultados: a utilização da tradução e intercâmbio do conhecimento na melhoria das práticas de dor neonatal

de perspectivas a impacto: aprovechando la ciencia de la implementación para mejorar las prácticas de manejo del dolor neonatal

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## Resumo

A principal causa de dor recém-nascidos hospitalizados são procedimentos dolorosos. A despeito de evidências consistentes acerca de estratégias analgésicas efetivas e seguras, o tratamento da dor no recém-nascido ainda é insuficiente. Para disseminar e fomentar o uso do conhecimento, o vídeo *Seja Doce com os Bebês* foi desenvolvido em inglês e francês, e traduzido para outras línguas como o Português (Brasil). O vídeo mostra recém-nascidos submetidos a lancetagem de calcâneo e punção venosa, enquanto recebem amamentação, contato pele-a-pele e soluções adocicadas. Ao ser avaliado por enfermeiros, pais de recém-nascidos hospitalizados em terapia intensiva e pelo público (por intermédio de uma rede social), o vídeo foi considerado útil, fácil de entender e de aplicar em situações reais. O uso das estratégias analgésicas foi considerado factível. Em uma unidade de alojamento conjunto, recém-nascidos de mães que assistiram ao vídeo tiveram o dobro de chances de receber analgesia durante a coleta do teste do pezinho, comparado aos recém-nascidos de mães que não assistiram ao vídeo. Pesquisadores e profissionais do cuidado precisam se comprometer com o avanço do conhecimento, com base nas melhores evidências disponíveis e em respostas a lacunas do conhecimento, bem como com a implementação das melhores evidências no cuidado neonatal.

## Abstract

Painful procedures are the main cause of pain in hospitalized newborns. Despite high-quality synthesized evidence on the effectiveness and safety of analgesic strategies, procedural pain relief in newborns is still insufficient. The *Be Sweet with Babies* video was developed to disseminate and promote the use of this knowledge. The video was initially produced in English and French and later translated into other languages such as Portuguese (Brazil). The *Be Sweet with Babies* video demonstrates the effects of breastfeeding, skin-to-skin care, and sweet solutions in newborns undergoing heel lancing and venepuncture. When assessed by nurses, parents, and the public (through social media), the video was considered useful, easy to understand, and to apply in real scenarios. The use of all analgesic strategies was considered feasible. In a rooming-in unit, newborns of mothers who watched the video were twice as likely to receive analgesia during the newborn screening compared to newborns of mothers who did not watch the video. Researchers and healthcare professionals need to commit to advancing knowledge, based on the best available evidence and addressing knowledge gaps, as well as implementing the best evidence-based practices in neonatal care.

## Resumen

La principal causa de dolor en los recién nacidos hospitalizados son los procedimientos dolorosos. A pesar de la evidencia consistente sobre estrategias analgésicas efectivas y seguras, el tratamiento del dolor en los recién nacidos todavía es insuficiente. Para difundir e incentivar el uso del conocimiento, se desarrolló el vídeo *Sé Dulce con los Bebés* en inglés y francés, y traducido a otros idiomas como el portugués (Brasil). El vídeo muestra a recién nacidos sometidos a punción del talón y venopunción, mientras reciben lactancia materna, contacto piel con piel y soluciones endulzadas. Al ser evaluado por enfermeras, padres de recién nacidos hospitalizados en cuidados intensivos y el público (a través de una red social), el vídeo fue considerado útil, fácil de entender y aplicar en situaciones reales. Se consideró factible el uso de estrategias analgésicas. En una unidad de alojamiento conjunto, los recién nacidos cuyas madres vieron el vídeo tuvieron el doble de probabilidades de recibir analgesia durante la prueba de punción del talón en comparación con los recién nacidos cuyas madres no vieron el vídeo. Los investigadores y los profesionales de la atención deben comprometerse a promover el conocimiento basándose en la mejor evidencia disponible y a responder a las lagunas de conocimiento, así como a implementar la mejor evidencia en la atención neonatal.

## Descritores

Recém-Nascido; Dor; Disseminação de Informação; Ciência da Implementação; Enfermagem pediátrica

## Keywords

Infant; Newborn; Pain; Knowledge dissemination; Implementation science; Pediatric nursing

## Descriptoros

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Pain in newborn infants was long underacknowledged, underappreciated, and undertreated until the combined efforts of a mother of a sick preterm newborn, and a junior physician brought the issue into the public arena.

Specifically, the negative impacts of surgery with no analgesia in hospitalized newborns were first documented in 1985 with the publication of a randomized, placebo-controlled clinical trial.<sup>(1,2)</sup> Anand and colleagues demonstrated the reduction of postoperative pain effects in newborns who received intraoperative fentanyl compared to no analgesia, after surgical closure of the arterial duct. Around this time, Jill Lawson played a pivotal role in raising public awareness about pain in infants when, in 1985, she spoke about how her extremely premature son born at only 26 weeks gestation, weighing just 1½ pounds, underwent surgery without anesthesia at two weeks of age.<sup>(3)</sup> Her infant, Jeffrey Lawson, had heart surgery, and only muscle relaxants were used to immobilize him during the procedure, while no pain relief was given.

Anand's findings and Lawson's advocacy drew attention to the widespread misconception that infants could not feel or remember pain, leading to public outcry and ultimately pushing for changes in clinical practices regarding pain management in newborns. Since then, there has been an exponential increase in studies aiming to understand neonatal pain processing, repercussions of repeated and untreated pain on growth and development, more robust pain assessment methods, as well as effective and safe strategies for neonatal pain relief.

The main cause of pain and stress in hospitalized newborns today is frequently occurring painful procedures, of which the majority are heel lances.<sup>(4)</sup> Although crucial for clinical diagnosis and therapy, these procedures are frequently performed with no analgesic or comforting interventions. Fifteen years ago, researchers suggested that pain should be considered as an adverse event in health care especially when healthcare professionals are routinely aware of pain (such as a result of procedures), yet they dismiss it as an unavoidable consequence of medical care.<sup>(5)</sup>

A large number of randomized clinical trials have been conducted over the years to investigate the effects of different interventions for procedural pain relief in newborns. Consequently, evidence syntheses have

been published and updated to inform researchers and clinical practitioners about the effectiveness and safety of these interventions. Consistent evidence is available for breastfeeding,<sup>(6,7)</sup> skin-to-skin care,<sup>(7,8)</sup> and sweet solutions,<sup>(7,9)</sup> and for this reason, these were the interventions selected for the video series *Be Sweet to Babies*.<sup>(10)</sup> The first video was developed by researchers, healthcare professionals, and families, in English and French. The *Be Sweet to Babies* video was professionally produced and uses real footage of newborns undergoing painful procedures (such as heel lancing and venepuncture) while receiving analgesic interventions offered by their parents. Subsequently, the video was translated into numerous other languages, including Portuguese (Brazil). All versions are available on YouTube (<https://www.cheo.on.ca/en/clinics-services-programs/be-sweet-to-babies.aspx>).

Over the years, the videos have been used as a knowledge dissemination strategy aimed at families and healthcare professionals. Some studies have explored the use of this strategy in the Brazilian context. In a cross-sectional study conducted in four newborn care units (obstetric center, rooming-in, semi-intensive care unit, and intensive care unit) of a university-affiliated hospital in São Paulo, 38 nurses watched and evaluated the video.<sup>(11)</sup> The analgesic effects of breastfeeding and sweet solutions were known by 97.4% of the nurses, while analgesic effects of skin-to-skin care were known by 81.5%. After watching the video, the vast majority (97.4%) of the nurses stated they intended to use the interventions portrayed in the video or encourage their use in their units during painful procedures. All the nurses considered the video as useful, easy to understand and apply in real situations. Finally, the nurses would recommend the video to other clinicians.

Similarly, a cross-sectional study was conducted involving mothers and fathers of newborns admitted to a neonatal intensive care unit (NICU) of another university-affiliated hospital in São Paulo.<sup>(12)</sup> A total of 100 parents, 75 mothers and 25 fathers, participated in the study by watching the video on a mobile device in the NICU. The vast majority were unaware of the analgesic effects of breastfeeding (80%), skin-to-skin care (69%), or sweet solutions (93%) for procedural pain relief in newborns, and a very limited number of participants mentioned that their newborns received

any of the analgesic strategies presented in the video (7%, 11%, and 2%, respectively). After watching the video, all parents stated they intended to use the strategies presented. Additionally, all parents considered the video useful, easy to understand, and applicable in real situations, as previously reported by the nurses. The video duration was considered ideal by 92% of the parents.

We also assessed the use of social media as a knowledge dissemination strategy. On a Facebook™ page, the video, followed by a questionnaire, was made available for one year.<sup>(13)</sup> The page received 70,753 views, 2,199 accesses, 1,553 'likes,' and 43 positive comments. The questionnaire was answered by 930 individuals (about a 42% response rate based on the number of page accesses). More than two-thirds of the respondents had prior knowledge about breastfeeding, skin-to-skin care, and sweet solutions for pain relief in newborns. After watching the video, 87% of the respondents intended to use breastfeeding or skin-to-skin care in the future, and 71% intended to use sweet solutions for pain relief. Almost all participants rated the video as very useful (99%), easy to understand (99%), and easy to apply in real-life situations (97%). The use of Facebook™ to disseminate and evaluate an intervention was considered feasible, with quick response collection, low cost, and promising for data collection. Additional studies are needed to assess the real impact of using social media on practice changes, especially with recent changes in algorithms, which may prioritize content and affect reach and engagement of research posts, and with challenges posed by the rise of misinformation and the increased need for content moderation.

In addition to knowledge dissemination, the video was assessed in a pragmatic, non-randomized clinical trial. The study was conducted in the rooming-in unit of a university-affiliated hospital in São Paulo and aimed to evaluate the effect of the Be Sweet to Babies video on mothers' involvement in pain management during neonatal screening.<sup>(14)</sup> A total of 73 mothers were included, with 38 in the control group (CG) and 35 in the experimental group (EG) – composed of mothers who voluntarily watched the instructional video during daily educational sessions conducted by nurses. A pamphlet on neonatal pain management was given to all mothers upon admission to the

rooming-in unit. In line with previous results,<sup>(11-13)</sup> the video was considered useful, easy to understand, and applicable in real scenarios, with an appropriate duration and recommendable to other parents. Analgesic strategies were used in 40% of cases in the EG and 23.7% in the CG, with breastfeeding being the most prevalent, followed by skin-to-skin care and sweet solutions. There was a clinically important difference between the groups (16.3%), although not statistically significant. Watching the video increased the likelihood of using analgesic strategies by 2.1 times, while the suggestion of analgesia by nurses increased this likelihood by 5.5 times. Finally, almost all participants stated they would use the analgesic strategies in future painful procedures.

These are promising results, especially considering the positive evaluation of the video as a knowledge dissemination strategy. However, despite increased knowledge and awareness on the use of effective and safe strategies for neonatal pain management among families and clinicians, the video and its dissemination do not guarantee a practice change in practice, especially when used at an individual level, such as described by Bueno et al., Almeida et al., and Vieira et al.<sup>(11-13)</sup> When individuals are the focus, change tends to be personalized, not allowing for spread and scale up.

There is a 17 to 20 years gap, on average, for research results to be incorporated into routine health-care practices.<sup>(15)</sup> In the neonatal pain field, there has been a huge delay in both research and clinical practice changes. For instance, a systematic review of 168 studies demonstrated that, despite consistent evidence on the effectiveness of sweet solutions in relieving procedural pain since the publication of the first randomized clinical trials in the 1990s.<sup>(16)</sup> Nonetheless, researchers continue replicating similar studies, to compare the effectiveness of sweet solutions to water or no intervention to date. In the clinical setting, a recent review indicated that (i) newborns undergo an average of 7.5 procedures per day during their hospitalization, (ii) the daily number of procedures performed per newborn has not decreased significantly over the past 30 years, and (iii) these procedures continue to be performed without adequate analgesia.<sup>(4)</sup>

Despite the abundance of published evidence, studies continue to be conducted and published to

test the effectiveness of sweet solutions compared to water, placebo, or no intervention,<sup>(17,18)</sup> raising several questions. From an ethical perspective, it is recommended that control groups offer the most effective and safe intervention available in experimental studies; thus, exposing newborns to painful procedures without analgesia is considered unethical. Additionally, parents should be informed of the best evidence available on procedural pain relief in newborns through the informed consent form. This raises questions about the integrity and clarity of the information provided to parents. It also highlights the waste of resources (both human and financial) in research, whose protocols are not truly based on available and current evidence and existing knowledge gaps.

From a clinical practice perspective, practice change needs to be incorporated at the organizational level, rather than at the individual level. At the organizational level, a broad and systematic change influences practices, workflows, and the local organizational culture and facilitates knowledge uptake and scale-up. Accreditation processes can play an important role in organizational practice change by establishing standards that encourage continuous learning and quality improvement. ChildKind International (<https://childkindinternational.org/>), for example, is an accreditation process that recognizes institutions for their excellence in pediatric pain care and that fosters evidence-based practice, the implementation of protocols for pain assessment and treatment through pharmacological and non-pharmacological, as well as psychological and physical strategies, alongside the use of continuous quality improvement processes. The use of multifaceted knowledge translation strategies can also favor practice change in healthcare units or, more broadly, in organizations. The Implementation of Infant Pain Practice Change (ImPaC) Resource<sup>(19)</sup> and NEODOL© (NEONato DOLOre)<sup>(20)</sup> are examples of successful strategies developed and implemented in neonatal units to promote improved pain assessment and management care in newborns.

Since 1985, significant advances have been made in the field of neonatal pain. However, newborns and their families, globally, are still not benefiting from knowledge generated over the past 40 years. Research-

ers and healthcare professionals need to commit to advancing knowledge generation, based on the best available evidence and in response to knowledge gaps, as well as to implementing the best evidence-based practices in neonatal care. Developing or adapting, implementing, and evaluating innovative strategies to improve pain assessment and management practices in newborns can foster research in neonatal nursing and advance knowledge while improving the quality of care and health outcomes for newborns. Partnering with, and empowering families is key to ensuring preterm, sick and healthy newborns receive individualized, humanized, and high-quality care in various neonatal care units.

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