DNP Project Report Declaration Page

Evaluating and Educating Bedside Nurses on the Utilization and Interpretation of Appropriate Pain Assessment Tools for Postoperative Pediatric Neurosurgical Patients

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Abstract

Postoperative pain management specifically in pediatric neurosurgical patients can presents unique challenges. Specifically, inconsistencies in pain assessment practices among registered nurses can pose a large barrier. In turn, inadequate/inaccurate pain evaluation can lead to undertreated pain which in turn can lead to psychologic and physiologic consequences. This quality improvement project aimed to evaluate how effect an educational intervention designed to improve nursing knowledge and confidence in utilizing appropriate pain assessment tools was. A pre- and post-survey design was used to measure the overall efficacy of stated intervention. The initial survey collected demographic information, assessed baseline knowledge of organizational pain assessment tools, and self-reported confidence in managing postoperative pain in pediatric neurosurgical patients. After reviewing an educational PowerPoint reviewing organizational policies and age-appropriate pain assessment scales (how to use and apply) participants completed a post-survey using the same metrics. Findings revealed variability in baseline knowledge and inconsistencies in the application of pain scales, particularly children unable to utilize the Numeric Scale. After the intervention, survey data showed a modest improvement in overall knowledge. Additionally, there was a notable increase in self-reported confidence among participants in evaluating and managing postoperative pain, suggesting that the intervention positively influenced clinical assurance even if knowledge gains were less significant. While the intervention did not fully address all inconsistencies in practice, it highlighted the need for focused educational efforts to support nursing confidence and competence. These results support the need for ongoing training and standardized, evidence-based protocols to ensure consistent and effective pain assessment and management in postoperative pediatric neurosurgical care.

Keywords: pediatric neurosurgery, postoperative pain, pain assessment, pain screening, pain interpretation, nursing education, quality improvement, confidence, knowledge retention.

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Introduction

Problem Statement/Significance

One of the most significant complaints that many patients experience is pain, especially in the postoperative period, and it is, unfortunately, oftentimes undertreated and/or mismanaged. Pain is highly individualized to each patient and subsequently requires accurate and individual assessment for each patient. For the pediatric population, an added layer of difficulty is found due in part to their varied ages and developmental stages. There exist numerous verified screening and assessment tools for pain; the choice is at the discretion of the bedside registered nurse providing care, but they need to ensure that they consider the patient's cognitive ability, age and language (Zieliński et al., 2020) to assess pain as accurately as possible. More frequently, pain after neurosurgical procedures (such as in a craniectomy/craniotomy and so on) has been found to be mostly reported as moderate-to-severe and underestimated (Xing et al., 2019). Properly utilizing pain assessment tools can help to circumvent these issues.

Postoperative pain in the pediatric population has an incidence rate of approximately 67% at the twelve-hour mark post-surgery, with moderate-to-severe pain having an incidence rate of approximately 36.6% at the twelve-hour mark post-surgery (Rede et al., 2024). A retrospective study that took place in Finland from 1998 to 2018 found that 386 pediatric patients underwent neurosurgical intervention for a traumatic brain injury alone (Möttönen et al., 2023). Taking into consideration how many more diagnoses/conditions warrant neurosurgical intervention (i.e. brain tumors, epilepsy, craniosynostosis, tethered spinal cord, etc.) across the globe, the sheer number of pediatric patients likely to experience undermanaged postoperative pain is significant enough to raise a call to arms.

Many barriers to proper management of postoperative pain exist, and among them are the number of verified pain assessment tools that exist as a means to cater to age, language, cognitive ability, and more (Zieliński et al., 2020). Having the necessary knowledge to correctly choose the appropriate tool is the first step; then comes having the necessary knowledge to appropriately interpret the pain scale and apply the intervention, as in medicating the patient appropriately using scheduled and as needed (PRN) pain medications ordered to coincide with varied pain levels. Unacknowledged postoperative pain will inevitably go untreated or undertreated and can have a series of sequelae. Among them include, but are certainly not limited to, suppressed functions such as respiratory and immunologic, and psychological issues due to traumatic experience from pain, or PTSD (Saigh & Saigh, 2023).

Review of the Literature

Search Strategy

Using the FIU Library Database, CINAHL Ultimate database was accessed to search for sources; Google Scholar was also utilized to search for sources. Using the PICO search option, PICO components for this project were plugged in. Broken down, the PICO search was as follows - “P - postoperative pediatric patient”, “I – education”, “C – pre-survey”, and “O – improved pain management”. Using these search terms, 123,376 sources populated, but none that matched the exact search query. The search was further refined to exclude any sources that were dated from before 2018; this returned 53,320 sources. Only those sources with full and accessible text were reviewed. Sources that studied any of the following were considered for the purpose of this QI project: the bedside nurses’ role in postoperative pain management and those that studied

educational interventions to improve postoperative pain management, regardless of whether or not pediatric patients were involved.

Of the several studies reviewed to develop a literature review for this project, those selected were chosen due to their capacity to support and guide the development of this project. Of the sources that were chosen, one explored the role of educational intervention as a means to help change attitudes, increase knowledge of appropriate pain assessment, and change self-perception of skills related to pain assessment. One study explored the role of the bedside nurse in postoperative pain management. Three other studies were specific to pain management in the pediatric population, with one more specific to postoperative pain and its management in pediatrics. Specifically, one study examines nurse perception of bedside pain and its management (Bach et al., 2018). Another examines pain characteristics/assessment, and the challenges posed in a setting such as the pediatric intensive care unit, or PICU (Laures et al., 2019). A third dissects the ease and sense to use scales such as Individualized Numeric Rating Scale, or INRS, to assess those pediatric patients that have neurodevelopmental disabilities (Rowe & Best, 2024). Two other studies look at education as an intervention and how effective it is at improving knowledge and self-perception of using pain assessment tools (Cook et al., 2021) and the overall improvement of postoperative pain in the pediatric population (Smeland et al., 2022).

Individually, these studies contribute unique insights, and collectively, they support various aspects of the project, creating a robust foundation and strengthening its development. Each study offers qualities, results, or discussions that enrich the project's purpose and interventions.

Synthesis of the Evidence

Emerging Themes

A central theme in the selected studies for review is the inconsistent use of appropriate pain assessment tools in pediatric postoperative care, particularly for nonverbal or critically ill children. As noted by Laures et al. (2019), the wide array of behavioral and self-report pain scales being used in practice often fails to ensure the accuracy or appropriateness of pain evaluation. In some instances, the absence of any tool or the application of unsuitable tools—such as sedation scales, which are not designed to measure pain—further compounds this issue. This inconsistency hinders the ability to effectively evaluate pain, making it difficult to tailor interventions appropriately to each patient's unique needs. These findings highlight the challenges faced in ensuring that all pediatric patients, particularly those who are unable to verbally communicate their discomfort, receive accurate assessments of their pain.

Similarly, Rowe and Best (2024) emphasize the underutilization of standardized pain assessment tools. However, they point to an emerging solution with the Individualized Numeric Rating Scale (INRS), which has shown promise in bridging the gap for children with neurodevelopmental disabilities. The INRS allows for a more personalized approach, potentially providing a more accurate reflection of the child's pain experience compared to traditional pain scales. This focus on individualized tools suggests a shift toward a more nuanced and patient-centered approach to pain assessment, but also underscores the continued challenge of selecting and applying the most effective tool for diverse pediatric populations.

Another significant theme in the literature is the lack of knowledge and confidence among registered nurses in assessing and managing pediatric postoperative pain. Numerous studies point to this gap as a key barrier to effective pain management. Smeland et al. (2022)

demonstrated that educational interventions targeting nurses' knowledge and clinical application of pain management strategies were successful in improving both their use of pain scales and the reduction of moderate-to-severe pain in patients. This highlights the potential impact of training on improving clinical practice, especially when it encourages nurses to use pain assessment tools more consistently.

Cook et al. (2021) found that while educational curricula improved nurses' attitudes and self-perceptions of their pain management abilities, it did not necessarily result in increased objective knowledge or a significant change in clinical practices. This discrepancy suggests that while educational interventions can shift perceptions and self-reported confidence, translating these improvements into consistent, evidence-based practice remains a challenge. It implies that further attention needs to be paid to the practical application of knowledge and skills, ensuring that training leads to measurable improvements in patient care.

Bach et al. (2018) observed a critical disconnect between formal pain management guidelines and their application in clinical practice. Nurses reported that existing guidelines, though well-researched, were not perceived as particularly useful in day-to-day practice. Instead, personal beliefs, routine practices, and organizational culture were often more influential in shaping how pain management was carried out. This finding reveals a significant gap between evidence-based knowledge and clinical application, particularly in fast-paced, high-pressure environments like pediatric postoperative care. Despite the availability of formal guidelines, many nurses are left to rely on personal judgment or established routines, which can lead to variability in care and potentially less optimal outcomes for patients.

The final emerging theme emphasizes the importance of engaging parents in the pain assessment process. Rowe and Best (2024) found that parents who were involved in pain

management through tools like the INRS reported feeling empowered and more confident in their ability to support their child's care. This aligns with a growing recognition of the value of family-centered care, where parents play an active role in the decision-making and care process. By involving parents in pain assessment, healthcare providers not only improve the communication between families and the clinical team, but also ensure that pain management strategies are more attuned to the child's needs. This collaboration fosters a more holistic and supportive care environment, benefiting both patients and their families.

These emerging themes highlight several persistent challenges in pediatric postoperative pain management, from the inconsistent use of pain assessment tools to the gaps in nursing knowledge and the disconnect between guidelines and real-world practice. However, they also point to promising interventions, such as individualized pain scales and educational programs for nurses, which have the potential to improve pain management practices. Furthermore, the involvement of parents in the pain assessment process can enhance both the quality of care and family satisfaction, signaling a need for more inclusive and collaborative approaches in pain management. These themes underscore the complexity of pain management in pediatric postoperative care and the necessity for ongoing improvements in both education and practice to ensure better outcomes for patients.

Patterns in the Literature

A prominent pattern across the reviewed literature is the significant variability in pain assessment approaches. All the studies included in the review consistently acknowledge that pain assessment in pediatric postoperative care is not standardized. This lack of consistency contributes to challenges in accurately measuring and managing pain, particularly in children who are unable to communicate their pain levels verbally. The diversity of tools used, such as

behavioral and self-report scales, varies in both type and application across settings, leading to inconsistent pain management practices. This variability also complicates efforts to establish evidence-based guidelines that can be uniformly applied across clinical environments.

Laures et al. (2019) highlights that, in many cases, inappropriate or inconsistent tools, such as sedation scales being used to assess pain, can exacerbate the problem. These tools, while helpful in measuring sedation levels, are not designed to evaluate pain and therefore do not provide accurate information about the child's pain experience. This mismatch between the tool used and the patient's needs can lead to underassessment or mismanagement of pain, highlighting the urgent need for standardized, appropriate, and effective pain assessment tools that are specifically designed for pediatric postoperative patients.

Another consistent theme across the studies is the strong support for educational interventions aimed at improving nursing knowledge and practice in pediatric postoperative pain management. Several studies, including Smeland et al. (2022) and Cook et al. (2021), emphasize that education can play a pivotal role in enhancing the knowledge base of healthcare providers, particularly registered nurses, about effective pain management techniques and the use of pain assessment tools. These studies show that, through targeted education, nurses can develop a better understanding of pain assessment scales, their correct usage, and the importance of accurate and timely pain evaluation.

Smeland et al. (2022) specifically demonstrated that educational interventions improved the nurses' clinical application of pain scales, leading to better pain management and reduced reports of moderate-to-severe pain by patients. This suggests that when nurses are properly educated on the tools and techniques available for pain assessment, they are more likely to incorporate these practices into their routine care, ultimately leading to better patient outcomes.

Educational interventions that focus on practical applications, such as real-time feedback and simulation-based training, as discussed by Cook et al. (2021), have also been shown to improve nurse performance and confidence, reinforcing the idea that education is a key factor in improving practice behaviors. However, the literature also acknowledges that while educational interventions can improve attitudes and self-perceptions of pain management skills, the translation of these improvements into sustained clinical practice is not always straightforward. For example, Cook et al. (2021) noted that, despite positive changes in nurses' attitudes and self-confidence, objective measures of knowledge or behavior change did not always show significant improvement. This highlights the challenge of ensuring that educational programs lead to lasting, measurable changes in practice, which underscores the need for ongoing professional development and reinforcement of learned skills in real-world settings.

In response to the variability and gaps in pain assessment, the literature suggests several adapted approaches that aim to improve pain management in pediatric postoperative patients. These adapted strategies include the use of individualized tools, such as the Individualized Numeric Rating Scale (INRS), and the selection of patient-specific assessment tools that are more closely aligned with the child's developmental stage, cognitive abilities, and specific medical condition.

Laures et al. (2019) advocates for the careful selection of pain assessment tools that best match the patient's condition, recognizing that not all tools are suitable for every patient. For instance, self-report scales may be inappropriate for nonverbal children or those with cognitive impairments, and therefore, alternative tools such as observational pain scales or individualized scales like the INRS may be more effective. By tailoring the pain assessment tool to the patient's

needs, healthcare providers can more accurately assess pain and deliver appropriate interventions.

Furthermore, real-time, bedside feedback training, as recommended by Cook et al. (2021), is gaining traction as an effective approach for improving the use of pain scales in clinical practice. This form of training provides nurses with immediate feedback on their pain assessments, which allows for timely adjustments and refinements in practice. Such feedback mechanisms help ensure that pain management interventions are both evidence-based and responsive to the changing needs of the patient.

Despite the promising benefits of these individualized and adaptive approaches, a critical pattern across the literature is the call for greater standardization in pain assessment practices. The variability in tool usage and the challenges in translating educational interventions into consistent clinical behavior underscore the need for standardized protocols that guide pain assessment and management in pediatric postoperative care. Standardization would not only ensure that all patients receive the most appropriate care based on their unique needs, but it would also facilitate the collection of consistent, high-quality data on pain management outcomes across different settings.

While individualized tools and approaches are valuable in addressing the diverse needs of pediatric patients, the overall goal should be to ensure that all healthcare providers are equipped with the necessary tools, knowledge, and confidence to assess and manage pain effectively. This can only be achieved if the strategies and tools used are consistent and aligned with best practice guidelines, ensuring that patients consistently receive optimal pain management interventions.

The literature reviewed reinforces several key patterns in the area of pediatric postoperative pain management: the variability in pain assessment approaches, the strong support

for educational interventions, and the use of adapted approaches such as individualized pain scales and bedside feedback training. These patterns highlight both the progress being made in improving pain management practices and the ongoing challenges in achieving consistent, standardized care. Educational interventions, while valuable, need to be complemented by system-wide changes that standardize pain assessment tools and integrate feedback mechanisms into everyday clinical practice. Only by addressing these issues comprehensively can we ensure that pediatric patients receive the highest quality of care and optimal pain management during their postoperative recovery.

Conflicted Findings

Smeland et al. (2022) conducted a study that demonstrated substantial improvements in both clinical practice and patient-reported outcomes following the implementation of an educational intervention aimed at improving pain management for pediatric patients after surgery. The findings of this study suggested that nurses who participated in the educational program not only showed increased knowledge of pain management tools, but also utilized these tools more effectively in practice. This, in turn, led to reductions in patient-reported pain and better overall pain management outcomes. The improvement in clinical practice was marked by an increase in the use of pain assessment tools, including standardized scales, which aligned with the observed decrease in moderate-to-severe pain levels in postoperative pediatric patients.

Nevertheless, the study's positive outcomes bring to light a fundamental challenge in pain management education: the sustainability and long-term applicability of these improvements. While the immediate effects on clinical practice and patient-reported outcomes were evident, Smeland et al. (2022) did not fully address whether these improvements were maintained over time. Given that pain management is a complex and dynamic process, the question arises

whether a single educational intervention can truly foster lasting behavioral changes, particularly in the fast-paced, resource-constrained environments of pediatric postoperative care.

Cook et al. (2021) conducted a study that explored the effectiveness of educational interventions on pain management in pediatric settings. While the study found that educational curricula improved nurses' attitudes and self-reported confidence regarding pain management, it also uncovered a significant limitation: knowledge retention was limited over time. This finding suggests that the initial improvements seen post-intervention may not be sustained, highlighting a critical issue with relying on one-time training programs.

The limitation of Cook et al.'s (2021) study raises a concern about the long-term impact of a single educational session on clinical practice. The short-term gains observed may not translate into sustained improvements in knowledge or pain management behaviors without continued reinforcement. Pain management is a skill set that requires ongoing practice, updates, and feedback to ensure that healthcare providers not only retain the knowledge gained but also integrate it into their day-to-day clinical decision-making. Cook et al. (2021) argue that one-time educational interventions may not provide enough of a "lasting change" in the knowledge base of nurses and that follow-up training, ongoing professional development, and regular assessments of knowledge retention are critical to ensuring the persistence of the initial improvements. This suggests that a more holistic, sustained approach to professional development is needed, rather than relying solely on periodic or isolated training sessions.

Bach et al. (2018) presented an additional layer of complexity to the discussion by arguing that even evidence-based guidelines for pain management are insufficient unless they are perceived as relevant and adaptable by nurses in the field. This finding highlights the importance

of not only educating nurses on theoretical pain management approaches but also ensuring that these approaches are practically applicable to real-world clinical scenarios.

While educational interventions may improve nurses' understanding of evidence-based guidelines, the true effectiveness of these guidelines depends on how well they are integrated into the clinical environment. Bach et al. (2018) emphasize that guidelines, if they are not adaptable or perceived as relevant to the daily realities of the clinical setting, are less likely to be followed. For instance, guidelines that are too rigid or generic may fail to address the specific needs of diverse pediatric patient populations, such as nonverbal children or those with complex medical conditions. As a result, nurses may feel that the guidelines are disconnected from the realities they face in patient care, leading them to rely on personal judgment or established routines instead.

This insight underscores the need for educational content to be closely tied to real-world applicability. Educational programs should not only focus on theoretical knowledge but also emphasize how to adapt guidelines and pain management strategies to the unique challenges and complexities of each clinical setting. This includes fostering the skills necessary to interpret and apply guidelines in a way that considers individual patient needs and the dynamic nature of pediatric postoperative care.

The conflicting findings from Smeland et al. (2022), Cook et al. (2021), and Bach et al. (2018) highlight the complexity of improving pain management practices through educational interventions. Smeland et al. (2022) found clear improvements in clinical outcomes following a one-time educational intervention, but the sustainability of these improvements over time is uncertain. Cook et al. (2021) cautioned that without ongoing reinforcement, knowledge retention from a one-time training may be limited, thus reducing its long-term impact on clinical practice.

Meanwhile, Bach et al. (2018) emphasized that pain management guidelines alone, no matter how evidence-based, may fail unless they are seen as adaptable and relevant to real-world practices.

Together, these findings suggest that while educational interventions can yield positive short-term results, lasting improvements in pain management require ongoing efforts. A single session of training is unlikely to be sufficient to bring about long-term changes in behavior or knowledge retention. Additionally, the success of any intervention is dependent on ensuring that the content is not only relevant but also adaptable to the specific needs of the clinical environment. In short, the evidence suggests that a more integrated and continuous approach to education, which includes regular reinforcement, practical application, and real-time feedback, is necessary to overcome the limitations of isolated, one-time training sessions.

These conflicting findings provide valuable insights into the complexities of improving pain management practices. They highlight the importance of a multifaceted approach to education that goes beyond one-time interventions and includes ongoing support, feedback, and adaptability to real-world challenges. The success of educational programs in pain management will depend on not only improving knowledge and skills but also fostering an environment where these skills can be effectively applied in the context of individual patient needs and clinical realities. Future research should focus on exploring the effectiveness of continuous education, feedback mechanisms, and the integration of adaptable guidelines to create a more sustainable and impactful approach to improving pediatric pain management.

Gaps in Knowledge

One of the most significant gaps in the literature surrounding pediatric pain management is the lack of universal consensus on which pain assessment scale should be considered the "gold

standard" for specific pediatric populations. Laures et al. (2019) highlighted this issue, noting that while a variety of pain scales exist, there is no definitive agreement on which scale is the most appropriate across different pediatric groups. This lack of standardization has led to considerable variability in how pain is assessed and managed in pediatric settings, resulting in inconsistent clinical practices.

Different pediatric populations, ranging from neonates to adolescents and including those with neurodevelopmental disabilities or communication impairments, present unique challenges when it comes to accurately assessing pain. For example, children who are nonverbal or critically ill may not be able to communicate their pain levels effectively, requiring the use of observational or behavioral pain scales. However, these tools vary significantly in terms of their sensitivity, specificity, and ease of implementation, leading to confusion among healthcare providers about which scale to use. This variability in assessment practices can lead to inadequate or inappropriate pain management, as clinicians may rely on tools that do not best capture the pain experiences of their patients.

Moreover, while some studies have explored the use of individualized pain scales, such as the Individualized Numeric Rating Scale (INRS), there is still a lack of widespread adoption or consensus on such tools. The absence of a standardized approach to pain assessment means that different clinicians may use different tools, leading to inconsistent assessments and, potentially, poor patient outcomes. The challenge, then, lies in establishing a universally accepted pain scale that can be adapted to the varied needs of pediatric populations, ensuring that all patients receive appropriate, accurate assessments of their pain.

Another key gap identified in the literature is the poor integration of existing pain management guidelines into the nursing workflow. As Bach et al. (2018) argue, evidence-based

guidelines alone are insufficient if they are not seamlessly incorporated into clinical practice. Nurses often report that, although guidelines are available, they are not always easy to apply or fully aligned with the realities of clinical care. This lack of integration stems from several factors, including the complexity of pain management tasks, the fast-paced nature of clinical environments, and insufficient support for nurses in implementing these guidelines effectively.

Guidelines may be perceived as cumbersome or impractical for routine use, especially when nurses are under pressure to manage multiple patients simultaneously, often with limited time and resources. Additionally, when guidelines do not account for the specific challenges faced by pediatric patients—such as those with cognitive impairments, communication difficulties, or complex pain presentations—they may be viewed as irrelevant or difficult to apply. Consequently, despite the availability of these guidelines, they are often underused or overlooked in favor of personal experience or established routines, which may not be aligned with best practices.

For pain management guidelines to be effective, they must be integrated into daily nursing practices in a way that is both practical and aligned with the realities of patient care. This includes streamlining the guidelines, providing nurses with real-time feedback, and ensuring that the tools and resources needed to follow the guidelines are readily accessible. Without such integration, the guidelines will remain underutilized, and the potential for improving pain management practices will not be fully realized.

Cook et al. (2021) noted another important gap in the research: the limited focus on the long-term retention of pain management knowledge in registered nurses, as well as the impact of refresher education on maintaining and enhancing these skills over time. While educational interventions have demonstrated short-term improvements in nurses' knowledge and confidence

regarding pain management, fewer studies have addressed whether this knowledge is retained in the long term or if periodic refresher courses are needed to reinforce and update nurses' understanding.

The issue of knowledge retention is particularly important in the context of pediatric pain management, as it is a specialized field requiring continuous learning to keep up with evolving best practices, new pain assessment tools, and emerging research on pediatric pain. Without adequate follow-up education, even nurses who initially perform well after training may see a decline in their ability to apply pain management techniques effectively over time. Moreover, the absence of regular refresher training may lead to the reversion to outdated practices or the use of tools that are no longer considered best practice.

The lack of research into the long-term effectiveness of educational interventions also limits the ability of healthcare organizations to design more effective professional development programs. To improve pediatric pain management, it is crucial to explore the effectiveness of various forms of ongoing education, such as refresher courses, mentorship programs, and evidence-based workshops, to ensure that nurses retain and apply the necessary skills and knowledge over the course of their careers.

The integration of new pain assessment tools, such as the Individualized Numeric Rating Scale (INRS), into nursing practice presents another gap in the research. Rowe and Best (2024) identified that there is limited research on the barriers to implementing these innovative tools into daily nursing routines. While the INRS has shown promise in improving pain assessment for pediatric patients, particularly those with neurodevelopmental disabilities, it has not been widely adopted in clinical settings. One of the primary reasons for this limited adoption is the practical difficulty of incorporating a new tool into the existing workflow.

There are several barriers to the widespread implementation of new pain assessment tools. First, nurses may be resistant to adopting unfamiliar tools, especially if they are already accustomed to using other scales that they believe are effective. Resistance to change is a common challenge in healthcare settings, where established routines and practices are deeply ingrained. Second, the lack of training or resources to support the new tool can also hinder its implementation. Nurses may not feel confident using the INRS without adequate training, and if the tool is not readily available in the clinical setting, they may opt for more familiar, but less appropriate, methods.

Furthermore, the time and resources required to introduce new tools into clinical practice can be a significant obstacle. The process of educating staff, providing ongoing support, and integrating the new tool into electronic health records or other documentation systems can be resource intensive. Without adequate support and clear evidence of the benefits, healthcare organizations may be reluctant to invest in the implementation of new tools, even if they hold promise for improving pain management outcomes. These gaps in knowledge highlight several critical areas that require further research and development to improve pediatric pain management practices. The absence of a universally accepted pain assessment scale, the poor integration of guidelines into clinical workflows, the limited understanding of long-term knowledge retention, and the barriers to implementing new tools all point to the need for more focused efforts in addressing these issues.

To close these gaps, future research should focus on identifying the most effective pain assessment tools for diverse pediatric populations and ensuring their widespread adoption through better integration into clinical practice. Additionally, ongoing education and refresher courses should be evaluated for their impact on knowledge retention and long-term clinical

outcomes. Finally, more research is needed on the barriers to the implementation of new tools like the INRS, with a focus on overcoming resistance to change and improving the overall integration of these tools into everyday practice. By addressing these gaps, healthcare providers can improve their ability to assess and manage pediatric pain effectively, leading to better outcomes for children undergoing surgery and other painful procedures.

Relevance to Practice

The literature reviewed and synthesized strongly supports the implementation of a quality improvement project that focuses on educational interventions to improve pediatric postoperative pain management, particularly within the context of neurosurgical patients. The body of evidence indicates that educational programs have the potential to substantially enhance nursing practice, especially in critical areas such as pain assessment and management. By emphasizing the relevance of education in shaping clinical practice, the following sections explore how this evidence aligns with and supports the goals of the proposed QI project.

Several studies underscore the positive impact of educational interventions on nursing confidence and behavior, especially in the context of pediatric pain assessment. As Smeland et al. (2022) and Cook et al. (2021) demonstrated, educational programs designed to improve pain management in pediatric patients have led to significant increases in nursing knowledge and self-reported confidence. Nurses who participated in these programs not only gained better understanding of pain assessment tools but also felt more confident in applying these tools during clinical care.

This boost in confidence is particularly crucial in the pediatric neurosurgical setting, where effective pain management is vital for both the comfort and recovery of postoperative patients. Neurosurgical patients often experience high levels of pain following surgery, and the

accuracy of pain assessment directly influences the effectiveness of subsequent interventions. When nurses feel more confident in their ability to assess pain accurately, they are more likely to use pain management tools consistently and appropriately, leading to improved outcomes for patients. This finding supports the idea that educational interventions aimed at increasing confidence can bridge the gap between theoretical knowledge and practical application, making nurses more adept at addressing complex pain management challenges.

Bach et al. (2018) pointed out that existing guidelines are often not effectively implemented in clinical practice because they are perceived as difficult to adapt to the dynamic and varied needs of real-world settings. In pediatric neurosurgery, where patients' pain levels may fluctuate rapidly and where clinical conditions vary greatly, guidelines alone are not enough to ensure effective pain management. The findings in Bach et al. (2018) underscore the importance of educational content that is not only evidence-based but also contextualized to reflect the complexities and realities of pediatric care.

In the context of this QI project, educational interventions that are tailored to the specific needs of pediatric neurosurgical patients will help bridge the gap between abstract guidelines and clinical realities. For example, pain management strategies may need to be adjusted based on a patient's age, developmental stage, and specific postoperative needs, factors which may not always be fully addressed by generic pain management protocols. Therefore, a QI project that focuses on training nurses in evidence-based guidelines while providing context-specific insights would empower them to make more informed decisions, leading to a better alignment between formal pain management protocols and the everyday challenges of clinical practice.

The literature also emphasizes the role of education in enhancing communication and family engagement in the pain management process. Rowe and Best (2024) demonstrated that

involving parents in pain assessment and management not only improves the accuracy of pain evaluations but also fosters a stronger sense of collaboration and trust between families and healthcare providers. Tools like the Individualized Numeric Rating Scale (INRS) have been found to empower parents by giving them a structured way to assess their child's pain, thereby contributing to family-centered care.

In pediatric neurosurgery, where pain can often be complex and subjective, family members play an essential role in identifying pain cues, especially in children who are nonverbal or unable to articulate their discomfort. Educational interventions that teach nurses how to engage parents and caregivers in the pain assessment process can create a more holistic approach to care. By training nurses on how to effectively communicate with families, healthcare providers can ensure that pain management decisions are made collaboratively, improving both the accuracy of pain assessments and the quality of care provided to pediatric patients. This collaborative, family-centered approach is especially important in pediatric neurosurgery, where outcomes are influenced by both clinical interventions and the support provided by caregivers.

One of the critical challenges in pediatric pain management is the variability in the use of pain assessment tools. As Laures et al. (2019) noted, pain assessment practices can differ widely depending on the tool used, the knowledge of the clinician, and the specific needs of the patient. This variability can lead to inconsistencies in pain measurement and management, potentially resulting in suboptimal care.The evidence suggests that educational interventions, when properly tailored and implemented, can reduce this variability by ensuring that nurses are familiar with and confident in using standardized pain assessment tools. In this QI project, the goal would be to standardize pain assessment practices by educating nurses on the use of validated, evidence-based tools that are appropriate for pediatric neurosurgical patients. By providing consistent

training and reinforcing the use of standardized tools, the project can foster more accurate and reliable pain assessments, which, in turn, will lead to more effective and timely pain management interventions.

The synthesis of the current literature clearly reveals a significant need for structured, practical, and ongoing education to improve pediatric postoperative pain management. One-time training sessions, while beneficial in the short term, do not provide the sustained impact necessary for lasting improvements in clinical practice. As Cook et al. (2021) pointed out, knowledge retention can be limited without ongoing reinforcement, and the application of learned skills requires regular practice and feedback.

In the context of a QI project aimed at improving pediatric neurosurgical postoperative pain management, an educational intervention that includes both initial training and ongoing support through refresher courses, real-time feedback, and hands-on bedside training will likely be more effective. This approach ensures that nurses retain and apply the knowledge they gain, and it helps them stay updated on best practices and emerging tools for pain management. Ongoing education also provides an opportunity for nurses to refine their skills over time, addressing any challenges or gaps in their practice.

The evidence presented in the reviewed literature strongly supports the implementation of a QI project focused on educational intervention to improve pediatric postoperative pain management, particularly for neurosurgical patients. Educational programs tailored to clinical realities, those that incorporate hands-on training, real-world applicability, and family engagement, have the potential to enhance nursing knowledge, improve the use of pain assessment tools, and ultimately lead to better patient outcomes.

A structured, ongoing education model, which reinforces knowledge and practice over time, will help close the gaps identified in the literature, particularly in terms of pain assessment tool use, guideline integration, and family-centered care. This QI project is well-positioned to address these key gaps, ultimately improving both the quality of care provided to pediatric neurosurgical patients and their postoperative recovery outcomes. By bridging these gaps with targeted education and continuous support, the project can foster a more standardized, effective, and compassionate approach to pediatric pain management.

Project Purpose and Clinical Question

Purpose Statement

The primary purpose of this QI project is to deliver educational interventions to those registered nurses at the bedside on the appropriate selection, use, and interpretation of pain assessment tools for managing pediatric neurosurgical patients, aiming to enhance their knowledge and improve pain management effectiveness.

PICO Clinical Question

In bedside nurses caring for postoperative neurosurgical patients, does education on appropriate use of pain assessment tools increase their knowledge of how to properly utilize and interpret pain scales?

P- Bedside nurses caring for postoperative neurosurgical patients

I-Education on the appropriate use of pain assessment tools

C-Pre-survey

O-Increase in registered nurses' knowledge and management of utilization and interpretation of pain scales

SMART Objectives

The overall goal of the implementation plan is to increase the total knowledge of registered nurses' and how to appropriately utilize and interpret pain assessment tools in the management of postoperative neurosurgical pain in the pediatric patient by implementing education specific on how to select, use, and interpret pain assessment tools.

Objective #1 – The Overall Goal

Specific. The focus of this project is on increasing the knowledge of registered nurses on appropriate selection, utilization and interpretation of available pain assessment tools.

Measurable. There will be an increase in nurses' knowledge, as evidenced by a higher number of correct responses on a post-survey when compared to a pre-survey.

Attainable. This goal will be achievable with an educational intervention.

Relevant. This goal is directly related to the improvement of patient quality of care.

Time-bound. This goal aims to be achieved by the time the post-survey is administered which will occur immediately following the educational intervention.

Objective #2 – Creation of Pre- and Post-Survey

Specific. The focus of this objective is to create the means necessary to evaluate nurses' knowledge of the subject before and after the educational intervention.

Measurable. There will be a completed and relevant pre-and post-survey able to evaluate nurses' knowledge of the subject.

Attainable. This objective will be achievable with the guidance of project mentors.

Relevant. This objective is directly related to being able to implement the plan.

Time-bound. This objective aims to be achieved by the time the project is submitted for IRB approval.

Objective #3 – Creation of an Educational Intervention

Specific. The focus of this objective is to compile relevant information on the selection, utilization and interpretation of available pain assessment tools.

Measurable. There will be a complete and succinct PowerPoint containing pertinent information on the selection, utilization and interpretation of available pain assessment tools.

Attainable. This objective will be achievable with the guidance of project mentors.

Relevant. This objective is directly related to increasing nursing knowledge and thereby the improvement of patient quality of care.

Time-bound. This objective aims to be achieved by the time the project is submitted for IRB approval.

Objective #4 – Recruitment of Participants

Specific. The focus of this objective is to recruit nurses to partake in the project.

Measurable. There will be 10-15 registered nurses who volunteer to participate.

Attainable. This objective will be achievable through dispersed flyers/QR code.

Relevant. This objective is directly related to the overall success of implementing the project.

Time-bound. This objective aims to be achieved immediately prior to implementing the project.

Definition of Key Terms

Neurosurgical – Specifies surgery that is performed on any part of the nervous system, such as the spinal cord and brain (Tewari et al., 2020)

Bedside nurse – Describes a healthcare provider who has a role in direct and personal care to a patient; their role includes responsibilities that are key to the recovery and overall well-being of patients (American Institute of Alternative Medicine, 2023)

Post-operative – The period of time after surgery (NCI Dictionary of Cancer, n.d.)

Pediatric – The period of time from birth through adolescence; those providers specializing in pediatrics have to address the unique variables surrounding children such as emotional, developmental, and medical needs (American Academy of Pediatrics, 2015)

Educational intervention – Development of strategies that are used to improve knowledge, attitudes, skills, and behaviors (*Health Education and Promotion*, n.d.)

Pain assessment tool – Scales that have been tested for reliability, validity, and usability that are used to rate pain intensity (*Nursing Guidelines: Pain Assessment and Measurement*, n.d.); examples include: behavioral (FLACC), self-report (Visual Analogue Scale, Wong-Baker Faces).

Conceptual Underpinning and Theoretical Framework

Theoretical Framework

There exists a plethora of theoretical frameworks, however, the one most closely aligned with the goals and objective of this specific project and that is helping to inform the design, implementation, and evaluation is Katherine Kolcaba's Comfort Theory (1994). Her theory endorses that to define comfort is difficult due to its complexity as a result of being multidimensional, but all the same, comfort is a basic human need that remains an essential part of human life (Kolcaba, 1992). Her theory looks at all the different aspects of comfort, of which proper pain relief is one of the cogs in the wheel; no one piece is more important than the next, and with that, being able to effectively and accurately assess/treat pain is a pivotal part to

guaranteeing a patient's overall comfort. Specifically, as it pertains to this QI project, accurately assessing, and thereby treating, a postoperative patient's pain is key to optimizing the patient's comfort.

Conceptual Framework

One such conceptual framework that guides this project and informs its design, implementation, and evaluation is the AACN Synergy Model for Patient. At its very core, this model sustains the notion that nurse competencies required for quality patient care are primarily driven by the needs of the patient (Synergy Model - AACN, n.d.). When the needs of a patient align with the competencies of the nurse, synergy is the result. In this specific QI project, the needs of the patient refers to properly managed postoperative pain, and the competencies of the nurse refers to the ability to appropriate select, utilize and interpret selected pain assessment tools. The goal of this project is to increasing nursing knowledge of assessing and interpreting pain in order to properly treat; in short, by increasing their knowledge, their competencies are also addressed making them better suited to treating their patients.

Methodology

Project Design

This quality improvement project has a quasi-experimental, pre- and post- intervention design. This will allow for a simple, yet efficient way to evaluate the impact of the educational intervention and the design also allows for measurable feedback into the improvement of knowledge and shift in self-perceived confidence.

Setting and Participants

This project took place on a specialized pediatric Neurology Unit. This specific unit at the research site is located in South Florida and is committed to providing complete and quality

healthcare to the pediatric population. Known as 5Tower, this unit is known for caring for the majority of the postoperative neurosurgical patients. The participants of this project are mainly the bedside nurses who provide care for those neurosurgical postoperative patients; the patients and, subsequently, their families are the ones who will reap the most benefit from this project. Inclusion criteria is met by those nurses who work primarily on 5Tower; float nurses who have completed training on 5Tower are welcome to participate as well. Those nurses who have not completed training on 5Tower meet exclusion criteria.

Sampling and Recruitment

This project originally aimed for a sample size between ten and fifteen participants, at the end, the sample size was eleven participants. A flyer was created and ultimately provided a quick synopsis of the project and engaged those who took note, and met eligibility criteria, to partake. Recruitment took place over two weeks to ensure sample size met the criteria approved by IRB (ten to fifteen participants).

Ethical Considerations and IRB Approval

Prior to any measures being taken within the research facility, this project was first presented to their Evidence-Based Council for approval. Subsequently, a letter of support was given to be used as part of the process for approval from the Institutional Review Board, or IRB. IRB approval allows for work to officially be started and also helps to guarantee that ethical standards, as well as laws specific to research with human subjects, are adhered to. All the information will be collected anonymously, ensuring the protection of participant data and ensuring confidentiality. Any information about the participant collected during the pre-survey, while specific to areas such as age, years of practice, self-rating of knowledge, etc., will be unable to identify a specific participant. This project does not require informed consent to be

obtained. By scanning the QR code and proceeding with the pre-survey, implied consent is given.

As a means to maintain confidentiality and protect the data gathered, this information was all exported from the Qualtrics form into a secure, encrypted, password-protected folder. Only those who were directly involved in the project had available access to this information; these persons include, but are not limited to, the primary investigator and other selected members of the research team. Protocols specific to data disposal were subsequently implemented to properly dispose of data related to this research, and applicable information was properly archived for to be used for future research.

Intervention Description

The project began with the creation of a pre- and post-intervention survey that had two portions, a knowledge portion with multiple choice and true/false questions to be graded for correctness, and a confidence portion that had participants rate their confidence in three separatee areas: selecting appropriate pain tools, interpreting pain tools, and applying pain score for appropriate pain management. The pre-intervention survey initially had questions addressing demographics and then asked participants to rate their confidence in utilizing and interpreting pain assessment tools to treat their patients. These questions were followed by multiple choice questions that were derived from the research facilities policies on pain management. Final questions were case scenario-based. The post-intervention survey was almost identical in nature, however, there were no demographic questions, and the case scenario-based questions were different. The post-intervention survey also had participants rate their confidence in the same three areas after reviewing the education.

Second, the educational material was created with the goal to increase the knowledge and confidence of the bedside nurse to correctly select, apply, and interpret pain assessment tools available for use on 5Tower. Once the pre-/post-intervention surveys and educational material was finalized, recruitment of participants took place. Specifically, recruitment took place over two weeks; the pre-survey, educational intervention, and post-survey were all completed in one day by the participant once started. Participants for this project were ultimately recruited through a variety of ways, but primarily via a flyer contained a brief overview of the project, as well as a QR code with further instructions and links to the pre-/post-intervention survey and the educational material. The unit clinical educator also played a large and important role in enabling the nurses and pushing them to participate for the betterment of the care they provide and their patient's quality of life. Upon scanning of the QR code on the flier, the nurses were presented with further instructions and links to the pre-/post-intervention survey. The pre-intervention survey had to first be completed before participants were able to access the educational material (the intervention) presented in PowerPoint format. Afterwards, they could then proceed and had access to the post-intervention survey.

The educational material that was presented as the intervention was highly specific to the use of the pain assessment tools utilized within the research facility, and especially those used on 5Tower. The information that can be found on the PowerPoint was ultimately derived from the research facility's policies on pain management in order to firstly ensure delivery of evidence-based guidelines, but also to align with the facility's practices to better serve the participants. There was two weeks allotted for participants to complete the project activities, in which time data was simultaneously collected and analyzed. The pre- and post-intervention surveys were

completed on a Qualtrics form for anonymity, ease of dissemination, and easier data collection and analysis.

Data Collection Procedures

Data collection did occur at two specific intervals during the implementation of this project; specifically, baseline assessment of knowledge and self-ratings were collected prior to the educational intervention during the pre-intervention survey. The second interval in which data was collected was after the educational intervention was presented, in the form of a post-intervention survey. This method ultimately allowed for assessment of, and direct correlation between, knowledge and self-perceptions and how they are affected by the educational intervention. The instruments used for data gathering (the pre- and post-intervention surveys) were initially discussed with mentors, faculty and the clinical educator of 5Tower to check for bias and determine reliability and validity. The structured surveys aimed to gather mainly quantitative data and to measure if there was an increase in knowledge and self-rating of confidence following the educational intervention. The post-intervention survey also served to collect information regarding the participants' opinions on the efficacy and clarity of the education presented as part of the intervention. This feedback can help refine the material for future research.

Measures and Instruments

Two outcomes were evaluated and analyzed. The primary outcome, and overall focus of the project, that was measured was a positive change in knowledge scores when comparing post-intervention survey results to pre-intervention survey results. A secondary outcome that was an unintended finding, but inevitably measured, was a positive change in self-reported confidence

levels in regard to selecting, interpreting, and applying pain assessment tools to appropriately assess and treat pain.

Data Analysis Plan

Based on the variables that were collected in this project, descriptive statistics was ultimately used in order to both summarize and to characterize the data collected during the pre- and post-intervention surveys. Such statistics that were used included measures of variability (as in standards of deviation), measures of central tendencies (as in median and mean), and frequencies. These descriptive statistics helped greatly to shed light on the variability and distribution of key variables such as completion, increase in knowledge, and positive change in self-rating of confidence. Also, there was a Likert-scale aspect to the surveys that measured participants' self-rating of their perceived ability and confidence in selecting, interpreting, and applying pain assessment tools in both pre- and post-intervention surveys. Participants were asked to rate their confidence in the three domains on a scale of one to five, where one signified that they strongly disagreed with the confidence statement, and five signified that they strongly agreed with the confidence statement.

Results

Data was collected to demonstrate how participants did on the pre-intervention survey versus the post intervention survey, and this information was represented by percentage of number correct responses the participant achieved on the knowledge portion of the pre-intervention and post-intervention survey, out of a total of thirteen questions (Table 1). Descriptive statistics was then used to analyze these results (Table 4). There is a standard deviation of 1.1 with the mean of 1.73 suggesting moderate variability, where most participants improved by 0.6 to 2.8 points. The most common change was an increase of two points. Cohen's

d was calculated to measure the practical significance of these findings.; d was approximately 1.57, which signifies a large effect size, or that the intervention used in this project most likely had a strong impact. Considering that the data was roughly symmetric where the median and mode were both 2, a paired t-test was calculated to determine statistical significance. With a degree of freedom of 10, for the two-tailed test, where $t = 5.22$, this is above the critical value of ~2.23, so $p < 0.001$ suggesting the improvements seen were statistically significant. The ultimate take-away from these results is that the intervention significantly improves overall scores.

Descriptive statistics was used to analyze the data as it pertains to participants' self-reported confidence in selecting the appropriate pain assessment tool before and after the educational intervention was implemented (Table 5). Participants were asked to rate their self-confidence on a scale of one to five, with one being that they strongly disagreed with the confidence statement and five being that they strongly agreed with the confidence statement. What was found here was that even before the intervention, participants had a high level of self-reported confidence with a mean of 4.45, and most reporting scores of five. After the intervention, the mean confidence rose from 4.45 to 4.82, indicating a positive shift – even among an already confident group. This is suggestive that the educational content still added value. The standard deviation decreased from 0.69 to 0.4, which means confidence ratings became more consistent overall. Fewer participants were uncertain or rated themselves at a lower confidence level after the intervention. The minimum confidence score improved from three to four showing that those who were less confident prior to the intervention benefited the most. This data helps to support the notion that the education intervention was effective in reinforcing and enhancing clinician confidence in selecting appropriate pain assessment scales. This is a vital

skill for ensuring accurate pain evaluation and management in pediatric postoperative neurosurgery. Even among an already confident group, the intervention fostered great consistency and helped to elevate all participants to a higher baseline of confidence.

Descriptive statistics was used to analyze the data as it pertains to participants' self-confidence rating in interpreting pain assessment scales before and after the education was implemented (Table 6). Participants were asked to rate their self-confidence on a scale of one to five, with one being that they strongly disagreed with the confidence statement and five being that they strongly agreed with the confidence statement. Following the educational intervention, participants reported a notable increase in confidence when interpreting pain scores. The mean confidence score improved from 4.36 (SD = 0.67) to 4.82 (SD = 0.40)**,** indicating a strong overall shift toward higher self-assurance. The median and mode both increased from 4 to 5, suggesting that the typical and most frequent response moved to the highest confidence level. The minimum score improved from 3 to 4, eliminating lower confidence ratings and narrowing the range of responses. The reduction in standard deviation reflects a more consistent confidence level among participants following the intervention. These findings suggest that the intervention not only enhanced confidence across the board, but also helped to standardize interpretation skills, an important outcome in ensuring accurate, timely pain management in pediatric postoperative neurosurgical care.

Descriptive statistics was used to analyze the data as it pertains to participants' self-confidence rating in applying pain assessment scales to appropriately medicate patients before and after the education was implemented (Table 7). Participants were asked to rate their self-confidence on a scale of one to five, with one being that they strongly disagreed with the confidence statement and five being that they strongly agreed with the confidence statement.

Following the educational intervention, participants demonstrated a marked increase in confidence when applying pain scores to guide PRN (as needed) pain medication administration. The mean confidence score rose from 4.36 (SD = 0.67) to a perfect 5.0 (SD = 0.0) on a 5-point scale, indicating that every participant reported the highest possible level of confidence after the intervention. The median and mode also increased from 4 to 5**,** and the minimum score improved from 3 to 5, reflecting a complete elimination of lower confidence ratings. The drop in standard deviation to zero signifies total uniformity in post-intervention responses — a rare and powerful outcome. These results suggest that the intervention was exceptionally effective, not only boosting confidence across the board but also ensuring complete alignment among participants in their ability to apply pain assessment data to clinical decision-making. This outcome is critical for promoting consistent, safe, and evidence-based pain management in pediatric postoperative neurosurgical care.

Data was collected to demonstrate the demographics collected as they relate to the participants' years of experience as a bedside nurse and also their years of experience caring for postoperative pediatric neurosurgical patients (Table 8). The participant group demonstrated a broad range of clinical experience, both in general nursing and specifically in the care of postoperative neurosurgical patients. In terms of general nursing experience, nearly half of participants (45.5%) reported having 6–10 years of experience as registered nurses, indicating a strong core of mid-career clinicians. An additional 18.2% each reported either less than 1 year or 2–5 years of experience, suggesting that 36.4% of the sample were relatively early in their careers**.** Another 18.0% had more than 10 years of experience, contributing senior-level insight and perspectives. This distribution suggests a balanced mix of novice, intermediate, and seasoned nurses, which may enhance interdisciplinary learning and reflective practice during

interventions. In terms of pediatric postoperative neurosurgical experience, experience in caring for postoperative neurosurgical patients was slightly more concentrated in early-career groups. 36.4% had 2–5 years of experience, and 27.3% had less than 1 year, meaning over 63% had 5 years or fewer of neurosurgical-specific experience. Only 9.0% reported more than 10 years in this highly specialized area, showing that deep neurosurgical expertise was limited among the sample. This may explain the pre-intervention variation in confidence levels, particularly in applying pain scores to guide PRN medication administration, a task that requires both general clinical judgment and specialized knowledge of neurosurgical recovery patterns.

Discussion

This quality improvement project served to evaluate the impact of a targeted educational intervention predominantly on the knowledge of proper utilization and interpretation of pain assessment tools for participating bedside nurses. What also was observed was the impact of a targeted educational intervention on participants' confidence in three key domains of pain assessment: selecting the appropriate pain scale**,** interpreting pain scores**,** and applying those scores to administer appropriate PRN pain medications in a pediatric postoperative neurosurgical setting. A structured pre- and post-intervention survey was used to assess overall knowledge and self-reported confidence. The intervention led to a significant improvement in overall scores**,** with an average increase of 1.73 points (SD = 1.1) across the survey. The mode and median improvement were both 2 points, with change scores ranging from 0 to 3. This demonstrates not only the effectiveness of the content delivered but also its consistency, as most participants had measurable gains in understanding and confidence.

In terms of domain-specific analysis: confidence in selecting the appropriate pain scale increased from 4.45 (SD = 0.69) to 4.82 (SD = 0.40)**,** with both median and mode shifting to the

highest rating of 5. The improvement in minimum score from 3 to 4 and decreased variability suggest greater group-wide confidence. Confidence in interpreting pain scores also rose from 4.36 (SD = 0.67) to 4.82 (SD = 0.40)**,** again showing a strong shift to the top of the scale. Most strikingly, confidence in applying pain scores to administer PRN medications increased from 4.36 (SD = 0.67) to 5.0 (SD = 0.0) — a uniform and complete improvement where every participant reached the maximum confidence score**,** eliminating variability entirely.

Limitations

This quality improvement project offers promising findings; however, it is not without important limitations that must be acknowledged when interpreting the results. First, the small sample size (n = 11) significantly limits the statistical power of the analysis and reduces the generalizability of findings to broader clinical settings. While the intervention appeared effective within this specific group, it is unclear whether similar results would be observed in larger or more diverse populations with varying levels of baseline confidence and clinical experience.

Second, examining self-reported confidence ratings, may not accurately represent actual clinical behavior, competence, or decision-making. Confidence is an important precursor to effective practice, but it does not guarantee accurate implementation of skills, especially in complex or high-pressure environments like pediatric postoperative neurosurgical care.

Additionally, the absence of a control group or randomized design introduces a limitation in establishing causality. Without a comparison group, it is difficult to determine whether the observed improvements in confidence were directly attributable to the educational intervention or possibly influenced by other factors, such as peer discussions, observational learning, or repeated exposure to the subject matter. There was also no long-term follow-up to evaluate the retention of knowledge or sustained confidence over time. As a result, it is unclear whether the

gains observed immediately post-intervention reflect true knowledge acquisition or merely short-term memorization in response to recent instruction.

Furthermore, the potential for response bias must be considered. Given the high baseline confidence scores reported by several participants, responses may have been influenced by professional self-image**,** social desirability, or the desire to align with perceived expectations. This could result in inflated ratings that do not fully reflect knowledge gaps or uncertainty in real-world practice.

Finally, the study did not assess the intervention's impact on actual clinical outcomes, which is essential in determining the true effectiveness of educational efforts. Objective measures—such as chart audits**,** direct observation**,** or performance-based assessments—were not conducted to evaluate whether nurses correctly selected age- and condition-appropriate pain assessment tools, or whether they accurately interpreted pain scores and administered PRN medications accordingly. These omissions highlight the need for future phases of the project to move beyond perceived confidence and explore the real-world application and accuracy of pain assessment and management practices**.**

Implications for Practice

Despite the limitations inherent in this quality improvement project, the findings hold several meaningful implications for clinical practice, particularly in the context of specialized, high-acuity settings such as pediatric neurosurgery. First, the results support the value of targeted educational interventions in enhancing clinicians’ confidence when performing complex, judgment-based tasks. In areas like pediatric postoperative care—where pain assessment can be nuanced and patient cues are often subtle—confident clinical decision-making is essential. The observed improvements suggest that even short, focused interventions can help bridge

knowledge gaps and reinforce existing expertise, ultimately fostering greater preparedness among frontline nursing staff.

Second, the intervention's ability to standardize confidence across all participants—as evidenced by reduced variability in post-intervention ratings—holds important implications for reducing practice variation. Consistency in confidence often correlates with more uniform application of protocols, which can lead to more timely, appropriate, and equitable pain management for pediatric postoperative patients. Standardized clinical behavior also supports interprofessional trust and smoother transitions of care, particularly in team-based environments where consistency is key to patient safety.

Third, the findings lend support to the broader implementation of similar interventions in other clinical domains where subjective judgment is required. Pain assessment, medication titration, sedation scoring, and early warning systems all rely on clinicians accurately applying clinical tools and interpreting patient data. Educational strategies that build confidence and reinforce correct usage of such tools could improve practice consistency and reduce variability in care delivery across units or institutions.

Finally, the project highlights the need for future quality improvement efforts to incorporate objective outcome measures alongside self-reported confidence ratings. Tools such as chart audits**,** direct observations, or clinical decision accuracy tracking can help determine whether increased confidence translates into improved practice behavior and, ultimately, better patient outcomes**.** By aligning subjective confidence with measurable clinical performance, healthcare organizations can ensure that educational efforts produce meaningful and sustained improvements in care quality.

Conclusion

This quality improvement project explored the impact of a targeted educational intervention on bedside nurses' knowledge and confidence in assessing and managing postoperative pain in pediatric neurosurgical patients. Pain assessment in this population is inherently complex due to age-related communication barriers, varying neurological baselines, and individualized responses to pain. The ability of nurses to choose the appropriate pain scale, interpret pain scores accurately, and apply those scores effectively to administer PRN (as needed) medications is essential to ensuring safe and timely pain relief.

The intervention yielded measurable improvements across all assessed domains. Overall, pre- and post-intervention survey results on the knowledge portion demonstrated a mean increase of 1.73 points (SD = 1.1), with the majority reporting a 2-point improvement. Confidence in selecting the appropriate pain scale rose from 4.45 to 4.82 (on a 5-point Likert Scale), and interpreting pain scores improved from 4.36 to 4.82, both with reductions in standard deviation—indicating increased consistency and fewer outliers. Most notably, confidence in applying pain scores to guide PRN medication administration improved from 4.36 to a perfect 5.0**,** with zero post-intervention variability. This finding suggests not only perceived competence, but also a shared standard of understanding among all participants following the intervention.

The participant cohort brought a wide range of nursing experience, with 82% having more than 2 years of clinical experience and over half having less than 5 years of postoperative neurosurgical experience. This diversity highlights the importance of reinforcing specialty-specific education, even among seasoned clinicians. The intervention was well-targeted to meet these needs, effectively closing confidence gaps among newer staff and reinforcing knowledge among more experienced nurses.

While the findings are encouraging, the project is not without limitations. The small sample size (n = 11) restricts generalizability and limits the statistical power of the conclusions. Furthermore, the use of self-reported confidence measures, while useful for gauging perceived competence, does not necessarily reflect actual clinical behavior or skill application. The absence of objective performance outcomes—such as chart audits or observational assessments—means that it cannot be conclusively determined whether improved confidence translated into improved patient care. Additionally, the short-term measurement window does not capture whether gains were sustained over time or influenced by memorization rather than deep learning. Finally, response bias may have influenced high baseline confidence levels, particularly among experienced clinicians who may overestimate their proficiency due to professional identity or social desirability.

Despite these limitations, the project has important implications for nursing practice and continuing education. It affirms that brief, focused educational interventions can be highly effective in enhancing confidence for judgment-based clinical tasks, particularly in specialized and high-risk populations**.** Importantly, the intervention helped to standardize confidence across the team**,** suggesting reduced variability in clinical decision-making—an essential factor in ensuring consistent and equitable care.

Moving forward, future iterations of this initiative should include objective outcome measures**,** such as chart audits that examine pain scale selection and PRN administration practices, as well as behavioral assessments or simulation-based evaluations to assess knowledge application in real time. Additionally, follow-up evaluations at later intervals could assess whether the observed gains in confidence and knowledge are retained over time and lead to long-term improvements in patient outcomes.

Ultimately, this project reinforces the role of nurse-led quality improvement in promoting safe, effective, and equitable pain management. It illustrates the power of education not only to improve knowledge, but to unify clinical practice around best standards of care—helping ensure that every child receives pain assessment and treatment that is both timely and appropriate, regardless of provider variability.

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Tables and Figures

Table 1

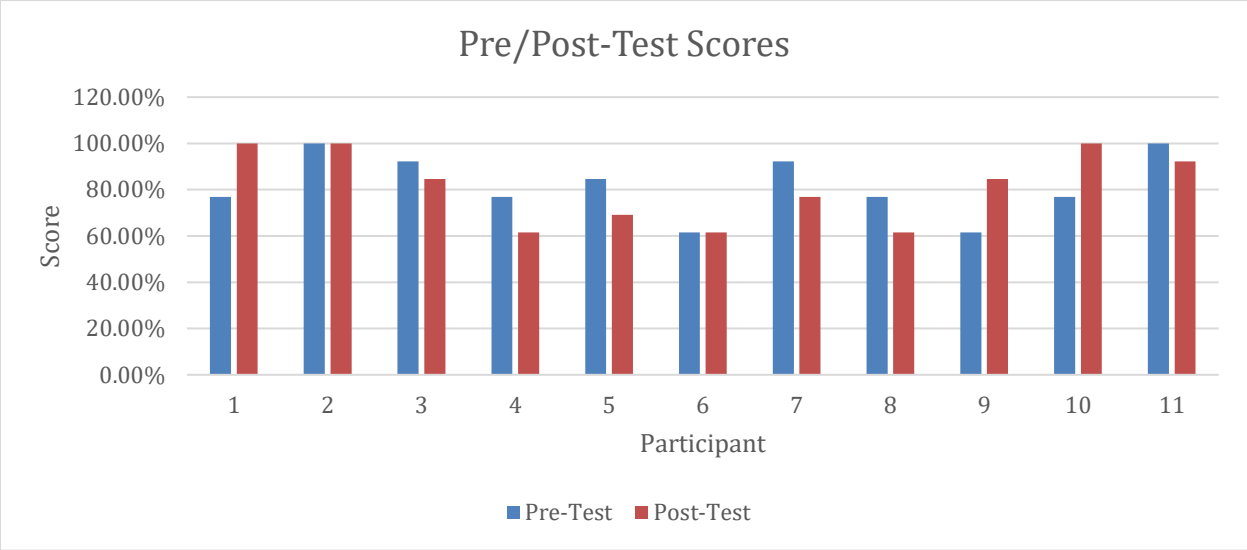
Individual Participant Pre- and Post-Intervention Test Scores

Participants	Pre-Test	Post-Test
1	76.90%	100%
2	100%	100%
3	92.30%	84.60%
4	76.90%	61.50%
5	84.60%	69.20%
6	61.50%	61.50%
7	92.30%	76.90%
8	76.90%	61.50%
9	61.50%	84.60%
10	76.90%	100%
11	100%	92.30%

Note. Scores reflect the percentage of correct responses on pre- and post-intervention knowledge assessments for each participant (N = 11). While several participants demonstrated improvement, others showed no change or a decline, suggesting varied effectiveness of the intervention across individuals.

Figure 1

Distribution of Change Scores Following the Educational Intervention



Note. The graph illustrates the number of participants (N = 11) reporting each level of change in survey scores (Post – Pre), ranging from 0 (no change) to 3 points of improvement. The most common change was an increase of 2 points. The distribution reflects overall improvement in knowledge following the intervention.

Table 2

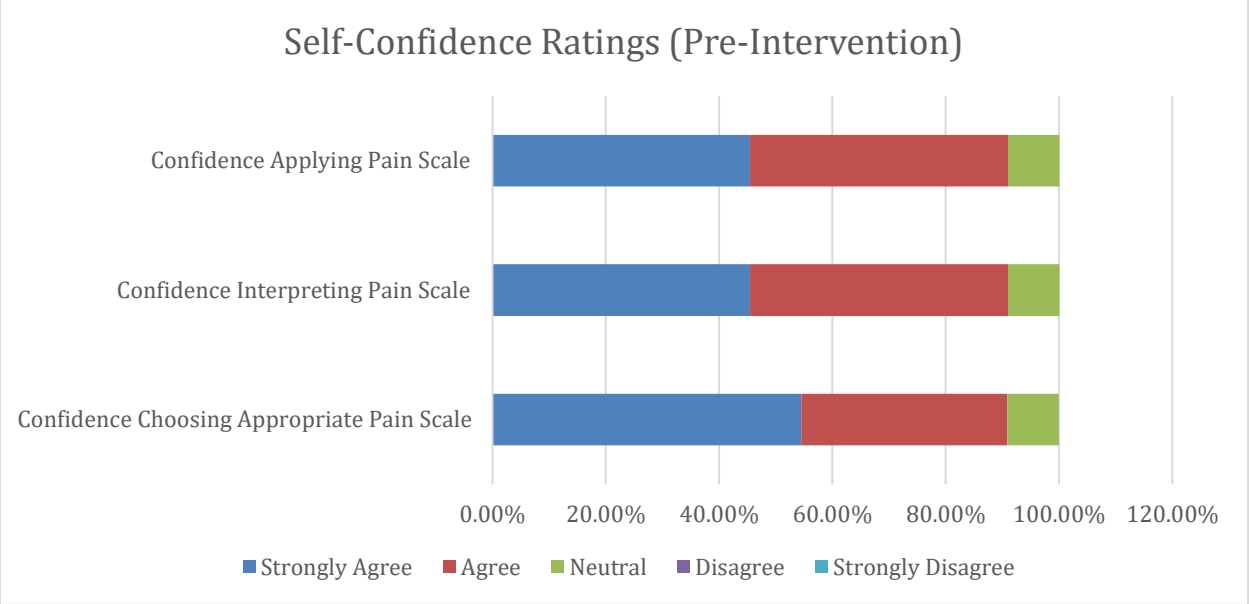
Pre-Intervention Confidence Ratings by Pain Assessment Domain

Rating	Confidence Choosing Appropriate Pain Scale	Confidence Interpreting Pain Scale	Confidence Applying Pain Scale
Strongly Agree	54.50%	45.50%	45.50%
Agree	36.40%	45.50%	45.50%
Neutral	9.10%	9.10%	9.10%
Disagree	0%	0%	0%
Strongly Disagree	0%	0%	0%

Note. Values reflect the percentage of participants (N = 11) selecting each confidence level prior to the educational intervention across three domains: choosing the appropriate pain scale, interpreting pain scores, and applying those scores to guide PRN pain medication administration. Most participants agreed or strongly agreed with confidence in each domain, though a small proportion reported neutral confidence, suggesting an opportunity for improvement.

Figure 2

Comparison of Pre-Intervention Confidence Ratings in Choosing, Interpreting, and Applying Pain Scores



Note. This figure displays pre-intervention values for participants' self-reported confidence scores (on a 5-point Likert scale) related to choosing, interpreting and applying pain scores with percentage of total participants being visually demonstrated.

Table 3

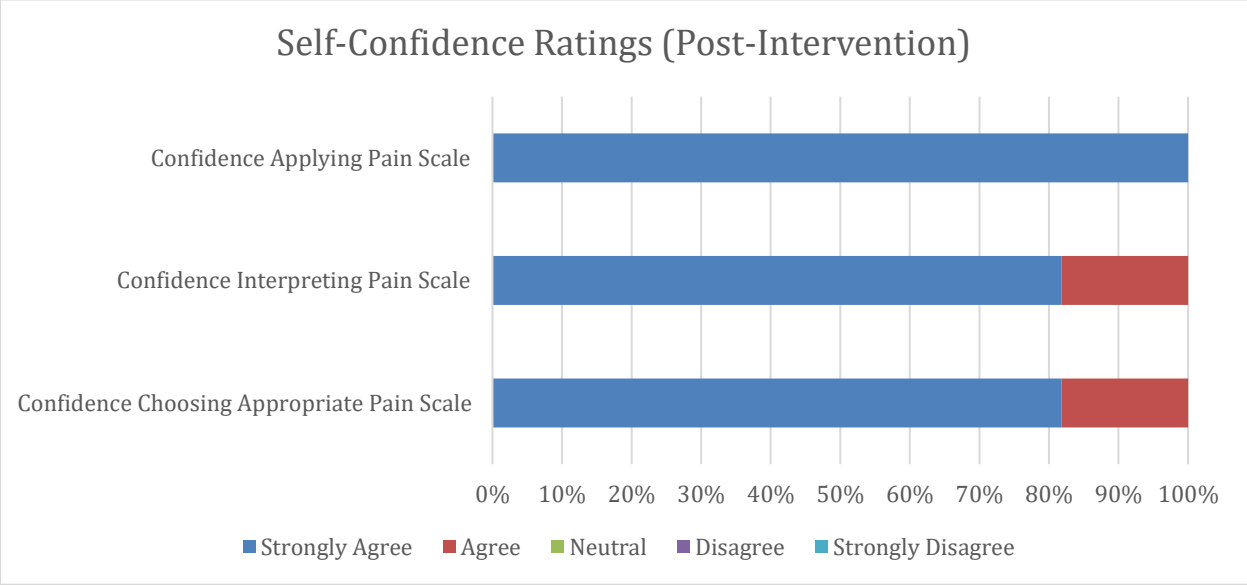
Post-Intervention Confidence Ratings by Pain Assessment Domain

Rating	Confidence Choosing Appropriate Pain Scale	Confidence Interpreting Pain Scale	Confidence Applying Pain Scale
Strongly Agree	81.80%	81.80%	100.00%
Agree	18.20%	18.20%	0.00%
Neutral	0.00%	0.00%	0.00%
Disagree	0%	0%	0%
Strongly Disagree	0%	0%	0%

Note. Values represent the percentage of participants (N = 11) selecting each confidence level following the educational intervention across three domains: selecting the appropriate pain assessment scale, interpreting pain scores, and applying those scores to guide PRN pain medication administration. All participants reported either "Agree" or "Strongly Agree" in each category, reflecting uniformly high confidence post-intervention.

Figure 3

Comparison of Post-Intervention Confidence Ratings in Choosing, Interpreting, and Applying Pain Scores



Note. This figure displays post-intervention values for participants' self-reported confidence scores (on a 5-point Likert scale) related to choosing, interpreting and applying pain scores with percentage of total participants being visually demonstrated.

Table 4

Summary of Overall Pre- and Post-Intervention Survey Scores

	Deviation
Mean	1.73
Median	2
Mode	2
Std. Deviation	1.1
Minimum	0
Maximum	3
Mean ± Std.	1.73 ± 1.1

Note. Values reflect the overall change in survey scores (post-intervention minus pre-intervention) across 11 participants. Scores indicate improved knowledge and/or confidence following the educational intervention, with a typical gain of 2 points and no reported declines.

Table 5

Pre- and Post-Intervention Confidence Ratings in Selecting the Appropriate Pain Assessment Scale

Pre-Intervention		Post-Intervention	
	Selecting the Appropriate Pain Assessment Scale		Selecting the Appropriate Pain Assessment Scale
Mean	4.45	Mean	4.82
Median	5	Median	5
Mode	5	Mode	5
Std. Deviation	0.69	Std. Deviation	0.4
Minimum	3	Minimum	4
Maximum	5	Maximum	5
Mean ± Std.	4.45 ± 0.69	Mean ± Std.	4.82 ± 0.4

Note. Ratings reflect self-reported confidence on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The intervention led to increased mean confidence and reduced variability, with more participants consistently reporting maximum confidence post-intervention.

Table 6

Pre- and Post-Intervention Confidence Ratings in Interpreting Pain Assessment Scale

Pre-Intervention		Post-Intervention	
	Interpreting Pain Assessment Scale		Interpreting Pain Assessment Scale
Mean	4.36	Mean	4.82
Median	4	Median	5
Mode	4	Mode	5
Std. Deviation	0.67	Std. Deviation	0.4
Minimum	3	Minimum	4
Maximum	5	Maximum	5
Mean ± Std.	4.36 ± 0.67	Mean ± Std.	4.82 ± 0.4

Note. Confidence scores were based on a 5-point Likert scale (1 = strongly disagree, 5 = strongly disagree). Post-intervention scores showed both an increase in overall confidence and a reduction in variability, indicating a more consistent and elevated confidence level among participants.

Table 7

Pre- and Post-Intervention Confidence Ratings in Applying Pain Scores to Properly Manage Pain

Pre-Intervention		Post-Intervention	
	Applying Pain Scores		Applying Pain Scores
Mean	4.36	Mean	5
Median	4	Median	5
Mode	4	Mode	5
Std. Deviation	0.67	Std. Deviation	0
Minimum	3	Minimum	5

Maximum	5	Maximum	5
Mean ± Std.	4.36 ± 0.67	Mean ± Std.	5 ± 0

Note. Confidence scores were self-reported on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Following the intervention, all participants reported maximum confidence in applying pain scores to guide PRN medication decisions, eliminating variability entirely.

Table 8

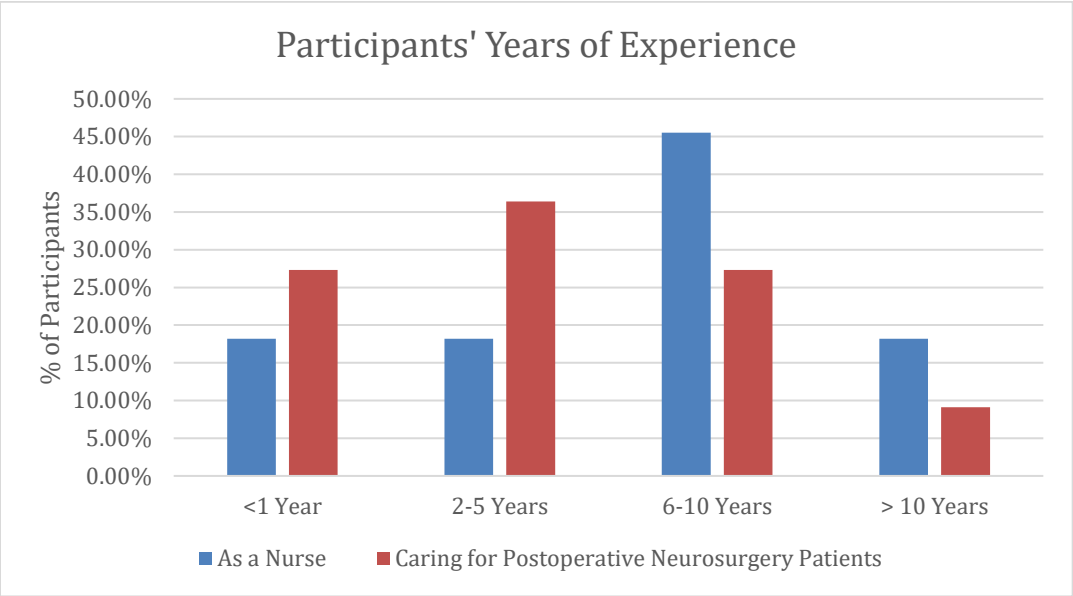
Participant Years of Experience as a Nurse and in Caring for Postoperative Neurosurgical Patients

Years of Experience	As a Nurse	Caring for Postoperative Neurosurgery Patients
<1 Year	18.20%	27.30%
2-5 Years	18.20%	36.40%
6-10 Years	45.50%	27.30%
> 10 Years	18%	9%

Note. Table presents the percentage of participants (N = 11) categorized by total years of nursing experience and specific experience caring for postoperative neurosurgical patients. The sample was diverse in experience levels, with the largest proportion having 6–10 years of nursing experience and 2–5 years of neurosurgical experience.

Figure 4

Participant Years of Experience as a Nurse and in Caring for Postoperative Neurosurgical Patients



Note. Figure presents visual representation of the percentage of participants (N = 11) categorized by total years of nursing experience and specific experience caring for postoperative neurosurgical patients. The sample was diverse in experience levels, with the largest proportion having 6–10 years of nursing experience and 2–5 years of neurosurgical experience.

Appendices

Appendix A - Gantt Chart

DNP Project Timeline

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To-Do

Name	Subitems	Owner	Status	Due date	Timeline - Start	Timeline - End
Preparation Phase		Project Leader	Done	2024-12-13	2024-08-13	2024-12-13
Subitems	Subitems	Owner	Status	Date		
	Literature Review	Project Leader	Done	2024-10-18		
	Project Planning and Approval	Project Leader	Done	2024-11-18		
	Recruitment and Training	Project Leader	Done	2024-11-18		
Implementation Phase		Project Leader	Working on it	2025-02-22	2025-04-01	2025-04-15
Subitems	Subitems	Owner	Status	Date		
	Recruit Participants	Project Leader	Working on it	2025-04-01		
	Data Collection	Project Leader	Working on it	2025-04-08		
	Intervention Implementation	Project Leader	Working on it	2025-04-08		
Evaluation Phase			Working on it	2025-02-23	2025-04-22	2025-05-27
Subitems	Subitems	Owner	Status	Date		
	Data Analysis	Project Leader	Working on it	2025-04-22		
	Interpretation of Results	Project Leader	Working on it	2025-05-06		
	Report Writing	Project Leader	Working on it	2025-05-13		
				2024-12-13 to 2025-02-23	2024-08-13	2025-05-27

Appendix B - Stakeholder Communication Plan

Nicklaus Children's Hospital

FIU FLORIDA INTERNATIONAL UNIVERSITY

Research Participants needed

We are looking for Registered Nurses (RN) working on the neurology unit (5T) at NCH to participate in a QI project.

Scan barcode to partipate

THIS QUALITY IMPROVEMENT PROJECT AIMS TO:

Improve nursing knowledge on the utilization and interpretation of pain assessment tools in post-operative pediatric neurosurgical patients.

PRE-AND-POST SURVEY WILL BE OBTAINED VIA QUALTRICS.

For any additional questions, please email:

vgras002@fiu.edu

Appendix C - Evaluation Tools

Pre-Survey

Demographics

1. How much experience do you have as a registered nurse?
    a. < 1 year
    b. 2-5 years
    c. 6-10 years
    d. > 10 years
2. How much experience do you have as a registered nurse caring for post-operative pediatric neurosurgical patients?
    a. < 1 year
    b. 2-5 years
    c. 5-10 years
    d. > 10 years
3. Please select your age range.
    a. 21-25 years old
    b. 26-30 years old
    c. 31-35 years old
    d. 36-40 years old
    e. > 40 years old
4. During orientation to my current role, I have received:
    a. No education about using/interpreting/applying pain assessment tools.
    b. Some education about using/interpreting/applying pain assessment tools.
    c. Sufficient education about using/interpreting/applying pain assessment tools.
    d. More education about using/interpreting/applying pain assessment tools than was necessary.

True/False & Multiple Choice

5. Vital signs are always a reliable way to verify whether a child's self-report of pain is accurate.
    a. True
    b. False
6. The younger a child is, the less likely they are to remember painful experiences.
    a. True
    b. False
7. The most reliable source of the child's pain intensity is:
    a. The parent/guardian
    b. The registered nurse
    c. The child
    d. The treating provider

8. According to NCH resources, which scale is appropriate for use in preemies and infants up to 2 months of age?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
9. According to NCH resources, which scale is appropriate for cognitively impaired children, and those children 2 months – 7 years old?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
10. According to NCH resources, which scale is appropriate for self-report for 3 years old and above?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
11. According to NCH resources, which scale is appropriate for self-report for 8 years old and above?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
12. Mild pain is indicated by an assessment of a pain score of:
    a. 4-6/10
    b. 7-10/10
    c. 3-5/10
    d. Less than 4/10
13. Moderate pain is indicated by an assessment of a pain score of:
    a. 4-6/10
    b. 7-10/10
    c. 5-8/10
    d. Less than 4/10
14. Severe pain is indicated by an assessment of a pain score of:
    a. 4-6/10
    b. 7-10/10
    c. 5-10/10
    d. Less than 4/10

Case Study

15. Julia is a developmentally appropriate, verbal, 12-year-old female who is currently POD #1 from a C1 laminectomy for Chiari decompression. You are the registered nurse caring for

her today. On assessment, you find that she is sitting calmy watching TV. You ask her to rate her pain. Which scale would you choose for pain assessment?
   a. FLACCR
   b. FACES
   c. CRIES
   d. Numeric Scale

16. You proceed to ask Julia to rate her pain on a scale of 1-10, and she reports that it is an 8/10. She localizes the pain to her neck and describes it as "sharp and very painful." How would you classify her pain?
   a. Mild
   b. Moderate
   c. Severe
17. Julia received her scheduled IV Tylenol almost 1 hour prior to this pain assessment. You check her MAR and find that she has Ibuprofen PRN for moderate pain, and Morphine PRN for severe pain. Which would you administer according to her pain report, according to the orders on her MAR?
   a. Ibuprofen
   b. Morphine

Self-Report

18. I feel confident choosing the appropriate pain scale in any patient scenario.
   a. Strongly Agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
19. I feel confident interpreting a pain score as mild, moderate, or severe.
   a. Strongly Agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree
20. I feel confident selecting a PRN pain medication based on my interpretation of pain score.
   a. Strongly Agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly Disagree

Post-Survey

True/False & Multiple Choice

1. Vital signs can be a reliable way to verify whether a child's self-report of pain is accurate.
    a. True
    b. False
2. The younger a child is, the less likely they are to remember painful experiences.
    a. True
    b. False
3. The most reliable source of the child's pain intensity is:
    a. The parent/guardian
    b. The registered nurse
    c. The child
    d. The treating provider
4. According to NCH resources, which scale is appropriate for use in preemies and infants up to 2 months of age?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
5. According to NCH resources, which scale is appropriate for cognitively impaired children, and those children 2 months – 7 years old?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
6. According to NCH resources, which scale is appropriate for self-report for 3 years old and above?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
7. According to NCH resources, which scale is appropriate for self-report for 8 years old and above?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
8. Mild pain is indicated by an assessment of a pain score of:
    a. 4-6/10
    b. 7-10/10
    c. 3-5/10
    d. Less than 4/10

9. Moderate pain is indicated by an assessment of a pain score of:
    a. 4-6/10
    b. 7-10/10
    c. 5-8/10
    d. Less than 4/10
10. Severe pain is indicated by an assessment of a pain score of:
    a. 4-6/10
    b. 7-10/10
    c. 5-10/10
    d. Less than 4/10

Case Study

11. Liam is a 13-month-old male who is currently POD #2 from an L2-L3 laminectomy for spinal cord detethering. You are the registered nurse caring for him today. The parents report that they believe him to be in pain. Which scale would you choose for pain assessment?
    a. FLACCR
    b. FACES
    c. CRIES
    d. Numeric Scale
12. On assessment, you find that he has occasional grimace, is restless and tense, remains in normal position with regular rhythmic breathing, occasionally whimpers, is not crying, and is otherwise content. How would you classify his pain?
    a. Mild (3/10)
    b. Moderate (5/10)
    c. Severe (8/10)
13. Liam has not received any pain medication since the middle of the night (8 hours ago). You check his MAR and find that he has Tylenol PRN for pain – give 1st, and Ibuprofen PRN for pain – give 2nd. Which would you administer according to your pain assessment, according to the orders on his MAR?
    a. Ibuprofen
    b. Tylenol

Self-Report

14. After reviewing the education, I feel confident choosing the appropriate pain scale in any patient scenario.
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree
15. After reviewing the education, I feel confident interpreting a pain score as mild, moderate, or severe.

a. Strongly Agree
b. Agree
c. Neutral
d. Disagree
e. Strongly Disagree

16. After reviewing the education, I feel confident selecting a PRN pain medication based on my interpretation of pain score.
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

Appendix D - IRB Approval Letter

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Rosa Roche
CC: File

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: February 20, 2025

Protocol Title: "Evaluating and Educating Bedside Nurses on the Utilization and Interpretation of Appropriate Pain Assessment Tools for Postoperative Pediatric Neurosurgical Patients: A Quality Improvement Project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-25-0046 **IRB Exemption Date:** 02/20/25
TOPAZ Reference #: 115358

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

MMV/em

Appendix E - NCH Letter of Support

Nicklaus Children's Hospital
Research Institute

22Jan2025

Danielle Sarik, PhD
For: Veronica Cordoba (DNP)
Nicklaus Children's Hospital
3100 SW 62nd Avenue
Miami, FL 33155

Subject: Non-Human Subjects Research Determination - QI
Project Title: **Evaluating and Educating Bedside Nurses on the Utilization and Interpretation of Appropriate Pain Assessment Tools for Postoperative Pediatric Neurosurgical Patients**

Dear Dr. Sarik and Ms Cordova,

This letter is in response to your application for a determination of Non-Human Subjects Research for the above-referenced project ("Project").

As per your assertion that this project is a quality improvement project and does not meet the definition of research under 45 CFR §46.102 "…a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge", we have reviewed the materials that you have provided to us and concur with your assessment that this project is intended to be for the purposes of quality improvement at Nicklaus Children's Hospital.

Nicklaus Children's Hospital does not impose an expiration date on its Non-Human Subjects Research determinations. Please note that any future changes to the project may affect the regulatory status of this project, and you may want to contact Regulatory Affairs about the effect these changes may have on the Non-Human Subjects determination status before implementing them.

If you have any questions about this determination, you may contact RegulatoryAffairs@Nicklaushealth.org or you can call Jenny Esteves at 786-624-2854.

Sincerely,

Signed Electronically by:
Matthew Bittle - Matthew.Bittle@Nicklaushealth.org
22-Jan-2025 @ 09:37 AM EST
Reason: Responsibility

Matthew Bittle, BABA, CCRP
Sr. Manager Clinical Trial Operations
Human Protections Administrator

cc: Jefrey Biehler, MD, MPH, Executive Medical Director, Quality
Elise Hermes, Executive Director, Quality Improvement
Frederick Trent, Quality Resource Administrator
Rebecca Jones, Director Research Institute
Jeanelle Reddick, Manager RDC

NCHRI Non-HSR Determination
QI-NCH_2025-4