Development of an Outcome Measure to Monitor the Effectiveness of Pain Management

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Attention to the pain that occurs during treatments and procedures for pediatric patients with cancer continues to be a priority. This article describes the development of a pain effectiveness outcome measure at an academic pediatric medical center in order to inform about the implementation of quality improvement strategies and evaluate the effect of these pain interventions within the hospital setting.

The Joint Commission (2012) estimated in 2001 that more than 76 million people in the United States suffered from pain. This finding was instrumental in prompting new standards for pain management from the Institute of Medicine ([IOM], 2011). The estimated number of Americans suffering from pain currently exceeds 100 million, with an associated cost of at least $635 billion in medical treatment and lost productivity (IOM, 2011). The number of individuals suffering from pain underscores alleviating pain is a national imperative (IOM, 2011). The purpose of the current article is to describe the development of a nurse-sensitive pain effectiveness measure, and to extend knowledge derived from the evaluation of pediatric pain management performance using existing process measures.

Two million children younger than age 18 years are hospitalized in the United States each year (Price, Stranges, & Elixhauser, 2012). Exactly how many of those children will experience pain is unknown, but pain in children is common and may go unrecognized (Taylor, Boyer, & Campbell, 2008). With 5% of pediatric hospitalizations associated with cancer-related treatment (Price et al., 2012) and with pain identified as one of the top four symptoms in pediatric patients with cancer, treatment of pain in children with cancer must remain a top priority (Baggott, Dodd, Kennedy, Marina, & Miaskowski, 2009; Hockenberry & Hooke, 2007).

Published strategies to improve pain management have focused on evaluation of staff education (McNamara, Harmon, & Saunders, 2012), use of pain assessment protocols (Treadwell, Franck, & Vichinsky, 2002), timeliness of medication administration (Corwin, Kessler, Aurbach, Liang, & Kristinsson, 2012), and enhancement of the assessment process (Kim et al., 2012). Methods for evaluation in these studies included time to intervention, reassessment rates, comparison of patient and staff assessment of pain level, as well as satisfaction with pain management. Process measures commonly are used to evaluate pain management practices because of the many variables that may impact effectiveness of pain-reduction strategies.

Developing a valid and reliable measure for evaluating pain effectiveness is laden with complexity. Determining the effectiveness of a pain management strategy can be confounded by disease state, comorbid conditions, and other variables affecting the perception of pain. Because of the complexity, pain effectiveness rarely is found as a nurse-sensitive outcome measure. Boston Children’s Hospital is one of 65 pediatric hospitals submitting pain management data to the National Database of Nursing Quality Indicators (NDNQI), which provides the ability to benchmark performance across institutions (Montalvo, 2007). Critically evaluating results of the NDNQI measures prompted interest in the development of an outcome measure to assess the percent reduction in documented pain scores postintervention. The creation of this measure would provide a means to evaluate the effect of pain interventions across geographic units or diagnostic groups.

The Model for Improvement (Langley et al., 2009) was used as a framework for building and applying knowledge. This model incorporates plan-do-study-act cycles and defines what will be accomplished, how change will be assessed, and what changes will result in improvement (Langley et al., 2009). The goal of this project was to improve the effectiveness of pain management and evaluate whether pain management strategies reduced pain. The primary focus of the project involved (a) determining the feasibility of developing and executing a standardized measure to monitor pain effectiveness, (b) testing the use...
of electronic data sources to minimize data burden on staff nurses and ensure accuracy, and (c) developing a sampling methodology.

Following a review of the literature, the authors determined that a reduction of about 30%–33% represented a reasonable standard for meaningful change in chronic pain conditions (Farrar, Young, LaMoreaux, Werth, & Poole, 2001; Hanley et al., 2006). The standard method for determining effectiveness was pain scores greater than or equal to four with a documented 30% decrease within 120 minutes (Farrar et al., 2001; Hanley et al., 2006).

Setting and Sample

The settings selected for piloting the measure were pediatric inpatient medical units, including three general medicine, one intermediate care, one hematology/oncology, and one stem cell transplantation. All patients admitted to those units were eligible to participate. The standard of care at Boston Children’s Hospital is to identify and document pain intensity using validated pain assessment tools appropriate to the age, medical condition, and level of cognitive development of the child. All pain scores range from 0 (no pain) to 10 (highest amount of pain). The data set, created using business intelligence software, consisted of all pain scores documented in the electronic medical record during admission. Data were pulled on a monthly basis. Initially, all pain records with a pain score greater than or equal to four were extracted and reviewed to determine whether a reduction of 30% or more had occurred. The process involved manual review of about 3,000 pain scores monthly. Because of the time-consuming nature of the process, a sampling methodology was piloted proportionately, randomizing 100 pain records based on each unit’s size. Internal consistency reliability testing evaluated the degree to which the sampling methodology produced similar results to the manual model, and it was determined to be reliable. After refining the sample, the results were centrally produced for the six inpatient units participating in the pilot phase for a period of 12 months. During this period, it was determined that the measure was feasible, and the pilot data provided an internal benchmark of performance for quality improvement purposes.

Expanding Data Collection

Based on the results of the pilot, a decision was made to adopt the measure as a hospital-based nursing measure, expanding data collection to all inpatient units. Adding those units required continued refinement of the sample, which was increased from 100 records to 320 records per month. Currently, all pain records documented in the medical record for inpatients are stratified by unit on a monthly basis. Records with a pain score of four or greater are extracted. The prevalence of pain scores of four or greater on average represents less than 10% of all documented inpatient scores. A sample of 320 pain records is then proportionately randomized by unit. The sample records are reviewed to determine pain score reduction by 30% or greater. Excluded from analyses are scores for which no reassessment was documented within 120 minutes.

Once the measure was in place, the focus of the nursing team transitioned to addressing the changes that could be made to improve practice. Recognizing that each participating unit cares for unique patient populations, it was important that ideas for improving pain management were elicited from caregivers and based on consensus. The Nurse Executive Committee for Quality established a universal target that 80% of pain scores of 4 or greater would be reduced by 30% within 120 minutes. That target was deemed reasonable because it accounted for the existence of chronic pain.

Use of Findings

One pediatric oncology unit has used the availability of the data to critically analyze results and identify strategies to guide improvement. The team embarked on several improvement efforts that included, but were not limited to, the domains of competency and knowledge. Education sessions emphasizing standardized documentation of pain, use of appropriate pain scales, consistent documentation of numeric pain scores, and reassessment within a maximum of 120 minutes after an intervention were conducted with staff. Posting monthly unit-based performance also was used to influence attitudes and performance. Currently, focus groups with staff members are planned to determine strategies to improve pain management with particular emphasis on the areas of timeliness, communication, pain assessment, knowledge and experience, provider bias, and patient factors (Pena, Estrada, Soniat, Taylor, & Burton, 2012). A second team has been organized to review the literature and develop an algorithm for the prevention and management of muscositis, determined to be one common source of pain for patients with cancer. Consistent with the Model for Improvement (Langley et al., 2009), each intervention will be observed for its impact on the results of the measure and used to inform future interventions. Baseline data from the unit’s pilot phase indicated that 70% of pain scores of 4 or greater were effectively reduced within 120 minutes. During a seven-month period, the unit experienced a 10% improvement from baseline, with an average of 80% of pain scores of 4 or greater effectively reduced within 120 minutes. Plan-do-study-act cycles will be an ongoing process using the measure as one means for evaluating the effectiveness of interventions.

Limitations are inherent when using a broad outcome measure across multiple practice settings. Although the degree to which this specific outcome is attributable to nursing care as opposed to other patient and hospital factors is open to interpretation, the levels of pain patients experience is something that nurses influence. The pilot project confirmed that a standardized pain effectiveness measure to monitor pain management is feasible, that data can be reliably pulled from electronic sources, and that an electronic sampling methodology is possible to reduce data burden. The measure has been successfully implemented throughout all inpatient units, and results have provided a greater awareness of overall pain management at the aggregate and unit levels. Despite the limitations identified, this outcome measure is generalizable to other settings and can be used to inform quality improvement projects focused on pain management. Findings from the project will be used to further refine the measure in the context of chronic pain and specialty-based practice areas.
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References


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