

Commentary

Pain assessment and decision making: Have we missed the mark?

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The routine assessment and documentation of pain are widely thought to provide the foundation for effective care of hospitalized children who experience pain (U.S. Department of Health and Human Services, 1992; Shrestha-Ranjit & Manias, 2010; Twycross, 2010). A large body of research has provided a number of valid and reliable measures that are widely recommended to assess pain in clinical and research pediatric settings (Stinson et al., 2006; Crellin et al., 2007; von Baeyer & Spagrud, 2007). Efforts to improve the effectiveness of pain management have, furthermore, typically included strategies to improve the quality of pain assessment, measured, in most cases, by the presence and frequency of documented pain intensity scores (Mularski et al., 2006; Franck & Bruce, 2009; Shrestha-Ranjit & Manias, 2010). The importance placed on pain assessment is further underscored by the recent addition of “pain assessment-intervention-reassessment” to the National Quality Forum’s list of nurse-sensitive pediatric quality indicators (Lacey et al., 2006).

Despite such activities, reports suggest that only modest, at best, improvements in pain assessment documentation have followed institutional standardization, with little evidence of improved pain outcomes for children or adults (Boughton et al., 1998; Franck et al., 2007; Franck & Bruce, 2009), leading investigators to ponder the relevance of pain assessment in facilitating treatment decisions. Indeed, Franck and Bruce (2009) recently dared to suggest that “there may be

something fundamentally flawed with the evidence base for the clinical practice of pain assessment” (p. 13). The disparity between supposed improvements in pain assessment practices and outcomes suggests that the way the evidence for assessment has been translated at the bedside may have failed. Such concerns have been echoed by experts in the field who lament the oversimplification of pain assessment via unidimensional pain scoring (von Baeyer, 2006, 2009), noting that such measures do not convey the array of information, including location and quality of pain, disease process, other symptoms, and clinical context that are needed to inform decisions (Schiavenato & Craig, 2010). Simplified approaches to pain assessment may be especially problematic in pediatric settings where children present with a variety of developmental, cognitive, and affective characteristics, posing unique challenges for clinician decision-making.

Understanding clinical meaning in pain assessment

Hodgins (2002) previously argued that the usefulness of pain scores toward decision-making is limited by a lack of guidance for interpreting their meaning. She posited that in the absence of interpretive criteria, value judgments may lead to a considerable variability in the recognition and interpretation of the clinical relevance of pain scores. The growing interest in clinical relevance is evident in recent reviews implying that analyses of assessment instruments should include, in addition to psychometric data, discussions of pain score

interpretability (Stinson et al., 2006; von Baeyer, 2006, 2009). Stinson et al. (2006) defined interpretability as “the [clinical] meaningfulness of the scores obtained from a pain measure” (p. 146) and suggested that the concept differs from responsiveness which, instead, refers to the instrument’s ability to identify statistically significant changes in pain over time (i.e. an effect size that is hypothesis-dependent). Interpretability has been examined in studies that have attempted to bring meaning to pain scores by comparing pain scores with more readily understood categories such as pain severity (i.e. mild, moderate, and severe), treatment threshold (i.e. need or no need for analgesia), and satisfaction with analgesia. Clinical meaning is also derived from studies comparing changes in scores with perceptions of pain relief (i.e. feel better, feel worse, etc.), yielding minimum clinically significant differences (MCS D) in pain scores. Such data are thought to provide better patient-oriented interpretations of pain scores reported in research (Todd, 2001), and in clinical settings where they may better facilitate decision-making (Bulloch & Tenenbein, 2002; McConahay et al., 2006).

Only a handful of studies, to date, have addressed pain score interpretability in children (Gauthier et al., 1998; Demyttenaere et al., 2001; Powell et al., 2001; Bulloch & Tenenbein, 2002; Bailey et al., 2007; Voepel-Lewis et al., 2011). Several investigators have identified mean or median pain score values associated with perceptions of mild, moderate and severe pain, all reporting significant overlaps in scores across categories (Gauthier et al., 1998; McConahay et al., 2006; Bailey et al., 2007). Additionally, despite statistically significant differences, overlaps in scores have also been demonstrated between children who perceived the need for medicine and those who did not (Gauthier et al., 1998; Voepel-Lewis et al., 2011), and in children who were satisfied versus dissatisfied with analgesia (Voepel-Lewis et al., 2011). Studies have further identified the MCS D in scores associated with the child’s perceived pain relief, but also with considerable overlap in scores between categories (Powell et al., 2001; Bulloch & Tenenbein, 2002; Bailey et al., 2007; Voepel-Lewis et al., 2011), demonstrating

variable perceptions of pain relief at the individual level. Similar to reports in adults, Voepel-Lewis et al. (2011) found that in more than one quarter of cases, the pain scores changed in the opposite direction of perceived pain relief, suggesting the influence of other moderating factors. A summary of findings from these studies and their limitations toward clinical decision making is presented in Table 1. While these studies demonstrate expected trends in pain scores across perceptions of pain severity, treatment thresholds, and pain relief, the considerable variability in perceptions exposes the difficulty interpreting self-reported pain scores in children.

Differences in pain score meaning are likely related to several child and situational factors. Gauthier et al. (1998), using a faces scale scored 0 to 6, found that girls reported significantly lower median pain score values than boys for each pain severity category (1.9 vs. 2.5, respectively, for mild pain; 2.8 vs. 3.6 for moderate; and 4.5 vs. 5.2 for severe pain). Gender differences were also reported by Voepel-Lewis et al. (2011) who found that girls were satisfied at higher pain scores compared to boys (median Numeric Rating Scale [NRS] score of 4 vs. 3). Furthermore, pain scores associated with satisfaction were significantly lower for children with previous surgery compared to those without, and in younger (<12 years) compared to older children (median NRS 3 vs. 4, for both comparisons). There were, however, no gender, experiential, or age-related differences in scores associated with the need for medicine or perceived pain relief in this sample (Voepel-Lewis et al., 2011). Lastly, similar to studies in adults, these investigators demonstrated that the MCS D in pain score was significantly lower for children with lower baseline scores (i.e. NRS <5) compared to those with higher scores.

Other factors further compound the difficulty in making sense of pain scores. Significant relationships between children’s postoperative self-report and behavioral pain scores and anxiety have been demonstrated, suggesting the potential influence of one construct on the other (Bringuier et al., 2009; Connelly & Neville, 2010). A recent qualitative study demonstrated the difficulty young children have distinguishing between pain, nausea,

Table 1

Summary of pain score data associated with indicators of clinical “meaning”. Table copyright © 2011, T. Voepel-Lewis, reproduced with permission.

	VAS	NRS or VNS	FPS	CAS	Limitations
Qualitative descriptors					
Mild pain	NA	3 (2,4) ^a	2.2 ±1 ^b [1-5]	3.5 (2,4.5) ^a [0.5- 6]	Overlaps between all categories
Moderate pain		6 (5,7) ^a	3.2 ±0.9 ^b [1-6]	6.0 (5,7) ^a [2-10]	
Severe pain		8 (6,9) ^a	4.8 ±0.9 ^b [2-6]	8.5 (7,10) ^a [3-10]	
Treatment threshold					
No need for medicine	NA	3 (2,5) ^a [0-10]		NA	Wide range of scores associated with “need for medicine”
Need medicine		6.5 (5,8) ^a [1-10]	3.2 ±1.8 ^b [0-6] & 1.79±0.96 ^b		
Perceived pain relief*					
A lot better	13 (7, 26) ^a	-3 (-2, -4) ^c	2.0 (2, 3) ^a	4.0 (2, 5) ^a	Overlaps; differences in data related to baseline measure
A little better	9 (15, 19) ^a	-1 (-0.5, -1.5) ^c	1.0 (1, 2) ^a	2.0 (1, 3) ^a	
Same	0 (-3, +4) ^a	-0.9 (-0.5, +0.2) ^c			
A little worse	8 (0, -14) ^a	1.2 (1.8, 2) ^c			
A lot worse	13 (-11, -13) ^a	3.8 (1.2, 5.7) ^c			
Perceived satisfaction					
Very satisfied	NA	3 (2,5) ^a [0-10]	NA	NA	Wide overlap; few cases in “not satisfied” group
Somewhat satisfied		5 (4,7) ^a [0-10]			
Not satisfied		8 (6,9) ^a [5-10]			

Notes. VAS = Visual Analog Scale [0-100mm range] (Powell et al., 2001)

NRS = Numeric Rating Scale [0-10 range] (Voepel-Lewis et al., 2011)

VNS = Verbal Numeric Scale [0-10 range] (Bailey et al., 2007)

FPS = Faces Pain Scale [0-6 range] (Gauthier et al., 1998; Demyttenaere et al., 2001; Bulloch & Tenenbein, 2002)

CAS = Color Analog Scale [0-10cm range] (Bulloch & Tenenbein, 2002; McConahay et al., 2006)

Data presented as: [range], ^aMedian (interquartile range), ^bMean ± SD, ^cMean (confidence interval)

*Pain relief data represent change in scores from baseline, and are verbatim from original works. VAS data were presented as absolute median values with directional interquartile range. Although directions differ between reports, it is assumed that “better” was associated with a decrease and “worse” with an increase in scores.

and anxiety symptoms postoperatively (Wennström & Bergh, 2008). These studies and others in adults (Wells & Ridner, 2008) emphasize the importance of distinguishing pain from other symptoms or features of pain to facilitate appropriate clinical decisions since each symptom requires different evaluation and intervention. Lastly, other contextual factors including surgical severity and reported pain

tolerance (i.e. measured by parental perception of child’s tendency to report pain) have been found to contribute significantly to pain scores in children (Kotzer, 2000). Collectively, these and, likely, many other factors, influence pain intensity scores and their relative meaning to the individual patient confounding clinical interpretability.

Potential misuse of pain scores

Findings related to pain score interpretability have considerable implications for clinical practice. Most important, perhaps, is that the use of specific pain score cut-points for individual treatment decisions, as some have suggested, may be inappropriate. Few investigators have, to date, implemented and evaluated treatment algorithms that base the choice and amount of analgesic on pain score cut-points (Vila et al., 2005; Falanga et al., 2006). In one study that randomized a small sample of healthy children to a postoperative decision algorithm with specified treatments based on pain scores, Falanga et al. (2006) demonstrated increased prescription of all analgesics, administration of non-opioids (but not opioids), decreased pain scores and increased nausea, but no other ill effects. Another study in adults that used institutional quality assurance data found that implementation of a pain score-based algorithm increased satisfaction with pain management, but also increased more than two-fold the prevalence of sedation-related adverse events (Vila et al., 2005). This latter study highlights the potential hazards associated with pain score-based treatments. Notably, despite suggestions that treatments be based on pain scores, grounded on the assumption of self-report as the gold standard, qualitative evidence shows that clinicians do consider other factors (Van Hulle Vincent & Gaddy, 2009). Lastly, it is important to recognize that interventions may not produce expected changes in pain scores and other outcome measures, since their meaning varies across children. The complex nature of the pain experience, pain score meaning, and individual response to treatment - particularly in children - thus, demands a more comprehensive approach beyond the use of simple score-based algorithms and evaluations.

Future directions

Berde and McGrath (2009) recently stated that “it remains a clinical art to combine patients’ reports, behavioral observation, and physiologic measurement with the history, physical exam, laboratory information, and overall clinical context in guiding clinical judgments and therapeutic interventions” (p. 474). To date, this art remains

largely misunderstood. Recent reviews and commentaries present a growing viewpoint that challenges the notions of self-report as a gold standard and pain assessment as a fifth vital sign, putting forth an alternate framework of pain assessment as a social communication (von Baeyer, 2009; Schiavenato & Craig, 2010). The conceptual model proposed by Schiavenato and Craig (2010) depicts the complex nature of the pain assessment transaction between the patient and clinician, acknowledging multiple contributing factors (e.g. biological, sociocultural, developmental, psychological, and contextual) and intervening characteristics (e.g. clinical factors and the possibility of pain suppression and exaggeration). This framework, which suggests a dynamic and recursive process culminating in clinician judgment, may help to explain ongoing gaps in the understanding of pain management decisions.

Others have similarly emphasized the complexity of pain assessment proposing a hybrid model that distinguishes pain intensity from distress (Wells & Ridner, 2008). These frameworks suggest the need for a more comprehensive approach to pain assessment in order to better guide decisions to treat. Such an approach might include a measure of pain intensity, pain distress or anxiety, patient functioning, and other important features including response to treatment or side effects, providing a more holistic evaluation that better guides next steps. The integration of more comprehensive approaches to pain assessment into clinical practice, however, may present significant and unique challenges. Lastly, future research guided by such frameworks may better explain the dynamic decision-making process between providers and children that will, in turn, facilitate improved pain management based on the mutual desire to alleviate pain, improve comfort, and minimize risk.

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