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Original Article

The Complexities of Nurses' Pain Assessment in Hospitalized Preverbal Children

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ABSTRACT

Background: Preverbal children are at increased risk for underassessment of pain. Pain is a social transaction involving the child in pain and the nurse assessor. However, our understanding of the nurse's part in this transaction is limited.
Aims: The aim of this study was to explore nurses' assessment of pain in hospitalized preverbal children based on self-selected clinical examples.
Design: Qualitative, descriptive design.
Settings: Five different hospital units in Canada and Norway. All units had an observational pain scale for preverbal children available for use.
Participants/Subjects: Nurses (N = 22) with ≥1 year experience caring for preverbal children.
Methods: Individual, semistructured interviews. Data were analyzed using inductive thematic analysis.
Results: Nurses' assessment of pain in hospitalized preverbal children emerged as a nonlinear complex process incorporating different actions and reflections in response to the child's situation and expression of distress. Information from parents was routinely included in the assessment, although further parental involvement varied considerably. Although each assessment was personalized to the individual child, the nurse used previous experiences to interpret observations of and information from the child and the parents. Few nurses described using structured pain scales, but when used, these scales were included as only one aspect of their overall assessment.
Conclusions: Nurses preferred pain assessment based on clinical judgment and tailored to the individual child. Implementation strategies that aim to integrate structured pain scales with clinical judgment to assess pain may be more likely to succed. Further examination of this approach is warranted.

Preverbal children, younger than age 3 years, have limited abilities to express and self-manage pain and are at increased risk for underrecognition and undertreatment of pain compared with older children and adults (Voepel-Lewis, Piscotty, Annis, & Kalisch, 2012).

As a result of limited verbal skills, preverbal children primarily express their pain through behavioral and physiologic cues such as facial grimacing, crying, and increased heart rate (Craig, Korol, & Pillai, 2002). Although the beginnings of a pain-related

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vocabulary gradually emerges from around age 1.5 years, verbal and cognitive abilities are not sufficiently developed to enable consistent self-report (Chan & von Baeyer, 2016; von Baeyer, 2014). Consequently, preverbal children are completely dependent on their caregivers' abilities to recognize signs of pain and provide pain relief (Waxman, Martin, & Pillai Riddell, 2017; Williams, 2002). Around half of the children admitted to pediatric hospitals in North America were younger than 3 years (Friedrichsdorf et al., 2015; Shomaker, Dutton, & Mark, 2015; Stevens et al., 2012), and hospitalization is associated with increased exposure to treatment-related and procedural pain (Stevens et al., 2014). Moreover, the chance that pain will be detected in these patients (Shomaker et al., 2015) and the likelihood that they will receive pain-reducing treatment (Birnie et al., 2014) are significantly lower.

The social communication model of pain (Craig, 2009) describes pain as a social transaction between the child experiencing and expressing pain and the caregiver assessing and treating the pain. In contrast to earlier, well-known pain models like the gate control theory (Melzack, 1999) and the neuromatrix theory (Melzack, 1999), the social communication model of pain is not limited to pain as an individual experience. The model also takes into consideration the social features of pain, including the relationship between the child and the caregiver and how the caregiver interprets and responds to the child's expression of pain (Craig, 2009). Consequently, to understand pain it is not enough to try to understand only the child experiencing pain; we also need to explore factors related to the nurse assessing and managing the child's pain to understand fully the persisting problem of under-recognition and undertreatment of pain. This includes intra- and interpersonal factors influencing the nurse assessor and his or her assessment of pain, such as personal knowledge and experience (Craig, 2009; Ely, 2001; Gimbler-Berglund, Ljusegren, & Enskar, 2008), as well as aspects related to the physical and social context (Craig, 2009; Ljusegren, Johansson, Gimbler Berglund, & Enskar, 2012). To date, this area has received little attention and most published research has focused on the child (Franck & Bruce, 2009; Voepel-Lewis et al., 2012).

Nurses report pain assessment as being more difficult in preverbal children than in older, verbal children (Ellis et al., 2007; Gimbler-Berglund et al., 2008; Smyth, Toombes, & Usher, 2011). Assessment of pain has been described as a systematic and holistic approach to the child's situation to determine whether the child is experiencing pain (Craig, 2009; von Baeyer, 2014). Structured pain measurement scales are considered an important aspect of pain assessment, and their use has long been considered a prerequisite for good pain management (Stevens, Riddell, Oberlander, & Gibbins, 2007; Twycross, Voepel-Lewis, Vincent, Franck, & von Baeyer, 2015), although there is limited evidence to support this belief (Franck & Bruce, 2009). Although both clinical practice and outcomes for hospitalized children were improved in a multidimensional knowledge translation intervention study (Stevens et al., 2014), the effect of structured pain scales on the observed improvements in patient outcomes cannot be determined from this study. Good adherence to pain assessment recommendations has been difficult to achieve, and structured pain measurement scales are infrequently used in clinical practice (Franck & Bruce, 2009; Ista, van Dijk, & Van Achterberg, 2013). Instead clinicians have expressed strong preferences for assessment based on clinical judgment (Ljusegren et al., 2012; Pölkki et al., 2010; Twycross, Forgeron, & Williams, 2015; Zisk-Rony, Lev, & Haviv, 2015).

To achieve sufficient pain management, an understanding of how pain is assessed and of factors related to the nurse assessor and the social and physical context in which the assessment takes place is needed (Craig, 2009), but clinical studies on nurses' pain assessment practices are scarce (Franck & Bruce, 2009; Voepel-Lewis et al., 2012). The few existing studies were published during the 1990s and 2000s (Gimbler-Berglund et al., 2008; Hamers, Abu-Saad, Halfens, & Schumacher, 1994; Joslyn, 2005; Noviello, 2006) and none has described how nurses assess pain when structured pain measurement scales are available.

All in all, the reasons behind the persistent gap between official recommendations and clinical practice are poorly understood, and more knowledge on how nurses assess pain is needed to define the gap between current and ideal pain assessment practices and devise effective strategies to decrease it. Therefore the aim of this study was to explore how nurses assess pain in hospitalized preverbal children.

Methods

This qualitative study had an inductive descriptive design.

Participants and Setting

A purposeful sample (Patton, 2015) consisting of 22 nurses was recruited using a two-step sampling strategy. First, eligible units were identified. Units were considered eligible if they cared for preverbal children and had available at least one observational pain assessment scale for this age group. Neonatal intensive care units were excluded. Five units providing different levels of care, from different hospitals and countries, were selected. A description of each unit was collected, including copies of available pain assessment scales and procedures related to pain assessment to provide background for the interviews (Table 1).

Second, eligible nurses working in these units were invited to participate. To be eligible, nurses needed to have $\geq$1 year of experience caring for preverbal children and be fluent in English or Norwegian. Recruitment was performed in close collaboration with a local contact person and multiple sources were used to disseminate verbal and written study information. Nurses who were interested in participating completed a brief questionnaire describing their age group, gender, educational background, and clinical experience. Interview participants were purposefully selected from the submitted questionnaires ($n = 45$), 4-5 nurses from each unit with the aim of maximal variation on individual variables (Patton, 2015). All interview participants were female, the majority had provided care to preverbal children for most of their nursing practice, and their median age was 38 years (Table 2).

Data Collection

Data were collected by means of individual interviews between June and November 2016. All interviews took place in a quiet room at the unit and lasted between 33 and 75 minutes (mean 49 minutes). The interviewer, a Ph.D. candidate with a background in neonatal nursing, had prior experience with pain assessment and the use of structured observational pain scales as well as interviewing.

A semistructured interview guide was developed to gain insight regarding the event "pain assessment" in the caregiver domain of the Social Communication Model of Pain (Craig, 2009). Participants were asked to describe how they assessed pain in preverbal children in their clinical practice, including observations, thoughts, and actions, as well as influencing factors. The interview guide was piloted during three interviews, two in Norwegian and one in English. Pilot findings were used to modify the content as needed, train the interviewer, and determine approximate interview duration. The main change after the pilot interviews was asking participants in advance to be prepared to discuss two case examples

Table 1
Participating Units (n = 5)

Unit	Hospital	Country	No. of Participants	Pain Scales Available
Pediatric intensive care unit	University hospital	Norway	5	FLACC/COMFORT-B
Pediatric surgical unit	University hospital	Norway	4	FLACC
Pediatric medical unit	University hospital	Canada	4	Behavioral scale*
Pediatric medical/surgical unit	University hospital	Canada	4	Behavioral scale*
Pediatric ward	Community hospital	Norway	5	FLACC

FLACC = Face, Legs, Activity, Cry, Consolability (Merkel et al., 1997); COMFORT-B = COMFORT behavior scale (van Dijk et al., 2000).
* The behavioral scale was unpublished and consisted of a list of behavioral signs, including moaning/whimpering, crying, screaming, verbalizing by child/parent, brow bulge, eye squeeze, grimacing, guarding, rigidity, reluctance to move, and restlessness. If any of these behaviors were present, a "B" for behavior was recorded.

from their clinical practice. Pilot data were not included in the analysis.

After providing written informed consent, participants were asked to describe the two preprepared case examples and questions were administered as needed. Only after the two examples had been discussed, participants were asked specific questions regarding use of structured pain scales both related to their examples and clinical practice in general and finally given the opportunity to add information. Interviews were digitally recorded and transcribed verbatim by a transcriptionist.

Data Analysis

Transcripts were systematically checked against the recording by the interviewer to ensure accuracy and corrected if needed. Subsequent data analysis was based on the amended written transcripts. The thematic data analysis followed the six phases described by Braun and Clarke (2006). RDA was responsible for the analysis in close collaboration with AAC. Transcripts were read multiple times to generate initial ideas for themes. The two authors separately coded the first two interviews before comparing codes and devising an initial coding structure used as a starting point for further coding. New codes were added and old codes amended as needed. Codes were sorted into themes and subthemes and relationships between different codes and themes explored. Codes and themes were continually checked against the interview transcripts. The emerging coding structure and themes were reviewed by all authors at two time points, halfway through and at the completion of coding. At completion, each coauthor read two interview transcripts in detail to determine the "fit" of the proposed coding structure. Themes were refined, and a map describing how they were connected was developed and discussed among the authors. NVivo qualitative data analysis software (QSR International Pty Ltd. Version 10, 2012) was used to code the written interviews and facilitate the analysis process.

To increase the trustworthiness of the findings (Lincoln & Guba, 1985), we used different sites across both countries and applied investigator triangulation in coding and analytic decisions. The sample and settings have been described in detail to assist the reader in determining the transferability of our findings.

Table 2
Demographic Data

Participants	N = 22
Women	22/22
Age [median (IQR*)] in years*	38 (28-48)
Nursing background	
Registered nurse (RN)	14
RN with specialist training†	8
Experience [median (IQR)]	
Number of years in nursing	12.5 (5-19)
Number of years working with children younger than age 3	9.5 (3.75-19)
Number of years working in current unit (as RN)	7.5 (2.75-17)
Full-time/part-time	17/5
Nurses with access to validated observational pain scales‡	14/22

IQR = interquartile range.
* Age was recorded in 5-year intervals; the middle value of each age group is given.
† Subsample of the Norwegian participants. In Norway RNs can complete 1.5 years of specialized education and training for example in pediatrics to become a pediatric nurse. This education is on a level above a bachelor's degree but below a master's. One of the RNs with specialist training in the sample also had a master of science in nursing.
‡ FLACC and COMFORT behavior scales.

Ethical Considerations

The study was approved by the Data Protection Officials for Research at Telemark Hospital (46336) and Oslo University Hospital (2016-2813) in Norway, and by the Research Ethics Board of the IWK Health Centre (1021714) in Canada. Hospital management approved participation. All participants were given written and verbal information about the study and provided signed informed consent to participate.

Results

Three themes —"gaining knowledge about the individual child," "having experience-based knowledge," and "combining knowledge with observations"—with subthemes were identified in the data (Table 3).

Gaining Knowledge about the Individual Child

All respondents stressed the importance of knowing the child when assessing pain. Knowledge of the child included how the child would normally act, when he or she was comfortable and in familiar surroundings (hereafter referred to as the child's normal), and about prior experiences that might affect the child's pain experience and expression. The main information provider was the parents.

Having Relationships with Child and Parents

Relationships with both the child and the parents were the foundation for learning to know the child and contributed to easier and quicker assessments, because the current situation, behavioral changes, and deviations from the child's normal were more easily identified. Assessment of pain was considered more difficult in situations where a relationship had not yet been established.

> It's a much bigger challenge or more difficult to assess a child in the emergency room really. It's a bigger challenge. To develop a collaboration with the parents. They don't understand what's going on with the child—and maybe you can't develop a collaboration with the child either. Then it's—yes, I think it is a bigger challenge. (R4)

Table 3
Themes and Subthemes

Theme	Subtheme
Gaining knowledge about the individual child	Having relationships with the child and parents
	Knowing through others
Having experience-based knowledge	Pain is pain, but more difficult to assess in preverbal children
	Knowledge-based expectations
Combining knowledge with observations	Having probable cause for pain
	Eliminate other sources for distress
	Using behavioral pain scores
	Evaluating change and effects
	Personalized and contextual pain assessment

Depending on the relationship with the child and parents and the situation, the nurse either communicated indirectly through the parents while observing the child's responses or directly with the child, using verbal and nonverbal communication as appropriate. Children approaching age 3 years had developed some verbal skills, and communication with them often included an attempt toward a verbal dialogue:

> We try “where's the owie” and “where does it hurt,” but often you don't get the answer you expect when they're that young. (R12)

Knowing through Others

Both parents and colleagues were often used as knowledge providers. Parents were perceived to know their child best, and all nurses actively used the parents to gain knowledge regarding the child's normal.

> I talk with mom about how the child usually is. What is normal for this child? (R2)

In general, nurses also found parents good at identifying subtle changes and deviations from normal behavior. Parents were less able to contribute information for young infants, because the parents had not yet learned their child's normal, and for children who had suffered severe, behavior-altering trauma, where the child's normal no longer applied to the current situation. In these situations or when parents were absent, other nurses or physicians who knew the child were sometimes consulted, but this information was not considered an equal substitute for information from parents.

> I don't know this child's normal and have to trust the report from the previous shift or from those who knew the child before me, but this is also an acquaintance of only a few days, so I don't know if this child usually has problems sleeping at night and cries during the nights. I don't know. And that's a huge influence. (R3)

The degree of collaboration depended on situational factors, such as the complexity of the situation and the physical environment, as well as nurse-related factors like experience, personal preferences and value system. Nurses' approach to pain assessment differed; some regularly consulted colleagues and/or parents, whereas others preferred trusting their own judgment more and only used colleagues to confirm their own assessment. Some, often the less experienced nurses, described making assessments almost solely based on the parents' interpretation of the child's behavior, especially when the nurse did not already know the child. Finally some nurses strived to actively involve either parents or colleagues in their assessment process whenever possible.

> We all stood together assessing, and they said this is not normal. I think—he wasn't that old either—this is very unusual for him and why does he do that? And—tried somehow to figure out why—why does he do that? Because they were really, somehow they really were [focused on] how he would normally behave. Then it's—what's not normal and why does he do this? (R5)

Having Experience-Based Knowledge

Experience was considered necessary for a correct assessment. Longer clinical experience was said to provide a greater understanding of pain, strategies for action, self-reliance, and confidence in one's ability to assess pain quickly and accurately. Lack of experience was imputed to lead to greater difficulty interpreting the child's distress and assessing pain, increasing the need for collaboration or to trust the assessments of others.

Pain is Pain, but More Difficult to Assess in Preverbal Children

Assessment of pain was often described as an integral part of patient care, and nurses believed pain to be a subjective experience that should be approached with the same considerations regardless of age. Although one experienced nurse found it easier to assess the smallest children because their expression was more “honest” and not influenced by exaggeration, assessment of pain was in general considered more difficult in preverbal children because self-report was not possible.

> You're not as confident and sure in yourself, because you don't have that verbal reassurance that what you are thinking is for sure the cause, because when he can't tell you. (R21)

Knowledge-based Expectations

Experience or previous knowledge about the child sometimes resulted in an expectation of pain even before the nurse saw the child.

> We're a special population where we're dealing with post-operative pain. So we're always thinking about pain. So every time we go into a room, you're assuming somebody is in pain. So it's almost a challenge. I almost want them to challenge me to say you're not in pain. (R19)

Although an a priori expectation of pain was likely to facilitate detection of pain, there was a risk that reliance on such expectations could limit or distort real-time clinical assessment and lead to under- or overestimation of the severity of the child's pain.

Previous experiences with children in the same age group, with a similar diagnosis or undergoing a similar procedure regardless of age, formed expectations on how normal or pain-free behavior versus pain behavior would usually look.

> If you haven't taken care of brain injuries before, then you don't know if they hurt or not, right? You need a bit of experience with these patients to be able to decide and make a correct assessment. (R3)

Older children's descriptions of pain in specific situations were used to illuminate the experience of and understand the expressions of pain in younger, nonverbal children.

Combining Knowledge with Observations

Information gained from others or through observation of the child was combined with experience-based and child-specific

knowledge using several different approaches or actions to gain a better understanding and interpretation of the child and the child's situation, with each approach contributing to the final assessment decision.

Having Probable Cause for Pain

It was considered much easier to assess pain in children who had a probable cause for pain. For example, nurses quickly concluded that a child was experiencing pain if behavioral changes coincided with a painful procedure or appeared postoperatively. If pain medication was already in use, time since last medication was used to estimate the probability for pain. Pain was considered more likely if behavioral changes occurred close to the scheduled administration time.

In cases where no diagnosis or procedure could explain pain-related behavior, it was considered much more difficult to determine if the child was experiencing pain.

> The harder one would be if you went in and they were upset and tense, and you couldn't think of any reason that they would have pain. Maybe they've had no surgery, maybe they've had nothing going on. And that's always harder because the only thing you can really tell them—the docs—is like there's something going on, I don't know what it is, but they're upset and they're different and. You know, you can't console them. (R17)

Eliminate Other Sources for Distress

Nurses often referred to pain assessment in preverbal children as a process of elimination. Behavioral cues were seldom considered pain specific and even more unspecific the younger the child was; this led nurses to rely more strongly on elimination of other causes in infants compared with toddlers.

> I just think like a baby crying, it could be they're in pain, they're hungry, they want their mom, they want their diaper changed. It could mean a lot more things. Whereas I just find the signs for a 1½ or 2 year old, they're just a little bit more specific to pain, I guess. (R21)

The nurses tried to eliminate basic needs like hunger or dirty diapers, psychological factors like anxiety or fear, and social needs or need for comfort, as well as other causes of distress not defined as pain, such as withdrawal or residual effects of anesthesia. Parents were the main tool in the elimination process, and the nurse evaluated the effect of parent-provided comfort whenever possible. If behavioral cues decreased or vanished with the application of comfort measures, it was concluded that the child was not experiencing pain, or only mild pain. Even when a probable cause was present, elimination was used to determine the cause of the observed distress, because different causes required different approaches. If the child continued to display behavioral cues associated with pain after all other causes had been eliminated, the nurse concluded that the child was likely experiencing pain.

Using Behavioral Pain Scores

Nurses believed that pain scores were not specific to pain and few nurses described using structured pain scales in their assessments. Two units did not have structured scales available; in the other three, reasons cited for non-use included lack of knowledge, forgetfulness, colleagues' nonuse, implementation deficiencies, and organizational factors.

> I'm not really certified to use FLACC [Face, Legs, Activity, Cry, Consolability] yet. That's why I've been—because it's sort of been like this, we've been told that we need to be certified to use FLACC.… And it's just sort of faded away. Now, I don't think it's—most may have it in their pocket, but… (R5)

Documentation of a pain score was perceived to be useful for communication about pain, to justify treatment and to evaluate treatment effect. In one of the units the COMFORT behavior scale was routinely used, but not FLACC. The COMFORT scale and documentation of COMFORT scores were well integrated into the patient records; nurses routinely assessed the child and documented COMFORT scores and physicians routinely prescribed and evaluated desired sedation level measured as COMFORT scores. None of these factors were in place for FLACC, and the nurses believed this was the main reason why FLACC was not used.

Evaluating Change and Effects

Nurses described how evaluating a child's response to the provision of an analgesic was helpful in determining if the child was experiencing pain.

> If he's got the pain order and they're expecting him to possibly be having pain anyway, and I go in and he seems to be in pain, then give it to him. And if it gets better or it seems to get better, it's like, okay, he probably was having pain. (R17)

If a pharmacologic intervention worked but comforting the child did not, it was taken as a confirmation that the observed cues were caused by pain. In situations where a pain diagnosis was confirmed, nurses compared behavioral cues from different time points with identify changes. These changes were interpreted as mirroring increases or decreases in pain intensity. Expectation of perceived pain intensity was also reported to be associated with additional factors such as diagnosis or time since surgery. In addition, the type of intervention needed to diminish observed cues indicative of pain was taken as an indication of pain intensity. Pain was assumed to be moderate if controlled with nonopioids and severe if opioid medication was needed.

Personalized and Contextual Pain Assessment

Nurses reported using known generic cues when assessing pain, but equally important was the evaluation of individual and child-specific signs and changes, with an emphasis on deviations from the child's normal.

> If it's a 2 year old, how is the child usually? If he suddenly starts to cry, is it ordinary—is this a cry that is common for the child at home or does it sound—the parents often know if it's different—if the child behaves very different from usual. (R8)

Although pain assessment relied on nurses' previous experiences and comparisons of the child with experience-based knowledge, nurses were always mindful that every child's pain was unique and influenced by both child-related and contextual factors. Children brought with them a unique set of earlier experiences that influenced both pain experience and pain expression.

> Well, I mean every child is different. It depends on what's wrong with them, and why they're here, and what they've had done. And you kind of see a broad picture that, okay, well, kids who normally have this done, they have…you know, usually they tolerate this much pain or they don't need this much pain medication. But everybody has a different pain threshold, and everybody reacts differently. (R22)

The influence of both the physical and the social environment was also taken into account. A busy open-bay observation room

with several people present was considered a negative influence on the child's experience compared with a quiet single room. Parents' or clinicians' emotional state or behavior could also affect a child's pain response.

> There the parents were a bit difficult. Because it seemed they somehow made him sicker than he really was. And children mirror their parents. So if mom is there almost crying because we are changing a Band-Aid, the child is bound to think that this is something horrible. (R13)

Discussion

Nurses' assessment of pain in hospitalized preverbal children emerged as a nonlinear complex process incorporating different actions and reflections in response to the child's situation and expression of distress. Although each assessment was personalized to the individual child, it also relied heavily on the nurse's previous experiences, because these were used to interpret observations of and information from the child and the parents. Information from parents was routinely included in the assessment, although further parental involvement varied considerably. Few nurses described using structured pain scales, but when used, these scales were included as only one aspect of their overall assessment.

The perceived difficulties in assessing pain in preverbal children described by nurses in this study are well known (Ellis et al., 2007; Gimbler-Berglund et al., 2008; Smyth et al., 2011). The inverse relationship described between child age and perceived assessment difficulties is further consistent with research indicating that young infants have difficulties to discern and express pain differently from other negative states (Ahola Kohut, Pillai Riddell, Flora, & Oster, 2012). The challenges in assessment of pain in preverbal children combined with developmental differences within the age group may have contributed to the varied and complex pain assessment processes the nurses described. Although similar actions were used in assessments across several assessors and situations, no consistent pain assessment process could be identified. Instead, each nurse appeared to have the child as a starting point and subsequently select from and combine numerous actions in an effort to determine if the child was experiencing pain and to estimate pain intensity.

Having a probable cause to explain observed pain-related cues was important to the assessment process, and this result is in accordance with previous studies (Gimbler-Berglund et al., 2008; LaFond et al., 2015; Noviello, 2006; Smyth et al., 2011; Woodgate & Kristjanson, 1996). However, expectations based on probable cause, such as perceived pain intensity as result of a specific diagnosis, were systematically weighed against observations of cues from the child, knowledge of the child, and contextual factors. Moreover, pain was not merely interpreted based on established, generic behavioral or physiological cues associated with pain (Hadjistavropoulos & Craig, 2002), but as deviation from the child's normal behavior. This type of approach may be an important consideration in future development of structured pain scales.

In their interpretation of observed cues from the child, nurses routinely compared their findings against information from parents. This concurs with the increased emphasis placed on parents' role in their children's pain management during the past 20 years from virtually nonexistent (Woodgate & Kristjanson, 1996) to being viewed as an important aspect of care (Gimbler-Berglund et al., 2008; Zisk-Rony et al., 2015). This view is not necessarily transformed into practice (Zisk-Rony et al., 2015), and in accordance with previous studies (Axelin et al., 2015; Ljusegren et al., 2012; Smyth et al., 2011), the extent to which parents were included in the assessment beyond the role of information provider varied considerably. Reasons for and consequences of this variation and the effect of including parental assessment in a composite assessment of child pain should be further explored.

The limited use of structured scales in pain assessment described in this study has also been reported by others (Ljusegren et al., 2012; Smyth et al., 2011; Stevens et al., 2012; Twycross, Forgeron, et al., 2015; Zisk-Rony et al., 2015) and illustrates the persistent gap between clinical practice and mainstream research, guidelines, and policies that advocate the use of structured, validated scales as the foundation for effective pain management (Voepel-Lewis et al., 2012). The effect of pain assessment and use of structured pain assessment scales on patient outcomes need to be further explored (Franck & Bruce, 2009). Although the use of a structured pain scale is currently the best evaluated foundation for clinical pain assessment, we argue, based on the findings from this study and previous research, that treatment decisions should not be based solely on pain scores. Having treatment algorithms based on pain scores dictate treatment without making room for clinical judgment has resulted in unwarranted and negative consequences (Lucas, Vlahos, & Ledgerwood, 2007; Pasero, Quinlan-Colwell, Rae, Broglio, & Drew, 2016).

Participants did not consider behavioral scores being specifically related to pain, which concurs with the views put forth in a recent editorial (Pillai Riddell et al., 2016). Consequently, a behavioral pain score alone is not a sufficient substitute for complex pain assessment based on clinical judgment. This may be one of the reasons why structured pain scales were never used in isolation, but together with other actions such as elimination of other causes. On the other hand, when structured pain scales were not used, nurses found it difficult to estimate pain magnitude and changes. This may serve as an argument for including valid, structured scales into clinical pain assessment. A major strength of observational pain scales is that they provide a pain behavior score that may be used to guide and evaluate the effect of pain treatment, although it should not be confused with a pain intensity score (Pasero & McCaffery, 2005).

Findings from this study support the idea of a composite approach to pain assessment as previously described in the literature (Herr, Coyne, McCaffery, Manworren, & Merkel, 2011; Twycross, Voepel-Lewis, et al., 2015). The commonality between these approaches is the systematic inclusion of additional actions besides a structured pain scale in the assessment of pain. Several of the actions used by nurses in this study to assess pain are included in the hierarchical approach suggested by the American Society of Pain Management Nurses (Herr et al., 2011). However; as pain scores and other information such as behavioral cues and information from parents were integrated in a comprehensive clinical judgment without any prespecified order, their approach to pain assessment more closely resembled a bundled approach (Twycross, Voepel-Lewis, et al., 2015).

Strengths and Limitations

The major strength of this qualitative approach was the diverse sample of nurses from several units in two countries, resulting in a rich and detailed picture of assessment of pain in preverbal children. This knowledge was only accessible from nurse assessors' detailed descriptions of their thoughts and actions. What we cannot know from this study is how often the identified strategies and approaches are used or to what extent our findings can be extrapolated to different situations, nurses and settings. Another possible limitation concerns misunderstandings from the use of cross-cultural interviewing (Patton, 2015), but several steps were taken to minimize this risk, including the use of a bilingual

interviewer and interview guides in both languages, pretesting in both cultural settings, use of native professional transcribers, and a cross-cultural research group. We believe that the systematic approach toward data collection and analysis as well as commonalities in findings across diverse settings, participants, and examples increase the dependability, credibility, and transferability of our findings (Lincoln & Guba, 1985). Finally, the inclusion of units with only a nonvalidated behavioral scale available may be considered a methodologic limitation. Because this scale did not provide a numeric rating, its use was more limited than that of the validated scales and more closely resembled pain assessment without any scale.

Implications for Nursing Education, Practice, and Research

A composite approach to pain assessment, where a structured and sufficiently validated pain scale is included together with other sources of information and guidelines regarding how information from different sources should be interpreted and weighed together, may be easier to implement into clinical practice and as such contribute to an improvement of clinical pain assessment and management. We suggest that future implementation efforts aim to integrate structured scales in a way that is compatible with and enhances clinical decision making.

The knowledge from this study serves as a necessary starting point for further research into a composite pain assessment strategy. The generalizability of the described approach needs to be further evaluated. Future work examining the validity, feasibility, acceptability, and effectiveness of a composite pain assessment process that embeds a structured and valid pain scale and encompasses additional child, parent, situational, and contextual factors is warranted, including evaluation of its effect on pain assessment practices, pain treatment, and outcomes for the child.

Conclusions

Nurses preferred pain assessment based on clinical judgment, and although clinical pain assessment in preverbal children had distinct commonalities across diverse assessment situations, each assessment situation was individually tailored to the child and situation. The complexity of clinical pain assessment and the myriad factors constantly weighed together in clinical decision making may explain the persistent difficulties in implementing structured pain assessment scales into clinical practice.

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References

Ahola Kohut, S., Pillai Riddell, R., Flora, D. B., & Oster, H. (2012). A longitudinal analysis of the development of infant facial expressions in response to acute pain: Immediate and regulatory expressions. *Pain, 153*(12), 2458–2465.

Axelin, A., Anderzen-Carlsson, A., Eriksson, M., Polkki, T., Korhonen, A., & Franck, L. S. (2015). Neonatal Intensive Care Nurses' Perceptions of Parental Participation in Infant Pain Management: A Comparative Focus Group Study. *Journal of Perinatal & Neonatal Nursing, 29*(4), 363–374.

Birnie, K. A., Chambers, C. T., Fernandez, C. V., Forgeron, P. A., Latimer, M. A., McGrath, P. J., & Finley, G. A. (2014). Hospitalized children continue to report undertreated and preventable pain. *Pain Research Management, 19*(4), 198–204.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Chan, J. Y., & von Baeyer, C. L. (2016). Cognitive developmental influences on the ability of preschool-aged children to self-report their pain intensity. *Pain, 157*(5), 997–1001.

Craig, K. D. (2009). The social communication model of pain. *Canadian Psychology, 50*(1), 22–32.

Craig, K. D., Korol, C. T., & Pillai, R. R. (2002). Challenges of judging pain in vulnerable infants. *Clinics in Perinatology, 29*(3), 445–457.

Ellis, J. A., McCleary, L., Blouin, R., Dube, K., Rowley, B., MacNeil, M., & Cooke, C. (2007). Implementing best practice pain management in a pediatric hospital. *Journal for Specialists in Pediatric Nursing, 12*(4), 264–277.

Ely, B. (2001). Pediatric nurses' pain management practice: Barriers to change. *Pediatric Nursing, 27*(5), 473–480.

Franck, L. S., & Bruce, E. (2009). Putting pain assessment into practice: Why is it so painful? *Pain Research Management, 14*(1), 13–20.

Friedrichsdorf, S. J., Postier, A., Eull, D., Weidner, C., Foster, L., Gilbert, M., & Campbell, F. (2015). Pain outcomes in a US children's hospital: A prospective cross-sectional survey. *Hospital Pediatrics, 5*(1), 18–26.

Gimbler-Berglund, I., Ljusegren, G., & Enskar, K. (2008). Factors influencing pain management in children. *Paediatric Nursing, 20*(10), 21–24.

Hadjistavropoulos, T., & Craig, K. D. (2002). A theoretical framework for understanding self-report and observational measures of pain: A communications model. *Behaviour Research and Therapy, 40*(5), 551–570.

Hamers, J. P., Abu-Saad, H. H., Halfens, R. J., & Schumacher, J. N. (1994). Factors influencing nurses' pain assessment and interventions in children. *Journal of Advanced Nursing, 20*(5), 853–860.

Herr, K., Coyne, P. J., McCaffery, M., Manworren, R., & Merkel, S. (2011). Pain assessment in the patient unable to self-report: position statement with clinical practice recommendations. *Pain Management Nursing, 12*(4), 230–250.

Ista, E., van Dijk, M., & Van Achterberg, T. (2013). Do implementation strategies increase adherence to pain assessment in hospitals? A systematic review. *International Journal of Nursing Studies, 50*(4), 552–568.

Joslyn, B. J. (2005). *How pediatric nurses assess infant pain*. Doctoral thesis. Teachers College, Columbia University, New York, NY. Available from EBSCOhost research databases. Accession Number 109846764.

LaFond, C. M., Van Hulle Vincent, C., Corte, C., Hershberger, P. E., Johnson, A., Park, C. G., & Wilkie, D. J. (2015). PICU nurses' pain assessments and intervention choices for virtual human and written vignettes. *Journal of Pediatric Nursing, 30*(4), 580–590.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: SAGE Publications.

Ljusegren, G., Johansson, I., Gimbler Berglund, I., & Enskar, K. (2012). Nurses' experiences of caring for children in pain. *Child: Care, Health and Development, 38*(4), 464–470.

Lucas, C. E., Vlahos, A. L., & Ledgerwood, A. M. (2007). Kindness kills: The negative impact of pain as the fifth vital sign. *Journal of the American College of Surgery, 205*(1), 101–107.

Melzack, R. (1999). From the gate to the neuromatrix. *Pain*, (Suppl 6), S121–S126.

Merkel, S. I., Voepel-Lewis, T., Shayevitz, J. R., & Malviya, S. (1997). The FLACC: a behavioral scale for scoring postoperative pain in young children. *Pediatric Nursing, 23*(3), 293–297.

Noviello, S. R. (2006). *A grounded theory study of pain management behaviors of nurses who care for preverbal children*. Doctoral thesis. Medical College of Georgia, Augusta, GA. Available from ProQuest Dissertations Publishing database. (Record No. 304954685).

Pasero, C., & McCaffery, M. (2005). No self-report means no pain-intensity rating. *American Journal of Nursing, 105*(10), 50–53.

Pasero, C., Quinlan-Colwell, A., Rae, D., Broglio, K., & Drew, D. (2016). American Society for Pain Management Nursing Position Statement: Prescribing and administering opioid doses based solely on pain intensity. *Pain Management Nursing, 17*(3), 170–180.

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Thousand Oaks, CA: SAGE Publications.

Pillai Riddell, R., Fitzgerald, M., Slater, R., Stevens, B., Johnston, C., & Campbell-Yeo, M. (2016). Using only behaviours to assess infant pain: A painful compromise? *Pain, 157*(8), 1579–1580.

Pölkki, T., Korhonen, A., Laukkala, H., Saarela, T., Vehviläinen-Julkunen, K., & Pietil, A. (2010). Nurses' attitudes and perceptions of pain assessment in neonatal intensive care. *Scandinavian Journal of Caring Sciences, 24*(1), 49–55.

Shomaker, K., Dutton, S., & Mark, M. (2015). Pain prevalence and treatment patterns in a US children's hospital. *Hospital Pediatrics, 5*(7), 363–370.

Smyth, W., Toombes, J., & Usher, K. (2011). Children's postoperative pro re nata (PRN) analgesia: Nurses' administration practices. *Contemporary Nurse, 37*(2), 160–172.

Stevens, B. J., Harrison, D., Rashotte, J., Yamada, J., Abbott, L. K., Coburn, G., Stinson, J., & Le May, S. (2012). Pain assessment and intensity in hospitalized children in Canada. *Journal of Pain, 13*(9), 857–865.

Stevens, B. J., Riddell, R. R. P., Oberlander, T. E., & Gibbins, S. (2007). Assessment of pain in neonates and infants. In K. J. S. Anand, B. J. Stevens, & P. J. McGrath (Eds.), *Pain in neonates and infants* (3rd ed., pp. 67–90). Amsterdam: Elsevier.

Stevens, B. J., Yamada, J., Estabrooks, C. A., Stinson, J., Campbell, F., Scott, S. D., & Cummings, G. (2014). Pain in hospitalized children: Effect of a multidimensional knowledge translation strategy on pain process and clinical outcomes. *Pain, 155*(1), 60–68.

Twycross, A., Forgeron, P., & Williams, A. (2015a). Paediatric nurses' postoperative pain management practices in hospital based non-critical care settings: A narrative review. *International Journal of Nursing Studies, 52*(4), 836–863.

Twycross, A., Voepel-Lewis, T., Vincent, C., Franck, L. S., & von Baeyer, C. L. (2015b). A debate on the proposition that self-report is the gold standard in

assessment of pediatric pain intensity. *The Clinical Journal of Pain, 31*(8), 707–712.

van Dijk, M., de Boer, J. B., Koot, H. M., Tibboel, D., Passchier, J., & Duivenvoorden, H. J. (2000). The reliability and validity of the COMFORT scale as a postoperative pain instrument in 0 to 3-year-old infants. *Pain, 84*(2-3), 367–377.

Voepel-Lewis, T., Piscotty, R. J., Jr., Annis, A., & Kalisch, B. (2012). Empirical review supporting the application of the "pain assessment as a social transaction" model in pediatrics. *Journal of Pain and Symptom Management, 44*(3), 446–457.

von Baeyer, C. L. (2014). Self-report: the primary source in assessment after infancy. In P. J. McGrath, B. J. Stevens, S. M. Walker, & W. T. Zempsky (Eds.), *Oxford textbook of paediatric pain* (pp. 370–378). Oxford, UK: Oxford University Press.

Waxman, J., Martin, J., & Pillai Riddell, R. (2017). Understanding infant pain responding within a relational context. In G. Buonocore, & C. V. Bellieni (Eds.), *Neonatal pain. Suffering, pain, and risk of brain damage in the fetus and newborn* (2nd ed., pp. 89–104). Cham, Switzerland: Springer International Publishing.

Williams, A. C. (2002). Facial expression of pain: An evolutionary account. *Behavioral and Brain Sciences, 25*(4), 439–455. discussion 455-488.

Woodgate, R., & Kristjanson, L. J. (1996). A young child's pain: How parents and nurses 'take care'. *International Journal of Nursing Studies, 33*(3), 271–284.

Zisk-Rony, R. Y., Lev, J., & Haviv, H. (2015). Nurses' report of in-hospital pediatric pain assessment: Examining challenges and perspectives. *Pain Management Nursing, 16*(2), 112–120.