Journal of Pediatric Nursing 48 (2019) 55–62

Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

Pain Assessment Practices in the Pediatric Intensive Care Unit

Elyse Laures, MSN, RN [a,*], Cynthia LaFond, PhD, RN [a,b], Kirsten Hanrahan, DNP, RN [c], Nicole Pierce, MSN, RN [a,b], Haeyoung Min, PhD, RN [d], Ann Marie McCarthy, PhD, RN [a]

[a] University of Iowa, College of Nursing, Iowa City, IA United States of America
[b] Comer Children's Hospital, University of Chicago, Chicago, IL United States of America
[c] University of Iowa Hospitals and Clinics, Iowa City, IA United States of America
[d] Gyeongsang National University College of Nursing, South Korea

ARTICLE INFO

Article history:
Received 14 January 2019
Revised 3 July 2019
Accepted 6 July 2019

Keywords:
Pain
Assessment
Pediatric
Intensive care
Critical care

ABSTRACT

Purpose: Pain assessment is the first step in managing pain; however, this can be challenging, particularly in settings such as the Pediatric Intensive Care Unit (PICU). This paper reports the current pain assessment practices from a study that was conducted describing the prevalence of pain, pain assessment, painful procedures, interventions, and characteristics of critically-ill children. Specifically, this paper addresses the child's communicative ability, pain scales, and characteristics of pain.
Design and methods: The primary study was a cross-sectional, multi-site, descriptive design. Data from a 24-hour time period were collected from medical records and bedside nurses.
Results: Data were collected from the records of 220 children across 15 PICUs. The average number of pain assessments per child was 11.5 (SD 5.8, range 1–28). Seven behavioral scales and five self-report scales were used. There were times when no scale was used, "assume pain present" was recorded, or a sedation scale was documented. Twelve pain scales, including the target population, scoring, psychometric properties, and clinical utility are described.
Conclusions: Results of this study indicate that a wide range of pain assessment tools are used, including behavioral scales for children unable to self-report.
Implications: Foremost, the appropriate assessment method needs to be chosen for each child to manage pain. Knowledge of the criteria for the use of each pain assessment scale will help the clinician select the appropriate scale to use for each child. The practice of "assume pain present," as well as standardization of pain scales, and clinical support tools needs further investigation.

Introduction

Pain assessment is particularly challenging in the Pediatric Intensive Care Unit (PICU) due to the high acuity of the population and the heterogeneity of children's developmental levels and diagnoses. Factors such as intubation, sedation, or changes in mental status may limit the ability of a child in the PICU to communicate and thus report their pain (Ismail, 2016). These challenges may explain why fewer pain studies have focused on the PICU compared to the Neonatal Intensive Care Unit (NICU) and the general pediatric population.

While it may be difficult to conduct pain research in the PICU, the long-term implications make it a critical area to study (Ismail, 2016; Turner, 2005). When any child experiences pain, the stress hormones released cause systemic changes, such as increased blood pressure, weakened immune function, and delayed healing (Olmstead, Scott, & Austin, 2010). Pain exposure may also create changes in brain development; for example, neonates who experience repeated painful stimuli risk the formation of altered neuronal circuits which create hypersensitivity to future noxious stimuli (Kennedy, Luhmann, & Zempsky, 2008). In the long term, mismanaged pain can create anticipatory fear for future painful events, avoidance of medical care, and noncooperative behavior with future medical procedures (Taddio et al., 2009). Moreover, a child's PICU experience which is exacerbated by their illness severity and exposure to painful procedures, is known to create post-traumatic stress symptoms up to six months post discharge (Nelson & Gold, 2012; Ward-Begnoche, 2007).

Since pain assessment is the essential first step in pain management, there is a need to understand how assessments are being done in the PICU. Self-report of pain is the first choice on the hierarchy of pain assessment, including a self-report scale and/or any confirmation of the presence or absence of pain (Herr, Coyne, McCaffery, Manworren, & Merkel, 2011). There are a variety of self-report scales available that can be used to facilitate pain assessment depending on the child's preferences, and cognitive and developmental ability. However, a child with

* Corresponding author at: University of Iowa College of Nursing, 50 Newton Road, Iowa City, IA 52242-1121, United States of America.
E-mail address: elyse-laures@uiowa.edu (E. Laures).

https://doi.org/10.1016/j.pedn.2019.07.005
0882-5963/

limited communicative ability, for example due to mechanical ventilation, may be able to self-report pain through behaviors such as nodding or squeezing a hand if experiencing pain, but may not be able to give a pain intensity rating. This form of assessment is still preferred over other less accurate pain assessment sources such as behavioral pain scales or physiological measures (Herr et al., 2011). Moreover, a child that can speak or even point can also give information about his or her pain, such as location, quality, and etiology. This information can aid the clinician in gaining a complete pain assessment to better manage the child's pain.

When a child cannot self-report due to a variety of factors including age and/or the use of medical devices, behavioral pain scales can be used. These scales are based on the assumption that children demonstrate common behavioral responses to pain. However, in the PICU, where sedatives and neuromuscular blockade may be administered to maintain supportive therapies, the nurse must first assess if the child is able to exhibit all of the behaviors on a behavioral scale before using it to assess pain (Pasero & McCaffery, 2005). For patients unable to exhibit pain behaviors, physiological measures such as tachycardia, tachypnea, and hypertension have been used to assess pain; however, physiological measures are only moderately correlated to pain (van Dijk et al., 2001) and often occur for reasons other than pain. For instance, some medications and diagnoses that are commonly seen in the PICU can create similar physiological responses (Ismail, 2016), making these measures less dependable when conducting a pain assessment. Although systematic reviews (Dorfman, Schellenberg, Rempel, Scott, & Hartling, 2014) and clinical recommendations (Harris et al., 2016) for pain assessment of critically-ill children have been conducted, there are gaps in the literature as to which scale to use and under what circumstances. Research is needed to look at current practices, including the appropriate use of clinical recommendations.

Purpose

The purpose of this paper is to describe the current pain assessment practices in United States PICUs. This is the necessary first step to optimize nurses' appropriate use of pain assessment methods in clinical practice. We present here, the pain assessment results from a larger study that described the prevalence of pain, pain assessment practices, painful procedures, intervention practices, and characteristics of critically-ill children that experience pain while in the PICU (LaFond et al., 2019). The following questions are addressed:

- What are the communicative abilities of children in PICUs?
- When assessing a child's pain intensity, what are the pain scales currently used in PICUs in the United States?
- What are the pain characteristics (location, etiology, quality) described by children in PICUs and how often are they assessed?

Methods

Design and participants

This study was an IRB approved, cross-sectional, multi-site, descriptive study (LaFond et al., 2019). Data were manually extracted from the electronic health records (EHRs) of the children in each participating PICU for a retrospective 24-hour time period. Institutions were invited to participate through the National Pediatric Nurse Scientist Collaborative (White-Traut, 2017). Fifteen PICUs with a total of 389 beds from 12 children's hospitals across the United States participated. Eligible units consisted of PICUs and specialty intensive care units such as cardiac, neurological, or burn units. Neonatal intensive care units and intermediate care units were excluded. All children who remained in the PICU for the complete duration of the 24-hour time period were included (LaFond et al., 2019).

Procedures and measures

Nurses collecting data at each site were trained via webinar sessions that described the intent of the study, the process for data extraction, and how to use the electronic data capture tool, REDCap (Harris et al., 2009). A reference training manual was provided for data collectors to use when needed. Each site identified a 24-hour time period from which they would collect data. During that designated 24 hours, PICU nurses who cared for the children that day were asked to complete a survey, the *Nurse Questionnaire: Child's Ability to Communicate Pain,* adapted from Hill, Carroll, Dougherty, Vega, and Feudtner (2014) for each child. Within a few days following the designated 24-hour time period, the site's trained nurse data collectors abstracted data from the EHRs and entered it into the REDCap database.

The information on each child was entered into REDCap and included various sections: 1) demographic and clinical information, 2) pain assessments, 3) sedatives, 4) neuromuscular blockade, 5) pharmacological pain interventions, 6) non-pharmacological pain interventions, 7) painful procedures, and 8) child's ability to communicate. For this paper, data from section 1 through section 8 were used. Section 1 included questions on age, race, sex, diagnosis, and supportive therapies that may affect the ability to communicate pain, including mechanical ventilation and extracorporeal membrane oxygenation. Section 2, pain assessments, was defined as documentation in the EHR of an evaluation of the child for the presence of pain. Details included were the number of pain assessments conducted in 24 hours, whether a pain scale was used, and if used—which pain scale and score, and lastly, the characteristics of pain when present (i.e., location, etiology, quality). Section 3 and 4 included the number of children receiving sedation and neuromuscular blockade due to the potential impact in a child's ability to communicate pain.

Section 8 included nurses' responses to the *Nurse Questionnaire: Child's Ability to Communicate Pain.* The survey included four questions adapted with permission from the work of Hill et al. (2014). The Hill et al. (2014) questionnaire consists of seven questions on patient communication and pain management. Three patient communication questions were used in this study with the addition of a question addressing communication challenges. The four questions included 1) selecting a sentence that best describes the child's ability to communicate, 2) identifying challenges to communication experienced during the shift, 3) rating the child's ability to effectively communicate pain and 4) assessing the need for a parent or caregiver to help the nurse understand the child's pain communication. Both questions 3 and 4 were rated on a Likert-type scale from “1” strongly agree to “5” strongly disagree.

Analyses

SAS 9.4 was used for statistical analysis. Descriptive statistics were calculated for all variables in the study, including the pain scales used by site, how frequently each scale was used, and the number of subjects that were assessed with each scale.

Results

Participants

The 12 children's hospitals that participated included hospitals from the Northeast, South, Midwest and West Coast. Nine hospitals were free standing children's hospitals and three were a part of an academic medical center. All of the hospitals were either Magnet® designated hospitals ($n = 8$) or on the journey to becoming a Magnet® recognized hospital ($n = 4$).

Data were obtained on a total of 220 children across the 15 units. Ages for the children ranged from <1 month to 21 years, with 51% being 2 years old or less. The children were primarily male (54%),

white (47%), and non-Hispanic (72%). During the 24-hour study period, 69% of the children required some sort of supportive therapy, such as non-invasive ventilation ($n = 47$, 21%), mechanical ventilation ($n = 110$, 50%), high frequency oscillatory ventilation ($n = 1$, 0.5%), and extracorporeal membrane oxygenation ($n = 4$, 2%). Furthermore, 112 (56%) children had a sedative administered and 29 (13.2%) had a neuromuscular blocking agent administered in the 24-hour period (LaFond et al., 2019).

Communication

Questions one and two on the *Nurse Questionnaire: Child's Ability to Communicate Pain* were completed for 217 children and questions three and four were completed for 216 children. Responding to the first question, nurses reported 117 (54%) of the children were able to communicate by either using full sentences ($n = 24$, 11%), simple words ($n = 18$, 8%), or were not able to speak but could communicate in other ways ($n = 75$, 35%), as compared to 100 (46%) children who could not communicate effectively. In the second question, nurses reported the following barriers to child communication: the child was preverbal ($n = 81$, 37%), had a cognitive impairment ($n = 75$, 35%), received sedation that limited communication ($n = 66$, 30%), was too ill to communicate effectively ($n = 23$, 11%), spoke primarily to family instead of staff ($n = 12$, 6%), spoke in another language ($n = 4$, 2%), or had other challenges ($n = 7$, 3%). Nurses reported multiple communication barriers for some children and no communication barriers for 15 children. Lastly, for questions three and four, nurses reported only 34% ($n = 74$) of the children could communicate effectively about their pain to the healthcare team (either strongly agreed or agreed) and similarly 34% ($n = 74$) of nurses needed the parent or guardian to help them understand the child's communication of pain or pain behaviors (results for question 3 and 4 are provided in Table 1).

Pain assessment and scales

Of the 220 children, a pain assessment was documented 2448 times across 213 children (Table 2). Three children did not have a pain assessment documented and four children had pain assessments conducted using the State Behavioral Scale (SBS), which measures sedation rather than pain (Curley, Harris, Fraser, Johnson, & Arnold, 2006). As a result, these seven children were excluded from Table 2, which describes the pain assessment practices used in the 24-hour period. The average number of assessments per child was 11.5 (SD 5.8, range 1–28). Some children had multiple scales used to assess their pain in this time period, with a maximum of 3 different pain scales per child in 24 hours.

A total of 12 pain scales were used across the hospitals in this study: five self-report scales and seven behavioral scales (Table 2). The scales used most commonly across hospitals were the numeric self-report scale (12 hospitals) and FLACC scale (10 hospitals). The use of a behavioral scale (1984 assessments, 81%) was more common than the use of a self-report scale (183 assessments, 7%). Overall, the most frequently used assessment scales for pain were the behavioral scales, specifically, the FLACC (used for 1044 assessments, 43%), rFLACC (617 assessments, 25%), and COMFORT B (260 assessments, 11%). Although the numeric scale was available in all 12 children's hospitals, it was used infrequently (140 assessments, 6%).

Pain assessments included both the use of a formal scale ($n = 2167$, 89%) or the nurse's documentation of "assume pain present" ($n = 74$, 3%) without a formal pain intensity score. A few pain assessments 111 (5%) did not include a scale or the use of "assume pain present"; these assessments were most often a comment in a free text box that included descriptions of the presence or absence of pain behaviors or changes in vital signs. Additionally, 96 (4%) pain assessments were described as "other" with incomplete documentation of the method used to assess pain.

After the pain scales currently used were identified, Table 3 was developed to describe the 12 scales used in these PICUs. Literature was reviewed for each scale, and the articles that initially described the scales were primarily used to identify information on the target population for each scale, scoring procedures, and psychometric properties. Suggestions for clinical utility for each scale were developed from both review articles and the expertise of the current authors in order to identify key issues for each scale that would be useful for nurses in PICUs.

Pain characteristics

Location of pain was documented in 23 of the 220 (11%) children for a total of 65 out of 2448 assessments (3%). The most common locations documented were head, neck, chest, abdomen, back, buttocks, and other. Etiology was recorded in 22 (10%) children for a total of 104 assessments (4%). The most common etiologies recorded were related to diagnosis, injury, medical device, painful procedure, post-operative pain, and other sources. Pain quality was recorded in 9 (4%) children for a total of 33 assessments (1%). The most common quality descriptions documented were aching, hurting, throbbing, and other. Three of the 12 hospitals did not have any children with pain location, etiology, or quality recorded during the 24-hour period.

Table 1
Children's abilities to communicate.

	n	%
Question 3: This patient is able to communicate effectively about her/his pain to me and other health care providers ($N = 216$)		
Strongly agree	17	7.87
Agree	57	26.39
Neither agree nor disagree	26	12.04
Disagree	58	26.85
Strongly Disagree	58	26.85
Questions 4:This patient needs a parent or caregiver to help the nurse understand the child's pain communication or pain behavior (N = 216)		
Strongly agree	23	10.65
Agree	51	23.61
Neither agree nor disagree	38	17.59
Disagree	61	28.24
Strongly Disagree	43	19.91

Note. One nurse did not complete these questions.

Discussion

This cross-sectional, multi-site, descriptive study, supports the many challenges of pain assessment in the PICU: approximately half of the children were under the age of 2 years and exactly half were mechanically ventilated. For this primarily younger and more acutely ill population, it is often not possible to assess pain with self-report measures. In this study, a child's ability to communicate was wide-ranging. Nurses stated that almost half of the children could not communicate effectively at all and few children could communicate in full sentences. Multiple barriers to communication were described. This finding confirms that children in the PICU often have limited communication ability, making pain assessment challenging.

Given the communicative limitations of this population, it is not surprising that the most common assessment methods used in this study were behavioral pain scales. However, if possible, self-report scales should be used before a behavioral scale. Of the 74 children that could effectively communicate about their pain, less than half of them had a self-report scale used. This raises concern that nurses are using behavioral scales when they could use a self-report scale to assess pain. The primary use of behavioral scales also supports findings from past research that suggest when children are able to self-report their pain, some PICU nurses rely upon behaviors or physiological measures to substantiate the child's pain report (LaFond et al., 2015).

Table 2
Pain scales used in 15 PICUs.

Pain Scale	Sites	Assessments[a] ($N = 2448$)	Score		# Subjects ($N = 213$)	Avg. age in months (range)
			Mean/ SD	Range		
Behavioral Scales						
FLACC	10	1044	0.61 ± 1.59	0–10	96	50.64 ± 64.30 (1–252)
rFLACC	6	617	0.66 ± 1.51	0–9	57	79.33 ± 73.65 (2–252)
Comfort B	1	260	14.82 ± 5.64	6–28	23	40.26 ± 61.05 (1–192)
NIPS	1	20	0.58 ± 1.39	0–4	2	2.00 ± 1.41 (1–3)
NPASS	1	20	2.85 ± 3.65	0–10	1	7.00
CRIES	2	13	0.00 ± 0.00	0	3	4.67 ± 2.08 (3–7)
Behavioral Pain Scale	1	10	3.00 ± 0.00	3	1	120.00
Self-report Scales						
Numeric Scale[b]	12	140	1.39 ± 2.51 (0–8)		20	169.20 ± 50.15 (36–252)
Verbal Descriptor Scale	1	32	2.19 ± 2.83 (0−10)		3	128.00 ± 60.40 (72–192)
Faces Scale	4	6	3.67 ± 1.97 (0–6)		4	97.75 ± 66.79 (7–168)
Wong-Baker FACES® Pain Rating Scale	1	3	0.33 ± 0.58 (0–1)		1	23.00
Visual Analog Scale	2	2	2.50 ± 3.54 (0–5)		2	93.50 ± 122.33 (7–180)
Other						
No Scale	6	111	NA		31	68.90 ± 78.86 (1–252)
Other	6	96	NA		15	57.40 ± 65.32 (3–204)
Assume Pain Present	4	74	NA		12	65.83 ± 77.21 (5–216)

[a] Number of assessments with a pain score.
[b] Numeric and Verbal Numeric.

Admittedly, self-report is challenging in the PICU due to the younger age of much of the population and the use of mechanical ventilation and sedation. Both mechanical ventilation and sedation decrease the verbal and cognitive ability of all children, even those previously able to self-report. However, as stated prior, any self-report of pain including a simple yes/no or a gesture such as a squeezing of hand should be used over a behavioral scale. If unable to obtain either of these methods of self-report, a behavioral scale may then be used. The use of the electronic health record (EHR) may contribute to the lack of self-report seen since the EHR may not readily provide the capability for documentation of a comprehensive pain assessment for self-report and non-verbal communication, such as the ability to gesture. These limitations may encourage nurses to use a behavioral scale instead of a self-report measure for pain in children who are able to nod but are not able to use a formal self-report scale.

In addition to the limited use of self-report scales, pain location, etiology, and quality were scarcely documented. Contributing factors might include the format/options within the EHR and the low number of children who had a self-report scale documented. However, this finding may also indicate that nurses primarily focus on pain intensity rather than the complete pain picture for their patients. More human factors research is needed to better understand how the EHR format impacts the nurse's pain assessment practices and to determine whether/how documentation differs from what nurses actually do to assess pain in practice.

While it is critical that nurses use self-report scales appropriately, it is also vital that they are using behavioral pain scales correctly for children unable to self-report. The child must be able to display all the behaviors on the scale in order for it to be used properly (Pasero & McCaffery, 2005). Therefore, if a child is receiving neuromuscular blockade or deeply sedated, it would not be valid to assess pain using a behavioral scale, such as the FLACC; the child's inability to exhibit pain behaviors due to the medication being given will result in a score of "0", suggesting absence of pain. However, it is not possible for the nurse to know whether that child would exhibit pain behaviors in the absence of the medications being administered.

In this study, 43 (20%) children did not have formal pain scales used. Either "assume pain present" was documented or potential indicators of pain were documented, for example, by stating the child's vital signs were increased. This practice may be a more appropriate way to assess pain in children with limited movement/behavior (Harris et al., 2016), such as the 29 children that received neuromuscular blockade. More research is needed to understand how nurses are assessing pain in children that are chemically paralyzed, where self-report and behavioral scales cannot be used. Additionally, further research is needed to investigate how different levels of sedation impact the child's communicative ability and consequently the nurses' pain assessment method.

Overall, there is a wide variety of pain assessment scales used in PICUs. Notably, the FLACC and the COMFORT-B were the two most commonly used behavioral pain scales. The primary difference between these scales is that the FLACC scale measures pain while the COMFORT-B scale measures distress which can encompass pain and agitation. Therefore, nurses can also use the COMFORT-B scale to assess sedation levels in those children that are mechanically ventilated and requiring sedation. This is a key area of focus in the PICU as sedation management plays a vital role in managing a child's pain. While pain and agitation share some similar behavioral and physiologic cues (Harris et al., 2016), they are not the same and require different management approaches. Nurses need to be aware of these differences to adequately manage pain. In this study, four children were

Table 3
Table of Scales.

Pain Scale	Population	Scoring	Instructions/procedures	Psychometric properties	Clinical utility
Behavioral Scales					
FLACC (Merkel, Voepel-Lewis, Shayevitz, & Malviya, 1997)	2months to 7years	0 to 10	There are 5 categories which include: facial expression, leg movement, activity, cry, and consolability. Rate patient's nonverbal signs in each category from 0 to 2.	**Interrater Reliability:** Scores of $r = 0.94$, $p < 0.001$ representing interrater reliability with kappa values above 0.50 in each category (0.52–0.82). **Construct Validity**: A positive correlation between the Objective Pain Scale (OPS) and the FLACC scale of $r = 0.80$, $p < 0.001$, demonstrating that they are capturing similar behaviors. In addition, there was a positive correlation of $r = 0.41$, $p < 0.005$ between total FLACC scores and the PACU nurses' global ratings of pain. Scores dropped following analgesia at the 10min, 30min, and 60 min mark from 7.0 ± 2.9 to 1.7 ± 2.2 to 1.0 ± 1.9 to 0.2 ± 0.5, $p < 0.001$ respectively.	**Advantages:** Simple to use, not time consuming, no assessment of physiological variables (Dorfman et al., 2014). **Validated uses:** Ventilated and non-ventilated critical care pediatric patients, procedural pain, postoperative pain (Dorfman et al., 2014). **Considerations:** When assessing pain in critically-ill, nonverbal infants, it is important to still evaluate normal infant behaviors that could contribute to distress, such as the need for a diaper change (Harris et al., 2016). There is not supporting data to recommend the FLACC for postoperative pain in children <2 months of age (Crellin, Harrison, Santamaria, & Babl, 2015).
rFLACC (Malviya, Voepel-Lewis, Burke, Merkel, & Tait, 2006)	Nonverbal children with some degree of cognitive impairment	0 to 10	The categories are the same as FLACC but add common pain behaviors in children with cognitive impairment. For example, open-ended descriptors that the caregiver/parent-identified. Scores 0 to 2 in each category on top of the pain behaviors.	**Interrater Reliability**: Cohen's kappa values of ≥0.44 (0.44–0.57) in each category. **Criterion Validity:** The correlation between FLACC scores and Nursing Assessment of Pain Intensity (NAPI) scores, Parent Global Scores, and child ratings of pain were >0.65, $p < 0.001$ (0.65–0.87). **Construct Validity:** Decrease in score following analgesic administration of 6.1 ± 2.6 vs 1.9 ± 2.7, $p < 0.001$.	**Advantages:** Caregiver input aids in identifying specific pain behaviors in children with cognitive impairment. For example, when a parent states that the way their child expresses their distress in a particular way (Ely et al., 2012). **Validated Uses:** Children with mild to severe cognitive impairment ages 4–19 years of age (Herr et al., 2011).
Comfort B (van Dijk, Peters, van Deventer, & Tibboel, 2005) (Ista, van Dijk, Tibboel, & de Hoog, 2005)	12 months to 3 years tested; ventilated patients and spontaneously breathing patients	6 to 30	There are 6 categories which include: alertness, calmness, respiratory response (for vented children) or cry (for spontaneously breathing children), physical movements, facial tension, and muscle tone. Then, the nurse must observe the patient for 2 full minutes and then can score 1 to 5 in each category.	**Interobserver Reliability:** Cohen's kappa ranged from 0.77 to 1.00. **Internal Consistency:** Cronbach's alpha = 0.78 to 1.00.	**Validated Uses:** tested for critically-ill/children ages 0 to 10 years of age for pain (Herr et al., 2011). Tested for use of assessment of sedation in critically ill children ages 0 to 16 (Harris et al., 2016). **Considerations:** Assessment requires 2 to 3 min of observations (Dorfman et al., 2014)
Neonatal Infant Pain Scale (NIPS) (Lawrence et al., 1993)	Preterm to full-term neonates	0 to 7	There are 6 categories which include: facial expression, cry, breathing patterns, arms, legs, state of arousal. The nurse can observe the patient for 1 min and then score 0 to 2 in the cry category and 0 to 1 in the other categories.	**Interrater Reliability:** The correlations ranged from 0.92 to 0.97 ($p < 0.05$). **Internal Consistency:** Cronbach's alphas were 0.95, 0.87, and 0.88 for before, during and after scores. **Construct Validity**: The mean and standard deviation of NIPS scores before, during, and after the first procedures were 1.1 (2.22), 4.8 (2.58), and 2.0 (2.09). **Concurrent Validity:** The correlations between NIPS and VAS scores ranged from the 0.53 to 0.84.	**Advantages:** Quick and easy to use (Spasojevic & Bregun-Doronjski, 2011). **Considerations:** Low sensitivity to change in pain scores has been shown (Spasojevic & Bregun-Doronjski, 2011).
NPASS (Hummel, Puchalski, Creech, & Weiss, 2008)	Neonates/infants	0 to 13	There are 5 categories which include: crying/irritability (silent cry observed in the intubated infant is scored as a cry), behavior/state, facial expression, extremities/tone, and vital signs. The nurse can score 0 to 2 in each category then add points to the preterm infant's pain score to approximate the normal response of a full-term infant. Gestational age: <28 weeks = 3 points, 28 to 31 weeks = 2 points, 32 to 35 weeks = 1 point, and >35 weeks = 0 points.	**Interrater Reliability:** ICC estimates of the pain scale before intervention for pain management were 0.95 to 0.97. ICC estimates after intervention to manage pain were 0.92 to 0.96. **Internal Consistency:** Cronbach' alphas for two raters were 0.82 and 0.72 for the pain scale and 0.89 for the sedation scale for both. **Convergent Validity:** The correlation between the NPASS and the PIPP scale was 0.83 for pre-intervention and 0.61 for post-intervention. **Construct Validity:** The mean pre-intervention pain score and sedation score significantly decreased after intervention ($p < 0.001$).	**Advantages:** Use in both preterm and term infants with incorporation of gestational age. Can be used for both pain and sedation (Gyland, 2012). **Validated Uses:** Procedural, postoperative, or critically ill neonates of 23 to 40-week gestational age (Herr et al., 2011).
CRIES	Neonates between	0 to 10	There are 5 categories which include:	**Interrater Reliability:** The correlation	**Validated Uses:** Procedural and

(continued on next page)

Table 3 (*continued*)

Pain Scale	Population	Scoring	Instructions/procedures	Psychometric properties	Clinical utility
(Krechel & Bildner, 1995)	32 weeks to 60 weeks gestational age.		crying, requires increased oxygen administration for sat >95%, increased vital signs, expression, sleeplessness. Each category is scored 0 to 2.	coefficient for both the Objective Pain Scale (OPS) ($r = 0.73$, $p < 0.001$) and CRIES was $r = 0.72$, $p < 0.001$. Nurse pairs were in agreement on subjective evaluation 94% of the time. **Concurrent Validity**: The correlation coefficient between OPS and CRIES score was 0.73 ($p < 0.001$). **Discriminant Validity**: the mean post-medication units decreased for both OPS and CRIES ($p < 0.001$).	surgical pain in infants of >32 weeks gestational age (Duhn & Medves, 2004) and preverbal children (Herr et al., 2011). **Considerations:** Scores not adjusted for gestational age (Gyland, 2012)
Behavioral Pain Scale (BPS) (Aissaoui, Zeggwagh, Zekraoui, Abidi, & Abouqal, 2005)	Ages 16 and older	3 to 12 subscales scored 1 to 4	Sum of three subscales: facial expression, upper limb movements, and compliance with mechanical ventilation. Each subscale is scored from 1 (no response) to 4 (full response). Therefore, possible BPS scores range from 3 (no pain) to 12 (maximum pain).	**Internal Consistency:** Cronbach alpha = 0.72. **Interrater Reliability**: ICC estimates ranged from 0.89 to 0.95 in each category. **Construct Validity:** Scores were significantly greater during a painful procedure compared to at rest ($p < 0.001$). The exploratory principal component factor analysis showed a large first factor, accounting for 65% of the variance in pain expressions, with coefficients of 0.90 for facial expression, 0.85 for the movements of upper members, and 0.64 for the compliance with the mechanical ventilation.	**Considerations:** Does not measure sedation (Cade, 2008).
Self-Report Scales					
Numeric rating scale (NRS) (Bailey, Daoust, Doyon-Trottier, Dauphin-Pierre, & Gravel, 2010)	Ages 8 and older	0 to 10	The nurse asks the patient to rate their pain from 0 to 10.	**Test-Retest Reliability:** The mean difference between the NRS first and second assessment in patients who mentioned that their pain was the same was 0.2 (95% CI 0.0, 0.4). **Concurrent Validity:** The correlation between the NRS and Visual Analog Scale (VAS) was $r = 0.93$ ($p < 0.001$). **Construct Validity:** The median NRS score decreased after an intervention to decrease pain ($p < 0.0001$). **Content Validity:** There were differences between those with mild pain compared and those with moderate pain ($p < 0.001$) and between those with moderate pain and with severe pain ($p < 0.001$).	**Validated Uses:** To assess pain for children ages 8 or up (Bailey et al., 2010).
Verbal Descriptor (also known as Word Descriptor and Word Graphic Scale) (Tesler et al., 1991) (Keck, Gerkensmeyer, Joyce, & Schade, 1996)	Ages 5 and older	0 to 100	The nurse has a scale that consists of descriptive words such as no pain, little pain, medium pain, large pain, and worst pain possible on a 100 mm line. Then the patients point to where they believe their pain is and points are scored with a ruler based on where the patient pointed to	**Test-Retest Reliability:** The correlation between the two word-graphic ratings scales was $r = 0.91$. **Convergent Validity:** For hospitalized children with pain, there were moderate to high correlations between the Verbal Descriptor and four other scales from 0.68 to 0.90. **Construct validity:** There was a significant time effect of pain scores for the mornings of Day 2 through 5 ($F(3, 39) = 6.12$, $p = 0.002$), pain decreased over time.	**Considerations:** Similar to the VAS but with words. Child needs to understand words (Joestlein, 2015).
Faces pain scale revised (FPS-R) (Hicks, von Baeyer, Spafford, van Korlaar, & Goodenough, 2001)	Ages 4 or 5 and older	0 to 5 or 0 to 10	The nurse has a horizontal line where there are 6 children's faces expressing different painful expressions and a number is underneath each face. The patient is then asked to rate their pain based on the varying intensity of the faces.	**Convergent Validity:** For children with ear piercing pain aged 5–12, the correlation between the VAS and FPS-R ratings was $r = 0.93$ ($p < 0.001$). For children with clinical pain aged 4–12, the correlation between VAS and FPS-R was $r = 0.92$ $p < 0.001$ and between the CAS (Color Analog Scale) and FPS-R was $r = 0.84$ ($p < 0.001$).	**Advantages:** Faces Pain Scale Revised has higher preference rating than visual analogue scales (Stinson, Kavanagh, Yamada, Gill, & Stevens, 2006). This scale is simple to use, requires minimal instruction and has been translated to over 35 different languages (Tomlinson, von Baeyer, Stinson, & Sung, 2010). **Validated Uses**: To assess procedure, postoperative, chronic pain in children ages 4 to 12 years old (Stinson et al., 2006).
Wong Baker FACES® Pain Rating Scale	Ages 3 and older	0 to 10	The nurse has a line from 0 to 10 and there is a face at each even number ranging in the intensity of painful	**Test-Retest Reliability:** In children 3 to 18 years old, the stability over 15 min was $r = 0.90$	**Advantages:** Preference has been seen with using this scale compared to other visual analog scales including the Faces

Table 3 (*continued*)

Pain Scale	Population	Scoring	Instructions/procedures	Psychometric properties	Clinical utility
(Wong & Baker, 1988)			expressions. The patient is then asked to choose which face best matches how they are feeling.	(Stinson et al., 2006). **Concurrent Validity**: There were no significant differences among the scales (Simple Descriptive Scale, Numeric Scale, Face Rating Scale, and Glasses Rating Scale) for any age group (aged 3–18) ($p < 0.05$).	Pain Scale Revised. This scale is also easy to administer and quick to assess (Stinson et al., 2006). **Considerations**: Children can be somewhat influenced by different faces, for example, the tears face my lead to underassessment of pain due to some children not wanting to admit to crying (Stinson et al., 2006).
Visual Analog Scale (Stinson et al., 2006)	Ages 8 and older	0 to 10	The nurse has a pre-measured vertical or horizontal line which goes to 0 to 100mm. Then the patient is asked to select a point or make a mark along the line to indicate the intensity of his/her pain.	**Test-Retest Reliability:** The correlation between the reported pain intensity ratings reported by 5–6-year-old children over a two-week period was $r = 0.70$. **Convergent Validity:** The correlation between pain severity measured on VAS and simple descriptive scales was $r = 0.63$, $p < 0.001$ (Scott, Ansell, & Huskisson, 1977).	**Validated Uses:** To assess pain in children 3 and up (Joestlein, 2015) **Considerations:** Can be vertical or horizontal, some versions have colors and descriptive words (Joestlein, 2015)

Note. Table provides population and psychometric properties reported primarily in early publications for each scale or first available. The scales may have been validated in other groups. Reference for population and psychometric properties is listed in pain scale column.

inappropriately assessed for pain using the State Behavioral Scale which measures sedation/agitation and is not validated to measure pain (Curley et al., 2006). Education may be needed on the difference between pain and sedation assessments and their management.

Several sites used neonatal and adult pain behavioral scales, likely due to the widespread age range of the children in PICU. Mandating these additional scales in the PICU would require training to ensure appropriate use. This added practice may be burdensome to PICU nurses and further contribute to the use of inappropriate scales for certain children. To minimize potential scale confusion, further research is needed to determine whether scales, such as the FLACC and COMFORT-B, could be applied to adult and neonatal populations. Moreover, there were five different self-report scales used across the 15 sites. Validating and standardizing select scales to be used across the PICU population would not only increase the appropriate use of those scales by nurses, but also allow for common data elements to be used in future collaborative research.

Limitations of this research include the use of a convenience sample and a brief 24-hour data collection period. This sample may not be representative of the broader PICU population which limits the ability to generalize findings from this study. The use of existing data through a retrospective chart review may only indicate what nurses are documenting and not what is actually occurring during a pain assessment in the PICU. Further prospective observational studies are warranted. Strengths of this research consist of rather than surveying sites regarding their practice or asking for their policies, the investigators obtained data at the point of care by the bedside nurse. In addition, this study links the child's communicative ability and how their pain was assessed. However, more research is needed to understand if nurses are choosing the appropriate assessment method based on the child's ability to communicate.

Clinical and research implications

As noted above, clinical practice may benefit from additional research validating select scales for this diverse population and then standardizing their use. While differences in childrens abilities to communicate and express pain must be addressed to ensure a valid pain assessment, we must also consider the usability of pain scales and the complexity of incorporating multiple scales into practice. Fewer pain scales could facilitate nurses' knowledge of the criteria for each scale and therefore support the appropriate use of the scales at the bedside. In addition, the use of common pain scales across sites would benefit future multisite research studies. When multiple scales are needed, nurses may benefit from tools to assist them in choosing the most appropriate pain scale. Experts, including practicing nurses and researchers, should participate in the development of a national algorithm that can be tailored to each site to guide clinical decision making. Education and site-specific quality improvement projects can help address the differences between sedation and pain scales and when to use or not use each.

Further investigation is needed to identify best practices in assessing pain in children unable to verbally report or express pain behaviors. It is unclear in this study how nurses are measuring pain in children with neuromuscular blockade. Using a behavioral scale when a child is heavily sedated or chemically paralyzed may result in under reporting of pain in this population. When it is not possible to receive any behavioral cues of pain and there is a painful procedure conducted or a pathological mechanism such as a trauma, it may be more appropriate to "assume pain present" and give analgesia (Herr et al., 2011). We do not know how PICU nurses used "assume pain present" in this study or when the nurses chose to not use a scale. Pain assessment is complex in this population. It is imperative that PICU nurses are able to distinguish the unique developmental, cognitive, and physical attributes of critically-ill children and how they influence pain assessment. Moreover, nurses are in the key position to differentiate and manage pain and sedation/agitation at the bedside. Current research needs to be further translated into practice to develop refined, evidence-based pain assessment skills for the PICU nurse. This is an important, initial step to build a foundation toward achieving positive pain management outcomes for critically-ill children and their families.

CRediT authorship contribution statement

Elyse Laures: Investigation, Visualization, Writing - original draft, Writing - review & editing. **Cynthia Lafond:** Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. **Kirsten Hanrahan:** Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. **Nicole Pierce:** Data curation, Formal analysis, Software, Writing - original draft, Writing - review & editing. **Haeyoung Min:** Resources, Validation, Visualization, Writing - review & editing. **Ann Marie McCarthy:** Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing.

Acknowledgments

We thank Maria Hein, Katherine Miceli, and Brianna Schiff for their assistance in data collection and management; and our colleagues Kathy Clark, Elizabeth Ely, Renee Manworren, Neethi Pinto, and Sharmeen Roy who provided expertise that assisted this research; and the individuals who contributed to data collection from each of the study sites: Advocate Children's Hospital, Akron Children's Hospital, Ann & Robert H. Lurie Children's Hospital of Chicago, Children's Hospitals and Clinics of Minnesota, Children's Hospital of Philadelphia, Children's Hospital of Wisconsin, Connecticut Children's Medical Center, Cook Children's Medical Center, Rush University Children's Hospital, Seattle Children's Hospital, University of Chicago Comer Children's Hospital, University of Iowa Stead Family Children's Hospital.

Funding

The research reported in this publication was supported by the Mayday Fund and *Pain and Associated Symptoms: Nurse Research Training* grant from the National Institutes of Health under award number T32 NR011147. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

Aissaoui, Y., Zeggwagh, A. A., Zekraoui, A., Abidi, K., & Abouqal, R. (2005). Validation of a behavioral pain scale in critically ill, sedated, and mechanically ventilated patients. *Anesthesia & Analgesia*, *101*(5), 1470–1476. https://doi.org/10.1213/01.ane.0000182331.68722.ff.

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. https://doi.org/10.1016/j.pedn.2015.01.022.

LaFond, C. M., Hanrahan, K. S., Pierce, N. L., Perkhounkova, Y., Laures, E. L., & McCarthy, A. M. (2019). Pain in the pediatric intensive care unit: How and what are we doing? *American Journal of Critical Care*, *28*(4), 265–273.

Bailey, B., Daoust, R., Doyon-Trottier, E., Dauphin-Pierre, S., & Gravel, J. (2010). Validation and properties of the verbal numeric scale in children with acute pain. *Pain*, *149*(2), 216–221. https://doi.org/10.1016/j.pain.2009.12.008.

Cade, C. H. (2008). Clinical tools for the assessment of pain in sedated critically ill adults. *Nursing in Critical Care*, *13*(6), 288–297. https://doi.org/10.1111/j.1478-5153.2008.00294.x.

Crellin, D. J., Harrison, D., Santamaria, N., & Babl, F. E. (2015). Systematic review of the Face, Legs, Activity, Cry and Consolability scale for assessing pain in infants and children: Is it reliable, valid, and feasible for use? *Pain*, *156*(11), 2132–2151. https://doi.org/10.1097/j.pain.0000000000000305.

Curley, M. A. Q., Harris, S. K., Fraser, K. A., Johnson, R. A., & Arnold, J. H. (2006). State Behavioral Scale (SBS) a sedation assessment instrument for infants and young children supported on mechanical ventilation. *Pediatric Critical Care Medicine*, *7*(2), 107–114. https://doi.org/10.1097/01.PCC.0000200955.40962.38.

van Dijk, M., de Boer, J. B., Koot, H. M., Duivenvoorden, H. J., Passchier, J., Bouwmeester, N., & Tibboel, D. (2001). The association between physiological and behavioral pain measures in 0- to 3-year-old infants after major surgery. *Journal of Pain & Symptom Management*, *22*(1), 600–609.

van Dijk, M., Peters, J. W., van Deventer, P., & Tibboel, D. (2005). The COMFORT behavior scale: A tool for assessing pain and sedation in infants. *American Journal of Nursing*, *105*(1), 33–36.

Dorfman, T. L., Schellenberg, E. S., Rempel, G. R., Scott, S. D., & Hartling, L. (2014). An evaluation of instruments for scoring physiological and behavioral cues of pain, non-pain related distress, and adequacy of analgesia and sedation in pediatric mechanically ventilated patients: A systematic review. *International Journal of Nursing Studies*, *51*(4), 654–676. https://doi.org/10.1016/j.ijnurstu.2013.07.009.

Duhn, L. J., & Medves, J. M. (2004). A systematic integrative review of infant pain assessment tools. *Advances in Neonatal Care*, *4*(3), 126–140.

Ely, E., Chen-Lim, M. L., Zarnowsky, C., Green, R., Shaffer, S., & Holtzer, B. (2012). Finding the evidence to change practice for assessing pain in children who are cognitively impaired. *Journal of Pediatric Nursing*, *27*(4), 402–410. https://doi.org/10.1016/j.pedn.2011.05.009.

Gyland, E. A. (2012). Infant pain assessment: A quality improvement project in a level III neonatal intensive care unit in Northeast Florida. *Newborn & Infant Nursing Reviews*, *12*(1), 44–50. https://doi.org/10.1053/j.nainr.2011.12.007.

Harris, J., Ramelet, A. S., van Dijk, M., Pokorna, P., Wielenga, J., Tume, L., ... Ista, E. (2016). Clinical recommendations for pain, sedation, withdrawal and delirium assessment in critically ill infants and children: An ESPNIC position statement for healthcare professionals. *Intensive Care Medicine*, *42*(6), 972–986. https://doi.org/10.1007/s00134-016-4344-1.

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, *42*(2), 377–381. https://doi.org/10.1016/j.jbi.2008.08.010.

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. https://doi.org/10.1016/j.pmn.2011.10.002.

Hicks, C. L., von Baeyer, C. L., Spafford, P. A., van Korlaar, I., & Goodenough, B. (2001). The Faces Pain Scale-Revised: Toward a common metric in pediatric pain measurement. *Pain*, *93*(2), 173–183.

Hill, D. L., Carroll, K. W., Dougherty, S., Vega, C., & Feudtner, C. (2014). Point prevalence study of pediatric inpatients who are unable to communicate effectively about pain. *Hospital Pediatrics*, *4*(6), 382–386.

Hummel, P., Puchalski, M., Creech, S. D., & Weiss, M. G. (2008). Clinical reliability and validity of the N-PASS: Neonatal pain, agitation and sedation scale with prolonged pain. *Journal of Perinatology*, *28*(1), 55–60. https://doi.org/10.1038/sj.jp.7211861.

Ismail, A. (2016). The challenges of providing effective pain management for children in the pediatric intensive care unit. *Pain Management Nursing*, *17*(6), 372–383. https://doi.org/10.1016/j.pmn.2016.08.005.

Ista, E., van Dijk, M., Tibboel, D., & de Hoog, M. (2005). Assessment of sedation levels in pediatric intensive care patients can be improved by using the COMFORT "behavior" scale. *Pediatric Critical Care Medicine*, *6*(1), 58–63. https://doi.org/10.1097/01.pcc.0000149318.40279.1a.

Joestlein, L. (2015). Pain, pain, go away! Evidence-based review of developmentally AppropriatePain assessment for children in a postoperative setting. *Orthopaedic Nursing*, *34*(5), 252–261. https://doi.org/10.1097/NOR.0000000000000175.

Keck, J. F., Gerkensmeyer, J. E., Joyce, B. A., & Schade, J. G. (1996). Reliability and validity of the faces and word descriptor scales to measure procedural pain. *Journal of Pediatric Nursing*, *11*(6), 368–374. https://doi.org/10.1016/s0882-5963(96)80081-9.

Kennedy, R. M., Luhmann, J., & Zempsky, W. T. (2008). Clinical implications of unmanaged needle-insertion pain and distress in children. *Pediatrics*, *122*(Suppl. 3), S130–S133. https://doi.org/10.1542/peds.2008-1055e.

Krechel, S. W., & Bildner, J. (1995). CRIES: A new neonatal postoperative pain measurement score. Initial testing of validity and reliability. *Paediatric Anaesthesia*, *5*(1), 53–61.

Lawrence, J., Alcock, D., McGrath, P., Kay, J., MacMurray, S. B., & Dulberg, C. (1993). The development of a tool to assess neonatal pain. *Neonatal Network*, *12*(6), 59–66.

Malviya, S., Voepel-Lewis, T., Burke, C., Merkel, S., & Tait, A. R. (2006). The revised FLACC observational pain tool: Improved reliability and validity for pain assessment in children with cognitive impairment. *Paediatric Anaesthesia*, *16*(3), 258–265. https://doi.org/10.1111/j.1460-9592.2005.01773.x.

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.

Nelson, L. P., & Gold, J. I. (2012). Posttraumatic stress disorder in children and their parents following admission to the pediatric intensive care unit: A review. *Pediatric Critical Care Medicine*, *13*(3), 338–347.

Olmstead, D. L., Scott, S. D., & Austin, W. J. (2010). Unresolved pain in children: A relational ethics perspective. *Nursing Ethics*, *17*(6), 695–704. https://doi.org/10.1177/0969733010378932.

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

Scott, P. J., Ansell, B. M., & Huskisson, E. C. (1977). Measurement of pain in juvenile chronic polyarthritis. *Annals of the Rheumatic Diseases*, *36*(2), 186–187.

Spasojevic, S., & Bregun-Doronjski, A. (2011). A simultaneous comparison of four neonatal pain scales in clinical settings. *Journal of Maternal-Fetal & Neonatal Medicine*, *24*(4), 590–594. https://doi.org/10.3109/14767058.2010.511342.

Stinson, J. N., Kavanagh, T., Yamada, J., Gill, N., & Stevens, B. (2006). Systematic review of the psychometric properties, interpretability and feasibility of self-report pain intensity measures for use in clinical trials in children and adolescents. *Pain (03043959)*, *125*(1/2), 143–157. https://doi.org/10.1016/j.pain.2006.05.006.

Taddio, A., Chambers, C. T., Halperin, S. A., Ipp, M., Lockett, D., Rieder, M. J., & Shah, V. (2009). Inadequate pain management during routine childhood immunizations: The nerve of it. *Clinical Therapeutics*, *31*, S152–S167. https://doi.org/10.1016/j.clinthera.2009.07.022.

Tesler, M. D., Savedra, M. C., Holzemer, W. L., Wilkie, D. J., Ward, J. A., & Paul, S. M. (1991). The word-graphic rating scale as a measure of children's and adolescents' pain intensity. *Research in Nursing & Health*, *14*(5), 361–371.

Tomlinson, D., von Baeyer, C. L., Stinson, J. N., & Sung, L. (2010). A systematic review of faces scales for the self-report of pain intensity in children. *Pediatrics*, *126*(5), e1168–e1198. https://doi.org/10.1542/peds.2010-1609.

Turner, H. N. (2005). Complex pain consultations in the pediatric intensive care unit. *AACN Clinical Issues: Advanced Practice in Acute & Critical Care*, *16*(3), 388–395.

Ward-Begnoche, W. (2007). Posttraumatic stress symptoms in the pediatric intensive care unit. *Journal for Specialists in Pediatric Nursing*, *12*(2), 84–92.

White-Traut, R. C. (2017). National Pediatric Nurse Scientist Collaborative. *Journal of Pediatric Nursing*, *34*, 4.

Wong, D. L., & Baker, C. M. (1988). Pain in children: Comparison of assessment scales. *Pediatric Nursing*, *14*(1), 9–17.