Original Article

Nurses' Perceptions of Children's Pain: A Pilot Study of Cognitive Representations

Catherine Van Hulle Vincent, RN, PhD
Department of Maternal-Child Nursing, College of Nursing, University of Illinois at Chicago, Chicago, Illinois, USA

Abstract

Despite advances in pain assessment and management, hospitalized children continue to report high levels of pain intensity. Untreated pain can have deleterious effects on multiple body functions, resulting in delayed recovery, prolonged hospitalization, and worsening illness. Prior research demonstrates that nurses administered analgesia that was less than amounts recommended by standards and less than that available by physician order. This study was conducted to better understand how nurses think about and respond to children's pain by examining pediatric nurses' cognitive representations (CRs) and comparing the contents of CRs with standards of practice and with management decisions in case studies. Kaplan's theory of CR guided the research. Twenty registered nurses' CRs were measured by the Conceptual Content Cognitive Map open-ended technique. Descriptive and content analyses revealed that participants have rich and diverse CRs of children's pain. Cognitive map content items (294) were coded by investigators as belonging to an assessment (63%) or management (37%) domain. Items were further coded into multiple subgroups in each domain. For assessment, 65% of participants included the use of children's self-report of pain in their maps while 80% included behavioral manifestations; 50% included both. For management, 75% of participants identified pharmacological approaches, 60% identified nonpharmacological approaches, and 35% identified family involvement; 25% identified all three approaches. Indicators in participants' cognitive maps suggest there may be a relationship between nurses' CRs and choice of analgesic administration. Findings provide the direction for future education and research to improve children's pain relief. J Pain Symptom Manage 2007;33:290–301. © *2007 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.*

Key Words

Children, pain, cognitive representations, nurses

Introduction

In spite of advances over the past decade in the assessment and management of pain, up to 81% of hospitalized children report moderate to severe levels of pain.[1] Analgesia is known to be effective in relieving children's pain but researchers have found that pediatric nurses administered subtherapeutic doses to as many as 60–65% of children.[2,3] Nurses

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Address reprint requests to: Catherine Vincent, RN, PhD, Department of Maternal-Child Nursing (MC 802), College of Nursing, University of Illinois at Chicago, 845 South Damen Avenue, Chicago, IL 60612-7350, USA. E-mail: vincentc@uic.edu

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also administered as little as 23–43% of the analgesics ordered.[4,5] Furthermore, 55–90% of nurses believed that children overreport their pain.[6,7] Untreated pain can have deleterious effects on cardiovascular, pulmonary, gastrointestinal, and immunological functioning, which can result in delayed recovery, prolonged hospitalization, and worsening illness.[8,9]

The American Academy of Pediatrics (AAP) and the American Pain Society (APS)[10] attribute the lack of effective pain management to myths, insufficient knowledge, and inadequate application of knowledge. While structured surveys have provided valuable information about nurses' knowledge and attitudes about pain assessment and management, survey data have not been shown to predict pain assessment and management behaviors. Nor have survey data provided information about why nurses do not believe children's pain reports.

According to Kaplan and Kaplan,[11] how individuals perceive a situation is based on previous experiences that are stored in memory as cognitive representations (CRs) and organized in map-like structures in the brain. These representations direct interpretation of new information and determine individuals' responses to new situations.[11,12] Therefore, examination of nurses' CRs of children's pain should provide valuable information about nurse's individual knowledge structures in this regard and could elucidate information about why nurses do not administer adequate analgesia to relieve children's pain.

The purpose of this pilot study was to examine pediatric nurses' CRs of children's pain and pain management to better understand how nurses think about and respond to a child experiencing pain. More specifically, the objectives were to examine pediatric nurses' CRs by describing the a) content items and categories in nurses' cognitive maps of children's pain/pain management, b) frequency and importance of these content items and categories, and c) congruence of content items in nurses' cognitive maps with known standards of pain assessment and management, and nurses' decisions about assessment and analgesic administration.

Cognitive Representation Theory

According to Kaplan and Kaplan,[11] knowledge is organized into compact and orderly cognitive structures created over time and resulting from numerous experiences. As individuals have experiences, they process information and code objects, events, or particular places in the brain as CRs. Associations between and among representations are developed as the result of repeated exposure to objects/events. These associations between CRs are organized into map-like structures. Cognitive maps are an accumulation or summary of an experience and embody an individual's assumptions, beliefs, facts, and misconceptions. They can exert considerable influence both over how new information is interpreted and whether or not information will impact behavior. However, because cognitive maps tend to be used unconsciously, individuals are not always fully aware of their influence.[11,12]

Well-learned representations tend to be organized and compact. Increasing familiarity leads to loss of loosely connected features and the strengthening of connections among those features that are more salient.[11] Well-developed representations will be activated easily and have a strong impact on perception and behavior. In contrast, recently acquired representations are likely to be comparatively large, diffuse, and disorganized.[11]

Problem solving and decision making often require individuals to take on new information and to develop new representations. When individuals' cognitive structures are strong and well developed, they feel confident. This confidence can lead to the conclusion that no new information is needed. Subsequently, a decision can be made to proceed with a solution that has been applied numerous times in the past, although it may not be the correct solution for the current situation.[11,12]

Furthermore, during decision making, individuals have cognitive map biases. There is a bias toward that which is familiar. For example, a recent, direct, and frequent experience will be stored in memory and influences decision making much more than a distant, indirect, and infrequent experience. Familiarity fosters compactness of the representation and leads to coherence and concreteness of stored information. Individuals take concrete information more seriously.[11] This bias has profound implication when considering children's self-report of pain intensity (subjective information) vs. behavioral and physiological

responses to pain (objective, concrete information), particularly when these two contradict each other.

Researchers in the health care arena have demonstrated effective use of CRs to measure patients' perceptions of hypertension,[13,14] cancer pain,[15] breast cancer,[16] worry about lung cancer,[17] and diabetes.[18] Cognitive mapping has been used to study nursing students' and medical residents' critical thinking abilities.[19,20] However, to my knowledge, there are no studies of nurses' CRs about the complex phenomenon of pain.

In summary, cognitive maps may be conceptualized as structures composed of representations developed from experience, which contain individual's assumptions, beliefs, facts, and misconceptions. They influence much, if not all, of the information that individuals perceive, process, and store, and they influence behavior. In the case of children's pain, nurses' CRs can bias their decisions by limiting their perceptions and actions to past experiences. Nurses may not consider new information about a particular child as necessary for their decision making about pain management. If a nurse's CRs include such thoughts as "Children's self-report of pain cannot be believed," the nurse may be less likely to consider the child's self-report in decision making about pain management. If nurses fail to believe the child's self-report of pain, it is unlikely that they will take appropriate action to relieve the child's pain.

Children's Pain Relief and Nurses' Attitudes, Knowledge, and Analgesic Practices

Research over the past decade clearly shows that hospitalized children's pain has not been adequately relieved and many children (22–81%) report moderate to severe pain.[1,5,21–26] Furthermore, over a similar time period, researchers reported that nurses administered analgesia that was less than amounts recommended by national standards[2,3,5] and less than that available by physician order.[3–5,27,28] In studies in which researchers reported the actual relationships between children's pain intensities and amounts of analgesia administered, weak to moderate positive relationships were found.[2,3,5,25,29]

Pediatric nurses' attitudes and inadequate knowledge are suggested as reasons for undermedication of children's pain.[9,30,31] In studies of pediatric nurses' knowledge and attitudes regarding pain, a striking finding was that 55–90% of nurses believed that children overreport their pain levels.[6,7] This finding is particularly alarming, as the single most reliable indicator of the existence and intensity of acute pain is the patient's self-report.[8]

Nurses' responses to select items on knowledge and attitudes surveys reveal other misconceptions. For example, it is known that respiratory depression rarely occurs in children receiving opioids. This fact was correctly identified by fewer than half (8–48%) of pediatric nurses.[5,6,32] Whether these responses reflect nurses' fear of respiratory depression, lack of knowledge about respiratory depression, or some other underlying rationale is unknown. On other items, nurses relied on behavioral manifestations rather than self-report to judge children's pain intensities in vignettes and were reluctant to administer analgesia even when reported pain levels were high.[5,6] Overall, nurses were more likely to accept a patient's self-report of pain when the patient exhibited behavioral manifestations (i.e., grimace). In addition, nurses were more likely to increase the dose of morphine for a grimacing patient than for a smiling one.

In prior research, Vincent and Denyes[5] studied the relationships among nurses' knowledge and attitudes about children's pain, amounts of available analgesia administered by nurses, and levels of children's pain in actual patient-care situations. It was hypothesized that nurses who had higher knowledge and attitudes survey scores would administer greater amounts of analgesia and that children, cared for by these nurses, would report lower pain intensities. Surprisingly, nurses' knowledge and attitudes were not significantly related to their analgesic practices or to levels of children's pain. Similar findings were reported by Watt-Watson et al.[33] in a study of nurses caring for adult patients after cardiac surgery.

In sum, prior research demonstrates that children's pain is not being adequately relieved, and nurses often are not administering available and recommended analgesia. Misconceptions about pain management most likely contribute to this dilemma. How these

misconceptions influence nurses' assessment and management behaviors is unknown. Unlike survey tests of knowledge, measurement of CRs can capture those thoughts and ideas that a particular participant owns.[12] Measurement of CRs will allow identification of factors most salient to nurses that are likely to influence their decisions and behavior. In addition, this measurement approach may prove to be a superior method to capture nurses' attitudes, which are not well captured in surveys with true/false and multiple-choice items.

Children have a right to be free of pain and nurses have a responsibility to relieve their pain. We need to find out why children are being undermedicated. If CRs can predict nurses' behavior, then educational strategies can be tailored to target groups and specific needs. This pilot study builds on what is already known in the area of nurses' knowledge and attitudes about children's pain management and further examines nurses' knowledge structures with a unique theoretically driven approach to better understand nurses' thinking about this complex phenomenon. This is the first report about pediatric nurses' CRs of children's pain/pain management.

Methods

Design

The current study was intended to generate information about nurses' CRs of children's pain and pain management using a new and unique measurement approach at one point in time. Because so little is known about nurses' CRs of children's pain and pain management, a descriptive and exploratory design was most appropriate to address the study objectives and to develop the foundation for future research in this area.

Sample

A convenience sample of 20 registered nurses employed at least 20 hours per week on general care pediatric units in a large children's hospital inpatient setting participated in the study. Nurses working in intensive care units and nurses working exclusively with infants were excluded because the nature of pain management for critically ill children and infants is different from that of the general pediatric population and outside the scope of this study. The number of participants was selected based on the descriptive and exploratory nature of the study and the desire to collect sufficient preliminary information about the content of nurses' CRs and use of the Conceptual Content Cognitive Map (3CM) method.

The study was approved by the Institutional Review Board at the participating institution. The investigator recruited pediatric nurses by mail contact or in person at a hospital mandatory review pain session. Before obtaining written consent, nurse subjects were informed of the study purpose, requirements, risks, benefits, rights as a volunteer, and confidentiality of their responses. A one-hour appointment was scheduled at each participant's convenience, during which time signed informed consent was obtained from all participants included in the study and the interview session was conducted. The appointments were held outside of working hours in a space in the hospital away from the unit where they worked. Participants were compensated for their participation with a highlighter pen.

Measures

Cognitive Representations. Participants' CRs were measured with the 3CM open-ended technique. This mapping method permits identification of the most salient features of the participant's knowledge and provides a visual display of how this information is organized and conceptualized.[12] Content validity was demonstrated by the technique's ability to differentiate levels of knowledge based on different levels of expertise.[12] The 3CM method has been successfully used to measure patient's perceptions of breast cancer[16] and worry about lung cancer.[17] For the current study, content validity was supported through a review of the proposed 3CM script and technique by two expert nurses in pain management and two researchers knowledgeable in the use of the 3CM instrument.

Based on the work of Kearney and Kaplan,[12] the following procedure was used in this study. Participants were requested to: "Think for a moment about children's pain. As you know, children's pain management involves many different things. Let's say that you are going to explain your thoughts about children's

pain and how to manage children's pain to a nurse who is unfamiliar with it. What are the things you would tell that nurse about?"

Participants were asked to write down phrases or sentences expressing each thing (content items) that they thought important about children's pain/pain management on a separate piece of paper. Then, they were requested to rate each item's importance from 1 to 5 (1 = not very important and 5 = extremely important). Once participants had listed and rated all content items, they were asked to group the items into categories, provide a short label for the category that explained why they grouped those particular items together, and rate the importance (as above) of each category. Participants were encouraged to add more items at any time. No constraints were placed on the number or organization of content items. Participants were assured that this was not a test; there were no right or wrong answers.

Case Study Vignettes. The congruence between pediatric nurses' CRs and their decisions about pain assessment and analgesic administration was determined by using the case-study vignette items from the Pediatric Nurses' Knowledge and Attitude Survey Regarding Pain (PNKAS).[34] In the vignettes, two adolescents are presented who are identical in gender, age, surgical procedure, and vital signs, and provide the same self-report of pain rated as 8 on a scale of 0−10. One patient exhibits behavioral manifestations of pain (i.e., grimaces); the other patient smiles. Both have been medicated two hours earlier, pain has not been relieved, and neither has experienced respiratory depression, sedation, or other untoward side effects. After reading the vignettes, nurses were asked to (a) assess the child's pain on a scale of 1−10 and (b) to check the amount of morphine they would administer: none, 1 mg, 2 mg, or 3 mg. Because both children's pain had been unrelieved with the earlier dose of 2 mg of morphine, the correct response is to administer 3 mg of morphine. Content validity of the PNKAS was supported by review of the instrument by a panel of nurse experts in pain management. Results of instrument test-retest after eight weeks was $r = 0.67$ and internal consistency Cronbach alphas of 0.72 and 0.77 are reported with two different samples of nurses.[34]

With Manworren's permission, the vignettes were modified by changing the age of the child from 15 years to 10 years old, thus measuring a child's pain rather than an adolescent's pain, and adding age-appropriate vital signs. In addition, the statement "dose safe for body weight" was added to clarify information for nurses' decision making.

Demographic Survey. Each participant completed a brief demographic survey. Items addressed included: age, gender, race/ethnicity, education level, years of pediatric nursing practice, and number of children in pain cared for in a typical week.

Data Analysis

Content analysis was used to describe the written data obtained from the 3CMs and case-study instruments.[35] Descriptive analysis was used to determine the frequency and importance of content items and categories in participants' cognitive maps.

Data were transcribed verbatim from participants' cognitive maps onto Excel spread sheets. The principal investigator (PI) and another researcher familiar with the 3CM method independently read through the content items and categories to identify initial domains and subgroups. Both readers met to compare findings and to identify any overlap, ambiguity, or lack of clarity in domains and subgroups. Two domains (assessment and management) plus multiple subgroups were agreed upon. Content items and categories were again independently reviewed. Content items were coded into domains and subgroups; categories coded only into domains. Both readers met a second time to compare findings and to again identify any overlap, ambiguity, or lack of clarity. Some content items, such as "can be helpful to involve child's family," were included in both the assessment and management domains and thus counted in each domain. Findings were discussed until consensus was reached. Further interrater reliability for the final content analysis was obtained for the study sample through validation by an expert in qualitative research. Once data were coded into domains and subgroups, subgroups were analyzed both by number of content items per subgroup and by number of participants' endorsements

(participants who included the specific content items in their maps).

Content items in participants' cognitive maps were examined for congruence with known standards of pain assessment and management. Experts agree that the most important indicator of the existence and intensity of pain is the patient's self-report[8,10] and that observation of behavior should be used to complement the self-report.[10] Thus, maps were judged for the presence or absence and importance of both self-report and behavioral manifestation items. In regard to management, the AAP and APS[10] state that drug therapy is the mainstay for acute pain in all age groups. Furthermore, a multimodal approach, including pharmacological and nonpharmacological treatment, as well as family involvement, is recommended for the effective management of children's pain. Maps were judged for the presence or absence and importance of these items.

The congruence between participants' CRs and their decisions about pain assessment and analgesic administration was determined by participants' responses to the case-study vignettes. Participants were classified into four groups based on the amount of morphine selected in the case study: 1) 3 mg (correct response), 2) 2 mg, 3) 1 mg, or 4) no morphine. Participants' maps in each group were judged for the presence/absence and importance of assessment standards (self-report and behavioral manifestation) and management standards (pharmacological, nonpharmacological, and family involvement).

Results

Sample Characteristics

Sixty-five percent of the participants ($n = 20$) cared for children on acute care units, while 20% worked in the Post-Anesthesia Care Unit and 15% worked in the outpatient setting. Participants reported a mean of 17.6 ± 8.3 years of pediatric nursing experience. Most (95%) cared for at least six to ten children in pain per week. All participants were white, nonHispanic females; 65% had a Bachelor's of Science in Nursing, the remainder of the participants were either diploma, associate degree, or master's prepared. Their mean age was 44.68 ± 8.55 years.

Content Items: Frequency and Importance

The 20 participants conveyed rich and diverse data in their CRs of children's pain and pain management. Fig. 1 depicts a sample cognitive map. Participants conveyed a total of 256 content items. Individual maps included a range of 5–24 items ($M = 12.80 \pm 5.52$).

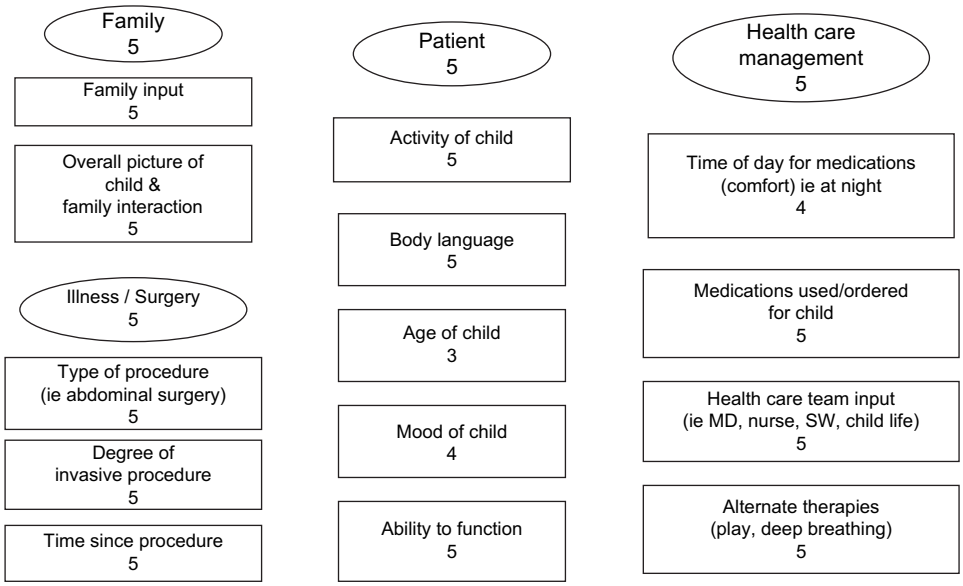

Fig. 1. Sample cognitive map. (Ovals indicate categories, rectangles indicate content items, and numbers indicate importance rating.)

Participants rated content items' importance as 3.4–5.0 (scale 1–5), with a mean of 4.32 ± 0.42.

During coding by the investigators, some content items, such as "can be helpful to involve child's family," were included in both the assessment and management domains and thus counted in each domain. This resulted in a total of 294 items for analysis; 185 (63%) were coded as assessment, while 109 (37%) were coded as management.

All participants identified content items in the assessment and management domains. Fourteen subgroups emerged for assessment and 12 subgroups for management. Tables 1 and 2 depict examples of participants' content items coded into assessment and management domains, respectively. In addition, the top five subgroups in each domain, determined by number of content items per subgroup, and the importance ratings of subgroups are shown. Table 3 depicts the top five subgroups characterized by number of participant endorsements (participants who included the specific content items in their maps). Although the actual rank order of the subgroups changed slightly when evaluated by number of content items vs. participant endorsements, the top five subgroups remained the same.

No participants included statements about respiratory depression in their CRs, suggesting that this adverse effect was not a salient factor in their thinking. The only reported adverse effects were constipation and stomach upset, identified by three participants.

Categories: Frequency and Importance

Participants grouped their 256 content items into 72 various categories. Individual maps included a range of two to six categories ($M = 3.60 \pm 0.94$), with one to 10 items per category ($M = 3.65 \pm 1.46$). Participants rated categories' importance as 4.0–5.0 (scale 1–5), with a mean of 4.73 ± 0.34. As with content items, all participants identified categories in the assessment and management domains, with 45.8% of their 72 categories coded by investigators as assessment and 25% as management. Sixteen categories (29.2%) were coded as both assessment and management because their content items included both assessment and management approaches. Investigators did not further classify participants' categories into subgroups. Table 4 includes examples of participants' categories coded into domains, including number and percent of categories coded per domain and importance ratings of domains.

Table 1
Participants' Content Items Coded into Assessment Domain Subgroups

Example Content Items in Participants' Own Words	Items *n* (%), Total 185	Top Five Subgroups[a] Coded by Investigators	Subgroup Importance (Scale 1–5) Mean ± SD
• Ability to be held or move freely • How the child looks (grimacing, curled up, etc), facial expression	36 (19.5)	Behavioral manifestations	4.20 ± 0.71
• Listen to family • Parents reliable • Parental attitudes (spoken & unspoken) may influence kid's report/perception	28 (15.1)	Family involvement in assessment	4.55 ± 0.54
• Listen to the child • Pain scale works • Use valid tools, self-report first, behavior second	24 (13.0)	Use of self-report	4.33 ± 0.82
• Patient age • Different cultures view pain differently • Different reactions by different persons	24 (13.0)	Individualized assessment	4.05 ± 0.55
• How previous staff have treated the patient's pain • Previous exposure to pain • Degree of invasive procedure	22 (11.9)	Consideration of history	4.33 ± 0.55

[a]Others subgroups with ≤5% items each: Type/expected pain, Psychological aspects, Pain experience, Reassessment, Child differences, Physiological signs, Nurses' experience, Environmental influences, General assessment statement.

Table 2
Participants' Content Items Coded into Management Domain Subgroups

Example Content Items in Participants' Own Words	Items *n* (%), Total 109	Top Five Subgroups[a] Coded by Investigators	Subgroup Importance (Scale 1–5) Mean ± SD
• Giving pain medications • Start with least amount of pain medication and increase if needed • Pain medications can cause constipation	31 (28.4)	Pharmacological approaches	4.34 ± 0.79
• Distraction, visualization, play • Comfort measures—music, toys, blanket • Important to try alternative methods as well as drugs	21 (19.3)	Nonpharmacological approaches	4.48 ± 0.64
• Stay ahead of pain-Don't let it build • Doctors might be wrong—you might need to advocate	16 (14.7)	General management strategies	4.50 ± 0.70
• Children CAN understand teaching • Explain things to patient	11 (10.1)	Education strategies	3.78 ± 0.66
• It's important to include children & families in pain control decisions • If parent not present, ask child what parent would do to help • Parents who are available to child during pain crises can generally help decrease pain by just being there	10 (9.2)	Family involvement in management	4.41 ± .64

[a]Other subgroups with <5% items each: Documentation, Collaboration, Discharge activity, Environmental changes, Individualized approach, Outcomes, Nurses' experience.

Congruence of Items and Standards

Participants' maps were judged for the presence or absence and importance of both self-report and behavioral manifestation assessment items. Only 10 participants (50%) included both types of assessment in their maps. All participants rated the importance (scale of 1–5) of self-report ($M = 4.33 \pm 0.82$) and behavioral manifestations ($M = 4.20 \pm 0.71$) similarly, but fewer participants included self-report items in their maps (Table 3).

In regard to management, participants' maps were judged for the presence or absence and importance of pharmacological, nonpharmacological, and family involvement approaches. Only five participants (25%) included all three approaches. All participants rated the mean importance of nonpharmacological approaches (4.48 ± 0.64), family involvement in management (4.41 ± 0.64), and pharmacological approaches (4.34 ± 0.79); the latter subgroup contained the highest number of content items (Table 2) and was addressed by the greatest number of participants (Table 3).

Congruence of Items and Decisions

In the vignettes, 35% of the 20 participants chose the correct response, to administer an increased dose of morphine to both children, while 10% chose the correct response for one child. The remaining 55% chose an incorrect response for both children. Table 5 shows that

Table 3
Pain Assessment and Management: Number of Participant Endorsements by Top Five Subgroups

Domain	Top Five Subgroups	Participant's # (%) ($n = 20$)
Assessment	Family involvement in assessment	16 (80)
	Behavioral manifestations	16 (80)
	Use of self-report	13 (65)
	Individualized assessment	11 (55)
	Consideration of history	9 (45)
Management	Pharmacological approaches	15 (75)
	Nonpharmacological approaches	12 (60)
	General management strategies	10 (50)
	Family involvement in management	7 (35)
	Educational strategies	6 (30)

Table 4
Participants' Categories Coded into Domains

Example Categories in Participants' Own Words	Categories *n* (%), Total 72	Domain Coded by Investigator	Domain Importance (Scale 1–5) Mean ± SD
• Patient demographics • Assessment, reassessment • Listening, • Family, parents • Illness/surgery	33 (45.8)	Assessment	4.72 ± 0.36
• Rx • Nonpharmacological ways to decrease pain • Treatment • Documenting communications to other staff • Education of patient	18 (25.0)	Management	4.75 ± 0.58
• Factors—physical, emotional, psychological, spiritual affecting pain and judgment of pain • Patient/child education • Child and family involvement • Physical comfort care	21(29.2)	Both Assessment and Management	4.74 ± 0.41

participants' choices of analgesia administration varied widely. Although most participants (90%) agreed with both children's pain ratings, 50% chose to administer less analgesia than received previously to the smiling child and, in fact, four participants (20%) chose to administer no analgesia to the smiling child in spite of his report of severe pain.

Although the small number of subjects precluded the use of statistical analyses, some indicators in participants' representations suggest that there may be a relationship between their CRs and choices of analgesia administration. The most obvious group differences were evident when comparing representations of participants who chose no morphine with those who chose the correct response (administer an increased dose), particularly in regard to assessment. The participants in the no-morphine group ($n = 4$) either did not identify self-report or behavioral manifestation at all as part of assessment or if they did, they rated behavior with a higher importance score ($M = 4.42$) than use of self-report ($M = 3.40$). In contrast, participants in the correct-response group ($n = 7$) were more likely to include both self-report and behavior items in their CRs and more likely to assign similar importance ratings to both. In regard to management, participants in the no-morphine group were more likely to include both pharmacological and nonpharmacological approaches in their CRs than those in the correct-response group. Only one participant (in the correct-response group) identified family involvement in pain management. Participants in both groups rated nonpharmacological approaches with a higher importance score ($M = 4.80$ and 4.75) than pharmacological ones ($M = 4.00$ and 3.88).

Table 5
Participants' Analgesic Choices for Children in Vignettes ($n = 20$)

Morphine Administration	Smiling Child	Grimacing Child
3 mg[a]	7 (35)	9 (45)
2 mg	3 (15)	7 (35)
1 mg	6 (30)	4 (20)
None	4 (20)	0 (0)

[a]Correct response.

Discussion

This study was designed to examine pediatric nurses' CRs of children's pain/pain management to better understand what nurses are thinking as they determine how to respond to a child experiencing pain. Based on CR theory,[11] examination of nurses' CRs should provide information about nurses' individual knowledge likely to influence their behavior.

Findings demonstrated that nurses have rich and diverse knowledge structures about children's pain. Participants identified multiple important approaches to assess and manage children's pain but many did not identify

recommended self-report and behavioral assessment or pharmacological and nonpharmacological approaches for management.

A positive finding, in line with current guidelines,[10] was that participants rated self-report of pain intensity with a slightly higher importance score than behavioral manifestations. However, 35% of participants did not include any content items about the child's self-report in their CRs. This finding is of particular concern as self-report is considered the gold standard for pain assessment.[8,10]

Further information about participants' use of self-report was found in the case-study vignettes. Although most participants documented a pain rating congruent with that of the child, their administration choices suggest that they did not always act on the child's self-report. The fact that participants chose to administer less analgesia to the smiling child than to the grimacing child suggests that participants were relying on the child's behavior to judge his pain intensity. Schafheutle et al.[36] suggested that, based on the results in their study, nurses merely record pain scores because they are required to so but do not necessarily incorporate the scores into practice. Findings of the current study support this view. The above findings suggest that, as proposed by Kaplan and Kaplan,[11] concrete information (behaviors of pain) is being taken more seriously than subjective information (self-report of pain).

Twenty-five percent of participants did not include any pharmacological approaches in their CRs. Furthermore, participants ranked both family involvement and nonpharmacological approaches with slightly higher importance scores than pharmacological approaches. In case-study vignettes, 65% of participants chose not to administer an increased dose of morphine to either child in spite of unrelieved pain. These findings suggest that nurses may not be using drug therapy as the mainstay for acute pain as recommended by the AAP and APS,[10] and may be relying on nonpharmacological approaches as a primary rather than secondary method to treat children's pain. The above findings may provide some explanation for why nurses may not administer available and/or recommended amounts of analgesia as found in prior research.[2–5,27,28]

The AAP and APS[10] recommend that family be involved in the management of children's pain. However, only 35% of participants identified family involvement in pain management in their CRs. In contrast, family involvement in assessment was identified by the greatest number of participants (80%) and contained the second largest number of content items. These findings suggest that participants' perceived a strong role for families in their children's assessment but may not involve them in pain management. Does this possible strong role in assessment indicate that nurses rely on parents to volunteer information about when and if their child is in pain rather than obtaining systematic pain assessment directly from the child? Woodgate and Kristjanson[37] reported that nurses in their study relied on parents to tell them if their child was in pain but parents wanted to "avoid bothering the nurses." This disparity may place children at risk for inadequate assessment of pain and subsequent undermedication. The role of parents in pain assessment and management needs to be further evaluated.

Although the small number of subjects in the current study precluded statistical analyses, results suggest that there may be a relationship between nurses' CRs and choices of analgesic dose. Research is needed with a larger sample size to further examine this relationship.

Limitations of this study include the small sample size, limited information about the children in pain cared for by participants, and minimal variance found in importance ratings for content items and categories in cognitive maps, thus limiting the conclusions. A replication of this study is needed with a larger number of nurses to provide sufficient power to adequately evaluate the relationships between nurses' CRs and assessment and analgesic choices. Also, more information is needed about the children cared for by nurses, such as diagnosis, length of hospital stay, and type of pain (e.g., acute, chronic). Furthermore, although use of the vignette technique can be a useful and practical tool to measure people's attitudes, perceptions, and beliefs in nursing research, it cannot capture reality[38] and responses are susceptible to the phenomenon of social desirability. Therefore, caution must be exercised in the interpretation and generalization of the findings.

In conclusion, findings here suggest that unlike surveys, measurement of CRs provides the nurses' conceptualizations of children's pain, including clues about why nurses may not be administering adequate analgesia to relieve children's pain. Once nurses' representations are known, interventions can be tailored to nurses' learning needs. Because cognitive maps/representations exert considerable influence both over how new information is interpreted and whether information will affect behavior,[11,12] it seems reasonable to predict that if interventions are directed toward nurses' CRs, they could be effective in improving knowledge and changing behavior.

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