

Nurse Characteristics And Inferences about Children's Pain

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The purpose of this study was to describe pediatric nurses' projected responses to children's pain as described in vignettes of hospitalized children and to explore nurse characteristics that might influence those responses. A survey was mailed to a national random sample of 700 RNs, and 334 nurses responded. The survey included case reports of three hospitalized school-aged children experiencing pain. Nurses were asked to rate their perceptions of the children's pain levels and to indicate how much analgesia they would recommend. Contrary to earlier studies, in response to the scenarios, nurses in this sample perceived high levels of pain, said they would administer doses of analgesia close to the maximum prescribed by physicians, and recommended an array of non-pharmacologic methods to treat pain. Variation in pain perceptions and decisions was not related to key personal and professional characteristics of the nurses, including their education level, race/ethnicity, age, years of clinical experience, and receipt of continuing education about pain. Findings from this large national study suggest that most nurses would make appropriate decisions relating to the treatment of children's pain, perhaps reflecting changes in the emphasis on pain management.

Pediatric nurses play a pivotal role in the management of children's pain. Effective treatments for alleviating pain and several valid and reliable pain measures for assessing pain in infants and children have been developed. Yet, concerns remain that nurses do not always make appropriate pain management decisions (Rush & Harr, 2001).

Some evidence exists that nurses do not use pain assessment tools consistently. In one survey of 260 pediatric nurses, only one-third used the

pain assessment scale that their hospital had recommended (Jacob & Puntillo, 1999). Similar findings have been reported by other researchers (Reyes, 2003; Simons & MacDonald, 2004). Nurses' perceptions of children's pain levels do not always match children's self-reports, which are considered the most reliable indicators of pain (Broome & Huth, 2003). Vincent and Denyes (2004), for example, found that 55% of the pediatric nurses surveyed thought children over-reported their pain.

Several investigators have also suggested that nurses underutilize prescribed treatments (Boughton et al., 1998; Ellis et al., 2002). Vincent and Denyes (2004) found that nurses did not administer analgesics to 26% of the children who reported having pain, and gave only 23% of available total analgesics to others. The wide array of non-pharmacologic strategies available for relieving pain, such as distraction and relaxation techniques, has not been used consistently by pediatric nurses (Jacob & Puntillo, 1999; Pederson & Harbaugh, 1995, Twycross, 2007).

Previous research indicates that nurses do not effectively treat children's pain, and therefore, organizations have established proactive standards to better assure that children's pain is treated effectively. In 1992, guidelines for the treatment of acute pain management in children were

issued in the U.S. by the Agency for Health Care and Policy Research in 1992 (Acute Pain Management Guideline Panel, 1992). In 1999, the Joint Commission issued new performance standards related to pain assessment and treatment (Joint Commission on Accreditation of Health Care Organizations, 1999). Subsequently, the American Academy of Pediatrics (2001) issued a policy statement on the relief of pain in children. Because of the recent focus on pain management, it seems appropriate to revisit the question of how nurses perceive children's pain and what treatment strategies they consider. Previous studies have been based on small, local samples, so it would be especially useful to gather information from a larger and more geographically dispersed sample of nurses.

Although research (Boughton et al., 1998; Ellis et al., 2002) has suggested that nurses' treatment of children's pain is sometimes inadequate, studies (Vincent & Denyes, 2004) also have found considerable variability among nurses. If this variation is systematically related to the characteristics of nurses, it would be possible to identify where deficiencies are most concentrated so efforts to improve nurses' knowledge and performance could be appropriately targeted.

Only a few nurse characteristics have been studied with any regularity. Several studies conducted in different

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Objectives and the
CNE posttest can be
found on pages 306-307.

countries suggest that nurses who have more clinical experience (Polkki, Vehvilainen-Julkunen, & Pietila 2001; Salanterä, Lauri, Salmi, & Helenius, 1999; Vincent & Denyes, 2004), are better educated (He, Polkki, Vehvilainen-Julkunen, & Pietila, 2005; Polkki et al. 2001; Salanterä et al., 1999), or have had personal experience with pain (Burokas, 1985; Holm, Cohen, Dudas, Medema, & Allen, 1989) are especially skilled at managing children's pain. However, findings are not consistent across studies, and several researchers have reported that clinical experience (Caly, Tourigny, & Koren, 1995; Dudley & Holm, 1984; Holm et al., 1989), education (Burokas, 1985; Vincent & Denyes, 2004), and personal experience with pain (Vincent & Denyes, 2004) are unrelated to nurses' pain management decisions. The lack of agreement might reflect methodological weaknesses, particularly small sizes, and convenience samples. These inconsistencies suggest the need for further exploration of the factors that affect nurses' pain perceptions and treatment decisions with a large and more representative sample of nurses.

Purpose

The purpose of this study was to describe pediatric nurses' projected responses to children's pain as described in vignettes of hospitalized children and to explore nurse characteristics that might influence those responses. The specific research questions were:

- What are nurses' perceptions of hospitalized children's pain levels, and what decisions do they say they would make regarding the treatment of children's pain?
- Are nurses' characteristics related to variations in pain perceptions and proposed pain treatments?

It was hypothesized that nurses with higher levels of education, more clinical experience, and personal experience with intense pain would be more likely than other nurses to ascribe high levels of pain in hospitalized children and to propose giving them more pain treatments.

Method

Study Design. Data for this study were collected in a cross-sectional mailed survey that was carefully developed by researchers with expertise in survey design. The survey incorporated three case reports (vignettes), each describing a hospitalized school-aged child who was experiencing pain. School-aged children were selected

because of evidence that the ability to correctly use pain scales improves with age and becomes especially reliable after age 6 (Stanford, Chambers, & Craig, 2006). For each vignette, respondents were asked to complete several questions relating to their perceptions of the child's pain and their pain management recommendations for the child. The cover letter assured prospective respondents that participation was completely voluntary. They were also told that, in appreciation of their cooperation, they would be entered into a raffle drawing for a \$200 gift certificate. They were instructed to return a postcard with identifying information separately from their questionnaire, so that the survey could be returned anonymously. The study proposal was approved by the medical center's Institutional Review Board.

Sample. Questionnaires were mailed to a sample of registered nurses residing throughout the United States. Researchers attempted to secure the names and contact information of a nationally representative sample of pediatric nurses through the American Nurses Association (ANA), but ANA was unable to provide a national list of RNs with a pediatric specialty. Thus, an alternative source of recruiting a geographically diverse sample was used. The population for this study was composed of RNs who subscribed to pediatric journals or who purchased pediatric books. The accessible population was 9,000 pediatric nurses whose names and addresses were available through the Marketing Services of Boston Company. The researchers were aware that they were recruiting a sample that was likely to be experienced, well-educated, and well-read.

Based on earlier research (Calderone, 1990; McDonald, 1994), researchers assumed a small-to-moderate effect size for key relationships in this study. With an effect size of 0.35, power of 0.80, and alpha of 0.05, it was estimated that a sample of 272 nurses was needed. Response rates to mailed surveys tend to be low, even when efforts are made to enhance them; researchers therefore anticipated a response rate in the vicinity of 40%. Questionnaires were mailed to a random sample of 700 RNs from the list of 9,000 pediatric nurses in January 2005.

A modified Dillman approach (Dillman, 2000) was used to enhance response rates. This primarily involved the use of repeated mailings of the instrument and an incentive. The

final sample, corrected for known ineligible and address changes, was 663 nurses presumed to be eligible, of whom 334 responded (50% response rate).

Survey instrument. The questionnaires included three vignettes and questions about pain management for each depicted child. The survey also included questions about the respondents' demographic characteristics and professional background.

Vignettes. Each vignette included a description of the child's medical condition and treatment, a photograph of the child, key characteristics of the child (age, weight in kilograms), what medications the child had already received, the child's rating of pain, and a physician's PRN range orders for analgesic medication. In all cases, physicians' orders gave nurses some discretion in managing pain; nurses could theoretically administer up to 0.1 mg/kg of morphine sulfate every 3 to 4 hours. A pediatrician specializing in pain management was consulted to ensure clinical validity of the orders. Vignettes were pre-tested by six pediatric nurses who provided feedback that was used to refine the vignettes and questions, and to correct any misconceptions in their presentation. PRN range orders for opioid analgesics are a common clinical practice and are considered an appropriate and flexible approach for making necessary adjustments based on an individual's response to treatment, but have also been viewed as a common source of inadequate pain management (American Pain Society, 2004).

The child's pain rating was represented by a circle drawn around one of the six children's faces on the FACES Scale. The FACES of Pain Scale, which is frequently used in clinical situations as well as in research on children's pain, has been found to have good concurrent and test-retest validity (Wong & Baker, 2000). The children in the vignettes were depicted as being in moderately severe to extreme pain. Table 1 summarizes key features of the vignettes.

Outcome measures. The questions that followed the vignettes were used to create the outcome variables for this study, which reflect the nurses' abstract choices.

Nurse's perception of child's pain. Nurses rated their perception of the child's pain level on a 100 mm visual analogue scale with two anchor points – "No Pain at All" at one end and "Pain as Bad as Could Be" at the other. Respondents' marks on the line were

Table 1.
Summary of Three Vignettes in the Survey

| Attribute of Child | Vignette A | Vignette B | Vignette C |
|--------------------|--|--|--|
| Medical diagnosis | Acute appendicitis | Compound fracture of right fibula | Acute lymphoblastic leukemia |
| Medical treatment | Open appendectomy, 12 hours earlier | Surgical alignment (open reduction), 8 hours earlier | Chemotherapy; autologous peripheral progenitor cell collection 6 days earlier |
| Pain treatment | Morphine sulfate 3mg IVq4, first 24 hours | 0.05 mg/kg of a morphine IV, 4 hours earlier | Fentanyl patch 25mcg q72 hours; morphine sulfate 0.05 mg/kg IV 3 hours earlier |
| PRN order | Morphine sulfate 0.05 to 0.1 mg/kg every 3-4 hours | Morphine 0.05 to 0.1 mg/kg every 3-4 hours | Morphine sulfate 0.05 to 0.1 mg/kg every 3-4 hours |
| Pain level | 5 | 5 | 6 |
| Weight | 33.1 kg | 35.5 kg | 29.1 kg |
| Age | 9 | 11 | 10 |
| Gender | Boy or girl* | Boy | Girl |

Note: The vignettes included a description of the child's medical condition, treatment, age, weight, gender, previous medication, self-report of pain, and the physician's orders for analgesic medication.

* Respondents were given a vignette of a boy or girl at random. The relationship between the child's gender and nurses' pain management decisions are described elsewhere (Griffin, Polit, & Byrne, 2007).

measured to the nearest millimeter, with higher values indicating greater perceived pain.

Medication dose. Nurses were asked to choose a dose of medication that they would administer to each child, both at the time described in the vignette and then three hours later when the pain was described as being unchanged. At both medication opportunities, nurses were asked to choose from four possible doses:

- No medication.
- 0.05 mg/kg.
- 0.075 mg/kg.
- 0.1 mg/kg.

For most analyses in this study, a total dose was computed, combining answers to the two questions. Thus, the range of possible doses was from 0.0 mg/kg (no medication at either opportunity) to 0.2 mg/kg (the maximum dose on both occasions).

Non-pharmacologic methods. Nurses were then asked if they would use any of 12 specified types of non-pharmacologic methods of pain relief, which were categorized into one of two groups, following a system by Pellino, Willens, Polomano, and Heye, (2003). The five methods that required the nurse to coordinate the treatment but did not demand his or her full attention and time were labeled Nurse-Coordinated Methods (NCM). These are encouraging deep or slow breathing, using toys for distraction, encouraging music listening, using TV/videos or electronic

games, and encouraging children to read to themselves. The seven methods that required the nurses' full participation were labeled Nurse-Participation Methods (NPM). These are using guided imagery, applying hot or cold packs, giving massages, patting or stroking, reading books to the child, rocking or swaddling, and sitting with the child. The ordering of these methods was randomized, and a fill-in option for "other" was provided at the end of the list. In the analyses, researchers counted the number of methods checked as an indicator of the range and breadth of techniques the nurses would use.

Nurse characteristics. The survey included questions about each nurse's characteristics, including highest level of education, age, gender, race/ethnicity, number of children, years of clinical experience, status as a nurse practitioner, current employment status, employment setting, personal experience with intense or prolonged pain, and whether in-service or continuing education about pain management had been received in the previous two years.

Data analysis. To analyze the relationship between nurses' characteristics and their pain management recommendations, *t*-tests and analysis of variance were used. These techniques permitted researchers to display descriptive information that would facilitate a meta-analysis. However, to

analyze the extent to which nurses' characteristics taken together were predictive of their pain perceptions and pain management choices, simultaneous multiple regression was used.

Results

Sample characteristics. The majority of respondents had at least a bachelor's degree (70%), and one-third had advanced degrees (see Table 2). Most were white (91%), and all but two were female. Most nurses (63%) were older than 45; the mean age was 48.0. The number of years of clinical experience ranged from 4 to 59 years, with a mean of 22.7 years. Only 24 of the 334 respondents were not currently working in nursing, and most of those who were employed were pediatric nurses. A sizeable minority (32%) were nurse practitioners (NPs). A full 62% of respondents had received pain management training within the previous two years, and 69% reported having had personal experience with intense or prolonged pain. About half of the nurses in the sample (47%) worked in inpatient settings. Respondents came from 39 states in the U.S. (not shown in table).

Sample bias. Most prior studies on pediatric pain management have used small, local samples, and none have examined the extent to which nurses in the sample were representative of a larger population of nurses. In an effort to enhance the rigor of this

Table 2.
Demographic and Professional Characteristics of Respondents
(N = 334)

| Characteristic | N | Percent/Mean |
|--|-----|--------------|
| Education | | |
| Diploma and associates degrees | 96 | 29.7% |
| Bachelors degree | 120 | 36.5% |
| Masters degree or higher | 113 | 33.8% |
| Race/Ethnicity | | |
| White non-Hispanic | 301 | 90.7% |
| Non-white | 31 | 9.5% |
| Age: Mean (SD) | 334 | 48.0% (8.2) |
| Years of clinical experience: Mean (SD) | 334 | 22.7% (9.5) |
| Current Employment Status | | |
| Pediatric nursing | 205 | 61.7% |
| Other nursing specialty | 103 | 31.0% |
| Not working in nursing | 24 | 7.2% |
| Nurse Practitioner Status | | |
| Nurse Practitioner | 106 | 31.8% |
| Other | | |
| Has had recent pain education | 207 | 62.0% |
| Has had personal experience with intense pain | 230 | 69.3% |
| Place of Employment | | |
| Inpatient/long-term | 156 | 46.7% |

Table 3.
Nurses' Perception of Pain, Recommended Medication Dosage,
and Number of Non-Pharmacological Methods Recommended for
the Three Vignettes

| | Vignette A | Vignette B | Vignette C |
|---|--------------|------------|-------------|
| | Appendicitis | Fx Fibula | Leukemia |
| Child's pain rating | 5.0 | 5.0 | 6.0 |
| Nurses' pain rating, mean | 78.1 | 79.9 | 94.4 |
| SD | 11.4 | 12.3 | 9.6 |
| Range | 15-100 | 25-100 | 31-100 |
| Medication dosage ^a , mean | 0.16 mg | 0.17 mg | 0.17 mg |
| SD | 0.04 mg | 0.04 mg | 0.04 mg |
| Range | 0.0-0.20 mg | 0.0-0.20mg | 0.00-0.20mg |
| Number of non-pharmacologic methods, mean | 4.8 | 5.0 | 5.6 |
| SD | 2.5 | 2.6 | 2.9 |
| Range | 0.0-13.0 | 0.0-13.0 | 0.0-1.0 |

^aTotal dosage of medication nurses would use (mg/kg) at two medication opportunities.

study, researchers undertook an analysis of possible sample biases. The sample's characteristics were compared to those of a representative sample of nurses from the National Sample Survey of Registered Nurses (U.S. Department of Health & Human Services [DHHS], 2000). This current sample was similar to pediatric nurses nationally in terms of gender and race/ethnicity but was better educated; only 3% of pediatric nurses in the DHHS survey, compared to 34% in the present survey, had a master's degree or higher. The current sample also over-represented NPs, with 32% NPs. This is true of only 2% of pediatric nurses in the DHHS survey.

Findings show that the educational level and years of experience were not associated with the nurses' pain management recommendations, implying that the results may not have been different even if the sample had been less well-educated or less experienced. This study is distinctive in its efforts to recruit a geographically diverse sample of nurses and to discuss the issue of sampling biases. The vast majority of nursing studies (including all prior relevant studies cited in the literature review) used small, localized convenience samples, and readers are typically given no information about ways in which the sample is representative of the population of interest.

Descriptive findings on pain treatment. Table 3 presents descriptive findings for three key outcome variables (nurses' perception of pain, total pain dosage, and total number of non-pharmacological methods recommended) for the three vignettes. With regard to nurses' pain perceptions, nurses' ratings varied considerably but were, on average, consistent with the children's own pain ratings. For example, the nurses' pain perception rating for child A ranged from 15 to 100, but the mean was 78.1. Nurses' perceptions were in harmony with the children's own reports; both child A and child B (with personal pain ratings of 5 on the 6-point scale) received average nurse ratings near 80, suggesting perceptions of moderately high levels of pain. Child C, with self-rated pain at 6, received nurse ratings suggesting perceptions of extreme pain (mean of 94).

An interpolation of the child's 6-point pain ratings to a 100-point scale, such as the one used by nurses, implies scores of 83 (5/6 x100) for child A, 83 for child B, and 100 for child C. These scores are notably close to the nurses' average ratings of

Table 4.
Nurses' Selection of Non-Pharmacologic Methods for Hospitalized Children's Pain (N = 334)

| | Vignette A | Vignette B | Vignette C |
|--|--------------|------------|------------|
| | Appendicitis | Fx Fibula | Leukemia |
| Nurse-Coordinated Methods | | | |
| Encourage deep breathing | 60.2% | 60.8% | 55.6% |
| Use toys for distraction | 50.0% | 36.8% | 42.9% |
| Encourage listening to music | 42.2% | 58.7% | 60.7% |
| Suggest TV or videos, electronics | 68.0% | 81.4% | 62.5% |
| Encourage child reading | 16.8% | 25.5% | 23.3% |
| Nurse-Participation Methods | | | |
| Use guided imagery | 24.3% | 29.0% | 41.4% |
| Apply hot and cold packets | 22.2% | 34.5% | 23.9% |
| Give massages | 17.1% | 16.8% | 35.0% |
| Pat or stroke | 37.1% | 28.4% | 47.1% |
| Read book to child | 47.9% | 37.5% | 55.3% |
| Rock or swaddle child | 9.9% | 5.7% | 15.7% |
| Sit with child | 64.4% | 58.0% | 70.7% |
| Mean Number of Nurse-Coordinated Methods (SD) | 2.4 (1.3) | 2.4 (1.3) | 2.5 (1.4) |
| Mean Number of Nurse-Participation Methods (SD) | 2.2 (1.7) | 2.2 (1.6) | 2.9 (1.8) |

78, 78, and 94, respectively. Using such an interpolation, the majority of nurses in this sample gave pain ratings close to the children's ratings, suggesting they accepted the children's self-reported pain level as valid.

Table 3 also shows the total dosage of pain medication that nurses said they would administer at the two opportunities combined. For all three vignettes, the actual range of values matched the full possible range; some nurses recommended no medication at either opportunity, and others said they would administer the maximum allowed per the PRN order of 0.2 mg/kg. The average doses were similar across the three vignettes, despite differences in perceived pain levels. On average, nurses said they would increase the dosage at the second opportunity across the three cases by 0.08 mg/kg (not shown in table), and this is consistent with the fact that the children's pain had not diminished.

The last panel of Table 3 shows the number of different non-pharmacologic pain relief methods the nurses said they would use. For all three vignettes, the number of methods ranged from 0 (none of the listed

methods) to 13 (all listed methods and a written-in option). The mean number of non-pharmacologic methods was similar for child A and child B, but higher for child C, who was in greatest pain.

The most widely-chosen non-pharmacologic methods – those selected by at least half of the nurses in all three vignette situations – included both NPMs (sitting with the child) and NCMs (using TV as a distraction, encouraging deep breathing), as shown in Table 4. There was a marked increase in frequency of NPMs for child C. For example, massages were chosen twice as often for child C (35%) than for child A or B (17%). The bottom two rows of the table indicate that while the mean number of NCMs was similar across the 3 vignettes (2.4 to 2.5), the mean number of NPMs rose from 2.2 for child A and child B to 2.9 for child C.

Pain treatment and nurse characteristics. Table 5 summarizes results of analyses in which seven nurse characteristics were examined in relation to three pain outcome measures – pain ratings, total dose of medication, and number of non-pharmacologic

methods. All outcome measures were averaged across the three vignettes to achieve stable estimates of the nurses' approach to managing children's pain. The nurse characteristics in these analyses included those on which hypotheses could be developed based on earlier research (education, years of clinical experience, and prior experience with pain), as well as others that had limited or no prior scrutiny in relation to pediatric pain outcomes (nurse practitioner status, race, current nursing status, and recent receipt of pain treatment training).

Few tests were statistically significant. Nursing education, for example, was unrelated to nurses' pain perceptions and pain management decisions. Nurses without a baccalaureate degree had average pain ratings, analgesic dosages, and number of non-pharmacologic methods comparable to nurses with more education, contrary to the researchers' hypothesis. Prior experience of pain, recent pain training, and years of clinical experience also were not significantly related to any of the pain outcome measures.

Both NPs and non-NPs had nearly identical ratings of the children's pain levels, but NPs said they would give a significantly higher dose of medication ($p = 0.02$). NP status was not significantly related to the number of non-pharmacologic methods used. Although there were relatively few respondents who said they were not currently working in nursing, current nursing status was significantly related to pain ratings. Currently employed nurses gave higher average pain ratings (84.5) than those not currently in nursing (78.5, $p = 0.002$). Currently employed nurses also had somewhat higher dosage scores and number of non-pharmacologic methods, but in both cases, the differences were above traditional significance levels ($p = 0.11$ and 0.13, respectively).

Finally, findings suggest that white nurses would use more non-pharmacologic methods on average (5.2) than non-white nurses (4.3, $p = 0.05$). Racial/ethnic differences for other pain outcomes, however, were not significant.

Altogether, variability in the nurses' pain perceptions and selected pain treatments was only weakly and inconsistently related to the characteristics that prior research suggested might play a role in pain decisions. In fact, when a Bonferonni correction is applied to the analyses shown in Table 5 (to adjust for an inflated risk of a type I error when running 21 separate tests), a p value less than 0.002 would

Table 5.
Nurses' Characteristics in Relation to Pain Perceptions and Pain Treatment

| Nurses Characteristics | Pain Rating | | Medication Dosage ^a | | Non-Pharmacologic Methods ^b | |
|--|-------------|---------------------------|--------------------------------|---------------------------|--|---------------------------|
| | X (SD) | F (or <i>t</i>) <i>p</i> | X (SD) | F (or <i>t</i>) <i>p</i> | X (SD) | F (or <i>t</i>) <i>p</i> |
| Education | | | | | | |
| Less than a bachelor degree (<i>n</i> = 99) | 84.4 (9.6) | | 0.172mg (0.03) | | 5.1 (2.3) | |
| Bachelor degree (<i>n</i> = 122) | 83.2 (9.8) | | 0.166mg (0.03) | | 5.1 (2.6) | |
| Higher than bachelor degree (<i>n</i> = 133) | 84.5 (8.5) | | 0.172mg (0.03) | | 5.2 (2.3) | |
| | | 0.69 0.50 | | 1.56 0.21 | | 0.08 0.93 |
| Is a nurse practitioner (<i>n</i> = 106) | 84.1 (8.6) | | 0.175mg (0.03) | | 5.4 (2.5) | |
| Not a nurse practitioner (<i>n</i> = 227) | 84.0 (9.6) | | 0.167mg (0.03) | | 5.0 (2.4) | |
| | | 0.10 0.92 | | 2.3 0.02* | | 1.41 0.16 |
| Race | | | | | | |
| White (<i>n</i> = 301) | 83.9 (9.5) | | 0.170mg (0.03) | | 5.2 (2.4) | |
| Non-white (<i>n</i> = 31) | 84.4 (7.5) | | 0.162mg (0.04) | | 4.3 (2.1) | |
| Years of Clinical Experience | | | | | | |
| 15 or fewer years (<i>n</i> = 86) | 83.1 (9.0) | | 0.167mg (0.03) | | 4.8 (2.3) | |
| 16 to 25 years (<i>n</i> = 111) | 85.5 (8.6) | | 0.172mg (0.03) | | 5.1 (2.3) | |
| 26 or more years (<i>n</i> = 135) | 83.3 (10.0) | | 0.170mg (0.03) | | 5.3 (2.5) | |
| | | 2.35 0.10 | | 0.6 0.55 | | 1.51 0.12 |
| Has Experienced Personal Pain | | | | | | |
| Yes, has experienced pain (<i>n</i> = 230) | 84.1 (8.6) | | 0.172mg (0.03) | | 5.0 (2.4) | |
| No, has not experienced pain (<i>n</i> = 102) | 83.6 (10.7) | | 0.165mg (0.03) | | 5.3 (2.4) | |
| | | 0.51 0.61 | | 1.87 0.06 | | 0.27 0.38 |
| Currently in Nursing | | | | | | |
| Yes, is currently in nursing (<i>n</i> = 308) | 84.5 (8.7) | | 0.171mg (0.03) | | 5.2 (2.4) | |
| Not currently in nursing (<i>n</i> = 24) | 78.5 (14.1) | | 0.160mg (0.03) | | 4.4 (2.2) | |
| Has Had Recent Pain Education | | | | | | |
| Yes, has had pain education (<i>n</i> = 208) | 84.3 (9.2) | | 0.171mg (0.03) | | 5.0 (2.4) | |
| No pain education (<i>n</i> = 136) | 83.5 (9.4) | | 0.167mg (0.03) | | 5.4 (2.5) | |
| | | 0.80 0.42 | | 1.21 0.23 | | 1.61 0.11 |

^a Total dosage of medication nurses said they would use (mg/kg) at two medication opportunities.

^b Total number of different non-pharmacologic methods nurses said they would use.

* Statistically significant result.

be needed. Only one relationship – pain ratings and current employment status – was significant at this level.

Because researchers expected nurse characteristics to be associated with pain management outcomes, multiple regression analyses in the analysis plan were included to help disentangle known correlations among nurses' characteristics (years of clinical experience is correlated with age). Ultimately, nurse characteristics were not good predictors of any pain outcomes, and the multiple regression

analyses yielded very low R²s. Researchers illustrated a single example in which an expanded set of nurse characteristics was used to predict total dose of analgesics. As shown in Table 6, the adjusted R² in this multiple regression analysis, although statistically significant, was only 0.04. With other characteristics held constant, two characteristics were significantly related to total dose – NP status and prior experience with pain. Nurses who had a personal experience of pain said they would administer higher doses of

medication than those who did not have such pain experience (means of 0.172 mg/kg versus 0.165 mg/kg, respectively) when other characteristics were controlled, but the relationship was modest and the clinical significance negligible.

The authors featured the regression for predicting total doses because the value of R² was highest for this outcome. The regression for predicting nurses' pain perceptions, using the same predictors, yielded an adjusted R² of 0.01 (*p* = 0.32), and the regres-

Table 6.
Summary of Simultaneous Multiple Regression of Mean Recommended Dose of Medication on Nurses' Background Characteristics (N = 311)

| Nurses' Characteristics | b | SE | β | t | p |
|----------------------------------|---------|-------|---------|--------|--------|
| Has less than a bachelors degree | 0.0043 | 0.005 | 0.065 | 0.796 | 0.427 |
| Has bachelors degree, not higher | -0.0035 | 0.005 | -0.056 | -0.717 | 0.474 |
| White | 0.0103 | 0.006 | 0.099 | 1.749 | 0.081 |
| Has a history of intense pain | 0.0072 | 0.004 | 0.112 | 1.981 | 0.048* |
| Has had recent pain education | 0.0391 | 0.004 | 0.064 | 1.039 | 0.300 |
| Is a nurse practitioner | 0.0111 | 0.005 | 0.171 | 2.204 | 0.028* |
| Currently working in nursing | 0.0094 | 0.007 | 0.080 | 1.393 | 0.165 |
| Has 1 or more children | 0.0016 | 0.005 | 0.021 | 0.359 | 0.720 |
| Working in an inpatient setting | 0.0057 | 0.004 | 0.095 | 1.450 | 0.148 |
| Age | -0.0004 | 0.000 | -0.126 | -1.361 | 0.174 |
| Number of years working | 0.0003 | 0.000 | 0.106 | 1.127 | 0.261 |

Note: Overall regression – $R^2 = 0.072$, Adjusted $R^2 = 0.039$, $F = 2.136$, $p = 0.018$.

*Statistically significant result.

sion predicting number of non-pharmacologic methods yielded an adjusted R^2 of 0.02 ($p = 0.10$).

Discussion

Nurse characteristics have been inconsistently cited as predictors in previous studies of pain management. In this national survey, appropriate assessment and intervention for children's pain were not found to be associated with many of the nurse characteristics previously reported in the literature. Education, years of clinical experience, personal pain experience, recent pain education, and whether respondents were currently practicing nursing were not significantly associated with pain perceptions or with pain management choices. In this study, slightly higher pain dosages were given by NPs than by RNs, and white nurses selected slightly more non-pharmacologic comfort measures than nurses of other races/ethnicities. The magnitude of these decision differences is arguably not clinically important. Additionally, with so many tests having been done on these data, it is possible that any significant results accepted at the initial 0.05 alpha level could reflect a Type I error. Attention to the results after the Bonferroni correction provides a more conservative interpretation.

The most important finding from this survey of nurses in pediatric care – notably, using a reasonably large

national sample – is the dominance of responses that reflect awareness of appropriate treatment decisions related to children's pain, regardless of nurses' characteristics. Nurses in this survey made assessments that were congruent with each child's report of pain and said they would implement adequate pain treatment using close to the maximum medication prescribed plus the addition of non-pharmacologic strategies. In contrast with prior literature, nurse characteristics did not predict nurses' assessments of children's pain and need for treatment.

On average, the nurse respondents in this study evaluated children's pain at the same high levels at which the children reported it. The congruency between nurse and child pain ratings contrasts with findings of previous studies (Ellis et al., 2002; Vincent & Denyes, 2004) and may reflect the fact that this study relied on a more representative national sample of nurses than in earlier work. Researchers did not provide behavioral pain indicators in the vignettes, which can distract from judging pain intensity (Berde & Sethna, 2002), and well-established pain measurement scales, which are encouraged for children in clinical settings, were included (Probst, Lyons, Leonard, & Esposito, 2005; Simons & MacDonald, 2004).

This study's nurse respondents selected, on average, doses of avail-

able medication at the higher end of the possible dose range. This finding is a departure from decades during which patterns of under-medication for children in pain have been the unacceptable norm. There has been a slow but constant turn to the philosophy that children need and should receive maximum possible pain treatment, which should be tailored to their widely varying needs and responses. In 2004, the American Society for Pain Management Nursing and the American Pain Society published a consensus statement providing guidelines for range orders (American Pain Society, 2004). The nurses in this current study appeared to demonstrate the ability to select medication from range orders in three scenarios involving school-aged children in acute pain.

In each scenario in this study, nurses also said they would opt for several non-pharmacologic interventions. Previous studies have reported that nurses do not consistently use non-pharmacologic methods in treatment of children's pain (Jacob & Puntillo, 1999; Pederson & Harbaugh, 1995). They cite inadequate knowledge, lack of protocols, and workload as barriers. In contrast, nurse respondents in the current study selected for each scenario an average of more than four non-pharmacologic strategies across a range of options with both low and high nurse involvement (see Table 3). Their decisions may have been evoked by the list of strategies provided and the assumption that these interventions would be supported in the clinical environment. The strategies listed were primarily in the realm of comfort measures for which nurses would have the skill without additional training in complementary techniques. Little data exist in the literature about nurses' knowledge, attitudes, or other aspects of decision-making regarding the selection of non-pharmacologic pain treatments for children. This is an area recommended for additional research.

Findings also may reflect an evolution in thinking about pediatric pain and its treatment. The dissemination of research evidence for pain recognition and management has been slowly filtering into the practice setting for decades (Zisk, 2003). The Diffusion of Innovations (DOI) theory (Rogers, 1962, 2003) provides a framework for explaining the timing of communication and acceptance of new ideas through five stages. These are knowledge, persuasion, decision, implementation, and confirmation. The

background and context for the researchers' studies incorporate several innovations in pediatric pain care, including documentation, development of valid and reliable clinical assessment tools, and efficacy of wider range of treatment options (Ellis, et al., 2002; Merkel & Malviya, 2000; Zisk, 2003). It can be inferred from this study's findings that nurses have absorbed the knowledge and persuasion stages of pain treatment innovations and have moved, at minimum, into decision making consistent with the innovations. This is demonstrated in this study through nurses' assessment and recognition of pain in school-aged children with moderate to

Limitations. This study has several limitations that the researchers readily acknowledge. The patient vignettes were limited to school-aged children in similar developmental stages, with high levels of pain and during acute stages of illness. Cases of children in home care and community outpatient settings were not included, nor were scenarios with chronic low levels of pain or pain symptoms unsupported by medical diagnosis. These aspects of pain management should be explored in future studies.

Vignettes as a study method can only provide inference that the health care provider responses are the same they would make in a clinical situation.

publishing mailing list is likely to be more professionally aware and more motivated to stay current than those nurses not purchasing books and journals. At the same time, however, it is important to note that this sample may well be more representative than has been the case in prior studies, which have tended to rely on small samples of nurses from single hospitals. The characteristics of the convenience samples of nurses in these earlier studies could be biased in any number of ways, but no analysis of sampling bias has been performed previously. Moreover, those nurses in this sample who lacked advanced degrees and who therefore were more similar to nurses nationally made pain management decisions comparable to better-educated nurses.

Complete national lists of nurses in specific specialty areas are not available, and any list consulted has inherent limitations resulting from characteristics that cause nurses to be on certain lists, for example, professional association membership, or in this study, interest in purchase of specialty books and journals. The marketing list purchased for this survey was a useful way to tap into a large, geographically dispersed group of nurses in pediatric care when few other options to do so are available. If state nursing boards and national professional nursing associations included practice specialty information in available lists of licensed nurses, these could serve as a more complete and accessible source for research.

Conclusion

Continued research is needed to evaluate nurses' decisions in actual clinical situations. Much remains to be learned about pain management decisions made by nurses and other providers across the age spectrum – from infancy to young adulthood – across the range of conditions that cause pain, and across the modalities available to provide relief.

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Future research should assess the extent of actual implementation of these decisions and the confirmation of innovation acceptance in all clinical settings and for children of all ages and health status.

severe pain in acute care settings. Future research should assess the extent of actual implementation of these decisions and the confirmation of innovation acceptance in all clinical settings and for children of all ages and health status.

Although this study suggests a strong trend that nurses have moved into the decision stage of pediatric pain innovations, a small number of non-adopters also was found. Neither education variables nor other individual nurse characteristics cited in earlier pain research explained variations in decision making by this study's nurse respondents. The extent to which decisions of individual survey respondents were influenced by the systems within which they worked is not known, but nurses have indicated there are continued barriers in some clinical systems that slow the adoption of pain management innovations (He et al., 2005; Zempsky, Cravaro, & the American Academy of Pediatrics Committee on Pediatric Emergency Medicine and Section on Anesthesiology and Pain Medicine, 2004). It has been strongly recommended that attention to capacity-building in organization, development, and technology is needed to accelerate diffusion of public health innovations (Haider & Kreps, 2004). Systems adoptions will be an important corollary to individual nurse adoptions of pain management innovations for children.

The stimulus of a brief case vignette may be quite different from that of an actual case unfolding in real clinical time and informed by prior care-based knowledge of the child, family dynamics, and availability of pain team services. Nevertheless, the use of vignettes to describe clinical situations and elicit information has a long history, both in pain studies and in other types of research on nurses' decision-making (McDonald et al., 2003), and it is especially useful for shedding light on people's attitudes, intentions, and levels of awareness rather than on their behavior (Hughes & Huby, 2002). Alternatively, an observational study could not realistically be conducted with a national sample of nurses, and it would be difficult to tease out the factors influencing the nurses' pain management decisions among divergent cases. Vignettes have been shown to be a valid and comprehensive method for measuring quality relevant to actual clinical practice and providing performance scores superior to chart audits and close to the gold standard patient simulation methods (Peabody, Luck, Glassman, Dresselhaus, & Lee, 2000).

When compared to a nationally representative sample of pediatric nurses (DHHS, 2000), this survey sample was similar in gender and race/ethnicity but more likely to have graduate education and over-represented NPs. The select population of pediatric nurses on a

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ASSIGNMENT

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OBJECTIVES

1. Discuss the importance of appropriate pain management for children.
2. List two interventions for increasing communication between nurses and parents regarding children's pain.
3. Describe the way in which emphasis on pain management may influence nurses' responses to perceptions of children's pain.
4. Identify opportunities for pediatric nurses to keep current on aspects of pain management.

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Statement of Disclosure

The authors reported no actual or potential conflict of interest in relation to this continuing nursing education series.

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QUESTIONS

1. In a study with PICU families, Studdard et al. found that _____ was the most commonly cited source of conflict between care teams and families.
 - a. Noise
 - b. Poor communication
 - c. Waiting times
 - d. None of the above
 - e. All of the above
2. Results from a study in Sweden suggest that parental security regarding management of their child's pain is derived from
 - a. trusting professionals who know how to take care of their child.
 - b. having control over what is going on with their child.
 - c. trusting themselves as the ones who knows the child best.
 - d. B and C.
 - e. All of the above.
3. Which of the following interventions were used in Hong's study?
 - a. An inservice designed to improve nurses' communication with parents.
 - b. An inservice designed to improve nurses ability to assess for pain.
 - c. A handout providing information to parents regarding pain management on the unit.
 - d. A and B.
 - e. A and C.
4. In Hong et al.'s study, which percentage of nurses received the staff education intervention on communicating with parents/families?
 - a. About 25%
 - b. About 35%
 - c. About 45%
 - d. About 55%
 - e. About 65%
5. The trend from Hong's study, although not statistically significant, suggests that staff inservice with written case studies and a parental informational handout combined might be useful interventions.
 - a. True
 - b. False
6. According to earlier studies, which of the following factors have been suggested as influencing nurses' skill at managing children's pain?
 - a. Nurses with more clinical experience.
 - b. Nurses who are better educated.
 - c. Nurses who have had personal experience with pain.
 - d. A and B.
 - e. A, B, and C.
7. According to Griffin et al.'s study, nurses' prior experience of pain, recent pain training, and years of clinical experience were not significantly related to any of the pain outcome measures.
 - a. True
 - b. False
8. Griffin et al. reported which of the following findings regarding nurse practitioners?
 - a. Nurse practitioners and non-NPs had nearly identical ratings of the children's pain.
 - b. Nurse practitioners rated children's pain higher than non-NPs.
 - c. Nurse practitioners rated children's pain lower than non-NPs.
 - d. Nurse practitioners said they would give significantly lower doses of pain medication than non-NPs.
9. Which of the following findings achieved statistically significance regarding current nursing status?
 - a. Currently employed nurses gave higher average pain ratings than those not currently in nursing.
 - b. Currently employed nurses had somewhat higher dosage scores
 - c. Currently employed nurses had a somewhat higher number of nonpharmacologic methods.
 - d. A and B.
 - e. B and C.
10. According to Griffin et al., the most important finding from their survey of nurses in pediatric care is the dominance of responses that reflect awareness of appropriate treatment decisions related to children's pain, regardless of nurses' characteristics.
 - a. True
 - b. False

Answer Form: Pain Management and the Pediatric Nurse

*PED J805

Check the box next to the correct answer.

1. A 2. A 3. A 4. A 5. A 6. A 7. A 8. A 9. A 10. A
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| 1. The objectives relate to the overall purpose/goals of the education activity. | 1 | 2 | 3 | 4 | 5 |
| 2. The activity met the stated objectives. | | | | | |
| a. Discuss the importance of appropriate pain management for children. | 1 | 2 | 3 | 4 | 5 |
| b. List two interventions for increasing communication between nurses and parents regarding children's pain. | 1 | 2 | 3 | 4 | 5 |
| c. Identify opportunities for pediatric nurses to keep current on aspects of pain management. | 1 | 2 | 3 | 4 | 5 |
| d. Describe the way in which emphasis on pain management may influence nurses' responses to perceptions of children's pain. | 1 | 2 | 3 | 4 | 5 |
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| 4. The content was relevant to my practice. | 1 | 2 | 3 | 4 | 5 |
| 5. The content met my needs. | 1 | 2 | 3 | 4 | 5 |
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| b. 1-2 hours _____ | | | | | |
| c. 2-3 hours _____ | | | | | |
| d. 3 hours or more _____ | | | | | |

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