



## An examination of child temperament as a predictor of parental post-operative analgesic administration



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### ARTICLE INFO

#### Article history:

Received 3 June 2013

Received in revised form 11 March 2014

Accepted 21 March 2014

#### Key words:

Post-operative pain

Pediatric pain

Analgesia

Pain management

Temperament

Surgery

### ABSTRACT

**Background/Purpose:** The purpose of this study was to examine children's temperament as a predictor of post-operative analgesics administered by parents after controlling for post-operative pain severity, surgery severity, and parental misconceptions regarding pain medication for children.

**Methods:** Participants included 286 Spanish- and English-speaking parents of children ages 1–18 (IQR: 3–8) undergoing outpatient elective surgery. Parents completed measures of baseline temperament, parental medication attitudes, and demographics preceding their child's surgery and recorded pain intensity and doses of analgesics administered (nonopioid and opioid) on postoperative days 1, 3, and 7.

**Results:** Pearson product-moment correlations revealed that emotionality was significantly associated with acetaminophen, ibuprofen and hydrocodone and shyness was significantly associated with acetaminophen and hydrocodone. Hierarchical linear regression analysis revealed emotionality as a significant independent predictor of acetaminophen, ibuprofen and hydrocodone administered ( $F(4, 72) = 2.82$ ,  $F(4, 73) = 1.53$ ,  $F(4, 58) = 8.75$ , respectively).

**Conclusion:** Dimensions of children's temperament, specifically emotionality, predict analgesic administration by parents following surgery even after controlling for confounding variables. These findings highlight the need for tailored interventions targeting management of children's pain in the home setting and suggest that both proximal (e.g., pain severity) and distal (e.g., child temperament) factors may be necessary intervention components.

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Children's post-operative pain management has been largely placed in the hands of parents due to the high number of outpatient surgeries, which continues to grow. Most children undergoing outpatient surgery experience significant post-operative pain, despite the previous misconception that 'minor' surgeries are associated with minor pain [1]. Unfortunately, parents inadequately administer analgesics to their children primarily due to lack of knowledge and misleading perceptions of children's analgesics [2–4]. Research suggests that parents often under-medicate children or wait to administer analgesics until children are in a considerable amount of pain [1–4].

Several studies have addressed the issue of parental pain management in order to identify factors that may be associated with under treatment of children's pain [1–5]. In 2009, our group conducted a study examining post-operative pain intensity and analgesic consumption for children undergoing tonsillectomy and adenoidectomy [5]. We found that the majority of children experiences significant post-operative pain and that even when parents recognized their children were experiencing pain at home, only a few

doses of analgesics were administered [5]. Underlying reasons for these parental practices were examined in a later study exploring the relationship between parental attitudes and beliefs regarding analgesic use for children and analgesic administration in the home setting [4]. Findings showed that after controlling for pain severity, greater endorsement of misconceptions regarding analgesic use for children by parents predicted fewer doses of analgesia given [4].

Although parental factors have been previously examined as predictors of children's post-operative analgesic administration, child variables have received less attention. In particular, children's temperament may play a significant role in how parents manage post-operative pain. Temperament, defined as the "how" of behavior, is considered genetically based due to its presence in early infancy [6]. The components of temperament have been controversial amongst researchers, however, three dimensions of temperament including the behavior expression of activity, emotionality, and sociability are widely accepted [7,8]. Specifically, child's temperament might predict response to adverse events and may affect both children's perception of pain as well as observable behavior [3]. This is essential considering parents administer analgesics when they perceive their children are in pain, which is evaluated by observing their children's behavior. Moreover, previous findings concluded that temperament was indeed related to children's self-report of pain intensity [3].

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The effects of children's temperament on post-operative pain have been explored in the hospital setting, [9] yet, the construct of temperament has been largely neglected as a predictor of analgesic administration by parents in the home setting. The purpose of this study, therefore, was to identify the relationship between four dimensions of children's temperament (activity, emotionality, shyness, and sociability) and the amount of post-operative analgesics administered by parents. Because temperament may impact children's pain expression, [3] it was hypothesized that children rated as having shy, inactive temperaments would receive less pain medication than children with loud, active temperaments.

## 1. Methods

### 1.1. Participants

A total of 286 Spanish- and English-speaking parents of children ages 1–18 with a median age of 5 (IQR: 3–8) undergoing outpatient elective surgery between March 2010 and April 2011 at Children's Hospital of Orange County (CHOC Children's) participated in this study. Eligible children were Classification I and II of the American Society of Anesthesiologists (ASA) Physical Status classification system, which entails the patient is in good health (Class I) or has a well controlled disease of one body system (Class II).

### 1.2. Measures

*Demographic questionnaire.* This measure was designed to gather socio-demographic information about the family, including race/ethnicity, education, income, and family constellation.

#### 1.2.1. Children's temperament

*Emotionality activity sociability temperament survey (EAS-TS)* [6]. The EAS-TS is a valid and reliable assessment reported by parents of baseline temperament in early childhood through adolescence. It consists of 20 items, five corresponding to each of the four components: emotionality, activity, sociability and shyness [6]. Emotionality, a measure of distress, is one's tendency to become easily and intensely aroused. Activity is a measure of tempo and vigor. Sociability is a measure of one's preference for the presence of others versus being alone. Shyness, a measure of inhibition and tension with strangers, is one's tendency to escape from new social situations [10]. A five-point scale is used to score the items, ranging from 1 = *not at all true* to 5 = *very much true* [6]. The parent completed the EAS-TS on the day of the child's surgery, prior to recovery.

#### 1.2.2. Parental attitudes

*Medication attitude questionnaire (MAQ)* [2,11]. This 16-item questionnaire examines attitudes about the use of pain medication for children's pain. Parents were instructed to consider their beliefs regarding the specific analgesics prescribed or recommended for a particular event, or over-the-counter analgesia any time [11]. It is measured on a 7-point Likert-type scale ranging from "strongly disagree" to "strongly agree" [2]. Higher scores indicate incorrect knowledge and greater attitudinal barriers toward administering analgesia to children [4]. The internal consistency for the overall scale is reported to range from .68 to .73 [2,11].

#### 1.2.3. Pain assessment

*Faces pain scale-revised (FPS-R)* [12]. This pain scale measures the intensity of children's pain, and contains six faces ranging from an expression indicating "no pain" to an expression characterizing the "most pain possible" [12]. FPS-R is a self-report scale scored from 0 to 10, and is a valid tool used for children [12]. Parents were instructed to

administer the FPS-R to children ages 4–7 years. FPS-R is used in this study to examine the level of pain the child is in when and if he or she is provided with analgesics by comparing it to the Analgesics Follow-up.

*Numeric rating scale (NRS)* [13,14]. This observational numeric rating of pain is a valid measurement of the intensity and unpleasantness of pain in children between the ages of 8 and 18, and ranges from 0 (indicating no pain) to 10 (severe pain) [13,14]. Observations were assessed by parents of children ages 0–18 [13,14]. Children ages 8–18 years self-reported pain severity using the NRS with developmentally appropriate anchors [13,14]. Specifically, anchors for children ages 8–11 included "not hurting" and "hurting a whole lot." For children ages 12–18, anchors included "no pain" and "severe pain."

#### 1.2.4. Analgesic administration

*Analgesic follow-up* [4]. Completed by parents on days 1, 3 and 7 after the child's surgery. Parents reported the amount and type of analgesics administered, along with the time of administration in order to provide real-time assessment of pain management [4].

### 1.3. Procedure

Potential participants were identified through review of surgery schedules, and eligibility was assessed by review of the electronic medical record. Because this study did not involve more than minimal risk to the participants, a waiver of written informed consent was granted by the institutional review boards (IRB) and verbal consent was obtained by all participating parents. This study was approved by UC Irvine and CHOC Children's IRBs.

After providing informed consent, parents completed a demographic questionnaire in addition to instruments examining baseline temperament (EAS-TS) and barriers to pain assessment (MAQ) while in the preoperative area. Prior to discharge from the Post Anesthesia Care Unit (PACU), parents were provided with follow-up forms for pain assessment (NRS, FPS-R) and analgesics administered (opioid and non-opioid) to children on post-operative days 1, 3 and 7. Pain was assessed once on each post-operative day, at the end of the day, with instructions for parents and children to report on the average overall pain for that day. On post-operative days 3 and 7, a research assistant contacted parents as a reminder to complete the follow-up instruments. Follow-up data were returned with a pre-addressed and stamped envelope previously provided to parents. Families with internet access had the option of completing the home pain management surveys through SurveyMonkey.

### 1.4. Statistical analysis

All analyses were conducted using SPSS 20.0. Descriptive statistics were used to describe the sample. Normally distributed data were presented as mean and standard deviation (SD), and skewed data were presented as median and range (IQR, 25%–75%). Pearson product-moment correlations were used to measure the associations between children's temperament (shyness, activity, sociability and shyness) and total dose of analgesics (hydrocodone, ibuprofen, acetaminophen and codeine) administered to children after surgery on post-operative days 1, 3 and 7. Because parental attitudinal barriers to pain management have been significantly associated with provision of fewer doses of analgesics [4], hierarchical linear regressions controlling for surgery severity (coded as 1 = mild, 2 = moderate, 3 = severe based upon surgical invasiveness and predicted pain severity), post-operative pain severity, and parental attitudes were conducted to analyze the unique contribution of temperament on analgesics administered by parents. Significance was

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