

Naturalistic parental pain management during immunizations during the first year of life: Observational norms from the OUCH cohort

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ABSTRACT

No research to date has descriptively catalogued what parents of healthy infants are naturalistically doing to manage their infant's pain over immunization appointments during the first year of life. This knowledge, in conjunction with an understanding of the relationships different parental techniques have with infant pain-related distress, would be useful when attempting to target parental pain management strategies in the infant immunization context. This study presents descriptive information about the pain management techniques parents have chosen and examines the relationships these naturalistic techniques have with infant pain-related distress during the first year of life. A total of 760 parent-infant dyads were recruited from 3 pediatric clinics in Toronto, ON, Canada, and were naturalistically followed and videotaped longitudinally over 4 immunization appointments during the infant's first year of life. Infants were full-term, healthy babies. Videotapes were subsequently coded for infant pain-related distress behaviors and parental pain management techniques. After controlling for preceding infant pain-related distress levels, parent pain management techniques accounted for, at most, 13% of the variance in infant pain-related distress scores. Across all age groups, physical comfort, rocking, and verbal reassurance were the most commonly used nonpharmacological pain management techniques. Pacifying and distraction appeared to be most promising in reducing needle-related distress in our sample of healthy infants. Parents in this sample seldom used pharmacological pain management techniques. Given the psychological and physical repercussions involved with unmanaged repetitive acute pain and the paucity of work in healthy infants, this paper highlights key areas for improving parental pain management in primary care.

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1. Introduction

Generally speaking, pain management strategies in the infant immunization setting fall into 2 broad categories: pharmacological and nonpharmacological. The uses of sucrose or topical anesthetics are examples of pharmacological approaches and have been consistently shown to reduce infant pain and distress [4,15,40].

Nonpharmacological techniques consist of parental behaviors used to reduce infant distress, such as distraction [8,13,22], verbal reassurance [5,35], and proximal soothing [3,7,26].

Compared with studies on pharmacological approaches, research pertaining to nonpharmacological techniques has yielded less clear results. In terms of proximal soothing, whereas the majority of studies have found an association or causal relationship

with decreased infant pain-related distress [6,7,16,17], 1 study found that proximal soothing only reduced infant-pain related distress when combined with parent vocalizing [23], and another study found that proximal soothing was related to difficulty with infant distress regulation [3]. However, this latter study measured proximal soothing and distress regulation concurrently, and directionality could not be confirmed. Similarly, research pertaining to distraction has been equivocal, with some studies finding support for distraction [8,10,11] and others not [13,22,25]. On the other hand, research pertaining to verbal reassurance and pacifying has been consistent, with all findings pointing toward a positive relationship between verbal reassurance and infant pain [5,12,32] and a negative relationship between pacifying and infant pain [7].

No research to date has presented the prevalence of parental use of these soothing behaviors in a naturalistic context. To properly address parental pain management in the immunization context, it is crucial to understand the landscape of these behaviors. This knowledge, in conjunction with an understanding of the relationships that these behaviors have with infant pain-related

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distress, would be useful when attempting to target parental pain management strategies during infant immunizations.

The level of distress that an infant displays is also important to consider because this has been linked to which pain management techniques parents use as well as their efficacy. For example, higher distress has been related to more proximal soothing [3], and breastfeeding and pacifying appear more effective when infant distress is low [23]. Moreover, studies have shown that the strategies that parents use during times of high infant distress (eg, bouncing, rocking) [6] may not attenuate pain to the extent that one would anticipate [3,6].

The present study had 2 developmentally informed objectives: (1) to present descriptive information about which pain management techniques are currently being used during immunizations during the first year of life and (2) to examine the relationships that these techniques have with infant pain-related distress. No hypotheses were formulated for the first objective because this component was descriptive. For the second objective, it was hypothesized, based on key reviews to date [30,31,34], that (1) pharmacological interventions would predict lower infant pain-related distress, regardless of age; (2) physical comfort, nursing, rocking, and pacifying would predict lower infant pain-related distress at all ages, whereas distraction and verbal reassurance would predict lower and higher infant pain-related distress, respectively, only at older ages; and (3) parent pain management techniques would account for greater variance in infant pain-related distress during periods of lower distress (ie, before the immunization and 2 minutes post-immunization) than higher distress (ie, the first minute post-immunization).

2. Methods

2.1. Procedure

Ethical approval was obtained through research ethics review boards at both the participating university and the associated pediatric hospital. Parents were approached to participate if they expressed interest to a nurse/administrator not directly involved in the study. If they agreed to be approached, a research assistant described the study in detail. Parental consent was obtained in the waiting room before beginning the study procedures. Immunizations were videotaped with 2 cameras. The first captured the infant's face and the second captured the entire parent-infant interaction. Parent-infant dyads were observed naturalistically, with no interference from the research assistant during the immunization period. Videos from each immunization were subsequently coded for infant pain-related distress and parent pain management techniques. A full description of our cohort procedure was published previously [28].

2.2. Measures

2.2.1. Demographic questionnaire and pharmacological pain management techniques

Parents completed a short demographic questionnaire that asked about basic background information such as their age, self-reported heritage culture, as well as infant sex and medical conditions since the last time they participated in the study. Parents were also asked whether they had administered pharmacological analgesics to their infants (ie, topical anesthetics such as EMLA [lidocaine and prilocaine] cream or over-the-counter acetaminophens such as Tylenol or Tempra) before the immunization appointment.

2.2.2. Infant pain-related distress

The Neonatal Facial Coding System [18,19] was used to code infant pain-related distress. This measure was designed to measure infants' facial responses to painful stimuli and is a well-validated

measure of pain. Each of 7 facial actions included in the analyses (brow bulge, eye squeeze, nasolabial furrow, open lips, vertical stretch mouth, horizontal stretch mouth, taut tongue) were coded as present (1) or absent (0) for every second within a 10-second epoch during the following 4 time periods: immediately before the first needle (pain baseline), immediately after the last needle (pain needle), 1 minute after the last needle (pain 1), and 2 minutes after the last needle (pain 2). Three of the original facial actions (chin quiver, tongue protrusion, lip purse) were not included in our analyses because they occurred <5% of the time. Our method is based on published precedents in the literature by our team and the original author [42,43]. The pain score was obtained for each time period by calculating the amount of time that facial actions were present. Scores ranged from 0 to 1 and indicate the amount of time during each 10-second epoch that facial actions were present. Higher scores indicate greater facial pain-related distress expression.

Trained Neonatal Facial Coding System coders, blind to the study hypotheses, coded the data. Primary coders to the measure were trained with 1 of the original scale designers, and subsequent coders went through a stringent process to attain reliability with trained coders. Interrater reliability was calculated among every permutation of 8 coders (eg, coder A with B, B with C, A with D). Twenty percent of the data were coded for reliability. Reliability was high, with percentage agreement scores for all 7 pain facial actions ranging from 0.85 to 0.97.

2.2.3. Parent soothing behaviors

Parent pain management behaviors during the immunization appointment were coded using the Measure of Adult and Infant Soothing and Distress (MAISD) [9]. The MAISD is a reliable and valid behavioral observation scale originally developed for use during pediatric medical procedures. Each of 8 behaviors (distraction, offer toy, offer pacifier, offer food [bottle or solid food], nursing [breastfeeding], physical comfort, rocking, and verbal reassurance) were coded as present (1) or absent (0) for 5-second epochs within three 1-minute periods: 1 minute before the first needle (pre-needle parent behaviors), 1 minute after the last needle (1-minute parent behaviors), and 2 minutes after the last needle (2-minute parent behaviors). For each of the 8 behaviors, percentage scores ranging from 0 to 1 were calculated for all three 1-minute phases. These scores represent the percentage of time that a behavior was present during that minute. Higher scores reflect a greater frequency of behavior.

Ten trained MAISD coders, blind to the study hypotheses, coded the data. Primary coders on the measure had training with the scale designer until reliability was attained. Subsequent coders went through a stringent process to attain reliability with trained coders. Twenty percent of all data were coded for reliability. Interrater reliability on all 8 parent behaviors was calculated among every permutation of coders (eg, coder A with B, B with C, A with D). The intraclass correlations ranged from 0.67 to 0.99 for the analyzed variables (ie, those that had occurred >5% of the time; see the following).

2.3. Analysis plan overview

To address the first research objective, a mean percentage for each coded epoch (1-minute pre-needle and 1 and 2 whole minutes post-needle) was calculated for each parental strategy at each age group. For the second objective, correlations were run between the parent behavior and the subsequent infant pain-related distress score, before regressions being run. Because no pharmacological technique was significantly correlated with infant pain-related distress, these planned multiple regressions were not conducted. To test the second hypothesis under the second objective,

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