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Sex as a Moderator in the Relationship between Post-operative Pain and Analgesics Administered in Children Undergoing Elective Surgery

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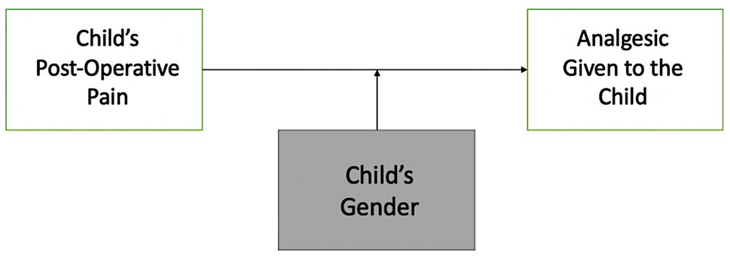
INTRODUCTION

- Post-operative pain is experienced by 85% of children who undergo surgery. A large percentage of these children do not receive proper pain management after discharge from the post-operative care unit (Fortier, Chou, Maurer, & Kain 2011).
- Among adults, women report more sensations of pain in comparison to men, but women have a higher pain tolerance (Fillingim et al. 2009). The sensation and perceptions of pain may be attributed to physiological characteristics such as hormones or BMI, but the social process of how pain is communicated between the two genders cannot be denied (Hussain et al. 2013).
- Experimental research suggests that adults have biases when it comes to pediatric post-operative pain (Cohen et al. 2014). Results showed that adults rate girls as more sensitive to pain and that they display a greater amount of pain.
- Previous research has revealed that when children are sick, parents sympathize more with their daughters than with their sons (Becker & Hu, 2008).
- A child's post operative pain could be directly related to the amount of analgesics given by the parent. However, looking at previous research, a child's gender could also influence this relationship because of societal biases and sociocultural factors (Cohen et al. 2014).
- The purpose of the current study is to understand the relationship between post-operative pain among children and analgesics given to the child, and how gender moderates this association.



METHOD

Participants: Procedures

112 patients ages 2-13 (Mean = 5.80) at the Children's Hospital of Orange County (CHOC Children's) who underwent elective surgery. 59% male and 41% female. 47% Hispanic, 25% White, and 28% other.

Parents and children were recruited prior to surgery to complete online surveys in a hospital setting where baseline information was gathered. After surgery parents were asked to report pain levels and analgesics given one, three, and seven days post-operatively through an online survey.

MEASURES

- **PPPM - Parent Postoperative Pain Measure** evaluates the child's pain, on days 1, 3, and 7 after surgery (Chambers et al. 1996).
  - Parents answered simply "yes" (coded 1) or "no" (coded 0) to 15 questions such as, "Since discharge from the hospital does your child, hold the sore part or his/her body?" or "Since discharge from the hospital does your child, cry more easily than usual?".
  - PPPM items are summed together. A score of 6 or higher is indicative of "clinically significant pain".
- An **Analgesic Consumption, Follow Up** survey was answered days 1, 3, and 7 post-operatively by parents to gather information on what medication(s) was given, the unit of measurement, and the amount administered. The reported analgesic was then converted into milligrams by the amount of active ingredient, using ratios to convert from tablespoons, ccs, droppers, teaspoons etc. The analgesics were then separated by types, specifically acetaminophen and ibuprofen. To account for weight differences, the amount of acetaminophen or ibuprofen was divided by the weight of the child in kilograms.

RESULTS

Analgesic	Post-Operative Pain and Analgesics	Coefficient of Sex as a Moderator
Post-Operative Day 1		
Ibuprofen	$b = 0.24$*	$b = 0.27$
Acetaminophen	$b = 0.22$*	$b = 0.08$
Post-Operative Day 3		
Ibuprofen	$b = 0.72$*	$b = 0.52$
Acetaminophen	$b = 0.34$*	$b = 0.39$
Post-Operative Day 7		
Ibuprofen	$b = 0.22$	$b = 0.91$
Acetaminophen	$b = 0.11$	---

Note: *$p < 0.05$

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RESULTS

Postoperative Day 1:

- For every one unit increase in pain, there was a 0.24 mg/kg increase in **ibuprofen** administered to the child, $b = 0.24$, $t = 3.55$, $p < 0.05$.
  - Sex did not significantly moderate the relationship between post-operative pain and ibuprofen administered to the child, $b = 0.27$, $t = 1.57$, $p > 0.05$
- For every one unit increase in pain, there was a 0.22mg increase in **acetaminophen** administered to the child, $b = 0.22$, $t = 5.38$, $p < 0.05$.
  - Sex did not significantly moderate the relationship between post-operative pain and acetaminophen administered to the child, $b = 0.08$, $t = 0.89$, $p > 0.05$.

Postoperative Day 3

- For every one unit increase in pain, there was a 0.72 mg/kg increase in **ibuprofen** administered to the child, $b = 0.72$, $t = 4.81$, $p < 0.05$.
  - Sex did not significantly moderate the relationship between post-operative pain and ibuprofen administered to the child, $b = 0.52$, $t = 1.72$, $p > 0.05$
- For every one unit increase in pain, there was a 0.34 mg increase in **acetaminophen** administered to the child, $b = 0.34$, $t = 4.44$, $p < 0.05$.
  - Sex did not significantly moderate the relationship between post-operative pain and acetaminophen administered to the child, $b = 0.39$, $t = 1.81$, $p > 0.05$

Postoperative Day 7

- There was no significant relationship between reported pain post-operatively day seven and given **ibuprofen**, $b = 0.22$, $t = 1.47$, $p > 0.05$
  - Sex did not significantly moderate the relationship between post-operative pain and ibuprofen administered to the child, $b = 0.91$, $t = 1.89$, $p > 0.05$
- There was no significant relationship between reported pain post-operatively day seven and given **acetaminophen**, $b = 0.11$, $t = 1.94$, $p > 0.05$

CONCLUSION

- Gender is not a moderator in the relationship between post-operative pain and analgesics administered to the child postoperatively all 3 days of data collection (days 1,3, and 7 post-operatively). Although it was non-significant, it is important to note the significant relationship between pain levels reported by parents and analgesic consumption. Parents are giving their child dosages of analgesics that are directly correlated to the reported pain values.
- Although gender was not a significant moderator, further research could be done analyzing socio-cultural influences between this association like number of siblings, gender of siblings, and temperament of the child.
- Some limitations of the study include the type of surgery that the participants were undergoing. Although the participants surgeries were elective, differences could lie in the experience of pain. If a participant had back pain due to surgery this could be more impactful on pain scores where other pain could be less.
- Perhaps with current gender equality movements and current education on gender equality makes this relationship not significant. Gender equality has perhaps had a positive influence on parents-perception of their child's pain where both genders are seen equal.
- The data presented could support the idea that both boys and girls are equal in a post-operative care environment, and it is not indicative that gender inequality is initiated at such a young age.
- Future analysis should analyze factors that interact with this association like the gender of the parent that is administering analgesics and the parent's education of analgesic usage.

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