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Parent Satisfaction with Acute Pediatric Pain Treatment at Home

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Abstract

OBJECTIVES—Outpatient pain management after acute injuries is an important part of emergency department care, but there is little evidence to support best-practice. Satisfaction with care is one way to assess effectiveness of current practice. This study describes the outpatient pain experience for children with an arm fracture and explores variables associated with parent's dissatisfaction with pain treatment for two analgesics after emergency department care.

METHODS—As a part of a randomized clinical trial assessing pain treatment after an arm fracture, parents and their children completed daily diaries recording pain scores, function disruption (play, school, sleep, eating) and adverse effects for three days after discharge from the emergency department. Parents and children also completed the Total Quality Pain Management Instrument on the third day to assess pain experience. Parent's satisfaction was defined by the lowest reported satisfaction during the study period.

RESULTS—244 children with complete diaries were analyzed. Children with a fracture experienced noteworthy pain with more than 54.5% of children reporting pain at home that was present “all the time” or “quite a bit”. 32% of parents were not satisfied with home pain treatment for their child. Parent's dissatisfaction was strongly associated with inadequate pain relief. It was also independently associated with nausea, disruption in play and sleep, and increased doses of medication.

DISCUSSION—Children with arm fractures experience noteworthy pain in the outpatient setting. Parent's dissatisfaction with home pain management for children suggests more research is needed to evaluate the factors that result in improvements in both parent and child satisfaction and the most effective way of producing those changes.

Keywords

Satisfaction; parent; child; outpatient pain management; injury

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INTRODUCTION

Effective pain management is an important component of the treatment of acute injuries. Recent efforts to ensure that pain is assessed and treated have improved pain treatment in the emergency department (ED) setting for children.^{1,2} However, there is evidence to suggest that parents provide inadequate analgesia for their children at home.^{3,4} After discharge from the ED, the most commonly prescribed medications for the treatment of fracture pain are ibuprofen and acetaminophen with codeine,⁵ despite recent literature concerning codeine's safety and efficacy.⁶⁻⁹ There is little literature to describe the home pain experience for children discharged from the ED and no evidence to support best-practice for outpatient treatment.¹⁰ Assessing satisfaction is one method to evaluate the home pain experience and the effectiveness of pharmacologic therapies. Further, identification of the factors associated with satisfaction with pain treatment can direct investigations to improve pain management for children after ED discharge.

Assessment of satisfaction provides a supplementary measure to communicate a comprehensive perspective of the pain treatment experience that self-reported pain scales that quantify severity of pain fail to address.^{11,12} In a study evaluating satisfaction with pediatric emergency care, resolution of pain was one of the variables significantly correlated with satisfaction.¹³ However, a number of studies have found no relationship between pain relief and satisfaction,^{3,14,15} while others confirmed an association but suggested pain relief is not the only contributor since it failed to perfectly predict satisfied patients.¹⁶⁻²⁰ A better understanding of the variables associated with parent's dissatisfaction might provide insight into the multi-dimensional nature of the satisfaction measure. To date, there has been no comprehensive evaluation of parent satisfaction with the treatment of pain for children at home.

The objectives of this study were to (1) describe the child and parent report of the pain experience during the first 72 hours following an acute arm fracture, (2) describe parent satisfaction with home pain treatment and (3) identify the factors associated with parents' dissatisfaction. We expect that parents are less likely to be satisfied with pain treatment if there are disruptions in their child's activities and that no particular subgroup of gender, race, age, pain score and fracture type would have an increased likelihood of dissatisfaction. A better understanding of the pain experience for children with fracture after ED discharge will inform future analgesic trials to optimize treatment.

MATERIALS AND METHODS

This was an observational cohort study that looked at factors associated with parents' dissatisfaction with outpatient pain management for children with simple arm fractures. It is a secondary analysis of data collected during the previously reported randomized, double blind clinical trial comparing the analgesic efficacy of ibuprofen and acetaminophen with codeine, two commonly recommended medications for pain treatment of children at home with an arm fracture.^{5,21} This study was approved by the institutional review board and consent and assent were collected for all families.

Briefly, the patients were enrolled at a children's hospital level 1 trauma center ED between August 2003 and September 2007. Eligible patients were children ages 4 to 18 years diagnosed with a fracture of the radius, ulna and/or humerus visualized on a standard two-view radiograph. Children were eligible if evaluated less than 12 hours after the initial injury and the fracture did not require reduction or manipulation in the ED. Less than 4% of the children underwent reduction after ED discharge. Non-English speaking parents and children were excluded. Demographic data were collected at the ED visit. Parents and children were instructed verbally and in writing by the research assistant on the use of the pain scale and daily diary. On the third and final day of the study, the parent and child separately completed the modified Total Quality Pain Management Instrument (TQPM) a validated quality assurance instrument developed to measure quality of outpatient pain management for children in the post-operative setting.²² Two standard follow up telephone calls were made during the first 72 hours after evaluation. Participants with completed pain diaries received a \$10 gift certificate.

Measures

The TQPM responses described the child and parent report of the pain experience in the first 72 hours after acute arm fracture and include perception of pain experienced, effectiveness of pain medication, and adverse effects. Numerical responses about pain were classified into mild (0, 1) moderate (2, 3) and severe (4, 5).

Parent satisfaction with home pain treatment was assessed on the day of injury and each of the three days following. The parent was asked in the daily diary: "How satisfied are you with the results of your child's pain treatment?" using a 0–5 Likert scale (very satisfied, satisfied, neutral, dissatisfied, and very dissatisfied). Analysis revealed that a report of 'neutral' was similar to 'dissatisfied' so parents were categorized as 'dissatisfied' with pain management if they reported neutral, dissatisfied or very dissatisfied on any of the four days. With a goal to identify factors that result in parent dissatisfaction, parents that reported being very satisfied or satisfied were compared to the dissatisfied parents.

Potential variables associated with parents' dissatisfaction were chosen based on available data and core outcome measures cited by PedIMPACT to be of value in clinical trials of pain treatment in children and adolescents.¹²

Functional disruptions—Using the pain diary each day, parents recorded whether their child's play, school attendance, sleep, and eating were altered. For each activity, parents noted whether function was increased, decreased or unchanged. Disruption of function was reported as the number of days the activity was decreased (range 0–4 days).

Adverse effects—In the daily pain diary, medication side effects experienced by the child were documented. Families could write-in their experiences or choose from a list of adverse effects adapted from the Physicians Drug Reference for both ibuprofen and acetaminophen with codeine including nausea, vomiting, dizziness, drowsiness or constipation. Adverse effects were assessed as the number of days in which the child reported any medication-associated side effects (range 0–4 days).

Pain scores—The modified Bieri faces pain scale was the validated pain assessment tool used (score range of 0–5).²³ In the daily diary, children reported a pain score at awakening, at bedtime, and prior to and one hour after each dose of medication. Total median pain score and median AM/PM pain score were analyzed. For pain scores greater than 2, indicating moderate-severe pain, it was the practice at this institution to treat the pain. Discharge instructions advised parents to treat their child's pain with an analgesic if pain scores were greater than 2. Lowest reported change in pain intensity (initial-final pain score) after an analgesic dose was also analyzed.

Pain relief—Pain relief was also determined by difference in pain scores before and after medicine administration. On day 3, children were asked on the TPQM: “Did the medication take away most of the pain?” to assess the child's perceptions of pain relief.

Medication—The medication assigned to the child and the number of doses the child received was collected. On day 3, children were asked the question: “Did the pain medicine taste bad?” to determine if taste was associated with parent satisfaction.

Analysis

Descriptive statistics were used to analyze the demographic and quality data. Analysis of outcomes was carried out in the intent to treat model. Associations between individual demographic and clinical characteristics and outcomes were defined a priori and assessed using the Chi-square test. Odds ratios with 95% confidence intervals (CIs) were calculated. The independent associations between each predictor variable and outcomes were determined by multiple logistic regression producing adjusted odds ratios with 95% confidence intervals. Planned subgroup analyses were performed to identify parents that might be at particular risk of not being satisfied by evaluating age, gender, higher pain scores and fracture type.

RESULTS

336 children and their parents participated in the study. Twelve patients were found to be ineligible (radiology did not confirm the arm fracture for 4 children and protocol violations for age and weight for 8 children) and were eliminated from analysis. 244 (75.3%) families completed the pain diary. Of those, 3 diaries were completed by telephone interview, the results of which were consistent with the rest of the sample. There was no difference in the age, gender, race/ethnicity, weight, fracture type and initial pain severity between children that participated and those lost to follow up.

Final analysis was performed for 244 children and the demographics are reported in Table 1. The distribution of race/ethnicity is comparable to what is seen in this ED. There was no significant difference in baseline characteristics between the satisfied and dissatisfied, except that Hispanic ethnicity and ‘Other’ was associated with an increased likelihood of not being satisfied.

Table 2 shows the pain experience report for the parent and the child on the modified TPQM. When comparing the report of the parent and the child, there was excellent

agreement with a kappa of 0.80 or more. However, the children's report of their experiences were always more negative than noted by the parent. Children and parents alike reported the broken bone "hurt a lot" with more than 50% reporting pain that is present all the time or quite a bit. The pain experienced was significant with 75% of children noting moderate or severe pain when lying quietly and over 90% reported pain when moving around. Each of the adverse effects (sleepiness, nausea, bad taste) were reported more often by children compared to parents (Table 2). When asked if they would want the same medication, 18% of children and 13% of parents said "no", a significantly higher proportion than reported that the pain medication did not take away the pain, 6.2% and 7.9% respectively.

Most parents were satisfied (20% very satisfied, 48% satisfied). However, a number (32%) of parents of children with arm fractures were not; 20% reported neutral, 7% dissatisfied, and 5% very dissatisfied. The proportion of parents that were not satisfied was highest on the date of injury (22.7%) and the first day after the injury (22.9%) but remained high on day 2 (17.1%) and day 3 (18.3%).

To evaluate the factors associated with parents' dissatisfaction with pain treatment in the outpatient setting further analysis was performed. *Univariate analysis:* The dissatisfaction was significantly associated with all activity disruptions, except eating (Table 3). Play showed the strongest association, with parents of children experiencing any days of disrupted play having 4 times greater odds of dissatisfaction. Of the adverse effects, the strongest association was found with nausea (OR: 7.6; 95% CI: 3.0 – 19.1). All of the variables that assessed the child's reported pain were significantly associated with parents' dissatisfaction. The child's report that the medication did not take away most of their pain was the strongest association (OR: 6.3; 95% CI 1.9–21.2). Medication taste, doses and type (ibuprofen or acetaminophen with codeine) were not associated with parent dissatisfaction. *Multivariate analysis:* Adjusting for other covariates, the predictor with the strongest association with parent dissatisfaction remained the child report that the medication did not relieve their pain (Table 4). Disruption of play and sleep were also significantly associated. Giving less than 5 doses of medication was also associated with increased odds of parents not being satisfied. *Subgroup analysis:* Planned subgroup analyses were performed to identify parents that might be at particular risk of dissatisfaction. No difference was found in the proportion of parents that were not satisfied when comparing younger to older children, gender, higher pain scores or fracture type. Parents of children identified as Hispanic race were less likely to be satisfied OR= 0.31 (C95% CI 0.11–0.88).

DISCUSSION

This is the first pediatric study to describe the child's pain experience and parent satisfaction for the home treatment of fracture pain. A significant proportion of children suffered pain and adverse effects after this common injury. The proportion of parents that were dissatisfied with the home pain treatment for the arm fracture was 32% suggesting there is significant room for improvement. A strong association was found between dissatisfied parents and the child's report that the medication did not "take away most of the pain". A number of other variables were also associated with parent dissatisfaction supporting its

multidimensional nature and highlighting factors to address when considering pain management for children after ED discharge.

Undertreated pain has been shown to be a particularly common problem for children in the hospital setting.^{24–26} A number of initiatives have improved pain treatment in the last 20 years but little research has evaluated the use of analgesics once children go home. As hospital lengths of stay shorten and more procedures are performed in the outpatient setting it is increasingly important to assess and optimize treatment at home. This is the first study to report significant deficiencies in the treatment of fracture pain at home. A number of factors could be implicated and require future study. The outpatient pain recommendations made to patients prior to discharge are not standardized, vary in complexity, and might affect the home pain experience. Parents may not be comfortable using pain medication or have concerns about side effects or addictions that might affect their administration of medication at home. No investigations have evaluated how these potential barriers might limit the use of pain medication after ED care.²⁷ Additionally the analgesics recommended for use may not provide adequate pain treatment; very few clinical trials of pain treatment for injuries have been performed. More studies are needed, but this analysis of the factors associated with parent satisfaction provides insight and generates a number of hypotheses.

The strong association between parent dissatisfaction and a lack of pain relief parallels those in previous studies of adults in ED and inpatient settings that have shown patient satisfaction is strongly associated with pain relief^{18,19} and lower pain scores.¹⁷ Contrary to our study, a previous investigation assessing satisfaction with pain management in ED patients found pain relief was not significantly associated with satisfaction.¹⁴ However, these differences may be due to discrepancies in satisfaction measurement, low patient expectations, and good staff communication.¹⁴ Our findings do suggest that optimizing pain relief for children may be associated with a concomitant increase in satisfaction. More clinical trials for children in this setting are needed to provide the evidence for the best analgesic and satisfaction. Importantly, lack of pain relief was not the only variable associated with parent dissatisfaction. Dissatisfied parents were at increased odds of having children with disruptions in play or sleep due to pain and reporting nausea. This spectrum of experiences in the outpatient setting highlights the importance of evaluating more than pain relief in pediatric analgesic trials. Interventions to improve satisfaction should optimize analgesic effects but also consider the medication's effect on the child's daily functions and the potential adverse effects associated with analgesic use.

Only a small percentage of patients were Hispanic, but significantly more Hispanic parents were dissatisfied with their child's outpatient pain management. More research is necessary to determine the reasons for this disparity, but a possible explanation for this finding may be cultural in nature. The Hispanic culture addresses health in a holistic manner, believing optimal health comes from a balance among their physical, spiritual and social lives. They tend to turn to prayer as a means of healing more regularly than whites.²⁸ The medication prescription may not have addressed the parent's needs resulting in a lack of satisfaction. Language barriers may also be a factor in this finding. Further study of the treatment of pain in this population is needed.

The association between low (<5) doses of medication and parent dissatisfaction is also intriguing. Parents often report concerns about medication addiction and side effects and are increasingly interested in natural therapies. These might predict dissatisfaction with increased analgesic use. On the contrary, this study showed an increase use of analgesic medication associated with an increase in satisfaction. These children may have had better pain relief and/or decreased function disruption resulting in increased satisfaction. Alternatively, administration of medication enabled parent to contribute to their child's care and well-being that may result in increased satisfaction. Parents that provided an analgesic but did not observe pain relief might be less likely to administer more medication and report lower satisfaction if their child has persistent pain. Further, inadequate discharge instructions might result in fewer doses of pain medication administered, increased pain, and dissatisfaction. Further studies are needed to understand the association between satisfaction and the number of medication doses administered.

A limitation of this study is its reliance on parent report of satisfaction. The term satisfaction is abstract and often considered too difficult for children to understand and use appropriately. As a result, assessment of satisfaction has been deferred to parents. While parents' satisfaction may be based on their child's feelings toward their pain treatment experience, the parents' and children's assessment of analgesia is not always the same. Comparing the responses to the TQPM measure revealed children's report of their experiences were always more negative than noted by the parent. Components of pain treatment valued by parents may differ from those important to a child's satisfaction. Identification of the words used by children to describe satisfaction and the age those terms are used would be important for future research of satisfaction for children. Then investigations of children's satisfaction can be performed to optimize home pain treatment.

Though there are limitations, the strengths of the study lie in its large sample size, small loss to follow-up, and the daily assessment of factors potentially associated with satisfaction in the outpatient pain setting. While ibuprofen and acetaminophen with codeine are commonly recommended for analgesia after acute arm fracture, their administration through a randomized clinical trial may limit generalizability of results to typical ED practice. Patients were enrolled as a convenience sample, dependent on research assistant availability in the ED and no records were kept of potential patients meeting eligibility criteria when research assistants were not present. However, a review of a 10% sample of all fractures evaluated in the ED over the enrollment period showed no difference in demographic information, fracture type or initial pain scores when compared to the enrolled patients. The proportion of children experiencing any adverse effect was relatively large, but the number of children who experienced vomiting, dizziness, and constipation was quite small. This accounts for the lack of precision in some analyses. Our sample included only patients with arm fractures not requiring reduction in the ED. It is unclear whether these findings can be applied to children with displaced fractures requiring reduction or those with other forms of pain after ED discharge. Disruption in activities may not only be due to pain. Children were placed in splints with a sling and much of the disrupted function may have been associated with whether the dominant arm was affected. We did not evaluate handedness so cannot comment if parents of children with the dominant hand affected were more likely to not be satisfied. Also, prior paternal expectations and beliefs in pain relief and functional limitation

after arm fracture likely affect these results as no uniform education was given to families on what to expect after discharge, highlighting a domain for further research and improvement.

In conclusion, 32% of parents were with outpatient pain treatment using ibuprofen or acetaminophen with codeine. A significant proportion of children suffered pain and adverse effects after this common injury. Child report of medication not taking away most of the pain increased the odds of parent dissatisfaction. Future studies to improve satisfaction with pediatric outpatient pain treatment should further delineate the relationship between parent satisfaction and their child's pain relief, functional limitations, and doses received. Additionally, the child's report of satisfaction with outpatient pain treatment should be investigated.

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Table 1

Demographics

Characteristics	Satisfied (n = 161)	Dissatisfied (n = 74)
Age yrs mean, [SD] (range)	8.1 [2.7] (4.0 – 12.7)	8.7 [2.8](4.1 – 14.9)
Weight kg mean (range)	30.8 (13.8 – 60)	32.8 (14.4 – 56)
Male n (%)	84 (52.1)	38 (51.4)
Race/ethnicity n (%)		
White	127 (71.3)	51 (28.7)
Black	19 (70.4)	8 (29.6)
Hispanic	7 (43.8)	9 (56.3) *
Other	8 (43.8)	6 (57.1) *
Fracture type n (%)		
Radius only	82 (68.3)	38 (31.7)
Ulna only	4 (66.7)	2 (33.3)
Radius and ulna	31 (62.0)	19 (38.0)
Humerus: Supracondylar I	35 (77.8)	10 (22.2)
Humerus: Supracondylar II	4 (55.1)	3 (42.9)
Humerus: Midshaft	5 (71.4)	2 (28.6)

* Statistically significant

Table 2

Quality of outpatient pain management reported by parents and child using the TPQM

Question	Response	%Parent s (n)	% Children (n)
Pain experience			
Did you/your child hurt a lot after the broken bone?	Yes	75.3% (168)	82.8% (178)
If yes, how much of the time did you/your child have pain?	All the time	9.0% (17)	19.4% (37)
	Quite a bit	46.8% (89)	35.1% (67)
	Once in a while	43.2% (82)	44.5% (85)
	Never	1.1% (2)	1.1% (2)
What number shows the most hurt of pain you/he/she had since the broken bone when you/he/she was just lying quietly and resting?	Mild	18.1% (40)	21.8% (47)
	Moderate	46.4% (103)	44.0% (95)
	Severe	35.6% (79)	34.2% (74)
What number shows the most hurt of pain you/he/she had since the broken bone when you/he/she was moving around?	Mild	8.6% (19)	10.2% (22)
	Moderate	42.7% (94)	35.9% (77)
	Severe	48.6% (107)	54.0% (106)
Do you think your child told you when he/she had hurt or pain?	No	10.4% (23)	10.3% (22)
Pain relief			
Did the pain medication take away most of the hurt or pain?	No	7.9% (17)	6.2% (13)
Did the pain medication take a long time to work?	Yes	10.7% (23)	18.6% (39)
Adverse Effects			
Did you/your child feel too sleepy after taking the pain medication?	Yes	19.9% (43)	24.9% (52)
Did you/your child feel like throwing up after taking the pain medication?	Yes	12.9% (28)	14.2% (30)
Did the pain medication taste bad?	Yes	36.0% (77)	45.0% (95)
Future analgesic use			
If you/your child had another broken bone, would you want the same medicine for the hurt or pain?	No	12.6% (27)	18.4% (38)
Tell us how we can get an A+ for taking the hurt or pain away	Stronger med	14.3% (35)	15.2% (37)
	Less dosing	19.3% (47)	15.2% (37)
	Fewer side effects	15.6% (38)	7.4% (18)
	Taste better	34.8% (85)	46.3% (113)

Table 3

Univariate analysis: Parent dissatisfaction with pain management (n = 235)

	Odds Ratio	95% CI	p – value
Function Disruption – any day			
Any dysfunction	2.8*	(1.4 – 5.8)	<0.01
Play	4.1*	(2.1 – 8.0)	<0.01
School	2.4*	(1.4 – 4.3)	<0.01
Sleep	2.3*	(1.3 – 4.0)	<0.01
Eating	1.4	(0.8 – 2.5)	0.25
Adverse Effects – any day			
Any adverse effect	3.1*	(1.7 – 5.4)	<0.01
Drowsiness	1.7	(0.9 – 3.2)	0.08
Vomiting	4.9*	(1.6 – 14.8)	<0.01
Nausea	7.6*	(3.0 – 19.1)	<0.01
Dizziness	1.8	(0.5 – 6.8)	0.40
Constipation	1.5	(0.2 – 9.0)	0.68
Other	3.7*	(1.4 – 9.5)	<0.01
Pain Scores			
Mean of all pain scores, > 2	1.8*	(1.0 – 3.1)	0.05
Mean of AM/PM pain scores, > 2	2.0*	(1.2 – 3.6)	0.01
Smallest reported pain relief < 1	2.1*	(1.0 – 4.3)	0.05
Med did not take away most of pain	6.3*	(1.9 – 21.2)	<0.01
Medication			
Taste, bad	1.5	(0.8 – 2.8)	0.17
Doses, > 5	0.6	(0.4 – 1.2)	0.14
Medication, Ibuprofen	0.7	(0.4 – 1.2)	0.15

* statistically significant association with lack of parent satisfaction

Table 4

Logistic regression: Parent dissatisfaction with pain management (n = 210)

	Odds Ratio	95% CI	p – value
Function disruptions			
Play	4.3*	(1.7 – 10.8)	<0.01
School	0.9	(0.4 – 2.1)	0.87
Sleep	2.6*	(1.1 – 5.8)	0.03
Eating	0.5	(0.2 – 1.1)	0.09
Adverse Effects			
Drowsiness	1.3	(0.6 – 3.1)	0.51
Vomiting	2.3	(0.5 – 10.9)	0.29
Nausea	5.7*	(1.8 – 17.7)	<0.01
Dizziness	0.3	(0.0 – 2.8)	0.29
Constipation	0.3	(0.0 – 4.7)	0.42
Pain Scores			
Mean of all pain scores, > 2	1.3	(0.6 – 2.8)	0.56
Med did not relieve most of child's pain	6.7*	(1.5 – 29.7)	0.01
Medication			
Taste, bad	1.2	(0.5 – 2.7)	0.64
Doses, > 5	0.4*	(0.2 – 0.97)	0.04
Medication type, ibuprofen	1.3	(0.6 – 3.1)	0.51

* statistically significant association with a lack of parent satisfaction