Pain outcomes in a US children's hospital: a cross-sectional mixed methods survey

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INTRODUCTION

Many hospitalized children experience acute pain, which is still widely under-recognized, under-documented and under-treated[1-3]. The 2010 Declaration of Montréal states that access to pain management is a fundamental human right, and pediatric pain has become a focus of improvement efforts world-wide.

As a result, many hospitals have implemented policies and processes to better recognize and treat pediatric pain. They often rely on the multimodal treatment of pain[4], which include pharmacologic components (basic analgesics, opioids, regional anesthetics, adjuvants) as well as non-pharmacologic components such as integrative therapies (acutherapy, massage, aromatherapy, mind-body techniques), child life services, and psychology.

However, pain management remains a major challenge in many hospitals, including our own, which is prompting us to benchmark our practices as we seek to improve the recognition and management of pain in our institution.

OBJECTIVES

The objective of this survey was to benchmark pain prevalence, intensity, assessment, documentation, treatment (both pharmacologic and non-pharmacologic) in children admitted to a US children's hospital and in laboring/post-partum mothers, and to elicit patient-reported experiences.

MATERIALS AND METHODS

As part of a quality improvement initiative, the Integrated Pediatric Pain and Palliative (IP3) service of our hospital conducted a cross-sectional mixed-method survey over 4 days in June 2018. Electronic medical records for all admitted patients in our pediatric hospital, in labor and delivery/post-partum were reviewed. Demographics, pain assessment, pharmacologic and integrative pain treatments documented in the preceding 24 hours were extracted. When pain was reported in the chart, patients or caregivers were surveyed regarding their experience with pain.

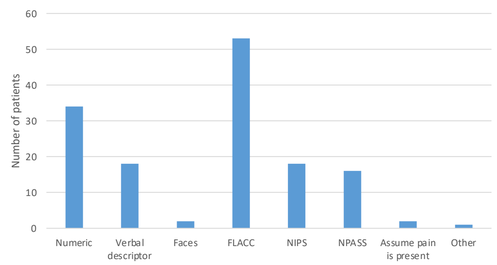
In April 2021, we obtained an exemption from our IRB to analyze these data in REDCap. We used descriptive statistics (demographics, documentation, management), qualitative analyses (patients' answers to questions regarding experiences and suggestions) and association/trend tests such as Fischer and Cochran Armitage.

RESULTS

- **Demographics**: A hundred and thirty-four patient charts were reviewed, and 29 patients/caregivers completed the survey. Length of stay ranged from 0 to 176 days (median 8 days; interquartile range 3.33). Patient characteristics are detailed in table 1.

- **Documented pain assessments:** A comprehensive pain assessment, recommended on admission to our institution, was completed within 24 hours of admission for 45.5% of patients. All patients admitted for at least 24 hours had documented pain assessments. Figure 1 shows the different pain scales documented in patients' charts. Ten patients (7.5%) were assessed using 2 different pain scales.

Fig. 1: Pain scales used



- **Documented pain levels:** A total of 56 patients (41.8% of patients) had pain recorded in their charts. Of all patients with pain documented in their charts, 26.8% had mild pain, 53.6% moderate and 19.6% severe. Of all hospitalized patients, 41 (30%) had moderate-to-severe pain.

- **Pain treatment**:
  - Pharmacologic measures:
    - A total of 69 patients received analgesics (51.5% of all patients; 123.2% of patients who had pain recorded in their charts). Nineteen patients (14.1% of all patients) received analgesics despite having no pain documented in their chart in the past 24 hours. Figure 2 shows the different analgesics used. Of all patients, 47.8% received basic analgesics (including acetaminophen for 29.9% of patients, NSAIDs for 17.9%).
    - Opioids: Of all patients, 52 received opioids (38.8% of all patients; 75.4% of patients receiving analgesics; 92.9% of patients with pain documented) and 12 patients received more than one type of opioid (9.0%). Of patients receiving opioids, 14 (26.9%) were receiving continuous and intermittent doses of the same opioid. A total of 23 patients (17.2% of all patients) had continuous IV opioids. Of all patients receiving opioids, 25 (48.1%) did not receive opioid-sparing analgesics.
  - Non-pharmacologic measures: A total of 44 patients received non-pharmacologic measures (32.8% of all patients; 78.6% of patients who had pain). The most used pharmacologic measures included repositioning (in 50% of patients who received non-pharmacologic measures), relaxation or distraction techniques (27.3%), and emotional support/presence (22.7%).
  - Reassessment: Pain was consistently reassessed after intervention in 26 patients (19.4%).
  - Pain consultation: A total of 17 patients received a consultation by the IP3 service (12.6% of total patients; 30.3% of patients with pain). Patients with severe pain were more likely to receive such a consultation (Cochran Armitage test).
- **Patient experience**:
  - A total of 39 patients/caregivers (29.1%) were interviewed regarding their experience. The interviewee was the patient in 15.4% of cases, parents in 74%. Among patients interviewed, 23% had experience with pain prior to being admitted to the hospital.
  - The most common causes of worst pain cited by patients were acute illness (53.6%) and procedures (35.7%). Multiple sources of pain were cited by 41.7% of interviewed patients.
  - Of all patients interviewed, 40% were very satisfied with the management of their pain, 40% were satisfied, 8% were dissatisfied. There was no significant association between level of pain and satisfaction (Fisher's exact test 0.076). Patients felt that interventions provided were very helpful in 44% of cases and helpful in 52% of cases.
  - When asked which measures were helpful, patients cited non-pharmacological measures as often as medications. Areas for improvement most requested by patients included optimizing communication around pain, improved management of procedural pain and increasing availability of non-pharmacological options and integrative modalities.

Table 1. Demographics

		n	Percentage of total patients
Admitted > 24 hrs			
	Yes	123	(91.8)
	No	11	(8.2)
Age			
	<1	51	(38.1)
	1 to <3	7	(5.2)
	3 to <5	7	(5.2)
	5 to <7	7	(5.2)
	7 to <10	5	(3.7)
	10 to <13	11	(8.2)
	≥ 13	46	(34.3)
Gender			
	Female	81	(60.4)
	Male	52	(38.8)
	Non-binary	1	(0.7)
Language			
	English	124	(92.5)
	Other	9	(6.7)
	Missing	5	(3.7)
Primary Service			
	Orthopedics	1	(0.7)
	Surgery	1	(0.7)
	Hematology/Oncology	8	(6.0)
	BMT	9	(6.7)
	TCU	12	(9.0)
	ICU	14	(10.4)
	Cardio	19	(14.2)
	ICN	29	(21.6)
	Hospital Medicine	23	(17.2)
	Obstetrics	18	(13.4)

Figure 2. Analgesics used

Pharmaceutical agent	n	%
Acetaminophen	40	29.9
Ibuprofen	13	9.7
Naproxen	2	1.5
Oxycodone	13	9.7
Ketorolac	7	5.2
Morphine	14	10.4
Hydromorphone	12	9
Fentanyl	20	14.9
Methadone	3	2.2
Ketamine	1	0.7
Gabapentin	6	4.5
Midazolam	2	1.5
Lidocaine patch	3	2.2
Magic mouthwash	1	0.7
Propofol	1	0.7
Cyclobenzaprine	1	0.7
Nitrous oxide	1	0.7

CONCLUSIONS

In this cross-sectional mixed-methods survey of all patients admitted to a US children's hospital, we found that 40% of admitted patients had pain documented in their charts; 30% of all admitted patients had moderate-to-severe pain documented. Interestingly, half of patients received analgesics (more than the number of patients with documented pain), likely indicating pain despite lack of documentation in the chart. Furthermore, 54.5% of patients did not have a complete pain assessment within 24 hours of admission, and 80.6% of patients were not reassessed after each intervention for pain, despite hospital policies requiring such practices. This is consistent with existing literature[1-4] showing that pain in hospitalized children is not assessed/documented enough.

We also showed that opioids were very largely used in our hospital, with 38.8% of all admitted patients having received opioids (92.9% of patients with documented pain). About half of patients admitted received basic analgesics. However, about half of patients receiving opioids did not receive opioid-sparing analgesics. New order sets have recently been rolled out to prompt clinicians to order opioid-sparing modalities when appropriate.

We found that non-pharmacologic modalities were used in 78.6% of patients who had pain, and patients found them as helpful as medications. Suggestions for improvement from patients included increasing access to integrative modalities, as part of multimodal pain regimens. Consequently, the IP3 division recently hired a nurse practitioner specialized in integrative medicine.

Finally, procedures were the second most common cause of worst pain cited by patients. This has been identified as an area for improvement in our hospital, and has also been widely reported in the literature[1-4]. Procedural pain is iatrogenic and easily addressed with adequate measures. We are currently preparing to implement an institution-wide, cross-campus quality improvement project to implement a bundle of interventions (including swaddling, sucrose, distraction, positioning) aimed at reducing pain associated with needles.

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