

Treating and Reducing Anxiety and Pain in the Paediatric Emergency Department: The TRAPPED survey

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BACKGROUND: Management of children's pain and anxiety in the emergency department is likely suboptimal.

OBJECTIVE: To determine the availability of currently used strategies in Canadian paediatric emergency departments.

METHODS: A cross-sectional survey involving all centres of the Pediatric Emergency Research Canada group was performed. The primary outcome was the availability of specific procedures for pain and anxiety management for children in the emergency department. One person per centre was identified to complete the survey. Data were collected from October 2013 to January 2014 using an electronic survey tool.

RESULTS: All 15 Pediatric Emergency Research Canada centres agreed to participate. The verbal numerical scale was widely used (80%) to assess pain. One-half of respondents (53%) had access to a child life specialist. The following techniques were available for minor procedures: television as a distraction tool (87% of respondents), topical anesthetic before intravenous needle insertion (73%) and positioning of the child on parent's lap (60%); most remaining centres reported that these could be easily implemented. Intravenous morphine was available at every centre. Intranasal fentanyl was available (60%) or considered to be easy to implement (33%). Few centres reported availability of clinical guidelines regarding pain for doctors (27%) and nurses (40%); all respondents considered them to be easy to implement.

CONCLUSIONS: There was wide variation in paediatric pain and anxiety management strategies among tertiary care Canadian emergency departments. Several pain-reduction procedures (distraction, positioning on parent's lap, topical anesthetic, intranasal administration) were identified that could be easily implemented to address the gap.

Key Words: Anxiety; Emergency department; Needle pain; Paediatric; Paediatric pain management; Procedural pain

The paediatric emergency department (PED) is a unique environment where patients experience physical pain and emotional stress. While symptoms may generate pain and anxiety, the diagnostic and treatment processes can also contribute significantly to the level of stress (1,2). For many reasons, including lack of resources, barriers to adequate analgesia persist in the PED (1). Recent studies have reported undertreatment of pain in the PED for obviously painful pathologies in children such as clinically angulated or displaced fractures (3-6). Oligoanalgesia is also present after discharge from the emergency department (7).

Le traitement et la réduction de l'anxiété et de la douleur à la salle d'urgence pédiatrique : l'enquête TRAPPED

HISTORIQUE : La prise en charge de la douleur et de l'anxiété de l'enfant à la salle d'urgence est probablement sous-optimale.

OBJECTIF : Déterminer l'accès aux stratégies à jour dans les salles d'urgence pédiatriques canadiennes.

MÉTHODOLOGIE : Les chercheurs ont effectué une enquête transversale auprès de tous les centres du Groupe de recherche en urgence pédiatrique du Canada. Les résultats primaires étaient la disponibilité d'interventions précises liées à la prise en charge de la douleur et de l'anxiété des enfants à la salle d'urgence. Ils ont repéré une personne par centre pour participer à l'enquête. Ils ont colligé les données d'octobre 2013 à janvier 2014 au moyen d'un outil de sondage électronique.

RÉSULTATS : Les 15 centres du Groupe de recherche en urgence pédiatrique du Canada ont accepté de participer. L'échelle numérique verbale était largement utilisée (80 %) pour évaluer la douleur. La moitié des répondants (53 %) avait accès à un spécialiste de l'enfance. Les techniques suivantes étaient disponibles pour les interventions mineures : télévision comme outil de distraction (87 % des répondants), anesthésique topique avant l'insertion de l'aiguille intraveineuse (73 %) et installation de l'enfant sur les genoux du parent (60 %). La plupart des autres centres ont déclaré que ces mesures pouvaient facilement être adoptées. La morphine intraveineuse était accessible dans tous les centres. Le fentanyl intranasal était accessible (60 %) ou considéré comme facile à adopter (33 %). Peu de centres déclaraient posséder des directives cliniques sur la prise en charge de la douleur pour les médecins (27 %) et les infirmières (40 %). Tous les répondants les considéraient comme faciles à adopter.

CONCLUSIONS : Les stratégies de prise en charge de la douleur et de l'anxiété variaient considérablement entre les salles d'urgence des centres pédiatriques de soins tertiaires canadiens. Plusieurs interventions de réduction de la douleur (distraction, installation sur les genoux du parent, administration d'anesthésique topique et administration intranasale) étaient considérées comme faciles à adopter pour corriger les lacunes.

Inadequate pain management is known to have long-term negative effects on children (8-10).

In the past 10 years, several studies and systematic reviews have reported effective strategies to decrease pain and anxiety among children in the PED (11-13). The logical next step would be to implement these strategies in the clinical setting. Key associations have issued recommendations urging health care professionals to adequately manage paediatric pain (1,14). These recommendations promote a change in professional perspective through education, the use of guidelines and quality improvement programs

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focused on important indicators such as validated pain scales, the use of appropriate analgesics, topical anesthetics and other minimally invasive methods of reducing pain, the monitoring of adverse effects of analgesia/sedation and discharge instructions for pain management (1).

To our knowledge, no study has systematically surveyed PEDs across Canada to determine which resources and practices are currently in place. Once these are known, future research can focus on implementing strategies to improve pain management in the PED setting. The objectives of the present study were to assess current resources and strategies in Canadian PEDs for pain and anxiety management in children, and to determine which techniques were considered to be easy to implement, if not already in place.

METHODS

Study design and participants

A cross-sectional survey was conducted to assess pain and anxiety management practices and available resources in PEDs across Canada. All hospitals that are members of the Pediatric Emergency Research Canada (PERC) group were eligible for participation (15). PERC is an association of physicians interested in research in paediatric emergency medicine, with representation from 15 hospitals in eight Canadian provinces. These constitute all academic emergency departments specialized in paediatrics in Canada. The study was coordinated at Sainte Justine Hospital (CHU Sainte-Justine), a tertiary care academic hospital located in Montreal, Quebec. Invitations to respond to the survey were sent by e-mail to a designated representative at each of the PERC institutions between October 2013 and January 2014.

Questionnaire development

To create the questionnaire, participants at the PERC 2013 Annual Scientific Meeting were invited to report all known procedures and available resources related to pain and anxiety management in children. The information collected at the meeting was used as the basis for questionnaire development, along with expert opinions and a literature review. The study tool was pilot-tested for face and content validity by three paediatric emergency physicians not involved in the project. The survey was developed in both French and English.

Outcome measures

The main outcome was the availability of specific procedures for pain or anxiety management at each PERC hospital emergency department. Which strategies were considered feasible for implementation was also assessed: in cases of nonavailability, responders were asked to evaluate ease of implementation at their institution. This was a subjective evaluation on the part of the local responder, who acted as a local expert.

Questionnaire content

The first part of the questionnaire consisted of demographic characteristics of the study centres such as province, annual census data and descriptions of health care professionals on staff. The second part consisted of strategies used to minimize and manage pain and anxiety in various areas of the emergency department such as triage, medical evaluation and treatment room. This part of the questionnaire also asked about access to staff training in pain and anxiety management (1). Two aspects of pain and anxiety management strategies were considered: at presentation, including pain assessment, access to distraction strategies (1,11), and standard and new pain treatments (12,16); and procedural, including avoidance of painful procedures whenever possible (17), urinary catheterization and alternatives (18), lumbar puncture, hydration alternatives (19), intravenous access (10,13,20-23), fracture therapy (16,24-26) and

sedation opportunity. Current availability and feasibility of future use were assessed for each strategy presented.

Distribution of the questionnaire

Each PERC representative was contacted to identify the most appropriate person to complete the survey at each centre, ie, the director of the emergency department, the PERC representative, or another physician with a special interest in pain and anxiety management. All identified respondents were invited to complete the self-administered electronic questionnaire by e-mail. Up to three reminders were sent to nonresponders, at two- to four-week intervals. The study protocol was approved by the CHU Sainte-Justine Research Ethics Board. Consent was implicit in completion of the questionnaire.

Statistical analysis

Data were collected using an electronic survey on the SurveyMonkey platform. All data were transferred to an Excel (Microsoft Corporation, USA) spreadsheet and analyzed using SPSS version 17 (IBM Corporation, USA). The primary analysis was the frequency of availability (simple proportion) of each procedure. The secondary analysis was the proportion of centres describing a procedure as easy to implement. For each centre, the number of such procedures was also reported.

RESULTS

Demographic characteristics

All centres responded to the questionnaire (100% response rate). Most (67%) respondents were PERC site representatives; the remainder were heads of their respective PEDs. Annual patient load per PED varied from 15,000 to >75,000 patients. All provinces were represented except Prince Edward Island and New Brunswick; neither of these provinces had a PED with formal PERC affiliation.

Education and guidelines on pain management

Regular training sessions for pain assessment and management were reported to be available for physicians in only two (13%) of 15 responding centres, and for nurses in eight (53%) of the 15 centres. To help physicians and nurses with pain management, posters regarding pain at triage, guidelines and pamphlets for parents were infrequently available; however, respondents believed that these strategies were easy to implement in their department (Table 1). Most of the centres (13 of 14) had a formal protocol for procedural sedation.

Pain assessment scales

The most frequently available pain assessment tools were the verbal numerical scale (n=12 [80%]) and the Wong-Baker FACES/Faces Pain Rating Scale (n=6 [40%]). These were mostly used at triage (n=13 [87%]) and during medical assessment (n=10 [67%]). Behavioural pain scales, such as the Face, Legs, Activity, Cry, Consolability (FLACC), Echelle Evaluation ENfant DOuLeur (EVENDOL), Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) and Non-Communicating Children's Pain Checklist – Revised were rarely used (n=1 [7%]).

Pain and anxiety management

Various management techniques, such as distraction, positioning for intravenous (IV) insertion, analgesics and sedatives were reported (Tables 2 and 3).

Distraction

One-half (n=8) of the centres had access to a child life specialist; an additional 13% (n=2) believed that a professional of this type could

TABLE 1
Educational strategies available in paediatric emergency departments to reduce pain and anxiety

| | Site* | | | | | | | | | | | | | | | Sites where available, n (%)† | Sites where unavailable but easy to implement, n (%)‡ |
|---|-------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-------------------------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | |
| Education on pain management | | | | | | | | | | | | | | | | | |
| Poster at triage | ● | ● | ● | ○ | ○ | ● | ● | ● | ? | ● | ○ | ● | ● | ● | ○ | 4 (29) | 10 (71) |
| Guideline for nurses | ● | ● | ● | ○ | ● | ○ | ● | ○ | ? | ○ | ○ | ● | ● | ● | ○ | 6 (43) | 8 (57) |
| Guideline for doctors | ● | ○ | ● | ○ | ● | ○ | ● | ● | ? | ○ | ● | ● | ● | ● | ○ | 4 (29) | 10 (71) |
| Formal protocol for procedural sedation | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ? | ○ | ○ | ○ | ● | ○ | ○ | 13 (93) | 1 (7) |
| Pamphlet for parents | ● | ● | ● | ○ | ○ | ● | ● | ● | ? | ● | ● | ○ | ● | ● | ○ | 4 (29) | 10 (71) |

*Representing the 15 paediatric emergency departments in Canada, all affiliated with Pediatric Emergency Research Canada (PERC); †Total n=14; ○ Currently available; ● Not available but could be easily implemented; ? No answer

TABLE 2
Strategies available in paediatric emergency departments to reduce pain and anxiety related to minor procedures

| Strategies to reduce pain and anxiety | Site* | | | | | | | | | | | | | | | Sites where available n (%)† | Sites where unavailable but easy to implement n (%)‡ |
|--|-------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|------------------------------|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | |
| Distraction strategy | | | | | | | | | | | | | | | | | |
| Child life specialist | × | ○ | ● | ○ | ○ | × | ○ | ● | × | ○ | ○ | × | ○ | × | ○ | 8 (53) | 2 (13) |
| Television | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ | ○ | 13 (87) | 1 (7) |
| Books | ● | ○ | ● | ○ | ○ | ● | ○ | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | 10 (67) | 5 (33) |
| Video games | ● | × | ○ | ○ | ○ | ● | ○ | ● | × | ○ | ○ | × | ● | ○ | ○ | 8 (53) | 4 (27) |
| Bubbles | ● | ○ | ● | ○ | ○ | ○ | ○ | ● | ● | ○ | ○ | ● | ● | ● | ○ | 8 (53) | 7 (47) |
| Decorations on wall | ● | ● | ● | ○ | ○ | ● | × | ● | ○ | ○ | ○ | × | ○ | ○ | × | 7 (47) | 5 (33) |
| Kaleidoscope | ● | ● | ● | ○ | ○ | ● | ● | ● | × | ○ | ○ | × | ● | ● | ○ | 5 (33) | 8 (53) |
| Music | ● | ● | ● | ○ | ○ | ● | ○ | ● | × | ○ | ○ | × | ● | ● | × | 5 (33) | 7 (47) |
| iPad (Apple Inc, USA) | × | ○ | ● | × | × | ● | ○ | ● | × | ● | ○ | × | ● | × | ○ | 4 (27) | 5 (33) |
| Positioning | | | | | | | | | | | | | | | | | |
| Sitting on parent's lap | ○ | ● | ○ | ○ | ○ | ● | ○ | × | ● | ● | ○ | ○ | ○ | ○ | ● | 9 (60) | 5 (33) |
| Topical anesthetic | | | | | | | | | | | | | | | | | |
| Topical anesthetic before IV (lidocaine/prilocaine, amethocaine, lidocaine cream, vapocoolant spray) | ○ | ○ | ● | ○ | ● | ● | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | 11 (73) | 4 (27) |
| LET (gel, liquid) in wound | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 14 (93) | 0 (0) |
| Lidocaine/prilocaine before lumbar puncture, n/total n (%) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ | ? | ○ | ○ | ○ | ○ | 13/14 (93) | 0 (0) |
| Lidocaine/prilocaine before suprapubic aspiration, n/total n (%) | ○ | ? | ● | × | × | ● | | × | ○ | ? | ? | × | ● | ○ | ○ | 4/11 (36) | 3/11 (27) |
| Other topical interventions | | | | | | | | | | | | | | | | | |
| Vibration, n/total n (%) | ● | ● | ● | × | × | ● | ○ | ● | × | ● | ? | × | × | ○ | ● | 2/14 (14) | 7/14 (50) |
| Hot or cold pack | ○ | ○ | ● | ○ | ○ | ● | ○ | ○ | ● | ○ | ● | ○ | ○ | ○ | ○ | 11 (73) | 4 (27) |

*Representing the 15 paediatric emergency departments in Canada, all affiliated with Pediatric Emergency Research Canada (PERC); †Total n=15 unless otherwise indicated; ○ Currently available; ● Not available but could be easily implemented; × Not available and could not be easily implemented; ? No answer; IV Intravenous; LET Lidocaine/epinephrine/tetracaine

be easily implemented at their centre, and 33% (n=5) believed that this would be difficult to implement. Distraction was provided by nurses performing the procedure in 87% (n=13) of hospitals. The most frequently reported methods were television and video players (n=13 [87%]), books (n=10 [67%]), video games (n=8 [53%]) and bubble blowing (n=8 [53%]).

Positioning and parental presence

All respondents (n=15) allowed parents to be present during IV procedures. Sixty percent (n=9) offered the possibility of the child sitting on the parent's lap for IV insertion; an additional 33% (n=5) believed that this could easily be implemented in their centre. Parental presence was allowed for lumbar puncture in 87% (n=13) of the centres, for sedation in 80% (n=12) and for fracture reduction in 40% (n=6).

Topical anesthetics before needle procedures

Not all sites responded to all questions in this section (Table 2). Some form of topical anesthetic use before IV insertion was reported by 73% (n=11) of the centres: amethocaine, seven of 15; lidocaine/prilocaine, six of 13; vapocoolant spray, three of 14; and lidocaine cream, two of 13. All remaining centres reported that topical anesthetics before IV insertion could be easily implemented. Moreover, 67% (10 of 15) of participating centres had nurse-initiated protocols for topical anesthetics before the IV procedure; all other centres believed the procedure would be easy to implement.

Analgesics

Nurse-initiated protocols were available for acetaminophen in all centres, ibuprofen in 93% (n=14) and sucrose in 80% (n=12) of PEDs. Other oral analgesics were reported (Table 3). Morphine was

TABLE 3

Pharmacological analgesics and anxiolytics available in paediatric emergency departments to reduce pain and anxiety

| Strategies to reduce pain and anxiety | Site* | | | | | | | | | | | | | | | Sites where available, n (%)† | Sites where unavailable but easy to implement, n (%)† | |
|--|-------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-------------------------------|---|-----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | | |
| Analgesics | | | | | | | | | | | | | | | | | | |
| Nurse-initiated protocol for oral sucrose | ○ | ○ | ○ | ○ | ○ | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 12 (80) | 3 (20) |
| Nurse-initiated protocol for acetaminophen | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 15 (100) | 0 (0) |
| Nurse-initiated protocol for ibuprofen | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 14 (93) | 1 (7) |
| Oral naproxen, n/total n (%) | ● | ● | ○ | ● | ○ | ○ | ? | × | ○ | ● | ○ | ● | ○ | ● | ● | ○ | 6/14 (43) | 7/14 (50) |
| Oral ketorolac, n/total n (%) | ● | ● | ● | × | ○ | × | ? | × | × | ● | ○ | ● | ○ | ● | ● | ○ | 3/14 (21) | 7/14 (50) |
| IV ketorolac | ○ | ○ | ● | ● | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | 11 (73) | 3 (20) |
| Oral codeine, n/total n (%) | × | × | × | × | × | ○ | ? | × | × | × | ? | × | × | × | × | × | 1/13 (8) | 0 (0) |
| Oxycodone, n/total n (%) | × | ● | ○ | ○ | ○ | ● | ? | × | ○ | × | ? | ● | ○ | ● | × | ○ | 5/13 (38) | 4/13 (30) |
| Oral morphine | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 12 (80) | 3 (20) |
| IV morphine | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 15 (100) | 0 (0) |
| Intranasal fentanyl | ○ | ○ | ● | × | ● | ○ | ○ | ○ | ● | ● | ○ | ○ | ● | ○ | ○ | ○ | 9 (60) | 5 (33) |
| IV fentanyl | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | × | ○ | ○ | ○ | ○ | ○ | ○ | 13 (87) | 1 (7) |
| Oral hydromorphone, n/total n (%) | ● | ● | ○ | ○ | ○ | ○ | ● | ? | ○ | × | × | ? | ○ | ● | ● | ○ | 6/13 (46) | 5/13 (38) |
| IV hydromorphone, n/total n (%) | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ? | ○ | ● | ● | ○ | 8/14 (57) | 5/14 (36) |
| IV prochlorperazine, n/total n (%) | ○ | ? | ○ | ● | ○ | ○ | ● | ? | × | × | ● | ? | ○ | × | ● | × | 4/12 (33) | 4/12 (33) |
| For fracture reduction, n/total n (%) | | | | | | | | | | | | | | | | | | |
| Inhaled nitrous oxide | ○ | ○ | × | × | × | ○ | ? | × | × | × | × | × | ○ | × | × | × | 4/14 (28) | 0 (0) |
| Bier block | ○ | ● | × | ● | × | ● | ? | × | ? | ○ | ? | × | × | × | × | × | 2/12 (17) | 3/12 (25) |
| Femoral block | ○ | ● | × | ● | ● | ● | ? | × | ? | ● | ● | × | × | ● | × | ○ | 1/13 (8) | 7/13 (54) |
| IV opiate (morphine or fentanyl) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ? | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 14/14 (100) | 0 (0) |
| Intranasal midazolam | ○ | ○ | × | ● | ○ | ● | ○ | × | ? | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 8/14 (57) | 4/14 (29) |
| IV midazolam | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ? | ○ | ○ | ○ | ○ | ○ | ○ | ? | 12/13 (92) | 0 (0) |
| IV propofol | ○ | ○ | ○ | ○ | ○ | ○ | ? | ○ | ? | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 13/13 (100) | 0 (0) |
| IV/intramuscular ketamine | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ? | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 14/14 (100) | 0 (0) |
| IV ketamine/propofol | ○ | × | ○ | ○ | ○ | ○ | ? | ○ | ? | ● | ○ | ● | ○ | ○ | × | ○ | 9/13 (69) | 2/13 (15) |
| IV etomidate | ○ | × | ○ | × | ○ | × | ? | × | ? | × | ● | ● | ○ | ○ | ○ | ○ | 5/13 (38) | 3/13 (23) |

*Representing the 15 paediatric emergency departments in Canada, all affiliated with Pediatric Emergency Research Canada (PERC); †Total n=15 unless otherwise indicated; ○ Currently available; ● Not available but could be easily implemented; × Not available and could not be easily implemented; ? No answer; IV Intravenous

the most commonly available opioid, both for oral (n=12 [80%]) and intravenous (n=15 [100%]) use. Intranasal fentanyl was available in 60% (n=9) of the centres while another 33% (n=5) believed it could easily be made available.

Fracture reduction

Not all sites responded to all questions in this section (Table 3). For fracture reduction, ketamine was available in 14 of 14 reporting sites, while IV propofol (13 of 13), IV midazolam (12 of 13), IV fentanyl (12 of 14) and IV morphine (13 of 14) were also used. Few sites reported using nitrous oxide (four of 14) and all remaining centres believed it would be difficult to introduce. Bier blocks were minimally used (two of 12) and perceived as difficult to implement (seven of 12). On the other hand, femoral block use was minimally reported (one of 13) but believed to be easy to implement (seven of 13).

DISCUSSION

The present study demonstrates variability in available strategies and resources used for pain and anxiety management in Canadian PEDs. It also highlights opportunities for site-specific improvements. While various strategies (eg, distraction methods and parental presence for minor procedures, use of formal protocol for procedural sedation in emergency departments) were most often reported to be available, in accordance with the latest AAP recommendations (1), other resources were underavailable as per the

recommendations (pain scales adapted to children [eg, Faces Pain Rating scale, FLACC], regular training sessions and guidelines for physician on pain assessment and management). To our knowledge, the present study is the first to describe pan-Canadian pain management strategies in PEDs and to report comfort levels with the implementation of particular interventions.

Canadian PEDs use a variety of interesting and innovative methods to manage pain and anxiety in children. We identified strategies perceived as easy to implement, either because they were already available or because they were generally believed to be easy to introduce, according to PED representatives. Furthermore, we provided tables that PEDs can use to compare their own strategies with those at other centres for further improvement. For instance, adding a child life specialist in the PED was recommended by the American Academy of Pediatrics (AAP) (1) as a key resource to help children and their parents during their emergency department experience, reducing patient anxiety and pain and educating the emergency department staff (1,27,28). Demonstrating that one-half of the PEDs in Canada already integrate a child life specialist into their unit may help others to advocate for their presence.

The list we have compiled of widely available strategies in Canadian PEDs can also be used as a starting point for general emergency departments when treating children. Distraction, positioning of the child on the parent's lap and topical anesthetics for IV insertion were widely available at surveyed PEDs and

considered to be easy to implement. Distraction and adequate positioning are known to improve paediatric pain and anxiety management in the emergency department (11,29,30), and parental presence is believed to reduce children's anxiety and distress (1). The use of topical anesthetics is supported by a strong body of literature (13,20-23,31-33) and recommended by key paediatric associations and experts (1,20). Ideally, a nurse at triage can apply the anesthetic cream, using clear guidelines: almost 70% of the PERC centres surveyed had access to nurse-initiated protocols. In addition to reducing pain, topical anesthetics have been reported to improve procedural success rates and to decrease procedure time; these are important factors to weigh against cost (1,21,32,34). Moreover, in a busy emergency department, in which a lack of time is ubiquitous, amethocaine, lidocaine and vapocoolant spray may be quite acceptable to staff because they require a short duration of application. In fact, some centres have noted the importance of multidisciplinary teams to manage needle pain and venous access, advocating education, reduction of punctures, distraction, positioning, sucrose and safe use of topical anesthetics using standing orders (20). Because all these strategies are already widely available or believed to be easy to introduce, universal availability of these techniques for children should be promoted in all emergency departments (both paediatric and general).

It is interesting to note that the analgesics used reflect current recommendations of leader associations, such as Health Canada. For instance, lack of codeine use by most centres likely reflects the Health Canada warning (35), which resulted in a change of practice (36,37). Current evidence for the ideal oral opioid for children is lacking, and studies are urgently needed to address the issue of treatment of moderate to severe pain. However, the trend by Canadian PEDs to follow Health Canada recommendations is a great example of successful and rapid knowledge translation in the emergency department.

A new trend was demonstrated in the present study: intranasal administration of analgesics. Intranasal fentanyl, used in 60% of the surveyed PEDs, appears to be a promising pain relief medication in the emergency department setting, both for ease of administration (including avoidance of IV access) and rapid action. Studies have shown its efficacy to be equivalent to IV morphine in acute musculoskeletal injuries and burns in the PED (12,38). Larger trials are urgently needed to evaluate appropriate use of this mode of pain management in children because IV access is often an issue for paediatric patients.

The present study had several limitations. First, we relied only on the report of a single individual at each centre. While this individual was identified as being the most knowledgeable, answers may not be perfectly representative of the centre's practice. Recall bias may play a role as well because respondents may not have remembered a strategy that is available in their emergency department, if it were infrequently used. Second, whereas

the present study focused on available strategies, we do not know the extent of their use by most professionals at each centre. For example, all PEDs reported access to standing orders for nurses for acetaminophen and most for ibuprofen; however, frequency and indication for use were not captured in this survey. It would be interesting to assess whether those nurse-initiated protocols are used regularly for pain management or only to treat fever.

CONCLUSION

The present study described strategies and resources available to clinicians in the management of paediatric pain and anxiety at Canadian PEDs. It also helped to identify possible areas for improvement at individual centres. Lack of availability of resources is reported by health care providers to be one of the main reasons for suboptimal analgesia provision in PED. This survey may be used by health care providers to encourage their administrators and colleagues in adopting new strategies that have been demonstrated to be accessible in similar centres. We have identified certain known and effective techniques for pain management that are considered to be easy to implement. These include positioning of the child on the parent's lap, topical anesthetics for IV insertion, intranasal fentanyl, guidelines for doctors and nurses, and information pamphlets for parents. By choosing to implement these changes first, clinicians and administrators may successfully and most easily address current deficits in paediatric pain management. The present study is a first step in a program aimed at improving pain and anxiety management for all children visiting the emergency department. The TRAPPED 2 project will focus on the creation of a quality improvement collaborative to encourage the implementation of new pain management strategies in Canadian PEDs. Although each centre has its preferred methods of minimizing pain and anxiety, our goal was to improve the sharing of positive experiences across Canada and to use this information to initiate conversations and collaboration regarding improvement in each centre. Knowing what is available in terms of pain therapy at the various PEDs will permit the sharing of knowledge in this important area of practice and can ultimately inform knowledge translation initiatives to general emergency departments as well.

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