FOCUS ON PEDIATRIC PAIN

PREHOSPITAL PAIN MANAGEMENT:
A COMPARISON OF PROVIDERS’ PERCEPTIONS AND PRACTICES

Halim Hennes, MD, MS, Michael K. Kim, MD, Ronald G. Pirrallo, MD, MHSA

ABSTRACT

Objective. To assess the knowledge of emergency medical technicians–paramedics (EMT-Ps) and compare their practice perceptions with actual pain management interventions in adults and pediatric patients (adolescents and children) with chest pain (CP), extremity injuries, or burns. Methods. This study included a cross-sectional survey of EMT-Ps and review of the emergency medical services (EMS) patient care database. EMT-Ps were surveyed for: 1) knowledge of pain treatment protocol; 2) estimated number of CP, extremity injury, or burn encounters and the frequency of morphine administration; and 3) barriers to providing morphine. Data on patients transported with any above conditions and those who received morphine were abstracted from the EMS patient care database. Data were analyzed using descriptive statistics, and 95% confidence intervals (CIs) were calculated. Results. Of 202 EMT-Ps, 155 (77%) completed the survey. Eighty-two percent reported knowledge of pain treatment protocol for both adults and pediatric patients. For adults, EMT-Ps estimated they administered morphine to 37% with CP (95% CI 35, 40), 24% with extremity injuries (95% CI 17, 30), and 89% with burns (95% CI 52, 99). In children and adolescents, inability to assess pain (93%) was the most common reason for withholding morphine. According to the EMS database, 5% of adults with CP (95% CI 4, 5), 12% extremity injuries (95% CI 8, 15), and 14% burns (95% CI 8, 20) received morphine. In children and adolescents, 3% with extremity injuries (95% CI 1, 5) and 9% with burns (95% CI 0, 26) received morphine. Pain score was documented in 67.0% of adult patients, compared with only 4.0% in pediatric patients (Δ = 63.0%, 95% CI: 60, 65). Conclusions. Significant disparity exists between EMT-Ps’ perceptions of acute pain assessment and the frequency of providing analgesia and their actual practice. Children and adolescents had less documentation of pain assessment and received less analgesic interventions compared with adults. Inability to assess pain may be an important barrier to the provision of analgesia. Key words: prehospital; pain; adults; children; emergency medical services; and analgesia.

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Nearly 14.5 million patients are transported by ambulance to emergency departments annually, and approximately 20% of those have moderate to severe pain.1 The Emergency Medical Services Outcome Project I (EM SOP) has identified relief of discomfort as one of the most relevant outcome measures for many prehospital conditions.2 In addition, the National Association of EMS Physicians (NAEMSP) issued a position paper stating that relief of pain and suffering of patients must be a priority for every emergency medical service (EMS) system. The statement further recommended that every EMS system should have a clinical care protocol to address prehospital pain management.3

In most EMS systems, pain management medical protocols advise prehospital providers to administer intravenous analgesia to patients with moderate to severe pain.4 However, over the past decade, published reports noted significant deficiencies in prehospital pain management.5–10 Some reports have identified barriers to pain management in adult patients by prehospital providers.4,6,9,11,12 To date, all of the published studies on prehospital pain management have focused on adult patients.

This study was undertaken to assess the current knowledge of EMS providers and compare their perceptions with actual practice interventions in adults and children with chest pain (CP), extremity injuries, or burns. We further examined the EMS providers’ perceived barriers for providing analgesia in the prehospital setting.
MATERIAL AND METHODS

Study Design

This was a two-part study: a survey of EMS providers and a review of the EMS system patient care database. The Children’s Hospital of Wisconsin Human Rights Review Board approved the study.

Study Setting

The Milwaukee County EMS system serves central urban and surrounding suburban communities with a population of approximately one million residents. Emergency care access occurs through enhanced 9-1-1 call taking centers throughout the county catchments area. EMS responds using a tiered model of dual-trained firefighter EMT basics (EMT-Bs) on fire trucks and EMT paramedics (EMT-Ps) on transporting ambulances. First-tier, EMT-B average response time to a scene is 4 minutes, and EMT-P average response time is less than 9 minutes 90% of the time. All EMT-Ps have passed the National Registry Examination and are state-certified. Their initial and ongoing education is provided by the county EMS education center.

Milwaukee County EMS system medical protocols define adult patients as those 17 years of age and older, adolescents aged 8–17 years, and children aged 0–7 years. The EMS system has medical protocols for adults and children with CP, suspected extremity fractures, and burns. Each of these protocols recommends a single dose of intravenous morphine 0.1 mg/kg for children less than 8 years of age (maximum dose 2 mg). Older children, adolescents, and adults can receive up to a maximum of four 2-mg doses. With online medical consultation, additional doses may be administered. Intravenous morphine is the only analgesic used in the system. In addition, the protocols advise that only hemodynamically stable patients with normal mental status and moderate to severe pain can receive intravenous morphine. Figure 1 is an example of an EMS treatment protocol.

Intervention

In the survey part of our study, the EMT-Ps attending the regularly scheduled, mandatory morbidity and mortality conference were asked to complete a 15-question anonymous survey. Demographic information included: length of service, practice type (full- or part-time), and practice city. Survey participants were asked about their knowledge of the indications for analgesia listed in the medical protocols for CP, suspected extremity fracture, and burn for both adults and children. To evaluate their perceptions of their practice, EMT-Ps were asked to estimate the number of patient encounters, number of times they used the verbal pain scale, and frequency of morphine administration during the preceding one month for adults, adolescents, and children with the following working assessments: CP, extremity injuries, and burns.

Responders were also asked to record their comfort level in providing morphine to hemodynamically stable adults, adolescents, and children with CP, extremity injuries, and burns. These three complaints were selected because they are common, identifiable, and within the scope of practice, and their management is protocol-driven. To identify potential barriers for prehospital morphine administration, EMT-Ps were asked to select the most important reason or barriers for withholding morphine from a predetermined list for adults and children separately. The list of potential barriers was preselected by the investigators and reviewed by two senior paramedics’ instructors for applicability. Figure 2 is the EMS provider survey instrument.

We then searched the EMS patient care database for all patient encounters by EMT-Ps between January and December 2001 to identify all adults, adolescents, and children transported with a working assessment of CP, extremity injury, or burn. All EMT-Ps’ medical encounter run sheets are scanned into the EMS Oracle database. The following data were abstracted: age, working assessment, vascular access, medication given, verbal 0–10 point scale pain score, and other interventions (splint, dressing). To ensure that we captured the targeted population, the database was searched using the same search criteria and the same data elements for all patients who received morphine by EMS providers during the same 12-month period and data were abstracted. The two data sets were compared for accuracy.

The Children’s Hospital of Wisconsin Human Rights Review Board approved the research protocol and consent form for the EMT-Ps’ survey.

Data Analysis

The survey results were entered into an SPSS database (SPSS v. 11.0, SPSS Inc., Chicago, IL). Demographic characteristics and responses to survey questions were expressed as simple frequencies or means. Data were tabulated and percentages of patients perceived to have been treated per EMT-P within each of the working assessment categories, stratified by age, were compared. To evaluate the perceived barriers to providing morphine EMT-Ps’ responses were tabulated and 95% confidence intervals (CIs) for the difference in proportion were calculated. In addition, we compared the survey responses based on years in practice to detect any difference in responses between those in practice for five years or more compared with those in practice for less than five years. Survey responses were combined in the analysis when the reported numbers of medical
encounters among adolescents and children were too small (<10).

Data from the EMS patient care database were also imported into an SPSS database. The data were tabulated and the percentages of patients within each of the working assessment categories, stratified by age, were compared. Chi-square analysis was performed to examine the difference in proportions between adults, adolescents, and children, and the 95% CIs were calculated. The relative risk for
receiving analgesia and 95% CI were calculated when appropriate.

RESULTS

The survey was distributed to the entire 202 EMT-Ps employed by the county attending the morbidity and mortality conference; 155 (77%) completed the survey. The general characteristics of respondents and their knowledge of indications for analgesia are summarized in Table 1. Most of the nonresponders left their survey forms blank and six stated that they do not provide direct patient care. Therefore, we had no reliable information on this group. No significant difference in

1. Years in Practice as EMT-P ________ Years
2. Your practice status: ☐ Full · ☐ Limited ☐ Special reserve
3. City of your practice: _____________________________
4. Are you familiar with the current medical protocols for pre-hospital analgesia?
   ☐ Yes, if so which one? ☐ Adult medical protocols ☐ Pediatric medical protocols ☐ Both ☐ No
5. What are the Indications for analgesia administration per medical protocol prior to base contact?
   (Please check all that apply)
   Adults
   ☐ Chest pain
   ☐ Burns
   ☐ Isolated extremity injury
   ☐ Others
   Pediatrics
   ☐ Chest pain
   ☐ Burns
   ☐ Isolated extremity injury
   ☐ Others
6. Did during the past 30 days how many times did you use the following routes to administer analgesia?
   A. Intravenous ☐ 0 ☐ 1-5 ☐ 5-10 ☐ > 10
   B. Intramuscular ☐ 0 ☐ 1-5 ☐ 5-10 ☐ > 10
   C. Subcutaneous ☐ 0 ☐ 1-5 ☐ 5-10 ☐ > 10
7. During the past 30 days, how many patients did you see with the following working assessment, how many received analgesia, and which route did you use.

<table>
<thead>
<tr>
<th>Adults</th>
<th># Of Patients</th>
<th># Received Analgesia</th>
<th>IV</th>
<th>SQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest pain</td>
<td></td>
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<tr>
<td>Extremity injury</td>
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<td></td>
</tr>
<tr>
<td>Burns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pediatrics</td>
<td># Of Patients</td>
<td># Received Analgesia</td>
<td>Route</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<tr>
<td>Working assessment</td>
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<tr>
<td>Chest pain</td>
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</tr>
<tr>
<td>Extremity injury</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Burns</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
8. During the past 30 days, how often do you use the verbal (0-10) pain scale for following patients?
   A. Adults (>17 yrs.) ☐ 0 ☐ 1-5 ☐ 5-10 ☐ > 10
   B. Adolescents (8-16 yrs.) ☐ 0 ☐ 1-5 ☐ 5-10 ☐ > 10
   C. Children (0-7 yrs.) ☐ 0 ☐ 1-5 ☐ 5-10 ☐ > 10
9. How comfortable are you in providing narcotic analgesia to the following group of hemodynamically stable patients with acute chest pain?
   A. Adults (>17 yrs.) ☐ comfortable ☐ somewhat comfortable ☐ somewhat uncomfortable ☐ uncomfortable
   B. Adolescents (8-16 yrs.) ☐ comfortable ☐ somewhat comfortable ☐ somewhat uncomfortable ☐ uncomfortable
   C. Children (0-7 yrs.) ☐ comfortable ☐ somewhat comfortable ☐ somewhat uncomfortable ☐ uncomfortable
10. How comfortable are you in providing narcotic analgesia to the following group of hemodynamically stable patients in severe pain from an isolated extremity injury?
    A. Adults (>17 yrs.) ☐ comfortable ☐ somewhat comfortable ☐ somewhat uncomfortable ☐ uncomfortable
    B. Adolescents (8-16 yrs.) ☐ comfortable ☐ somewhat comfortable ☐ somewhat uncomfortable ☐ uncomfortable
    C. Children (0-7 yrs.) ☐ comfortable ☐ somewhat comfortable ☐ somewhat uncomfortable ☐ uncomfortable

FIGURE 2. Prehospital providers' survey. (Continued)
11. How comfortable are you in providing narcotic analgesia to the following group of hemodynamically stable patients in severe pain from a burn?

A. Adults (>17 yrs) □ comfortable □ somewhat comfortable □ somewhat uncomfortable □ uncomfortable
B. Adolescents (8-16 yrs) □ comfortable □ somewhat comfortable □ somewhat uncomfortable □ uncomfortable
C. Children (0-7 yrs) □ comfortable □ somewhat comfortable □ somewhat uncomfortable □ uncomfortable

12. How important are the following reasons for you NOT to give pain medication? Please check all items

**Adults:**
- A. Inability to assess pain □ important □ somewhat important □ somewhat unimportant □ unimportant
- B. Low pain scores □ important □ somewhat important □ somewhat unimportant □ unimportant
- C. Patient refusal □ important □ somewhat important □ somewhat unimportant □ unimportant
- D. Difficulty IV access □ important □ somewhat important □ somewhat unimportant □ unimportant
- E. Pt doesn’t require IV □ important □ somewhat important □ somewhat unimportant □ unimportant
- F. Delay transport □ important □ somewhat important □ somewhat unimportant □ unimportant
- G. Fear of complications □ important □ somewhat important □ somewhat unimportant □ unimportant
- H. Record keeping □ important □ somewhat important □ somewhat unimportant □ unimportant
- I. Other care enough (splint, ice) □ important □ somewhat important □ somewhat unimportant □ unimportant

**Pediatrics:**
- A. Inability to assess pain □ important □ somewhat important □ somewhat unimportant □ unimportant
- B. Low pain score □ important □ somewhat important □ somewhat unimportant □ unimportant
- C. Patient refusal □ important □ somewhat important □ somewhat unimportant □ unimportant
- D. Difficulty IV access □ important □ somewhat important □ somewhat unimportant □ unimportant
- E. Pt doesn’t require IV □ important □ somewhat important □ somewhat unimportant □ unimportant
- F. Delay transport □ important □ somewhat important □ somewhat unimportant □ unimportant
- G. Fear of complications □ important □ somewhat important □ somewhat unimportant □ unimportant
- H. Record keeping □ important □ somewhat important □ somewhat unimportant □ unimportant
- I. Other care enough (splint, ice) □ important □ somewhat important □ somewhat unimportant □ unimportant

13. Current pain management for adults >17 years is adequate under the current medical protocol.

Why? □ Strongly agree □ Agree □ Disagree □ Strongly disagree

14. Current pain management for adolescent 8 to 16 years is adequate under the current medical protocol.

Why? □ Strongly agree □ Agree □ Disagree □ Strongly disagree

15. Current pain management for children 0 to 7 years is adequate under the current medical protocol.

Why? □ Strongly agree □ Agree □ Disagree □ Strongly disagree

For additional comments, write below.

Thank you very much for your assistance.

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the number and type of complaint of patients or the frequency of morphine use between EMT-Ps based on their practice location or number of years in service was evident.

Survey responders estimated that they administered morphine to 363 of 981 (37%) adults with CP (95% CI 35, 40), ten of 41 (24%) with extremity injuries (95% CI 17, 30), and 16 of 18 (89%) with burns (95% CI 52, 99). In adolescents and children, they estimated that one of 34 (4%) with extremity injuries (95% CI 0.5, 15) received morphine and reported no encounters in the age group of 0–17 years with CP or burns during the previous one month.

EMT-Ps’ estimates of using a verbal pain scale (0–10) for pain assessment are presented in Table 2. Nearly 50% (77/155) estimated that they used a verbal pain score more than ten times during the month in adults. By comparison, 31% (48/155) and 6% (9/155) stated they performed pain assessment in adolescents and children, respectively. While more than 90% of the EMT-Ps reported that they are comfortable or somewhat comfortable with administering morphine in hemodynamically stable adult patients, the majority were uncomfortable with children (Table 3). The most commonly cited barriers to providing analgesia in both adults and pediatric patients (including adolescents...
and children) are summarized in Table 4. In this table we combined the participants’ responses, comfortable and somewhat comfortable, because the responses for the other two categories, somewhat uncomfortable and uncomfortable, were too small.

In the EMS patient care database, 5,383 patients (5,099 adult, 188 adolescents, and 96 children) with the study-defined working assessment were transported by EMT-Ps between January and December 2001. Morphine was administered in the field to 258 (4.8%) patients (Table 5). Sixty-four patients (24.8%) of those who received morphine had no documented pain assessment. And of those 64, 56 (87.5%) had no repeat pain assessment after receiving the morphine. A search of the EMS patient care database by patients who received morphine in the field identified the same 258 patients. Adults with extremity fracture were 4.3 (95% CI 2.9, 6.7) times more likely to receive analgesia in the field compared with children and adolescents. For burn patients, adults were also 1.5 times more likely to receive analgesia compared with children and adolescents. For burn patients, adults were also 1.5 times more likely to receive analgesia compared with children and adolescents (Table 6).

**TABLE 1. Survey Participants’ Demographics and Knowledge (N = 155)**

<table>
<thead>
<tr>
<th>Practice location</th>
<th>Median length of service in months (interquartile range)</th>
<th>Practice location</th>
<th>Median length of service in months (interquartile range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>73 (47%)</td>
<td>Suburban</td>
<td>82 (53%)</td>
</tr>
<tr>
<td>Suburban</td>
<td></td>
<td>Urban</td>
<td>73 (47%)</td>
</tr>
<tr>
<td>Familiar with any pain treatment recommendation</td>
<td>149 (96%)</td>
<td>Familiar with adult and pediatric pain treatment recommendations</td>
<td>105 (68%)</td>
</tr>
<tr>
<td>Knowledge of indications for analgesia in adults</td>
<td>Chest pain 139 (90%)</td>
<td>Knowledge of indications for analgesia in children and adolescents</td>
<td>Chest pain 21 (14%)</td>
</tr>
<tr>
<td></td>
<td>Extremity injury 140 (90%)</td>
<td></td>
<td>Extremity injury 77 (50%)</td>
</tr>
<tr>
<td></td>
<td>Burn 142 (92%)</td>
<td></td>
<td>Burn 80 (52%)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Inadequate pain management, oligoanalgesia, in the prehospital setting has been extensively studied during the last decade, resulting in recommendations and policy statements advocating improvements. However, few reports have addressed strategies for successful interventions to resolve the ongoing problem of prehospital oligoanalgesia.

The initial step in addressing oligoanalgesia is identification of barriers. Some barriers to adequate pain management by prehospital providers have been identified in previous studies. In our study, inability to assess pain was the most frequently cited barrier for withholding analgesia in the field. While the EMS providers recorded the pain score on the patient care records for 65% of adult patients, they recorded the pain scores for only 5% of the adolescents and 2% of the children. Of importance, all eight children with burns had no documentation of pain assessment; conversely, 71% of the adults with CP had a pain score obtained. This may reflect the current EMS traditional practice and may imply that the evaluation and management of acute chest pain could have a direct impact on patient outcome and mortality while pain relief alone is not as important. Our finding supports all the prior findings of lack of pain assessment in pediatric patients. However, the degree to which the pain scores are not documented is a significant concern. A 2002 report concluded that prehospital pain assessment is feasible but identified several reasons for lack of assessment, including altered mental status and preverbal age. In a more recent report, the authors noted that more than 80% of the patients older than 13 years of age had some form of pain assessment after implementing a mandatory prehospital pain assessment protocol using either a verbal rating scale or a numeric pain scale.

Existing evidence clearly stated that pain assessment and the determination of pain scores improve compliance with administering analgesia. The lack of validated, appropriate pain assessment tools for different age groups in the prehospital setting may be the main reason for lack of assessment and oligoanalgesia in pediatric patients. Pain is a complex multidimensional phenomenon that is difficult to assess, particularly in young children. Their inability to verbalize the pain experience and the inseparable anxiety further complicate assessment. However, brief, reliable, and age-appropriate pain assessment tools have been developed and validated for neonates through adolescents. Currently, these validated age-appropriate assessment tools are widely used in hospital settings. Adopting such tools in the prehospital setting may improve pain management. Mandatory assessments of both the presence and severity of pain and the use of reliable tools for pain assessment were the two top recommendations in the NAEMSP position paper.

We have found that a knowledge deficit of pediatric pain management among EMT-Ps may be a significant barrier for improving pain management. While 93% had knowledge that analgesia is indicated for adults with extremity fractures, only 50% of the providers stated that analgesia is also indicated for children with extremity fractures. Similar findings were also observed for adults and children with burns. In addition to this knowledge deficit, Jones and Machen identified...
attitudes and perceptions of EMT-Ps as additional barriers. EMT-Ps did not provide analgesia if they perceived that patients were dishonest in describing their pain.9 In our study, 81% of the survey responders listed possible drug seeking as a reason for providing no analgesia to adult patients. More interesting was the fact that 65% of the EMT-Ps echoed their fear of drug seeking as a reason for providing no analgesia to children. This may imply that there are either cultural or personal barriers as well as knowledge deficit that need to be addressed to improve prehospital pain management.

Disparity in pain management by age was also evident in our study, as the EMT-Ps appeared more comfortable administering morphine to adults and adolescents compared with children. Among many possibilities, the lack of prehospital age-appropriate pain-assessment tools, particularly for young children, may be the biggest contributing factor to this disparity in care. A handful of pain-assessment tools are available; however, none has been validated in the prehospital setting. This disparity in care is significant since nearly half of the EMS-transported patients are under 18 years of age.1

We compared the EMT-Ps’ perception with their actual practice; they administered morphine to 37% of the adults with CP (actual 4%), 24% with extremity injuries (actual 12%), and 89% with burns (actual 14%). According to the patient care database, adults with extremity fractures were 4.4 times more likely to receive analgesia than were children. Significant differences exist between what EMT-Ps self-report they do for patients with acute pain and what they actually do in practice. This difference may in part be due to the social desirability in surveys, but it is worth noting for future investigations. Furthermore, if EMT-Ps truly perceive that they are providing better pain management than their actual practice, that offers an opportunity to provide continuing education, and incorporating their actual practice data may be of benefit.

In order to overcome the barriers mentioned, there is a need for a validated, comprehensive multidisciplinary continuing-education tool to address the pain-management knowledge deficit, use of appropriate pain-assessment tools, and attitude and cultural beliefs of EMS providers. Other issues such as EMS operations and patient request for pain management should be further investigated.

### TABLE 3. Participants’ Level of Comfort with Administering Morphine in the Field (N = 155)

<table>
<thead>
<tr>
<th>Comfortable (%)</th>
<th>Somewhat Comfortable (%)</th>
<th>Somewhat Uncomfortable (%)</th>
<th>Uncomfortable (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults (&gt;17 years)</td>
<td>Chest pain 93</td>
<td>5</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Extremity injury 95</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Burn 93</td>
<td>6</td>
<td>0.6</td>
</tr>
<tr>
<td>Adolescents (7–17 years)</td>
<td>Chest pain 36</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Extremity injury 70</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Burn 77</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Children (&lt;7 years)</td>
<td>Chest pain 24</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Extremity injury 38</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Burn 44</td>
<td>27</td>
<td>18</td>
</tr>
</tbody>
</table>

### TABLE 4. Participants’ Barriers to Administering Morphine (N = 155) (Pediatric Group Includes Children and Adolescents)

<table>
<thead>
<tr>
<th>Pediatric Patients</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inability to assess pain</td>
<td>135 (87%)</td>
</tr>
<tr>
<td>Low pain score</td>
<td>130 (84%)</td>
</tr>
<tr>
<td>Patient refusal of pain medication</td>
<td>131 (85%)</td>
</tr>
<tr>
<td>Difficult vascular access</td>
<td>123 (80%)</td>
</tr>
<tr>
<td>Vascular access not needed</td>
<td>104 (67%)</td>
</tr>
<tr>
<td>Delay of transport</td>
<td>102 (66%)</td>
</tr>
<tr>
<td>Fear of complication</td>
<td>105 (68%)</td>
</tr>
<tr>
<td>Record keeping</td>
<td>47 (30%)</td>
</tr>
<tr>
<td>Other care adequate</td>
<td>97 (63%)</td>
</tr>
<tr>
<td>Possible drug seeking</td>
<td>101 (65%)</td>
</tr>
</tbody>
</table>

### TABLE 5. Emergency Medical Services Patient Care Database Results of Morphine Usage and Pain Assessment Documentation

<table>
<thead>
<tr>
<th>Pain Score (%)</th>
<th>Received Morphine (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (N = 5,383)</td>
<td>95% CI (N = 258) 95% CI</td>
</tr>
<tr>
<td>Adults (&gt;17 years)</td>
<td>Chest pain 4671 3,316 (71%)</td>
</tr>
<tr>
<td></td>
<td>Extremity fracture 314 71 (23%)</td>
</tr>
<tr>
<td></td>
<td>Burn 114 29 (25%)</td>
</tr>
<tr>
<td>Adolescents (7–17 years)</td>
<td>Chest pain 12 2 (17%)</td>
</tr>
<tr>
<td></td>
<td>Extremity fracture 173 8 (5%)</td>
</tr>
<tr>
<td></td>
<td>Burn 3 0 (0%)</td>
</tr>
<tr>
<td>Children (&lt;7 years)</td>
<td>Chest pain 3 0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Extremity fracture 85 2 (3%)</td>
</tr>
<tr>
<td></td>
<td>Burn 8 0 (0%)</td>
</tr>
</tbody>
</table>
**LIMITATIONS AND FUTURE DIRECTIONS**

Our study has several limitations. The retrospective nature of the database review limited our ability to evaluate contraindications for providing morphine in the field. Furthermore, we were unable to examine hospital records, evaluate the extent of injuries, verify EMT-P working assessments, and evaluate the impact of other interventions such as splinting. Our survey instrument was not externally validated and the providers’ responses may have included recall bias for some items. Although we emphasized the fact that this was an anonymous survey, we cannot ascertain whether some of the responses were biased by the social desirability. The EMT-Ps’ perceptions of the need for vascular access and their ability to achieve access may be a confounder for morphine administration. However, our survey was not designed to address this issue. In addition, the anonymous nature of the survey did not allow us to obtain information on nonresponders. However, a response of 77% is within the accepted range (66–75%) to assume the response can be generalized. Finally, we were unable to obtain information on the patient preference of the use of morphine for pain management. The barriers identified in appropriate pain management include medical oversight, protocols, and education of EMS provider. Further evaluation of these specific problems and methods to overcoming these barriers may be explored.

**CONCLUSION**

In our study, we observed a considerable disparity between EMT-Ps’ perceptions of acute pain assessment and the frequency of providing analgesia and their actual practice. In addition, there is a significant lack of pain assessment and documentation in the prehospital setting. Pain assessment and documentation are less frequent in children, and consequently the children studied received fewer analgesic interventions than adults. Exploring the barriers for this disparity, developing appropriate pain-assessment tools, and offering educational programs on pain assessment and management for prehospital providers may improve compliance with protocols for the treatment of pain.

**TABLE 6. Emergency Medical Services Morphine Use in Adults and Children with Suspected Extremity Fractures and Burns (Pediatric Group Includes Children and Adolescents)**

<table>
<thead>
<tr>
<th>Extremity fractures</th>
<th>Received Morphine</th>
<th>No Morphine</th>
<th>Relative Risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>37</td>
<td>314</td>
<td>4.3 (2.0, 9.6)</td>
</tr>
<tr>
<td>Pediatric</td>
<td>7</td>
<td>258</td>
<td></td>
</tr>
<tr>
<td>Burns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>16</td>
<td>114</td>
<td>1.5 (0.2, 10.6)</td>
</tr>
<tr>
<td>Pediatric</td>
<td>1</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

**References**