Examining Self-Reported Pain of School-Age Children Undergoing Treatment for Cancer Using a Game-Based App

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Pain is a distressing and common experience in pediatric oncology
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Pain can be difficult for children to quantify and describe

Limited information is available on pain experiences outside of clinical settings

Purpose: To describe pain experiences reported by school-aged children participating in a trial of a game-based symptom assessment app.
Color Me Healthy App Trial

• 19 children (ages 6-12, *Mdn.* 8; 12 boys) receiving treatment for cancer at Primary Children’s Hospital, Salt Lake City, UT

• Participants asked to use app for at least 5 days between clinical encounters
  • 13 participants recorded in app for at least 4 days (*Mdn.* 4 days, range 1-12 days)

• Symptoms reported as “general symptom” and/or “localized symptom”, open-ended questions, daily diary
Data analysis

• Descriptive statistics used to evaluate prevalence and characteristics of pain reported as a general symptom or specified as a location

• Free-text questions and daily diary reviewed for pain-related statements and analyzed using content analysis
  • How are you feeling today?
  • What is the best thing about today?
  • What is bothering you the most today?
  • Did anything else make you feel sick today?
All 19 children reported pain at least once
- Total of 67 reports across 48 days

Severity and bother positively correlated, \( (rs(50) = 0.414, p < .01) \)

### Results: Prevalence of pain

<table>
<thead>
<tr>
<th>Pain Severity</th>
<th>General symptom ((N = 39))</th>
<th>Pain location ((N = 28))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Little</td>
<td>18</td>
<td>46.1</td>
</tr>
<tr>
<td>Medium</td>
<td>5</td>
<td>12.8</td>
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<td>10.3</td>
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<tr>
<td>None</td>
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<td>20.5</td>
</tr>
<tr>
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<td>41.0</td>
</tr>
<tr>
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<td>2.6</td>
</tr>
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*Note. NR = not reported*
All 19 children reported pain at least once
• Total of 67 reports across 48 days

Severity and bother positively correlated, \((rs(50) = 0.414, p < .01)\)

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Note. NR = not reported
Results: Locations of pain reported

Chest (n = 6) Extremity (n = 4) Head (n = 8) Mouth (n = 3) Stomach (n = 7)

Percentage of Pain Counts per Location

Severity: Not reported, None, Little, Medium, A lot

Bother:
Results: Locations of pain reported

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<thead>
<tr>
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<th>Count</th>
<th>Percentages</th>
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<td>100%</td>
</tr>
<tr>
<td>Extremity</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
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<td>8</td>
<td>100%</td>
</tr>
<tr>
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</tr>
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Legend:
- Not reported
- None
- Little
- Medium
- A lot
Results: Locations of pain reported

Percentage of Pain Counts per Location

- Chest (n = 6)
- Extremity (n = 4)
- Head (n = 8)
- Mouth (n = 3)
- Stomach (n = 7)

Severity and Bother categories:
- Not reported
- None
- Little
- Medium
- A lot
Results: Pain related-descriptive statements

- Eleven children documented 32 pain-related qualitative statements
  - 65.6% (n = 21) in reply to *What is bothering you the most today?*
  - 15.6% (n = 5) in reply to *Did anything else make you feel sick today?*
  - 12.5% (n = 4) written in the app daily diary
  - 6.3% (n = 2) in reply to *How are you feeling today?*

- The most frequently documented topic was in reference to the central line (28.1%, n = 9)

- The second most frequent topic referenced the stomach or gastrointestinal tract (25%, n = 8)
Results: Pain related-descriptive statements

- “head ache”
  7-year-old girl with a brain tumor

- “leg and arm pain”
  10-year-old boy with Hodgkin Lymphoma

- “Feeding tube/meds”
  12-year-old boy with ALL

- “the neupegen shot”
  11-year-old boy with Non-Hodgkin Lymphoma

- “lump in throat (heartburn?)”
  7-year-old girl with ALL

- “around 9 pmish my port sgarted to hurt”
  11-year-old girl with a brain tumor
**Color Me Healthy supports pain communication**

- Pain persists between clinical visits
  - Any pain may disrupt daily activities
  - Clinicians should inquire about pain and its consequences between clinical encounters

- Mobile health tools provide unique opportunities to support children in expressing their pain experiences
  - Permit and encourage children to use their own words in a developmentally-friendly way
  - *Color Me Healthy* allowed children to report pain in ways that were relevant and meaningful to them

- Pain not reported in a discrete assessment does not eliminate the possibility of a localized source of discomfort
Color Me Healthy supports pain communication

• Limitations:
  • Small feasibility trial at a single institution
  • No exclusion criteria for a diagnosis of chronic pain
  • No requirement to document all pain characteristics (severity/bother)

• Directions for future research:
  • How can we improve Color Me Healthy to support school-age children in their pain reporting?
  • What is the role of the app to support pain-related decision making?
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