BACKGROUND

- Pain in adolescents with cancer (AWC) is common and is estimated that 49-96% of AWC will experience pain related to the disease and/or associated invasive procedures and treatments.
- Pain negatively affects adolescent quality of life, impedes cancer recovery, results in adolescent and family distress, and is associated with long-term morbidity.
- Very limited research has been conducted on how to best manage the symptom in AWC, especially when out of the hospital.

STUDY OBJECTIVE:
- To refine the current Pain Squad+ smartphone app for AWC using a user-centered design approach.

METHODS

- Two cycles of design sessions were conducted following the User-Centred Design process.
- Cancer patients were recruited from the pediatric oncology clinic in a Canadian tertiary care centre.
  - Aged 12-18 years;
  - Cancer diagnosis;
  - Could speak and understand English.

Results: Participant Demographics

<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>Cycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=16, M±SD = 15.1±2.0 years of age</td>
<td>n=8, M±SD = 13.8±2.1 years of age</td>
</tr>
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</table>

Eligibility
- Cancer patients were recruited from the pediatric oncology clinic in a Canadian tertiary care centre.
- Aged 12-18 years;
- Cancer diagnosis;
- Could speak and understand English.

Design Sessions
- Participants were asked to review the smartphone app wireframes and provide feedback on the app theme, aesthetics, gamification mechanics, and provide overall likes and dislikes.

Analysis
- Participant feedback was summarized into feasible and specific app modification items.

Modifications
- App modifications using results from each cycle were implemented prior to commencing the subsequent cycle.

RESULTS: THEMES IDENTIFIED

App Design

- What are your thoughts on the theme of this app compared to the other theme you saw?
  - OPTION A: Different theme would be more engaging.
  - CHANGE: Superhero theme was preferred and in line with anime comics and video games.

App Aesthetics

- What style of animation do you like best?
  - OPTION A: Preferred the graphics to have a "comic book" feel. Option A had a darker tone and more mature graphics.

App Navigation

- What did you like or dislike about the current app?
  - CHANGE: Video rewards as a game mechanic were not motivating.
  - CHANGE: An enhanced points system and more imbedded rewards to unlock items was incorporated.

App Customization

- What did you like or dislike about the current app?
  - FEEDBACK: App needs to be inclusive.
  - CHANGE: Ensuring diversity in the app characters (i.e. different skin tones, sex).

App Gamification

- What would motivate you to use this app?
  - FEEDBACK: Consulted with research team to shorten survey from 22 to 8 "need to have" questions.

CONCLUSION

- A user-centered design approach is key to ensuring the Pain Squad+ smartphone app meets the needs of AWC and is used as intended by this population.
- Next steps include conducting a full-scale RCT with the redesigned app to determine effectiveness, before widespread clinical implementation.

ACKNOWLEDGEMENTS

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