Iterative Refinement of an Open-Source Ecological Momentary Assessment App for Adolescents and Young Adults with Cancer

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INTRODUCTION

• Adolescents and young adults (AYA) with cancer demonstrate suboptimal medication adherence, which can negatively impact the efficacy of their treatment
• Little is known about how contextual time-varying variables impact daily oral chemotherapy adherence
• Ecological momentary assessment (EMA) involves recurring surveys of behaviors/experiences in real time, and is uniquely equipped to address this gap
• Objective: To illustrate the iterative refinement of an existing EMA app—“SARA,” originally developed for AYA at risk for substance abuse and designed to incentivize engagement—for AYA with cancer (“ADAPTS”)

METHODS

• SARA is an open-source EMA app that delivers 30-days of surveys and micro-randomizes various engagement strategies (e.g., memes, quotes)
• Informed by user-centered design and agile science principles, the refinement of SARA for AYA with cancer involved 3 stages over 8 months:
  1) Multi-disciplinary team meetings to identify necessary app modifications, then selecting and vetting new engagement content with AYA with and without cancer, and oncology research staff (n=33 responses)
  2) 1-month internal pilot test with behavioral oncology research staff (e.g., faculty, post-docs; n=8)
  3) 1-month pilot with end user AYA with cancer (n=10, M age=16.5)

RESULTS

Stage 1 Results (Stakeholder Needs/Feedback)
• Expanded the virtual environment to accommodate a longer EMA period by adding new levels
• Added a new engagement feature that reminds participants that their EMA responses will benefit others (altruistic messages)
• Updated memes/quotes to be contemporary and narrow to the most highly rated
• Selected 66 memes and 100 quotes from social media/web, vetted by stakeholders on a 4-point rating scale and retain the most highly rated (31 memes and 72 quotes; M > 3.2)
• Developed a parallel caregiver version

Stage 2 Results (Internal Pilot)
• Fixed technical issues (e.g., offline survey submission error, back button survey bug)
• Accommodated suggestions for improving app functionality (e.g., storing previously received incentives in a feed, adding educational content that clarified the app’s functionality)

Stage 3 Results (Pilot Test with End Users)
• Discovered and resolved additional technical issues (e.g., notification glitch, money glitch)
• AYA expressed satisfaction with the content and showed high completion rates on average (M=79%, Range=34%-100%)

DISCUSSION

• Our rapid, iterative development process led to a more functional and appealing app
• Refining an open-source EMA app had many advantages (i.e., generalizability, low cost, lessons learned from the initial trial)
• We are now enrolling participants and will discuss our protocol for micro-randomizing engagement features (see Figure 1)

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