Acceptability and Usefulness of a Relational Agent-based Mobile Phone App Promoting Healthy Behaviors in Young Black MSM with HIV

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BACKGROUND
Overview

• National HIV/AIDS Strategy lists priority populations that include Black MSM and young persons
  – Black MSM less likely to be retained in care and to achieve viral suppression
• Theory-informed mobile phone app directed at improving ART adherence, viral suppression, and retention in care was developed for young, Black men who have sex with men (YBMSM) living with HIV
  – Designed to provide education (Information), improve self-efficacy (Motivation), and include functions to improve adherence (Behavioral Skills)
My Personal Health Guide

- Customizable realistic relational agent (“avatar”) with plain-speaking, human voice that empathizes, motivates, and relates to user
- Informed by 5 iterative focus groups in Chicago with YBMSM living with HIV
- Pilot study of 32 YBMSM demonstrated high acceptability and preliminary efficacy (pill count adherence >80% improved from 62% at baseline → 88% after 3 months) (NIH R21NR016420)
My Personal Health Guide

- Avatar asks and answers questions with branching logic
- Recordings of motivational messages from healthcare personnel and community peers living with HIV
- ‘Let Me Explain’ questions the app can answer
- Setting reminders for medication-taking
- Viral load and CD4 count graphs to monitor trends
- ‘Show My Medicine’ to educate about HIV medications
My Personal Health Guide

- ‘How am I doing taking my medicines?’ to monitor self-reported adherence
- Privacy features (pause/hide screen)
- Customization of app/avatar
- ‘The Dating Game’ (gamification) to reinforce learning of ‘Let Me Explain’ questions
To determine acceptability of the My Personal Health Guide app and usefulness of app functions among YBMSM living with HIV

We hypothesize that acceptability and usefulness of the My Personal Health Guide app will be high
METHODS
Design

- Data from multi-site randomized controlled trial (NIH R01MH116721)
- YBMSM (18-34 years) prescribed oral ART who self-reported non-optimal adherence or were referred by a healthcare professional as having non-optimal adherence
- Participants recruited from 23 states during Feb 2020 – Sept 2023
- Randomized 1:1 to download either My Personal Health Guide or control app (avatar-based focused on food)
- Intervention participants selected from male or female avatar, while only female avatar was available in the control app
Analysis

• Descriptive statistics
• Acceptability and usefulness questions were either dichotomous (Yes/No) or asked on a scale from 1 (low) to 10 (high)
  – Favorable responses defined as rating of ≥8 on 10-point scale
• Nonparametric Wilcoxon rank-sum tests used to compare acceptability of the My Personal Health Guide vs. control app
• Average usefulness of each My Personal Health Guide app function is reported
RESULTS
## Selected Baseline Demographics

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n=95 (53.7%)</strong></td>
<td></td>
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<tr>
<td><strong>n=82 (46.3%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South: 61%</td>
<td>South: 55%</td>
<td></td>
</tr>
<tr>
<td>Midwest: 25%</td>
<td>Midwest: 34%</td>
<td></td>
</tr>
<tr>
<td>Northeast: 14%</td>
<td>Northeast: 10%</td>
<td></td>
</tr>
<tr>
<td>West: 0%</td>
<td>West: 1%</td>
<td></td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College: 24%</td>
<td>College: 37%</td>
<td></td>
</tr>
<tr>
<td>Some college: 47%</td>
<td>Some college: 37%</td>
<td></td>
</tr>
<tr>
<td>High school/GED: 24%</td>
<td>High school/GED: 21%</td>
<td></td>
</tr>
<tr>
<td>Less than high school: 4%</td>
<td>Less than high school: 6%</td>
<td></td>
</tr>
<tr>
<td><strong>Housing security</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecure: 47%</td>
<td>Insecure: 52%</td>
<td></td>
</tr>
<tr>
<td>Secure: 53%</td>
<td>Secure: 48%</td>
<td></td>
</tr>
</tbody>
</table>
App acceptability by app randomization

Would you recommend the app to a friend who is living with HIV? (Yes)
- Intervention: 91.6%
- Control: 79.3%

Would you recommend the app to anyone else? (Yes)
- Intervention: 72.6%
- Control: 79.3%

Can you think of an example of how at any time the app affected your behavior in a positive way? (Yes)
- Intervention: 74.7%
- Control: 64.6%

Did the app embarrass you or make you uncomfortable at any time? (Yes)
- Intervention: 7.4%
- Control: 6.1%
Acceptability of relational aspects by app randomization

(1 = “not at all”, 10 = “very much”)

- To what extent did the app make you feel in control of your health?
- I feel the avatar cares about me
- How willing are you to continue using the app?
- I feel the avatar understood the issues I face
- I feel the avatar gave me new information I did not know before using the app
- I feel the avatar was my friend

* p<.05

Median
Usefulness of My Personal Health Guide functions

(1 = “not useful”, 10 = “very useful”)

- Avatar asking if you took your medicine today
- ‘Show My Medicine’ Function
- Calendar/Graph of Medication Adherence
- Set Reminders
- Avatar asking how you were feeling
- ‘Let Me Explain’ Function
- Privacy/Hide Screen
- Customize Avatar
- Pause
- Viral Load and CD4 Count Graphs
- Avatar asking if you want to hear what a friend said
- Record Side Effects
- Record Motivational Message
- ‘Dating Game’ Function (Gamification)
- Customize Background

Median
DISCUSSION
Acceptability and Usefulness

Acceptability of the My Personal Health Guide app
- Majority of participants would recommend the app to someone else
- Most were willing to continue using app
- Low number of concerns reported

Usefulness of My Personal Health Guide functions
- HIV Continuum of Care, relational functions were among most useful
- Customizing avatar, privacy settings also important to this population
Acceptability of the Avatar

- Overall, avatar was well-rated by participants in both groups
- My Personal Health Guide avatar received high relational ratings for feeling that the avatar cares about them and feeling that the avatar understands the issues they face
- Participant suggestions included expanding customization options such as clothing and appearance
Limitations

- App use was voluntary, resulting in high variability in overall app experience
- Length of follow-up time led to lower app use throughout follow-up period
- Adapting to COVID meant new challenges for technology-based intervention

Strengths

- Overrepresentation of YBMSM in the South
Conclusions

✓ Both My Personal Health Guide and control apps were well-received in this population of YBMSM

✓ Relational agent-based digital health approach to health promotion is promising

✓ Future research to explore acceptability of My Personal Health Guide app in broader population of people living with HIV and other areas of prevention
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## Appendix

### Table 1. Baseline characteristics of all study participants who completed the 6-month follow-up visit, 2020–2023

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intervention app n=95 (53.7%)</th>
<th>Control app n=82 (46.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median age in years (IQR)</strong></td>
<td>30 (27-32)</td>
<td>30 (26-32)</td>
</tr>
<tr>
<td><strong>Region of residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>13 (13.7%)</td>
<td>8 (9.8%)</td>
</tr>
<tr>
<td>Midwest</td>
<td>24 (25.3%)</td>
<td>28 (34.1%)</td>
</tr>
<tr>
<td>South</td>
<td>58 (61.1%)</td>
<td>45 (54.9%)</td>
</tr>
<tr>
<td>West</td>
<td>0 (0%)</td>
<td>1 (1.2%)</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College degree</td>
<td>23 (24.2%)</td>
<td>30 (36.6%)</td>
</tr>
<tr>
<td>Some college*</td>
<td>45 (47.4%)</td>
<td>30 (36.6%)</td>
</tr>
<tr>
<td>High school or GED</td>
<td>23 (24.2%)</td>
<td>17 (20.7%)</td>
</tr>
<tr>
<td>Did not finish high school</td>
<td>4 (4.2%)</td>
<td>5 (6.1%)</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed (full or part-time)</td>
<td>60 (63.2%)</td>
<td>47 (57.3%)</td>
</tr>
<tr>
<td>Student (full or part-time)</td>
<td>5 (5.3%)</td>
<td>4 (4.9%)</td>
</tr>
<tr>
<td>Unable to work/unemployed</td>
<td>27 (28.4%)</td>
<td>27 (32.9%)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (3.2%)</td>
<td>4 (4.9%)</td>
</tr>
</tbody>
</table>

Abbreviations: IQR, interquartile range

*Includes Associate's degree and/or Technical School

### Table 1 (cont). Baseline characteristics of all study participants who completed the 6-month follow-up visit, 2020–2023

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intervention app n=95 (53.7%)</th>
<th>Control app n=82 (46.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income level</td>
<td></td>
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</tr>
<tr>
<td>&lt;$10,000 yearly</td>
<td>27 (28.4%)</td>
<td>20 (24.4%)</td>
</tr>
<tr>
<td>$10,000 to $29,999 yearly</td>
<td>28 (29.5%)</td>
<td>28 (34.1%)</td>
</tr>
<tr>
<td>$30,000 to $49,999 yearly</td>
<td>19 (20.0%)</td>
<td>12 (14.6%)</td>
</tr>
<tr>
<td>≥$50,000 yearly</td>
<td>17 (17.9%)</td>
<td>18 (22.0%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4 (4.2%)</td>
<td>4 (4.9%)</td>
</tr>
<tr>
<td><strong>Housing insecurity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecure</td>
<td>45 (47.4%)</td>
<td>43 (52.4%)</td>
</tr>
<tr>
<td>Secure</td>
<td>50 (52.6%)</td>
<td>39 (47.6%)</td>
</tr>
<tr>
<td><strong>Incarceration history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>33 (34.7%)</td>
<td>18 (22.0%)</td>
</tr>
<tr>
<td>Never</td>
<td>62 (65.3%)</td>
<td>64 (78.0%)</td>
</tr>
<tr>
<td><strong>Substance use in past 2 weeks</strong></td>
<td></td>
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</tr>
<tr>
<td>Alcohol</td>
<td>72 (75.8%)</td>
<td>54 (65.9%)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>62 (65.3%)</td>
<td>43 (52.4%)</td>
</tr>
<tr>
<td>Other substances</td>
<td>36 (37.9%)</td>
<td>21 (25.6%)</td>
</tr>
<tr>
<td>None</td>
<td>9 (9.5%)</td>
<td>12 (14.6%)</td>
</tr>
</tbody>
</table>