mHealth for Mental Health: User-Centered Design and Usability Testing of a Mental Health Application to Support Management of Anxiety and Depression in African American Women

Terika McCall, PhD, MPH, MBA
Center for Medical Informatics, Yale School of Medicine
Agenda

▪ Background
▪ Focus Groups
▪ Usability Testing
▪ Takeaways
▪ Conclusions
▪ Next Steps
Prevalence of mental illness among African American women is comparable to the general population (20.6% vs. 19.1%).

However, they use mental health services at less than half the rate of their white counterparts (10.2% vs. 27.2%).

15.7% of non-Hispanic Black women reported having generalized anxiety in their lifetime.

27.4% of non-Hispanic Black women reported experiencing depression in their lifetime.

Sources: SAMHSA, 2019; HRSA, 2010
Mental Health Service Use

Approximately 70% of African American women that reported experiencing mental illness in the last year did not receive treatment.

Barriers to receiving care

- Higher levels of stigma in the Black community
- Less access to treatment
- No or inadequate health insurance coverage
- Lack of professionals who share their socio-cultural background
- Mistrust of providers
- Low health literacy

Sources: SAMHSA, 2019; Thompson et al, 2004; Hines-Martin et al, 2003; Merritt-Davis et al, 2006; Braithwaite Holden et al, 2009
Barriers to Seeking Care Among African American Women

The top 10 reasons for not seeking mental health treatment or counseling when needed (N = 261 out of 304)

<table>
<thead>
<tr>
<th>Reasons*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You could not afford the cost</td>
<td>71 (23)</td>
</tr>
<tr>
<td>2. Your health insurance does not pay enough for mental health treatment or counseling</td>
<td>37 (12)</td>
</tr>
<tr>
<td>3. You did not know where to go to get services</td>
<td>32 (11)</td>
</tr>
<tr>
<td>4. Lack of time</td>
<td>30 (10)</td>
</tr>
<tr>
<td>5. Your health insurance does not cover any mental health treatment or counseling</td>
<td>20 (7)</td>
</tr>
<tr>
<td>6. You were concerned that getting mental health treatment or counseling might have a negative effect on your job</td>
<td>20 (7)</td>
</tr>
<tr>
<td>7. You were concerned that you might be committed to a psychiatric hospital or might have to take medicine</td>
<td>19 (6)</td>
</tr>
<tr>
<td>8. Hard to find preferred provider</td>
<td>14 (5)</td>
</tr>
<tr>
<td>9. You were concerned that the information you gave the counselor might not be kept confidential</td>
<td>11 (4)</td>
</tr>
<tr>
<td>10. Decided not to seek mental health treatment or counseling</td>
<td>7 (2)</td>
</tr>
</tbody>
</table>

*A total of 304 responses were given, however only the most common reasons are presented in the table (n=261). Therefore, percentages will not sum to 100%. Participants were permitted to select all responses that apply.

Sources: McCall, 2020
Access and Convenience

Would having the option to use a mobile app to complete an appointment with a professional increase your access to mental health services?

<table>
<thead>
<tr>
<th>Percentage of Respondents</th>
<th>Under 50</th>
<th>50+</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>25.0%</td>
<td>50.3%</td>
</tr>
<tr>
<td>Yes</td>
<td>75.0%</td>
<td>49.7%</td>
</tr>
</tbody>
</table>

Sample percentages, by age group, for response to the statement, “Would having the option to use a mobile app to complete an appointment with a professional increase your access to mental health services?”

Source: McCall, 2020
Access and Convenience continued

Sample percentages, by age group, for response to the statement, “Would having the option to use a mobile app to complete an appointment save you time traveling to a professional’s office?”

Source: McCall, 2020
Sample percentages, by age group, for response to the statement, “Would having the option to use a mobile app to complete an appointment with a professional be more convenient for you than an in-person appointment?”

Source: McCall, 2020
mHealth for Mental Health

- mHealth interventions for anxiety or depression significantly reduced symptoms post-intervention (p < 0.05)
- African American women are comfortable with participating in mHealth research and interventions
- 80% of African American women own smartphones
- On average, they spend approximately 19 hours per week using smartphone apps
- Current tools are not consistently usable for diverse patients

Purpose of the Study

1. Determine what content, features, and considerations should be included in an app tailored to support management of anxiety and depression in African American women

2. Evaluate the usability of the app
Focus Groups
Focus Group Methods

Setting: Sessions were held at a Durham County library and at UNC-Chapel Hill in January 2020

Sample population: Women (18 years or older) who identify as Black/African American (or multiracial, Black/African American and another race)

Recruitment methods: Survey respondents, social media posts, and flyers

Incentive: $25 Amazon gift card and a mental health resources information sheet
Focus Group Methods continued

**Design:** Conducted by a moderator, and notetaker present

**Topics:**
- Past and current causes of anxiety and depression; coping skills used
- Attitudes and perceptions towards mental illness and receiving mental health treatment
- Content and features needed in a smartphone app designed to help African American women manage anxiety and depression
- Barriers and facilitators to use of a smartphone app for mental health care
Qualitative Data Analysis Plan

- Audio files transcribed and imported into NVivo 12
- Thematic analysis conducted
- Reoccurring themes across the focus groups were noted
Sociodemographic Characteristics of Focus Groups (N=4)

- 4 focus group sessions with 5 participants each (20 total)
- Black/African American or multiracial (i.e., Black/African American and another race) women
- Mean age 36.6 years (SD 17.8, range 21-79 years)
  - 75% (15/20) less than 50 years old
Past App Use for Mental Wellness

- Mental health and wellness apps that had the following features:
  - Meditation
  - Calorie intake and activity monitoring
  - Mood tracking
  - Deep breathing exercises

- Music apps and podcasts (e.g., Therapy for Black Girls)

- Inspirational messages on social media apps

Source: nappy.co
User-centered Recommendations

**Content**
- Information to find a Black woman therapist
- Guidance on how to deal with common stressors (e.g., microaggressions, imposter syndrome, relationships)
- Upcoming events in the area to connect with other Black women
- Inspirational messages and encouraging stories
- Daily uplifting and supportive messages
- Suggested readings that promote mental wellness
- Information on financial assistance

**Features**
- Anxiety, depression, and mood tracking
- Guided meditation, deep breathing, and other coping techniques narrated by a Black woman
- Group chat rooms to connect with other users
- Ability to connect with a preferred therapist through the app via messaging or video call

**Daily Active Use**
- App must promote a sense of community
- Ability to connect with a therapist
- Guidance to learn coping skills to managing anxiety and depression
- Short exercises to help manage anxiety and depression
- Clean user interface
- Intuitive and easy to use
- Provide tutorial on how to use the app
- Accountability features (e.g., mood check-in)
- Gamification (e.g., earned stars for completing a task)
- Limit notifications

**Trust**
- Transparency on who created and owns the app
- Transparency on how user data is protected
- Clearly stated policies on data ownership, use, and data sharing
- Confidentiality and privacy concerns must be addressed about communicating with a mental health professional through the app
Content

- Information to find a Black woman therapist
- Guidance on how to deal with common stressors (e.g., microaggressions, imposter syndrome, relationships)
- Upcoming events in the area to connect with other Black women
- Inspirational messages and encouraging stories
- Daily uplifting and supportive messages
- Suggested readings that promote mental wellness
- Information on financial assistance
Regarding information to find a therapist, a participant voiced she would like to be able to:

“Find Black women therapists in the area, with also listing what insurances they take, their hours, all that good stuff, because, again, those barriers. People are just like, "Where are these people?"

[Speaker 4, Group 2, 23 years old]
Features

- Anxiety, depression, and mood tracking
- Guided meditation, deep breathing, and other coping techniques narrated by a Black woman
- Group chat rooms to connect with other users
- Ability to connect with a preferred therapist through the app via messaging or video call
Regarding features to track anxiety, depression, and mood, a participant voiced she would like:

“If you could have a history in there and then you could look back and see when the last time was that you had this anxiety and what helped when you have this anxiety attack or whatever. You don't just end it with what you see. You can write down what helped and then you can go back to that.” [Speaker 3, Group 1, 63 years old]
Daily Active Use

- App must promote a sense of community
- Ability to connect with a therapist
- Guidance to learn coping skills to managing anxiety and depression
- Short exercises to help manage anxiety and depression
- Clean user interface, intuitive and easy to use
- Provide tutorial on how to use the app
- Accountability features (e.g., mood check-in)
- Gamification (e.g., earned stars for completing a task)
- Limit notifications
Regarding providing some type of incentive to use the app, one participant stated:

“Although it would be a superficial incentive, I feel just like apps that keep track or give you stars or anything that I guess signifies that you've completed something in itself can be validating to people, especially good habit building and stuff like that.” [Speaker 5, Group 1, 23 years old]
Trust

- Transparency on who created and owns the app
- Transparency on how user data is protected
- Clearly stated policies on data ownership, use, and data sharing
- Confidentiality and privacy concerns must be addressed about communicating with a mental health professional through the app
Regarding data sharing and use, a participant voiced her concern stating:

“I was watching the news on the treadmill last night, two nights ago, and they were talking about how these big companies on these dating apps are selling data, and so I would be worried about who has control over the data that's happening in the app, and what are they going to do with it now that they have all this information about Black women? [Speaker 1, Group 2, 27 years old]
Usability Testing
TherapyLink
Usability Testing Methods

**Setting:** Sessions were held in the UNC-Chapel Hill School of Nursing’s Biobehavioral Lab

**Sample population:** Women (18 years or older) who identify as Black/African American (or multiracial, Black/African American and another race)

**Recruitment methods:** Social media posts, flyers, and Research for Me @UNC recruitment listing

**Incentive:** $25 Amazon gift card
Usability Testing Methods continued

**Design:** Cognitive Walkthrough Method was used to evaluate the user interface design on how well it supports users in learning to complete tasks

- Tobii Pro Glasses 2 and software were used to record the session (including taps, eye movements, and time spent on each task)
- Participants were read the persona and scenario and then asked to begin the 4 tasks
- Questionnaire for User Interface Satisfaction (QUIS) administered

Sources: Polson et al, 1992; Chin et al, 1988; tobiipro.com
Tasks

Scenario #1 Tasks:
1. Find out your levels of anxiety for the past 6 weeks
2. Find information on how to manage anxiety
3. Add a new entry to your journal
4. Locate a therapist to schedule an appointment

Scenario #2 Tasks:
1. Find out your levels of depression for the past 6 weeks
2. Find information on how to overcome depression
3. Create a self-care plan
4. Locate a therapist to schedule an appointment
Data Analysis Plan

Quantitative data analysis plan:

- Descriptive statistics
- QUIS scores
- Efficiency measures (time to complete each task, number of taps)

Qualitative data analysis plan:

- Heat maps
- Feedback from cognitive walkthrough session
Characteristics of Usability Testing Participants (N=15)

**Age**
- Mean age 29.8 (SD 12.4, range 20-66 years)

**Race**
- All identified as either Black/African American or multiracial

**Education**
- 86.7% had a bachelor’s degree or higher

**Mobile App Use**
- 93.3% used mobile apps 4 or more times per day
# Questionnaire for User Interface Satisfaction Scores

## Summary of Mean Scores for the Five Domains of the Questionnaire for User Interface Satisfaction for Scenario #1 and Tasks (N= 8)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Minimum Mean Score</th>
<th>Maximum Mean Score</th>
<th>Average of Means (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Reactions to the Software</td>
<td>5.8</td>
<td>9.0</td>
<td>7.2 (1.1)</td>
</tr>
<tr>
<td>Screen</td>
<td>6.0</td>
<td>9.0</td>
<td>7.3 (1.3)</td>
</tr>
<tr>
<td>Terminology and App Information</td>
<td>5.8</td>
<td>9.0</td>
<td>7.6 (1.3)</td>
</tr>
<tr>
<td>Learning</td>
<td>5.0</td>
<td>9.0</td>
<td>8.0 (1.3)</td>
</tr>
<tr>
<td>App Capabilities</td>
<td>6.2</td>
<td>9.0</td>
<td>8.3 (0.9)</td>
</tr>
<tr>
<td>Domain</td>
<td>Minimum Mean Score</td>
<td>Maximum Mean Score</td>
<td>Average of Means (SD)</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Overall Reactions to the Software</td>
<td>6.0</td>
<td>8.7</td>
<td>7.5 (1.0)</td>
</tr>
<tr>
<td>Screen</td>
<td>6.3</td>
<td>9.0</td>
<td>8.0 (1.0)</td>
</tr>
<tr>
<td>Terminology and App Information</td>
<td>7.0</td>
<td>9.0</td>
<td>8.4 (0.8)</td>
</tr>
<tr>
<td>Learning</td>
<td>7.6</td>
<td>9.0</td>
<td>8.2 (0.5)</td>
</tr>
<tr>
<td>App Capabilities</td>
<td>8.3</td>
<td>9.0</td>
<td>8.8 (0.3)</td>
</tr>
</tbody>
</table>
Efficiency

- Most participants were able to fully complete each task with limited to no assistance.
- Creating a journal entry proved to be the most time consuming and cumbersome task.
- The differences in time to complete each task were primarily due to typing speed or using an alternate method to search.
Eye Tracking using Tobii Pro Glasses 2
Recommendations for App Development from Usability Testing

- Intuitive and easy to use
- Visually appealing interface with clear labelling
- Place important information on the left side or middle of the screen
Limitations

Focus Groups
- Most under 50 years old
- Social desirability bias

Usability testing
- Geographical restriction
- Most under 50 years old
- Personal preferences
- Efficacy of app to reduce anxiety and depressive symptoms not measured
Takeaways

- Findings consistent with previous literature which highlight the need for educational, psychotherapy, and personal development components
- Tailoring needed to address specific needs and interests of African American women
- Use of preferred resources and app features will help researchers and developers create apps that are both useful and “sticky”

Sources: Huguet et al, 2016; Topham et al, 2015
Takeaways continued

- The design preferences of the study participants confirm the importance of incorporating trust-centered design components.

- Important to design health information technologies for:
  - Stigma reduction
  - Social support exchange

- Incorporating user-centered design requirements of intended users may help them become more engaged and feel empowered.

Conclusions

- 80% of African American women own a smartphone

- Great opportunity to use mobile technology to provide mental health resources and services

- A *one-size-fits-all* approach to designing mHealth interventions may lead to more options but continued disparity in receiving mental health care

- To increase the likelihood of adoption, mHealth interventions should be culturally-tailored

Sources: Nielsen Company, 2017
Next Steps

▪ Focus groups with 20 African American women to receive feedback on the upgraded prototype

▪ Usability testing sessions with 8 African American women to evaluate the upgraded prototype

▪ 8-week pilot study to evaluate the smartphone app prototype among 80 African American women with moderate to severe anxiety or depression (GAD-7 or PHQ-9 score ≥ 10)
  
  • Evaluate the feasibility, acceptability, and estimate the effects of the mHealth intervention on anxiety and depressive symptoms
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Selected References


Barry, M. C., Threats, M., Blackburn, N. A., LeGrand, S., Dong, W., Pulley, D. V., ... Muessig, K. E. (2018). Stay strong! keep ya head up! move on! it gets better!!!!: resilience processes in the healthMpowerment online intervention of young black gay, bisexual and other men who have sex with men. AIDS Care, 30(sup5), S27–S38. doi:10.1080/09540121.2018.1510106


Selected References continued


Thank you!
Questions?
Contact Information

Terika McCall, PhD, MPH, MBA

✉ terika.mccall@yale.edu
🐦 @TelementalHlth