

A Smartphone-based Mobile Health App to Address the Adverse Effects of Androgen Deprivation Therapy in Men with Prostate Cancer: Pilot Testing and Initial Results

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Introduction & Objective

Androgen deprivation therapy (ADT) is a standard treatment modality for patients with advanced or recurrent prostate cancer, as well as for those initiating radiation therapy with unfavorable intermediate-risk or high-risk prostate cancer.

ADT causes metabolic and cognitive disturbances, which may lead to increased risks of diabetes, cardiovascular disease, and death. Interventions such as supervised exercise programs, lifestyle modifications, and dietary advice are efficient in monitoring and preventing ADT-related toxicities. There are increasing data to support mobile health apps as powerful adjuncts in the management of chronic diseases.

Herein we describe our experience in development of a mobile health app to address metabolic and cognitive effects for men treated with androgen deprivation therapy (ADT) for prostate cancer, followed by pilot testing with physicians and men initiating ADT.

Materials/Methods

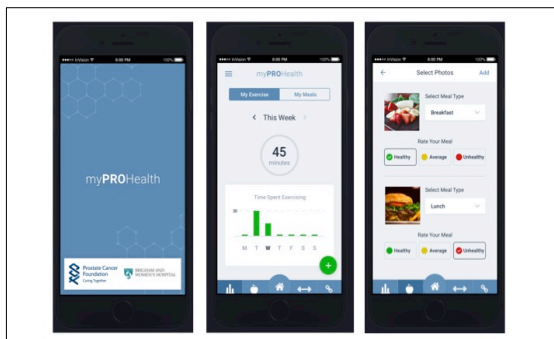
The mobile health app was designed and developed by an independent contractor allowing patient data to be stored at hospital servers. It allows for tracking of food intake and exercise.

Pilot testing took place in March 2019. A sample of 5 physicians who treat prostate cancer, and 5 patients initiating ADT, aged 45-75 were recruited for a focus group discussion based on availability and willingness to participate.

A research coordinator followed a pre-established IRB-approved script. Themes were identified through review of transcripts by two independent reviewers.

Results

App Design and Function



The current version of the mobile health requires patients to record and track their daily exercises and food intake. Participants are able to rate their food as 'unhealthy' (red), 'adequately healthy' (yellow), and 'healthy' (green). The app generates a line chart of their average exercise time per week, as well as a pie chart of the proportion of healthy food. In addition to data collection, researchers can perform survey assessments as well as chart reviews, which can be merged with in-app data.

Patient Reported Experience

Pilot testing in semi-structured interviews revealed themes of appreciation for the holistic care of the patient and ease of use. Difficulties with finding emailed link and downloading occurred with 3/5. all were able to use the program once downloaded. Providers felt that the app was easy to use however several raised concerns about usability among older men who do not commonly use smartphone apps.

Pilot Testing

Patients, n=5

Age	
45-55	1 (20%)
55-65	2 (40%)
65-75	2 (40%)
Race/Ethnicity	
White	4 (80%)
Hispanic/Latino	1 (20%)
Education Status	
Graduate/Professional Degree	2 (40%)
Some College	2 (40%)
GED/High School Diploma	1 (20%)
Physicians, n =5	
Urologist	2 (40%)
Medical Oncologist	2 (40%)
Radiation Oncologist	1 (20%)

Participant Reflections on App Usage

Patient Knowledge	"There are so many options, wow – I didn't realize that things that I do on a daily basis would be considered exercise. My wife would be so happy to hear that! What else did you ask? If it was intuitive? Yes, it is clear and intuitive to me"
Patient Appreciation	"No, this is great. It shows that the providers care and that we are more than a number to them I think"
Patient Struggling	"To be honest I don't think this is intuitive. It might just be me but it's tough for me to understand"
Physician Reflections on App Usage	
Undermining Patients	"I think my con is that, I don't think older patients, or any patients with prostate cancer will understand how to use this app"
Fear of Technology	"I think patients will struggle with this. I think that we need to be careful with technological...interventions like this because it may make them more stressed"
Ageist Bias	"The application is really well designed and is...generally pretty intuitive. But I worry that the patients won't actually use it. It might be hard for older patients, and most prostate cancer patients are above the age of 45"

Conclusions

The mobile health app was successfully developed and underwent heuristic evaluation in semi-structured interviews by small groups of providers and patients.

Themes of appreciation for holistic care of the patient were identified, however low familiarity with smartphone apps and difficulties with the download process were seen in some.

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