Improving Diabetes Self-Management with a Mobile App: Preliminary Results of a Pilot Program at a Safety Net Hospital System

Sawkia R Patterson, MBA; Roopa Kalyanaraman Marcello, MPH; Johanna Dolle, MA; Sharanjit Kaur, MPH; Nichola Davis, MD, MS

INTRODUCTION

For patients with type 2 diabetes, self-management remains a significant challenge. In recent years, the use of digital health technologies (DHTs) for chronic disease management has increased, with some facilitating improvements in diabetes outcomes. Historically, safety net systems have been slow to adopt DHTs, in part due to assumptions about literacy and the use of technology among low-income or non-English speaking patients. The use of DHTs among diverse, low-income patient populations has not been well studied.

NYC Health + Hospitals (H+H) is the largest safety net healthcare system in the nation. H+H launched a pilot program of BlueStar, an FDA-cleared mobile app for diabetes self-management, among patients with poorly-controlled type 2 diabetes at two of its acute care hospitals. The app was provided to patients in English and Spanish. Participants were able to record and receive feedback on their medications, blood glucose, blood pressure, and meals.

METHODS

Beginning in December 2018, patients with uncontrolled diabetes (n=273) were enrolled in the BlueStar app pilot program. Participants were eligible if they had a diagnosis of type 2 diabetes, an A1c ≥ 9, and owned a smartphone onto which they could download the app. Patient demographics and baseline A1c values were assembled for participants and propensity score-matched controls. Matching was performed on indicator variables for sex, race, preferred spoken language and on continuous variables for age, baseline A1c, and inpatient, emergency, and clinic utilization in the previous six months. Mean changes in A1c between participants and controls were not regression adjusted.

RESULTS

Participants who used the BlueStar app (n=273) experienced a significantly greater average six-month reduction in A1c (1.1 vs. 0.2; -0.9, p<0.01) than matched controls. More than half of the participants used the app once a week; recording blood glucose and medication were the most frequently used features (82% and 62%, respectively).

DISCUSSION

After six months of use of the BlueStar app, participants with poorly-controlled diabetes had a significant and clinically meaningful reduction in A1c as compared to controls. The app was used by both English and Spanish speakers, and many participants found the app easy to use and understand. Our findings highlight that in this low-income, minority population, patients not only were engaged in using a DHT but also experienced substantial and significant A1c reductions.

Patients with poorly-controlled diabetes who used the BlueStar mobile app for six months had an average A1c reduction of 1.1.

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RESULTS

Table 1: Baseline Characteristics*

	Participants (N=273)	Controls (N=549)
Male	156 (57%)	313 (57%)
Black	63 (23%)	127 (23%)
Spanish Language	110 (40%)	220 (40%)
Baseline A1c	10.4	10.4
Healthcare utilization in six months prior to baseline		
All Visits	5.76	5.18
Inpatient Clinic Visits	0.09	0.09
ED Visits	0.58	0.38

*There were no significant differences between the participants and the propensity score-matched control group.

Table 2: A1c Results

	Mean Baseline A1c	Mean 6-Month A1c	Mean Difference
Participants	10.3	9.2	-1.1 *
Controls	10.4	10.2	-0.2 **

* p<0.01
** corrected from poster presented at American Diabetes Association 80th Scientific sessions