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Evaluating Patient Interest in an Adherence-Focused Smartphone App to Improve HIV Care

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ABSTRACT

Objective: *Evaluate patient interest in a smartphone mobile application (app) to assist in medication adherence.* ***Methods:*** *In January 2014, a 19-question, anonymous, paper survey was distributed to a convenience sample of patients in the reception area of a nonprofit HIV primary care clinic and pharmacy.* ***Results:*** *Of the 101 patients surveyed, 72.3% had a smartphone and 70.3% were interested in downloading and using an adherence app if one was available. If an app was customizable, patients desired appointment reminders (87%), notifications to schedule appointments (85%), refill notifications (83%), medication reminders (79%), and adherence tracked by pharmacy (59%).* ***Conclusions:*** *Results share insights on the potential use of technology to assist an HIV patient population with medication adherence.*

Key Words: HIV/AIDS; adherence; smartphone; mobile application; medical technology

INTRODUCTION

Adherence to medication is imperative in the successful treatment of Human Immunodeficiency Virus (HIV). [1] Taking medication daily allows patients to live long and healthy lives; however, commitment to daily medication adherence can be a struggle.[2] Low adherence results in resistance to antiretroviral medications, which may lead to less utility of available HIV therapies and further health complications.[1] Adherence to medications involves effort from both the clinician and patient. From a clinician perspective, multiple strategies to enhance adherence to HIV and non-HIV medication regimens have been described, including patient education, [2] an interdisciplinary team approach to patient care, [3] and improved dosing schedules. [2] Patient strategies to improve medication adherence may include a willingness to start therapy, social support, and utilization of pillboxes.[4] With the commonality of individuals carrying smartphones, smartphone applications (apps) have been suggested as a novel method to enhance patient medication adherence. The use of apps in medication adherence has been evaluated in recent trials, with research evaluating impact on patient medication adherence, [5] physician and health care system monitoring of patient adherence via apps, [6] as well as patient perception and use of technology in adherence. [7] Additionally, individual adherence apps have been evaluated and rated on their general use. [8]

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Research surrounding use of apps by people living with HIV (PLWH) has been conducted, with a primary focus on assessing use of apps related to risk-inducing behaviors, using apps to deter these types of behaviors, and evaluating available HIV-related apps. Research suggests that adherence apps have been useful in the general population and that HIV patients commonly use smartphones and general apps; thus, adherence apps may provide pathways to education as well as increased health and wellness for PLWH. [9, 10] Literature is lacking to describe the interests of PLWH in medication adherence apps. This study aimed to evaluate patient interest and willingness to use smartphone medication adherence apps in an urban, HIV-positive population.

METHODS

The research was conducted at Equitas Health formerly AIDS Resource Center Ohio Medical Center and Pharmacy, a nonprofit organization that provides comprehensive care to the lesbian, gay, transgender, bisexual, and queer communities of Ohio. Equitas Health is a patient-centered medical home in Columbus, Ohio where patients have access to HIV/AIDS care, primary care, behavioral health therapists, social workers, and pharmacy services. The Equitas Health Pharmacy is committed to improving patient adherence to anti-retroviral therapies, and as a result, the pharmacy is interested in developing and utilizing a smartphone adherence app for its patients. From January 1, 2014 through January 31, 2014, PLWH at Equitas Health were surveyed to assess patient interest and willingness to use a medication adherence-focused smartphone app, to evaluate smartphone use in the HIV population, and to determine patient's current use of adherence aids.

Using a paper survey developed by investigators, the following areas were assessed: 1) patient interest in a smartphone adherence app and possible features available for this type of app, [11] 2) smartphone use within an HIV population, 3) methods used by patients to help remember to take medications or barriers to adherence, [2,3] and 4) overall interest in using a smartphone adherence app to help improve HIV care. The survey was developed by the investigators through review of smartphone adherence apps available on the market, [11] literature review of common adherence methods and barriers to adherence, [2,3] and discussions with the research team and Equitas Health employees to identify needs of the clinic's patients. Surveys were anonymous and consisted of 19 questions with a mix of free response, multiple choice, and check-all-that-apply questions. The Ohio State University Institutional Review Board determined this research as exempt.

A convenience sample was recruited five days a week for a period of three-hours each day with alternating morning and afternoon time blocks. Three different investigators were trained and followed a formal script to invite patients to participate in the research study. Investigators were unknown to the patients. Investigators sat in the reception area of Equitas Health and invited individuals who were English-speaking, 18 years of age or older, patients of Equitas Health Medical Center and Pharmacy, and currently taking at least one medication to complete the survey – at the time of the study, Equitas Health only served PLWH. Recruiting participants in the reception area offered the opportunity to gather a broad range of patients as they entered Equitas Health for various reasons including medical appointments, behavioral health appointments, social work appointments, weekly support group meetings, and picking up or dropping off prescriptions at the pharmacy. Participants were asked to complete the survey in one sitting and return the survey to a designated drop-off box prior to exiting the building. Descriptive statistics were used to analyze results.

RESULTS

One hundred one (101) PLWH completed the survey at Equitas Health in January 2014. Most respondents were male (n=93, 92.1%) and identified with a racial background of either Caucasian (n=58, 57.4%) or African American/Black (n=31, 30.7%). The majority of respondents were less than 50 years of age. Table 1 summarizes baseline demographics.

Of the 101 patients surveyed, 73 (72.3%) indicated having a smart phone and 71 (70.3%) were interested in downloading and actually using an adherence app if one was available. Of the 73 patients that had a smartphone, 60 (82.2%) patients expressed interest in downloading and using an adherence app if one was available.

Figure 1 describes the features patients, who were interested in downloading and using a potential app, desired in a potential adherence app. Patients most desired having appointment reminders. Having adherence tracked by the pharmacy was the least desired feature. Adherence tracking was described as a process where patients would indicate if they took their medications as prescribed each day, and their response would be accessible by the pharmacy.

Figure 2 shows the correlation between age and willingness to download and use an adherence app. Within the 18-30 year old age group, 23 of 26 patients (88.5%) would download and use an adherence app. In the 31-40 and 41-50 age groups, 19 of 25 patients (76%) and 16 of 25 patients (64%), respectively, would download and use an adherence app if one was available. In contrast, of those patients surveyed that were 51 years old and older, only 10 of 21 patients (47.6%) stated that they would be interested in downloading and using an adherence app. Four patients surveyed did not indicate their age. Of these four patients, three would download and use an adherence app.

Considering the 71 patients interested in downloading and using an adherence app, respondents were further broken down into the number of medications taken on a daily basis. Forty-eight (48) patients took 1-5 medications, 16 patients took 5-10 medications, and 6 patients took greater than 10 medications. Of the 48 patients that took 1-5 medications and stated that they would download and use an adherence app, 43 patients (89.5%) had a smartphone. Additionally, 34 of 48 (70.8%) patients taking 1-5 medications were 40 years of age or younger; furthermore, 20 of 48 (41.7%) of patients were 30 years of age or younger. Thirteen (13) of 16 (81.3%) patients taking 5-10 medications had a smartphone, and 3 of 6 patients (50%) taking 10+ medications had a smartphone. One patient indicated an interest in downloading and using an adherence app, however, number of medications taken daily was not indicated. Figure 3 further shows these correlations.

Patients were also asked their current methods for medication adherence. When considering the entire cohort, patients indicated family and friends as the primary source of their medication adherence reminder support (59.4%). Other reminders included pill boxes (50.5%), alarm reminders (28.7%), and to a lesser extent patients relied on medical staff (13.9%), calendars (10.9%), and caseworkers (10.9%). Patients rarely relied on support groups (8.9%), written notes (5.9%), or online resources (2%).

Discussion

The results of our survey showed that the majority of the PLWH surveyed were interested and willing to download and use a smartphone adherence app to aid in their HIV care if one was available to them. The survey further showed that the majority of patients were interested in an app for their HIV medical care, reminders for appointments and refilling medications, and notifications to take their medications. Patients were least interested in having their adherence tracked by the pharmacy; adherence tracking was described as a process whereby patients

would indicate if they took their medication as prescribed each day, and their response would be sent directly to the pharmacy. Results indicated that younger patients and those taking fewer daily medications were most interested in downloading and using an adherence app for their HIV care. This is expected, as younger patients may be more apt to embrace new and advanced technologies.

Previous studies support our finding that patients have positive interests and perceptions toward the utilization of technology for HIV care.[12, 13] However, our study looks at patient interest in a smartphone app whereas previous studies focused on the utilization of short messing system (SMS) or mobile phone text messaging, as a form of communication.[11, 12] Reid et al sought to determine the opinions, perceptions, and acceptability of utilizing SMS interventions to improve adherence of PLWH in Garborone, Botswana.[14] The authors found that patients were most interested in utilizing SMS interventions for doctor appointment reminders and to lesser extent reminders to take daily medications.[14] These findings are consistent with the results from the current study. Similarly, in a recent study of 24 community pharmacy patients, participants expressed interest in a smartphone app that fostered an improved, convenient pharmacy experience and specifically help in the management of medications such as refill reminders.[15] Additionally, patients desired a smartphone app that provided an opportunity to communicate and interact with the community pharmacy[15]; however, within the urban HIV-positive population included in this study, patients were least interested in having their adherence rates tracked by the pharmacy. This may relate to concerns about privacy; previous literature shows that one major barrier to utilizing technology in PLWH is patient confidentially.[12, 14]

Limitations

Limitations exist related to the measurement and process of this study. The conducted survey was developed by investigators and was not validated. The survey was offered to patients at the medical center during limited hours each week for a month resulting in a convenience sample. Additionally, patients were not asked the number of anti-retroviral medications they were taking; patients were only asked to indicate the total number of daily medications they were taking. Knowing the number of anti-retroviral medications a patient is taking would allow investigators to assess how complex anti-retroviral medications relates to patients wanting help with medication adherence via a smartphone app. Also, patients were not surveyed as to whether they were already utilizing a smartphone adherence app. Surveying this information would add additional insight in understanding who would choose to download and utilize a smartphone adherence app. Finally, Equitas Health is one of many access points to healthcare services for HIV/AIDS patients in Central Ohio; the sample is relative to the patients who chose Equitas Health in January 2014.

CONCLUSION

PLWH surveyed in an urban healthcare setting were interested in downloading and using a smartphone adherence app. Further research needs to be completed in order to determine factors that support successful implementation of an adherence app into practice including assessment of the available adherence apps for compliance with regulations on healthcare information as well as desired features and consideration of how the app fits into clinic workflow. Once a smartphone adherence app is implemented, the success compared to conventional adherence methods (e.g. pillboxes, family/friend reminders, and phone alarms) should be evaluated. Finally, as patients most desired appointment reminders as a component of a smartphone adherence app, future research should assess the effect of the smartphone adherence appointment reminders on patient no-show rates.

Opportunities for mobile technologies to influence care of PLWH abound, especially in the area of adherence. The healthcare system and local health systems should consider ways to optimize and integrate these technologies to enhance care using existing devices and emerging products and services, while considering preferences of patients using these technologies.

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Conflict of Interest: Dr. Jennifer Rodis is the creator and director of the Partner for Promotion (PFP) program. Otherwise, all other authors declare no conflicts of interest or financial interests that the authors or members of their immediate families have in any product or service discussed in the manuscript, including grants (pending or received), employment, gifts, stock holdings or options, honoraria, consultancies, expert testimony, patents and royalties.

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Table 1

	n	%
Gender		
Male	93	92.08
Female	4	3.96
Transgender (M to F)	1	0.99
No specific gender	3	2.97
Ethnicity		
Caucasian	58	57.43
Black/African American	31	30.69
Other	6	5.94
Hispanic	2	1.98
Black/Indian	1	0.99
No ethnicity specified	3	2.97
Age		
18-30	26	25.74
31-40	25	24.75
41-50	25	24.75
51 +	21	20.79
No age specified	4	3.96

Figure 1 – Study Design

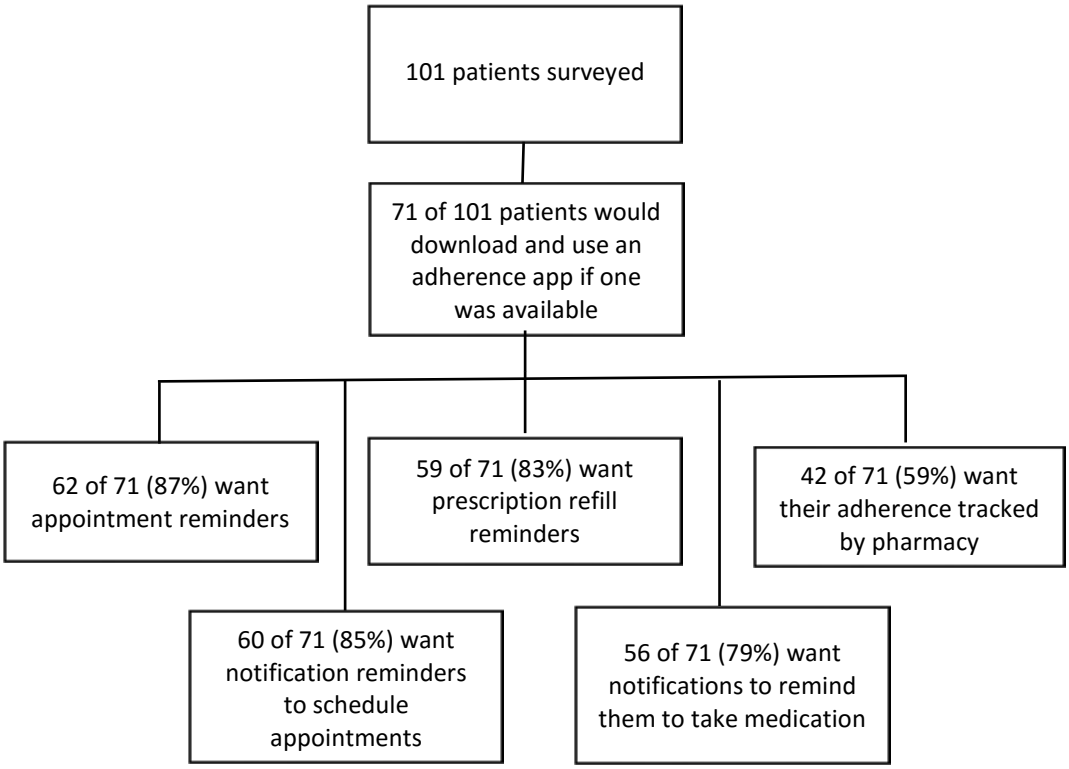
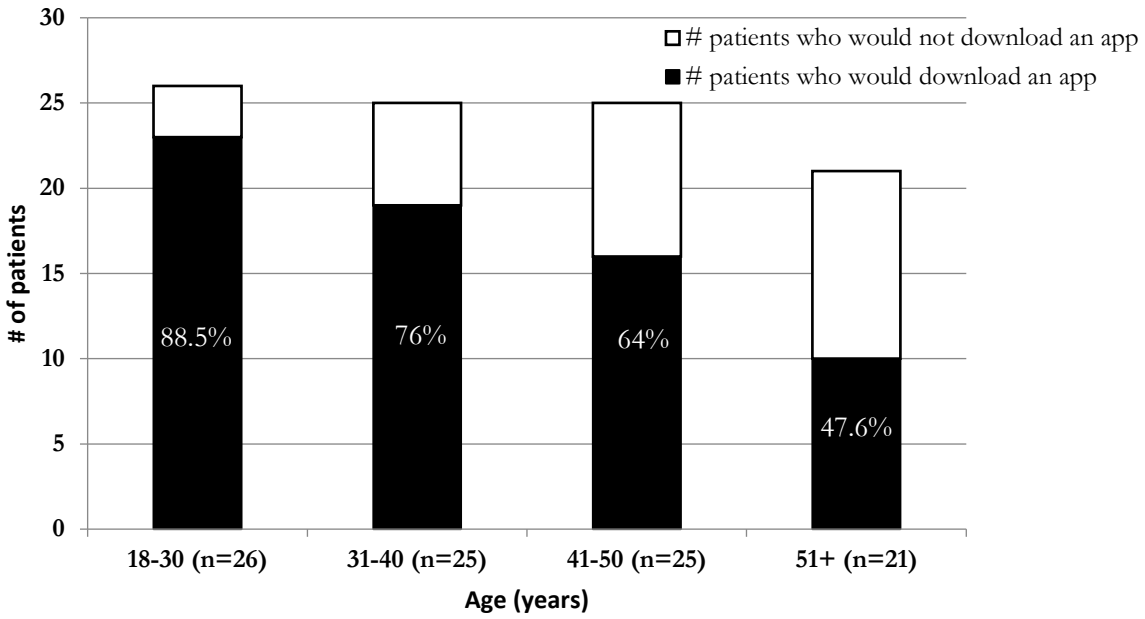


Figure 2

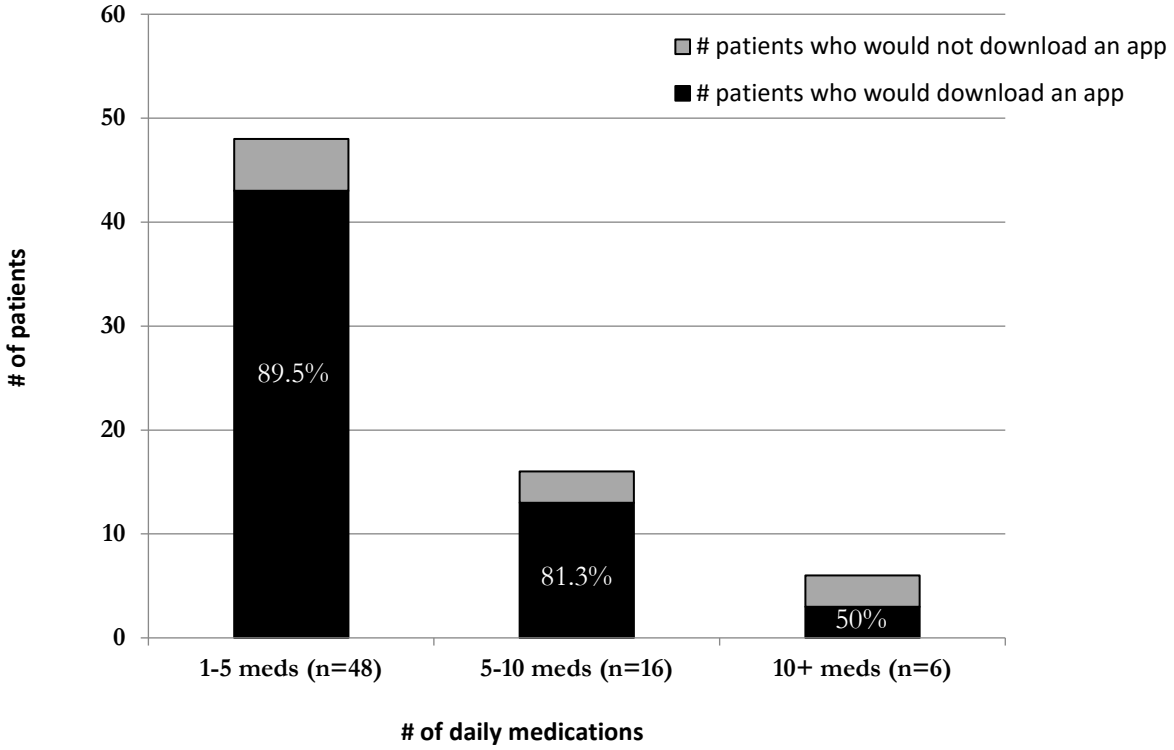
Correlation between age and willingness to download and use an adherence app* (N = 101)



*Four patients did not indicate an age; however, three of these patients indicated a willingness to download and use an adherence app.

Figure 3

Correlation between number of patients who would download and use an adherence app based on number of medications taken daily# (N = 71)



#One patient indicated they would download and use an adherence app, however, number of medications taken daily were not indicated