The mPOWER Project: Results of a Pharmacotherapy Model integrated with Mobile Health Technology for Veterans working through Substance Use Disorders

Abstract

This article describes preliminary results from a three year study testing the effectiveness of an addiction pharmacotherapy care model, integrated with a mobile health application, tailored for at-risk Veterans living in rural environments and working through substance abuse issues. The Mobile Patient Opportunities for Wellness, Engagement and Recovery (mPOWER) project investigates alternative therapies for a high risk/high need population over-utilizing addiction crisis, emergency medical and emergency psychiatric services. Reported outcome measures captured patient activation and satisfaction, usage statistics, and population readmission rates. Patients indicated satisfaction with the mPOWER program, increased motivation to improve health and reported greater control of alcohol cravings. A steady increase in mobile health usage was identified with the most popular application being the discussion board used to communicate with peers and care staff. After 10 months of enrollment in the mPOWER program, it is observed that cumulative total readmissions for active participants (n=24) decreased by 71% as compared to their readmission rates from the previous 10 months before enrollment.

Introduction

Veterans living in rural environments who are working on issues of addiction are in need of tools that will help bridge the gaps in communication caused by decreased access to peers, support centers and clinics. While psychosocial methods have been the predominate therapy for substance abuse issues related to alcoholism there is a growing body of research into pharmacotherapy models of substance abuse treatment. Interventions such as the Medical Management model proposed here align psychosocial treatment with pharmacotherapy in efforts to improve treatment outcomes and have found moderate success in doing so.

Substance abuse issues related to addiction to alcohol, drugs and tobacco affect upwards of 40 million Americans (CASA Columbia, 2012). Forty percent of annual U.S. admissions to treatment for abuse of alcohol and drugs reported alcohol as a primary substance, with 45% of those episodes also reporting secondary drug abuse (SAMHSA, 2009). Substance addiction, frequently discussed in terms of the social impact it causes, has a public health impact that challenges common health issues such as diabetes, cancer and heart disease. Consequently, more comprehensive models of prevention, diagnosis and treatment appear to be necessary to address the care plans and goals of patients facing substance abuse problems (Wakeman, Green, & Rich, 2014). New strategies are needed to help high risk/high need patients with substance use disorders as well as multiple physical and psychiatric co-morbidities.

Personal health records (PHR), telehealth and mobile health tools can improve care continuity and communication between patients and care providers, and increase motivation to self-manage their health (Botts, Horan, & Thoms, 2011; Morris, et al., 2010; Brennan, Downs, & Casper, 2010). Moreover, supportive technologies have improved self-management of chronic diseases, including addiction, such as the Comprehensive Health Enhancement Support System (CHESS) model have proven effective in a variety of health-related contexts (Gustafson, et al., 2010; Johnson, Isham, Shah, & Gustafson, 2011). The University of Wisconsin's ACHESS (CHESS focused on addiction) tool is a relapse prevention prototype

designed to improve addiction treatment. ACHESS is delivered through a smart-phone rather than a personal computer and focuses on helping addiction patients leaving residential care enhance their recovery.

Encouraged by these and other findings, the Mobile Patient Opportunities for Wellness, Empowerment and Recovery (mPOWER) program extends health and behavioral services to Veterans struggling with issues of substance abuse, primarily alcohol. MPOWER is designed to improve medical management by using mobile health (mHealth) services to reduce health communication and motivation gaps faced by rural Veterans to decrease barriers caused by rural isolation, transportation and economic insecurity. The intervention reported in this article provided new services such as addiction pharmacotherapy combined with medical management, trauma-informed care, and increased peer support. As such mPOWER reduced veterans' need for and use of addiction crisis, emergency medical and psychiatric services from 4.26 episodes of care every 18 months to less than 1 episode of care every 18 months.

The goal of this project is to deliver enhanced technology supported services to a targeted population. MPOWER is designed to be a new treatment model that meets the Department of Veteran Affairs' (VA) substance use disorders (SUD) standards, increases protective factors that reduce cravings; and thus the risk of relapse and its associated consequences.

Method

This report provides a descriptive analysis of data gathered across a 2 ½ year study funded by the Substance Abuse and Mental Health Services Administration (SAMHSA) and administered by the Loyola Recovery Foundation (Loyola), a Pittsford, New York, community-based non-profit organization providing sub-specialty behavioral health, health management, housing, and employment services to Veterans.

Recruitment and Data Collection

Using data from Loyola's electronic health record (EHR), an initial 43 members were identified for participation in the mPOWER program; 77 percent were White and 23 percent were African American. Two age groups were present, one representing the Gulf I, Operation Enduring Freedom/Operation Iraqi Freedom and the other the Vietnam era sub-cohorts. The age range in the first group was 25-51, populated by 15 of the 43 members of the cohort. The age range of the second group was 52-71, populated by 28 of the cohort. Participants had a total household income within 100 percent of the Federal Poverty Level. Forty-eight percent were functionally homeless under the VA definition of homelessness and 100 percent maintained unsupported temporary housing or a living situation in a rural area in the 18 months before the program started. The population was highly transient. None of the participants had home or cell phones to access services or an independent means of transportation. Since the initial 43 enrolled another 56 members have been enrolled in the program as previous members have dropped out and capacity has become available.

After informed consent and agreement to participate in mPOWER was confirmed, Veterans were educated on mPOWER program procedures and provided and trained on the use of a smartphone that includes the ACHESS application. Participants of mPOWER were given addiction pharmacotherapy, psychosocial recovery management and smartphone-assisted counseling to maintain fidelity to the

integrated pharmacotherapy/psycho-social model of care. Vivitrol, an injectable naltrexone was the primary pharmacotherapy due to the high incidence (89%) of chronic alcohol dependence in the cohort. Recovery management was delivered during office visits and via ACHESS technology.

MPOWER established a recovery plan with patients including monthly physical and behavioral health appointments, administration of Vivitrol, participation in monthly group sessions, program survey completion, and sessions with a recovery coach. Patients were trained to: use the basic functions of the smartphone, access and use ACHESS tools and respond to the study surveys using the mobile phone. Patients were encouraged by mPOWER staff and via smartphone notifications to participate in ACHESS discussion board conversations and to listen to motivational recordings available to them.

Measures

The measures provided in this report assessed the Veterans engagement and satisfaction with mPOWER's recovery program, the type and degree of usage of ACHESS, and the rates of readmission for the active population within the first year of program rollout.

Patient Satisfaction and Engagement

After at least one month after starting mPOWER, on their next scheduled appointment, members were requested to complete a sixteen question survey asking about their perceptions of the mPOWER program, its ability to help them manage their conditions, aspects they find most useful and needs that mPOWER does not currently meet. Surveys were administered in person by the nurse and via mobile phones for those who felt comfortable.

Mobile Health Application Usage

A significant part of mPOWER was use of mobile health technologies integrated with the clinical and behavioral health therapies. This required using a smartphone and the ACHESS application and responding to assessments. ACHESS usage was analyzed using activity data downloaded from ACHESS servers including information related to frequency of use and types of applications they used most.

Rates of Readmission

Readmission rates reported from Loyola's EHR provided information about when participants were admitted into crisis detoxification. Detox episodes require up to seven inpatient days to ensure the health and safety of the Veterans as they recover from their relapse. Due to the high readmission rates for this population, reduction of readmission is very important for both the Veteran's health and the cost of services required. MPOWER maintained an average enrollment of approximately 45 veterans, however throughout the project some participants dropped out of the program either due to relocation, disinterest or inactivity. Readmission rate data currently presented in this report represents a portion of the population (n=24) that was active for at least ten to months or more in the mPOWER program and who had readmission data available for ten months prior to their enrollment.

Results

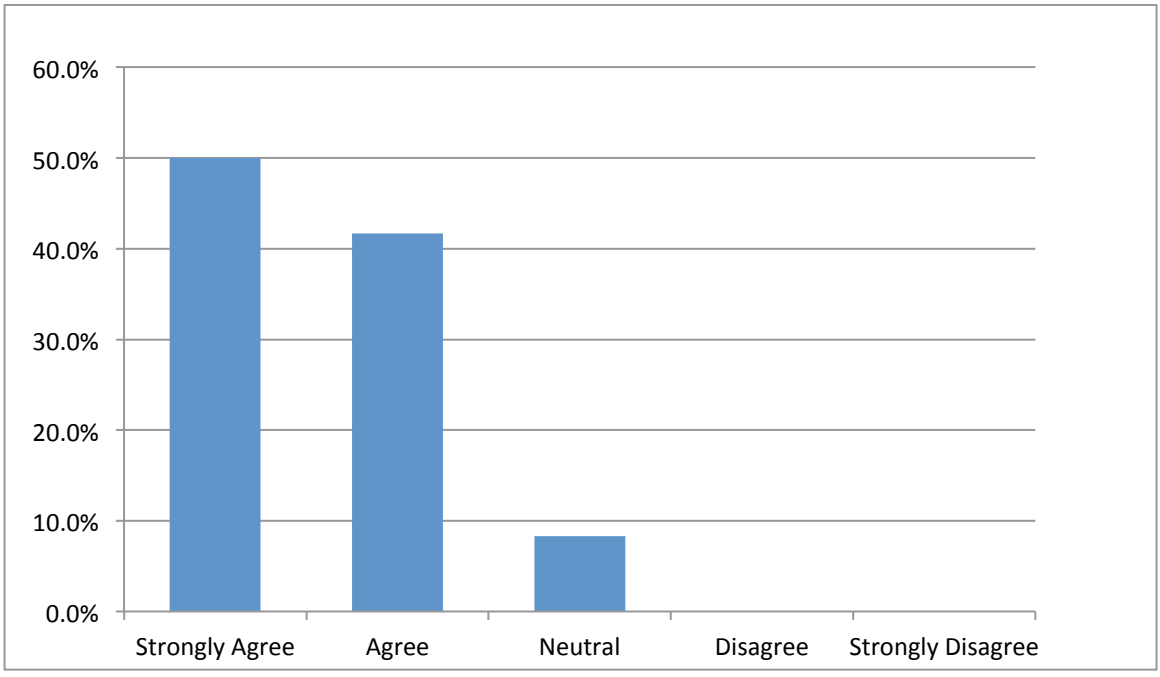
Patient Satisfaction and Engagement

All patients surveyed (n=36) found the program either very helpful (69%) or helpful (29%) and when asked whether the participation in the mPOWER program had been difficult for them 84% indicated that they had encountered no difficulties. When asked what they understood to be the goals of the mPOWER program patient responses included comments such as:

- "It is supposed to empower us to live life without craving or using alcohol or drugs with the use of shots and a communication system."
- "It enhances my belief that I can stay clean; because of the program structure that is available."
- "It is supposed to help stop craving for alcohol use by use of support network phone and Vivitrol injections."
- "Incentive to do well by providing instant access to help from peers and information combined with therapy, counseling/medical/info access."

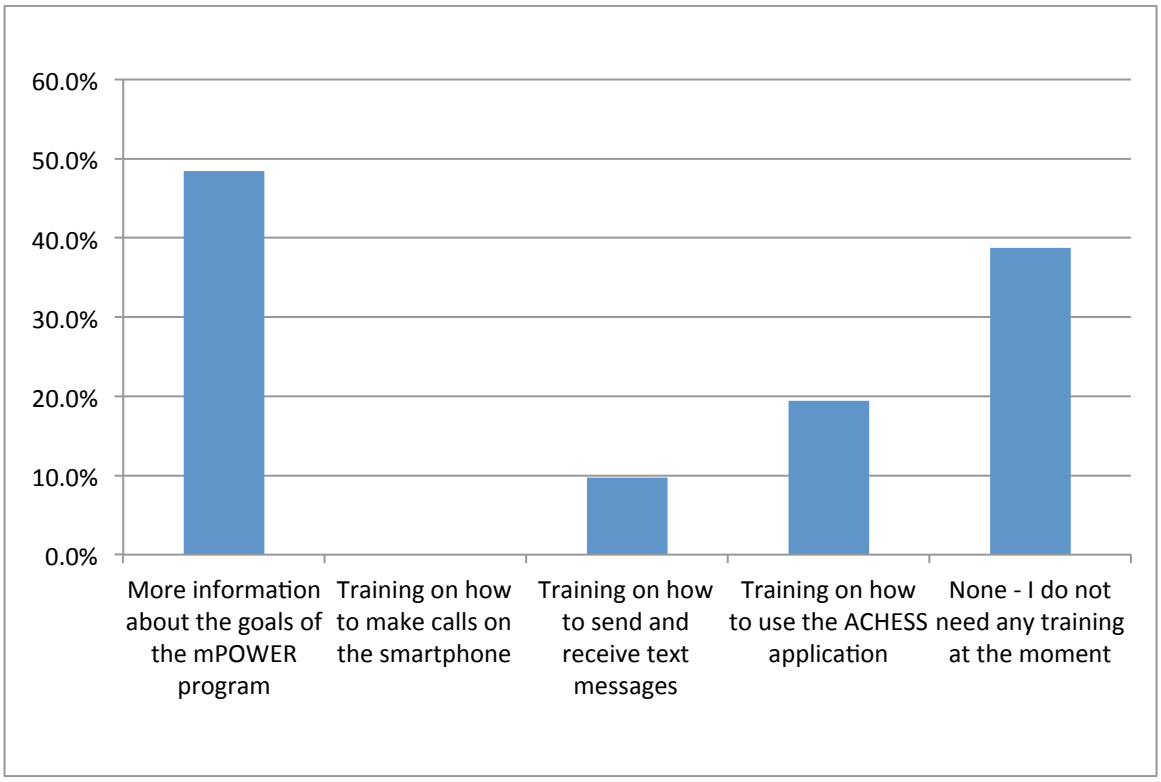
The majority of mPOWER participants (92%) felt as though the program had made them feel more involved with the management of their health and did not have any concerns with their involvement in the program (Figure 1).

Figure 1 - Patient perception of whether mPOWER influenced their engagement with their health



When asked what additional things would be helpful for them as they participate in the mPOWER program many noted wanting to better understand the goals of the program and to receive further training on use of the ACHESS application (Figure 2).

Figure 2. mPOWER Patient Perceived Training Needs



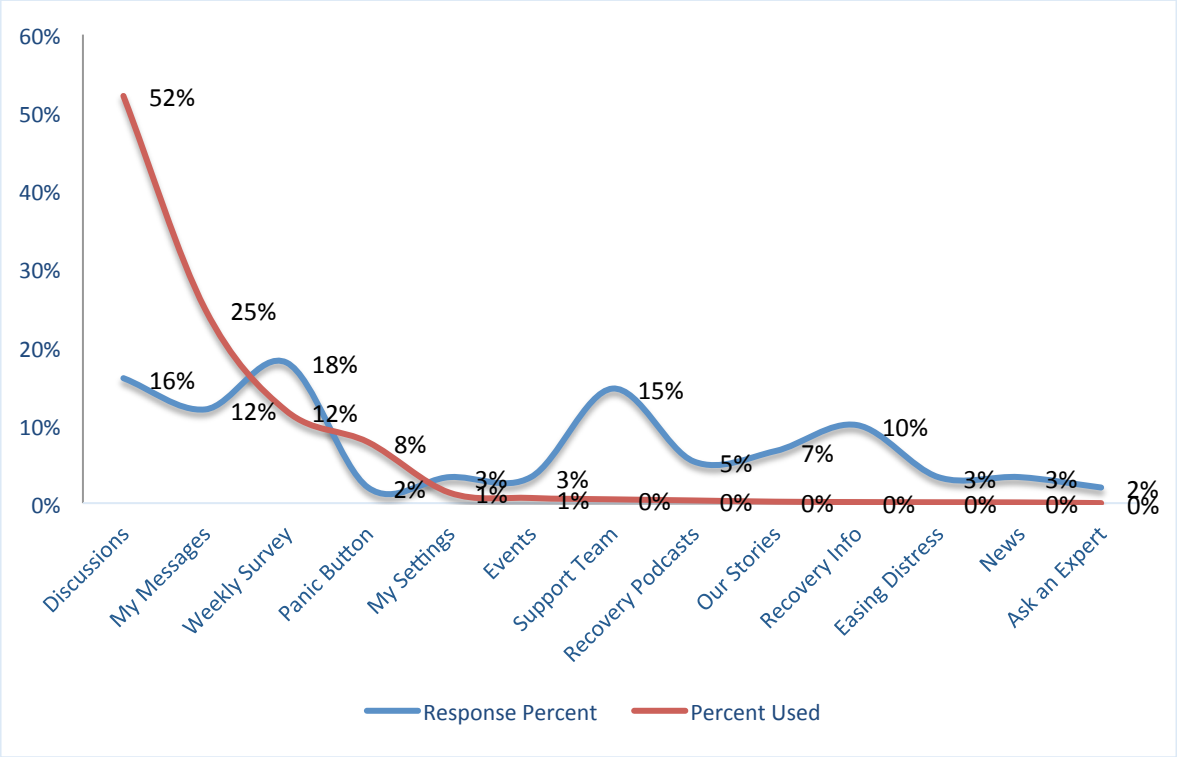
When asked what mPOWER could do for them that it wasn't already doing, responses included comments related to wanting increased smartphone functionality (e.g., ability to use the smartphone as an Internet tether), more training, treatment and individualized counseling, and opportunities to take on further roles within the program beyond general participant (e.g. peer leader).

Over half of the Veterans participating indicated that they had not owned a smartphone before participating (56%), but the majority (86%) was confident that they could use it. When asked whether participation in mPOWER had been difficult for them, 75% of those who had not owned a phone before enrollment disagreed. All patients who indicated having used a smartphone before mPOWER enrollment had no difficulty in program participation.

Veterans indicated that they had either learned to use the smartphone from an mPOWER staff member or were able to do so on their own. The majority of those who had used the smartphone found it to be helpful and reported being confident in their ability to use it.

Error! Reference source not found.3 below provides a comparison of the ACHESS applications perceived most useful by survey participants (blue-lined) as compared to the applications they actually used (blue-filled). Perceived use, while similar in many cases, did not directly match actual application use by participants. For example, while the discussion board feature was only perceived useful by 16% of the respondents, its use made up over half (52%) of ACHESS application use by respondents.

Figure 3. ACHESS applications perceived most useful by mPOWER participants compared to actual use

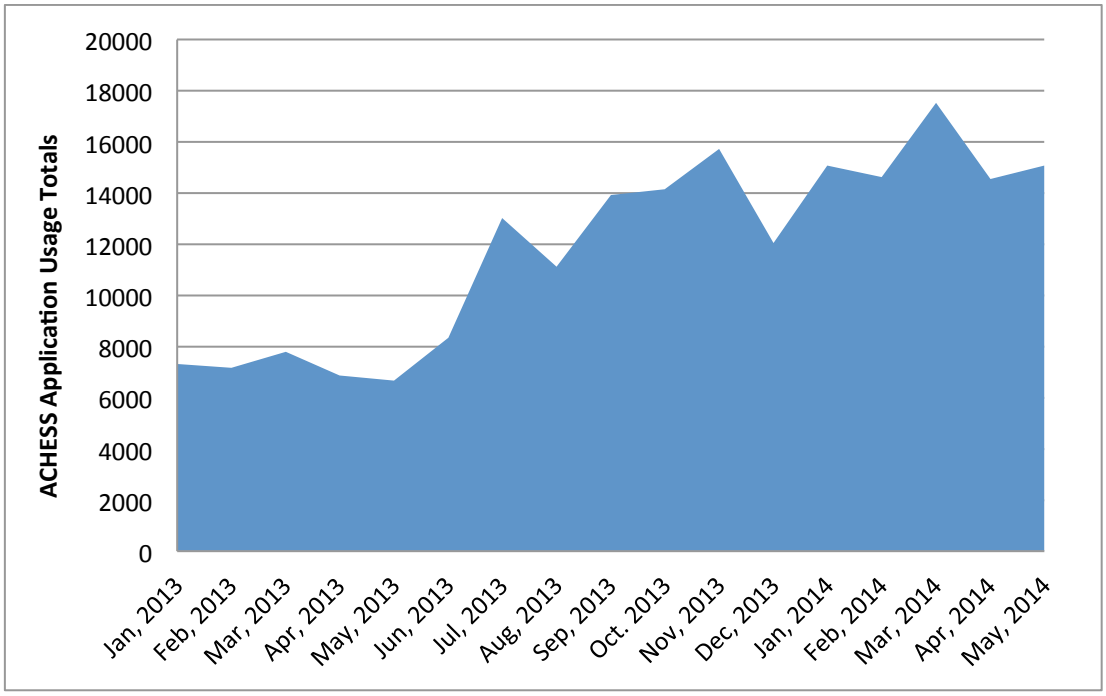


ACHESS mHealth Application Usage

Veterans accessed the ACHESS application an average of 297 times per month across 16 different applications; cumulatively having accessed ACHESS applications (does not include usage related to home page or non-application specific access) approximately 353000 times since April of 2012 through July of 2014. The last 6 months of use of ACHESS by Veterans increased upwards of 101% since the first six months of 2013 (Figure 4) and upwards of 230% since the first 6 months of the project. The range of use per participant ranged between less than 1% to upwards of 10%, with ten participants accounting for almost 50% of total usage.

The top five applications used (not including the Home page which is automatically accessed when opening the application) included Discussions, My Messages, the Weekly Brief Addiction Monitor (BAM) survey (not reported here) (Cacciola, et al., 2013), the Panic Button, and My Photos. The project discussion board overwhelmingly ended up being the primary service used within ACHESS (40% of all use).

Figure 4. ACHESS application usage from January 2013 to May 2014

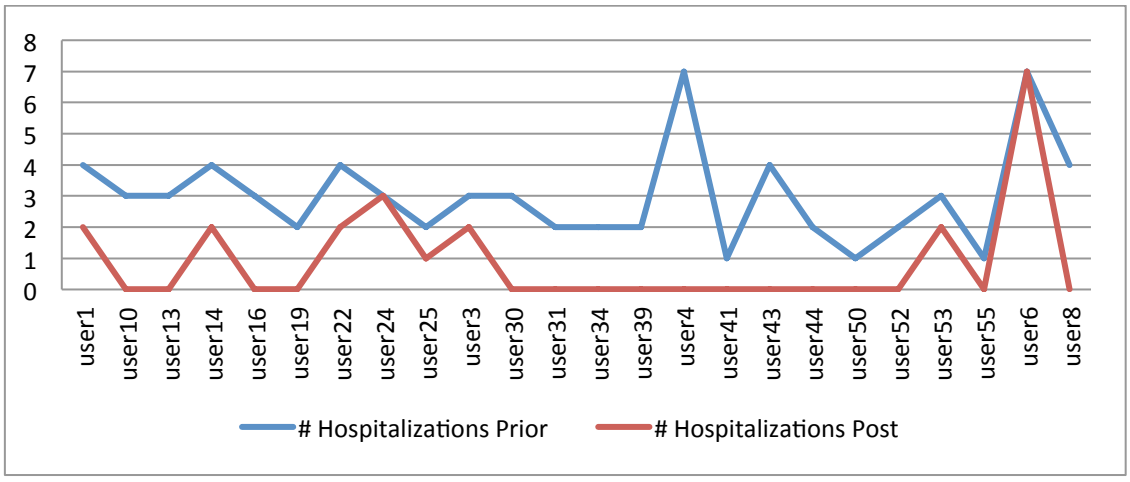


Outcomes - Readmission Rates

Analysis of mPOWER participants who had remained active in the mPOWER program (e.g., did not dropout or go for long periods without communicating with staff) (n=24), readmission rates decreased by 71% as compared to their readmission rates before their enrollment in the mPOWER program.

After enrollment in mPOWER the average decrease in 10-month readmission rates for active participants went from 3 readmissions to less than one (0.88) readmission after enrollment. Figure 5 below provides an illustration of readmission rates (y axis) per user (x axis) before and after program participation.

Figure 5. Comparison of hospitalization rates for participants 10 months before and 10 months after participation



As can be seen from the lines plotting readmissions, there is still a degree of uniformity across users in terms of their readmissions rates, with more at-risk users still being readmitted, but often at a lower rate.

There is little doubt that for those who were prescribed the Vivitrol medication that its ability to decrease urges had a significant impact on the Veteran's ability to reduce their frequency of relapse. Care staff, however, was not convinced this was the only key factor. Anecdotal comments from mPOWER care staff suggested that increased communication and opportunity to intervene more quickly with the Veterans had a significant impact on reducing readmission rate. It is also possible that increased follow-up and communication with Veterans helped to increase overall adherence to their care plan. Discussion board response data indicate that Veterans find value in being able to both discuss their challenges and successes with their peers, and also in being able to support their comrades in their own challenges when needed.

Because mPOWER participants were rural and frequently homeless, effective communications are a constant issue that had been partially mitigated through access to the smartphone. Loyola care staff working on the mPOWER project found that new pathways to care needed to be developed in order to properly integrate use of the mHealth tools into their workflow. The increased communication from Veterans was seen as a big step and great benefit, but also an issue to be considered as it related to the frequency of calls received and the hours and days in which Veterans were reaching out. If Veterans in the mPOWER program missed a group session or appointment, staff were now receiving calls from the Veterans apologizing for missing the appointment or letting them know that they couldn't make it. While this helps the staff reschedule and determine appropriate care plans for Veterans, it also provides opportunities for the Veterans to take responsibility for their own actions which is an important element in their recovery.

The term "network effect" describes a process through which greater participation in the network increases the value of a particular good or service (Abrahamson & Rosenkopf, 1997). It is important to mPOWER success for every care team member and participant to become intimately familiar with the mHealth tools and applications to increase the value of the service. An important project change was incorporating an alert that made Veterans aware of when their peers accessed the discussion board. After this change, as more Veterans saw their peers reach out greater participation was observed.

The mHealth tools such as the discussion board, play supporting roles to the recovery services provided by the Loyola staff and VA. Additional support services included face-to-face, group-based experiences led by Loyola clinicians and staff, sessions with recovery coaches and greater overall communication with the Veteran's care providers. Mobile health tools might best be seen as an extension of the direct support provided to patients, with the added convenience of being able to surpass the location-based constraints that used to hamper working with rurally located Veterans.

Conclusion

Research and development of mHealth devices and applications have seen marked growth in the last few years. Baseline studies of the effect of mHealth tools on outcomes, however, have been limited, especially as it relates to their use for treatment of substance abuse within Veteran populations. The mPOWER findings to date indicates that a network effect is being engendered and is visible to the degree that

Veterans are appreciative and find value with their recovery program. Participants and the care team appear to be adopting the mHealth tools effectively and using them as recovery resources, and within the first pilot of the mPOWER project a pronounced reduction in readmissions is observed. Preliminary findings from the mPOWER project illustrate the potential in adopting a bundle of mHealth, medication and therapy tools by Veterans that may reduce hospital readmissions due to substance use disorders.

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