Smartphone and Mobile Application Utilization Prior to and Following Treatment Among Individuals Enrolled in Residential Substance Use Treatment

Jennifer Dahne, M.S. *, Carl W. Lejuez, Ph.D.

Center for Addictions, Personality, and Emotion Research, University of Maryland, College Park, 2103 Cole Student Activities Building, College Park, MD, 20742, United States

ARTICLE INFO

ABSTRACT

Background: Following completion of substance use treatment, it is crucial for patients to continue to utilize skills learned in treatment for optimal treatment outcomes. Mobile applications (apps) on smartphones offer a unique platform to promote utilization of evidence-based skills following completion of substance use treatment. Despite the promise of mobile apps and smartphones for treatment delivery, it remains unknown whether patients in substance use treatment in the United States have access to smartphones and utilize mobile apps on smartphones. The present study sought to determine smartphone utilization among individuals enrolled in one residential substance use treatment center in the U.S. catering specifically to low-income adults.
Methods: Participants included 251 individuals at a residential substance use treatment center in Washington DC admitted to the center between March, 2014 and January, 2015. During the intake process, participants completed interviewer-administered demographics and psychiatric questionnaires as well as a self-report of technology utilization.
Results: Results indicated that the majority of patients in this residential substance use treatment center owned mobile phones prior to treatment entry (86.9%) and expected to own mobile phones after leaving treatment (92.6%). Moreover, the majority of these phones were (68.5%) or will be smartphones (72.4%) on which patients reported utilizing mobile applications (prior to treatment: 61.3%; post treatment: 64.3%) and accessing the Internet (prior to treatment: 61.3%; post treatment: 65.9%).
Conclusions: Mobile phone and smartphone ownership among this sample were comparable to ownership among U.S. adults broadly. Findings suggest that smartphones and mobile apps may hold clinical utility for fostering continued use of treatment skills following substance use treatment completion.

1. Introduction

In 2012, at any given time, more than 1.25 million individuals were enrolled in the 14,500 dedicated substance use treatment centers in the United States (National Institute on Drug Abuse, 2012; Substance Abuse and Mental Health Services Administration, 2013). While treatment itself is crucial to recovery, it is also necessary for patients to continue to utilize skills learned during the course of substance use treatment following completion of treatment as patients who more frequently utilize treatment skills tend to have better treatment outcomes following treatment completion (Hundt, Mignogna, Underhill, & Cully, 2013). In recent years, a number of mobile applications (apps) have been developed that adhere to evidence-based substance use treatment principles. These apps may be ideal for helping patients to continue to use treatment skills after completing substance use treatment.

Utilization of mobile app therapies for promoting evidence-based skill use following the completion of substance use treatment is predicated on patients having access to smartphones capable of downloading mobile applications. Despite the potential promise of smartphones and mobile apps for addressing gaps in substance use treatment research, few studies to date have examined smartphone ownership and mobile app utilization among individuals in substance use treatment. One study by Milward, Day, Wadsworth, Strang and Lynskey (2015) with patients enrolled in four United Kingdom (U.K.) community drug treatment programs found that 83% of patients reported owning a mobile phone, 57% of which were smartphones. Moreover, 72% of patients in this study had pay-as-you-go contracts, which may be related to more frequently changing phone numbers and lower treatment retention (McClure, Acquavita, Harding, & Stitzer, 2013). An additional study by McClure et al. (2013) solely examined technology utilization among individuals in substance use treatment in the U.S., but did not gauge smartphone or mobile application utilization. Results of this study suggest that 91% of patients had access to a mobile phone and 79% utilized text messaging. Moving forward from these two studies to understand the potential use of evidence-based smart phone apps for substance

* Corresponding author. Tel.: +1 443 625 8435.
E-mail address: jdahne@umd.edu (J. Dahne).

use treatment in the United States, it is important to consider access to smartphones, particularly among low-income patients in the most intensive levels of care (i.e., residential treatment) as these patients may have the greatest treatment needs.

The present study sought to determine smartphone utilization among individuals enrolled in a residential substance use treatment center in the U.S. catering specifically to low-income adults. To extend previous research by Milward et al. (2015) and by McClure et al. (2013), within smartphone utilization, we were specifically interested in: 1) mobile phone ownership, 2) SMS text messaging capability and utilization, 3) smartphone ownership, 4) utilization of mobile apps, 5) utilization of a smartphone to access the Internet, and 6) contract type. An additional exploratory aim of the present study was to examine associations between demographic variables and mobile phone utilization.

2. Methods

2.1. Participants

Participants included 251 individuals admitted to a residential substance use treatment center in Washington DC between March, 2014 and January, 2015. Demographic information for participants is shown in Table 1.

2.2. Procedure

Permission to conduct research was obtained from the University of Maryland Institutional Review Board. Data for the present study were collected as part of an intake-to-treatment interview at the residential substance use treatment center during which doctoral-level trained interviewers asked patients questions about their substance use history, psychopathology, and smartphone utilization. At the end of the interview, participants were given the option to provide informed consent for the data they shared to be used for research purposes. More than 95% of individuals did consent to be included in research and are included here.

2.3. Measures

2.3.1. Demographic information
Demographic information (sex, age, race, education) was collected using the demographic portion of the Psychiatric Research Interview for Substance and Mental Disorders (PRISM; Hasin et al., 1996).

2.3.2. Substance use and psychopathology
As part of the standard intake battery at the treatment facility, psychiatric history and current psychopathology were diagnosed by trained doctoral-level interviewers using the Structured Clinical Interview for the DSM-IV-TR (First, Spitzer, Gibbon, & Williams, 2002).

2.3.3. Mobile phone utilization
Mobile phone utilization was assessed using an adapted version of the communication technology questionnaire developed by McClure et al. (2013). Questions gauged mobile phone and smartphone utilization both prior to and following treatment. Questions assessed: 1) mobile phone ownership (Y/N), 2) contract type (pay-as-you-go, annual contract, government issued/Safelink, other), 3) phone SMS text messaging capability (Y/N), 4) SMS text messaging utilization (Y/N), 5) smartphone ownership (Y/N), 6) mobile app downloads (Y/N), and 7) using the phone to access the Internet (Y/N). We refer to questions regarding technology utilization prior to treatment as "prior to treatment" and questions regarding anticipated technology utilization following treatment discharge as "post treatment."

Table 1
Demographics and technology use.

Demographics		
Age (M(SD)) (n = 251)	43.21(11.74)	
Gender (n = 250)		
Male	66.80%	
Female	32.80%	
Transgender	0.40%	
Race (n = 251)		
White	1.60%	
Black	96.80%	
Hispanic	0.40%	
Other	1.20%	
Education (n = 251)		
Less than GED	49.00%	
More than GED	51.00%	
Income (n = 237)		
<$15,000	85.70%	
>$15,000	14.30%	
Court mandated to treatment (n = 251)	72.10%	
Current SUD diagnosis (n = 250)		
Alcohol dependence	25.60%	
Cannabis dependence	10.00%	
Opioid dependence	16.00%	
Cocaine dependence	30.80%	
Hallucinogen/PCP dependence	16.00%	

Technology use		
Prior to treatment	Yes	No
Own a mobile phone (n = 251)	86.90%	13.10%
SMS capability (n = 218)	95.90%	4.10%
Use text messages (n = 218)	83.00%	17.00%
Own a smartphone (n = 216)	68.50%	31.50%
Download mobile apps (n = 217)	61.30%	38.70%
Use the phone to access the Internet (n = 217)	61.30%	38.70%
Contract type (n = 209)		
Pay-as-you-go	50.70%	
Annual contract	24.40%	
Government issued/Safelink	23.90%	
Other	1.00%	
Post treatment	Yes	No
Own a mobile phone (n = 243)	92.60%	7.40%
SMS capability (n = 223)	96.40%	3.60%
Use text messages (n = 222)	84.70%	15.30%
Own a smartphone (n = 221)	72.40%	27.60%
Download mobile apps (n = 221)	64.30%	35.70%
Use the phone to access the Internet (n = 223)	65.90%	34.10%
Contract type (n = 213)		
Pay-as-you-go	51.60%	
Annual contract	25.40%	
Government issued/Safelink	21.60%	
Other	1.40%	

Note: SUD = substance use disorder, SMS = short message service. The total sample size for the study was 251. The respective n's next to each item represent the number of patients for whom we have data for that item. For demographic data and for owning a mobile phone post treatment, sample sizes less than 251 are due to missing data (e.g., the patient did not answer that question or ended the interview early). For the technology utilization items all patients were asked whether they owned a mobile phone prior to treatment and whether they anticipated owning a mobile phone post treatment. Only patients who endorsed "yes" for these items were queried with subsequent items.

2.4. Data analytic strategy

All data were analyzed using SPSS version 22. Descriptive statistics were used to examine demographic characteristics, mobile phone utilization, and DSM-IV-TR substance use disorder (SUD) diagnoses of the sample. In order to predict technology use outcomes, exploratory binary logistic regression analyses were used in order to control for inter-related predictors. Because having a non-annual phone plan has been related to more frequently changing phone numbers (McClure et al., 2013), we dichotomized mobile phone plan as annual contract vs. not annual contract. Thus, all technology variables