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Authors

Cohen, Amy
Niv, Noosha
Nowlin-Finch, Nancy
[et al.](#)

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Mobile Phone and Smartphone Use by People with Serious Mental Illness

Alexander S. Young, MD, MSHS,

Veterans Greater Los Angeles Healthcare System, Los Angeles CA; University of California Los Angeles, Los Angeles CA

Amy N. Cohen, PhD,

Veterans Greater Los Angeles Healthcare System, Los Angeles CA; University of California Los Angeles, Los Angeles CA

Noosha Niv, PhD,

Veterans Long Beach Healthcare System, Long Beach CA

Nancy Nowlin-Finch, MD,

Los Angeles County Department of Mental Health, Los Angeles CA

Rebecca S. Oberman, MPH, MSW,

Veterans Greater Los Angeles Healthcare System, Los Angeles CA

Tanya T. Olmos-Ochoa, PhD, MPH,

Veterans Greater Los Angeles Healthcare System, Los Angeles CA

Richard W. Goldberg, PhD,

Veterans Maryland Healthcare System, Baltimore MD

Fiona Whelan, MS

University of California Los Angeles, Los Angeles CA

Abstract

Objective: Mobile technologies can deliver assessments and interventions that reach into people's daily lives and improve services. There is, however, disagreement regarding whether people with serious mental illness are making meaningful use of mobile technologies, and whether technologies should be tailored for this population.

Methods: At two clinics, 249 people with serious mental illness were interviewed regarding mobile phone use and had their cognitive functioning assessed.

Results: Mobile phones were used by 85%, including 60% who used a smartphone. Mobile phones were used for messaging by 81%, internet by 52%, email by 47%, and apps by 45%. Individuals were less likely to use a smartphone if they were older, had a persistent psychotic disorder, received disability income, or had worse neurocognitive functioning ($\chi^2=52.7$, $p<.001$).

Corresponding author: Alexander Young, ayoun@ucla.edu.

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Conclusions: Most people with serious mental illness use a mobile phone. A majority use a smartphone. Intervention developers should consider tailoring for psychosis and cognitive deficits.

INTRODUCTION

Surveys indicate that 95% of U.S. adults own a mobile phone, and three-quarters own a smartphone (1). Numerous evidence-based interventions use mobile messaging or apps to deliver services for persistent health conditions such as smoking, obesity or diabetes (2). While there also is enthusiasm regarding mobile assessments and interventions in people with serious mental illness, research and dissemination has been slow. There continues to be substantial skepticism from researchers and clinicians, and uncertainty regarding whether people with serious mental illness are using mobile phones or smartphones, whether they can use the same mobile interventions as other people, and whether apps would benefit from tailoring to meet the specific needs of this population (3).

It is often difficult to implement evidence-based mental health treatments. Clients are often not using effective treatments (4). The dissemination of mobile phones is an opportunity for monitoring and intervention outside the clinic setting, reaching clients when and where it is convenient for them. Interventions using technology could promote health behavior change, improve the effectiveness of interventions, and reach large populations (2). There have been studies of mobile phone ownership in people with serious mental illness (5). Most studies are from before the rapid dissemination of smartphones, and say little about smartphone use. Research studies on non-smartphone mobile phones found that about 86% of people owned a mobile phone (6). There have also been studies on the feasibility of using mobile phones as part of treatments in people with serious mental illness (7). These have found that mobile interventions can be feasible and improve the therapeutic alliance (8). Attention has turned more recently to smartphone use. It is not clear how often individuals with serious mental illness use smartphones, for what functions, and whether characteristics of this population limit use of smartphones.

There are issues specific to the population with serious mental illness that could impede smartphone use. People with serious mental illness have conditions that are often accompanied by socioeconomic disadvantage, limited education, symptoms, and cognitive impairments that could affect phone use. Socioeconomic barriers include limited income, although the federal Lifeline program offers phones, including smartphones, to most people with serious mental illness at low cost. Cognitive barriers include pervasive problems with speed of processing, attention, working memory, verbal learning and memory, visual learning and memory, and problem solving. In-person interventions have been tailored to accommodate cognitive deficits and literacy issues (9). Mobile interventions have not been consistently tailored for people with serious mental illness (10).

This is a study of mobile phone use among individuals with serious mental illness at mental health clinics. The purpose is to understand use of mobile phones and smartphones by people with serious mental illness. The study examines whether and how they are using these phones, which phone functions they are using, and how phone use varies by demographics, education, psychiatric diagnoses, disability, and cognitive functioning.

METHODS

Participants were recruited as part of a larger project studying interventions intended to improve the diet and activity of overweight individuals with serious mental illness (11). Recruitment occurred at two large mental health clinics, one operated by the Department of Veterans Affairs (VA) and one by the Los Angeles County Department of Mental Health. Individuals in treatment were eligible if they were overweight and had a diagnosis of schizophrenia, schizoaffective disorder, bipolar disorder, major depressive disorder with psychosis, or severe persistent post-traumatic stress disorder. The study was approved by the Institutional Review Boards and human subjects committees of all involved institutions. Participants provided written informed consent. Enrollment occurred between March of 2012 and April of 2014. Research staff interviewed participants regarding demographics, level of education, receipt of disability income, internet access, the mobile phone they used, and information regarding which functions and apps they used on their phone. Smartphones were identified by determining the specific manufacturer and model of the phone. Cognitive functioning was measured using the Digit Symbol Test to assess neurocognitive speed of processing (12), and the Hopkins Verbal Learning Test Revised, measurements from which have been associated with disability (13). Cognitive functioning was transformed to general population norms (13, 14). Multiple logistic regression was used to examine the effect of participant characteristics on both mobile phone use and smartphone use.

Semi-structured interviews were completed with a random subset of 48 participants. Respondents were asked about their use of mobile phones and interest in mobile phone apps. The interviews were audio-recorded and transcribed. Atlas.ti was used to organize analysis into thematic sections. Two research team members used open coding to label text segments of interest. Transcripts were coded to the interview questions and for any additional pertinent factors emerging during coding. Discrepancies in coding were discussed and reconciled after coding. Overarching-themes were identified from the open coding through an iterative process.

RESULTS

Three-hundred twenty-six individuals enrolled in the larger study, including 276 at the VA clinic and 50 at the county clinic. There were 77 participants lost to follow-up. They were not interviewed about mobile phone usage, leaving 249 participants for mobile phone analyses. In this sample, mean age was 54 ± 9.8 ; 224 (90%) were male; 108 (43%) were white, 102 (41%) black, 6 (2%) Native American and remaining were mixed or other race; and 28 (13%) were Hispanic. There were 115 (46%) with schizophrenia, 58 (23%) bipolar disorder, 45 (18%) persistent PTSD, and 31 (12%) other persistent psychotic disorders. Education was high school or less for 79 (32%), any college for 159 (64%), and any graduate school for 11 (4%); 138 (55%) received social security or VA disability payments. Mean transformed cognition on Hopkins Verbal Learning was 34.8 ± 7.6 , and Digit Symbol was 37.4 ± 11.5 . Both are more than one standard deviation below population norms.

Two-hundred thirteen (86%) had a mobile phone, and 149 (60%) had a smartphone. The rates of mobile phone and smartphone use were similar at the VA and county clinics.

Smartphones were used by 44 (77%) of people with bipolar, 20 (77%) with other psychoses, 34 (76%) with PTSD, and 51 (44%) with schizophrenia. Of smartphones, 105 (71%) were Android, 40 (27%) iPhone and 4 (3%) Blackberry. Of those with a mobile phone, 173 (81%) used it for messaging, 127 (60%) for camera, 111 (52%) for internet, 99 (45%) for email, 96 (45%) for apps, 87 (41%) for music, 86 (40%) for calendar, 61 (29%) for alarm, and 49 (23%) for calculator. Rates of use of functions were lower in people who did not have a smartphone. When asked for the app they used most frequently, the response was, in descending order of frequency, social media, video, games, music, and maps. The second most frequently used app was email, social media, music, video, games and news.

Table 1 presents correlates of use of mobile phones and smartphones from regression analyses. The first model found that individuals were less likely to use any mobile phone ($\chi^2=33.5, p<.001$) if they were male, receiving disability income, or had worse neurocognitive speed of processing. The second model found that individuals were less likely to use a smartphone ($\chi^2=52.7, p<.001$) if they were older, had schizophrenia, received disability income, or had worse neurocognitive speed of processing.

Qualitative analyses resulted thematic categories of facilitators, barriers, and preferences regarding mobile phones and smartphones. Facilitators to mobile interventions included convenience and increased access to services. While some respondents were hesitant about computers, there was general enthusiasm for mobile apps. There was substantial interest in obtaining a smartphone and learning more about use of smartphones. There was belief that smartphones could provide structure, supports and services between clinic visits. Barriers included the costs of smartphones and data plans, concerns about privacy and security, limited experience and comfort with technology and apps (tech literacy), and having an old phone with limited capacity. Responses suggested that mobile interventions could be more successful if they consider issues specific to this population.

DISCUSSION

The rapid increase in the rate of smartphone use has also occurred in the population with serious mental illness, with growth trends and ownership rates comparable to the general population. When the data in this study were collected, about 90% of U.S. adults owned a mobile phone and 55% owned a smartphone. In this population with serious mental illness, there were similar rates of use. People were making frequent use of mobile phone messaging and smartphone apps. This provides a timely opportunity to enhance disease management by extending health interventions beyond the reach of traditional care settings. Mobile phones can deliver content that is intensive, engaging, accessible, and tailored to the needs of a particular client population. Competing demands on time (e.g., work, school, care of children and other dependents) and other barriers (e.g., transportation in urban or rural areas) make it difficult for clients to receive services during clinic hours. Mobile services can reduce the need for clients to visit mental health clinics, and allow services to be brought to clients, at their convenience. Although technology has revolutionized the delivery of many healthcare services, mental health services remain largely office-based.

In other areas of healthcare, patient-reported outcomes have improved treatments and outcomes, and driven measurement-based care. In mental health, there have been calls for similar interventions, and apps and messaging, but questions remain regarding the use of these methods with people who have serious mental illness. Some have been concerned this population cannot make productive use of mobile phones or smartphones. Some believe that people with serious mental illness are able to use the same apps and interventions as populations without serious mental illness. This study finds that a large proportion of this population with serious mental illness are making use of mobile phones and smartphones, and interested in mobile interventions. Limitations of this study include that the sample consisted of clients who were in treatment in one urban area, overweight, and willing to participate in intervention research. They may not be representative of the national population with serious mental illness. Also, while Lifeline is a national program that can provide low-cost mobile phone access, people with low incomes can still have barriers to access. In the population studied here, certain characteristics of serious mental illness did have a meaningful impact on smartphone use, including having a mental health disability, schizophrenia, or cognitive impairment. Mobile interventions can accommodate these characteristics. This tailoring could strengthen impact of interventions.

CONCLUSIONS

The population of people studied here with serious mental illness have rates of ownership and use of smartphones that are similar to the general population. Opportunities exist for researchers, clinicians, and technology developers to address serious mental illness through mobile interventions using smartphones. There is a need for studies of the implementation and effectiveness, in populations with serious mental illness, of mobile interventions that accommodate the cognitive, literacy and financial characteristics of this population.

Disclosures and acknowledgements:

The authors report no potential conflicts of interest.

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Highlights:

- Rates of mobile phone and smartphone use by people with serious mental illness were similar to the general population.
- Phones were commonly used for messaging, social media, internet, email and apps.
- Individuals were less likely to use a smartphone if they were older, had a persistent psychotic disorder, received disability income, or had worse neurocognitive functioning.

TABLE 1.Correlates of mobile phone ownership among 249 study participants^a

Variable	OR	95% CI	p
Owns any mobile phone			
Age (years)	.97	.92 – 1.02	.25
Female (reference: male)	5.99	1.54 – 23.34	.01
High school or less education (reference: graduate school)	1.34	.11 – 16.89	.70
College education (reference: graduate school)	1.00	.08 – 11.34	.83
Persistent PTSD (reference: bipolar disorder)	.31	.05 – 2.05	.52
Schizophrenia (reference: bipolar disorder)	.23	.05 – 1.17	.12
Receives disability income	.15	.05 – .40	<.001
Digit Symbol cognitive score	1.05	1.01 – 1.10	.02
HVLT cognitive score	.98	.92 – 1.06	.68
Owns a smartphone			
Age (years)	.92	.88 – .96	<.001
Female (reference: male)	1.67	.53 – 5.29	.38
High school or less education (reference: graduate school)	1.15	.16 – 8.35	.93
College education (reference: graduate school)	1.47	.22 – 9.94	.56
Persistent PTSD (reference: bipolar disorder)	.99	.31 – 3.17	.19
Schizophrenia (reference: bipolar disorder)	.28	.11 – .69	<.001
Receives disability income	.38	.19 – .76	.006
Digit Symbol cognitive score	1.04	1.01 – 1.07	.01
HVLT cognitive score	.97	.92 – 1.02	.25

^aResults are from multiple regression