

Mobile Phones as a Medium of Mental Health Care Service Delivery: Perspectives and Barriers among Patients with Severe Mental Illness


Gopika Sreejith, Vikas Menon¹

ABSTRACT

Background: The use of mobile phone technology to support various components of health care delivery (often referred to as mHealth) is on the rise. Little systematic information, however, is available on user felt needs and barriers to mHealth approaches among people with severe mental illness (SMI). Our objectives were to elicit user needs, preferences, and barriers to using mobile phones for health care service delivery among people with SMI. **Materials and Methods:** A cross-sectional study was carried out among 75 subjects with SMI between August 2017 and October 2017. All patients had a minimum illness duration of two years or more and a Global Assessment of Functioning score of less than 70. Information on user perspectives was elicited using a 10-item structured questionnaire, to assess mobile phone usage patterns, felt needs, barriers, and preferences, developed for use in patients with SMI. **Results:** Majority of the patients reported using mobile phones and were favorably disposed to mHealth approaches. Voice calls ($n = 47, 62.7\%$) were the most preferred mode of service delivery. The most preferred service frequency was twice-weekly ($n = 31, 41.3\%$), followed by once-weekly ($n = 22, 29.3\%$). Majority ($n = 47, 62.7\%$) reported no barriers to mobile phone usage, whereas 14 (18.6%) perceived a lack of necessity of mobile phones as a service delivery medium. Reminders about medication and appointments through mobile phones ($n = 35, 46.6\%$) were the most felt needs, followed by crisis helplines ($n = 27, 36.0\%$) and information about mental health services ($n = 22, 29.3\%$). **Conclusion:** These findings support the use of mHealth approaches in resource-constrained settings and provide specific inputs to refine the modalities of mHealth service delivery.

Key words: Bipolar disorders, mHealth, mobile phone, psychiatry, schizophrenia, telemedicine

Key messages: Mobile phone based approaches can be used to facilitate mental health care service delivery for patients with severe mental illness in our country. Twice-weekly voice calls appear to be the most preferred frequency and mode of service delivery, whereas reminders about medication and appointments were the most common felt need in this population.

Access this article online	
Website: www.ijpm.info	Quick Response Code 
DOI: 10.4103/IJPSYM.IJPSYM_333_18	

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Sreejith G, Menon V. Mobile phones as a medium of mental health care service delivery: Perspectives and barriers among patients with severe mental illness. Indian J Psychol Med 2019;41:428-33.

3rd year MBBS Student, ¹Department of Psychiatry, Jawaharlal Institute of Post Graduate Medical Education and Research, Dhanvantri Nagar, Puducherry, India

Address for correspondence: Dr. Vikas Menon
Department of Psychiatry, Jawaharlal Institute of Post Graduate Medical Education and Research, Dhanvantri Nagar, Puducherry - 605 006, India. E-mail: drvmenon@gmail.com

Received: 07th August, 2018, **Accepted:** 21st July, 2019

Inequitable access to professional mental health services is a major issue in low- and middle-income countries like India.^[1,2] Consequently, a significant percentage of people who are in need of treatment may not receive it. This is often referred to as the treatment gap in mental health disorders,^[3] which can be attributed, partly, to ineffective service delivery or utilization. Remote health technology has been rightly positioned as a low-cost, low-burden, sustainable method to address this unmet need.^[4,5] Increasing mobile phone penetration rates in India and the rest of the world^[6,7] offer a valuable opportunity to harness the power of technology to improve care delivery. More specifically, this medium offers us valuable opportunities to scale up service delivery, provide real-time health outcomes data, and even deliver real-time interventions in the natural environment of the patient, otherwise referred to as “ecological momentary interventions.”^[8-10]

Based on this premise, several trials using mobile phone based interventions for enhanced management of a range of chronic health conditions, including mental disorders, have emerged from different parts of the globe. Such approaches are commonly referred to as “mHealth,”^[11] where the focus is on leveraging mobile technology to support various aspects of health care delivery. In the last decade or so, the evidence base for mHealth approaches in improving adherence, providing psychotherapy services as well as data diagnostics, is rapidly increasing.^[12-14] However, there is relatively less data on user preferences and barriers to such approaches.

For optimal success, it is essential to elicit user perspectives and service delivery preferences before the implementation of mobile phone based interventions. This will help in planning interventions that have maximal uptake, continued service usage, and enhanced user satisfaction, ultimately improving clinical outcomes. The barriers to and perspectives on utilizing mobile phones for mental health services may, presumably, differ across cultures and ethnic groups. For instance, it has been shown that patients in South Asian cultures find such approaches to be less stigmatizing.^[15] To the best of our knowledge, only one previous study, restricted to centers from North India, has previously assessed barriers and perspectives to mHealth approaches among people with severe mental illness (SMI).^[16]

Against this background, we carried out the present study with three objectives: first, to elicit patient perspectives and preferences and to understand their felt needs regarding the utilization of mobile phone technology for health care services delivery; second, to assess mobile phone usage patterns among people

with SMI; and third, to assess the barriers to using mobile phones among people with SMI. We restricted our study only to patients with SMI as they are likely to be the most underserved group and, therefore, the most likely to benefit from such approaches than say, people with common mental disorders.

MATERIALS AND METHODS

Setting and design

This was a cross-sectional study carried out in the Psychiatry outpatient department of a teaching-cum-tertiary care center, between August 2017 and October 2017. The hospital, which is attached to a centrally funded autonomous university, is located in an urban area of the union territory of Puducherry, India. Being a centrally funded institution offering heavily subsidized treatment, it draws a significant percentage of clients from the neighboring districts of the state of Tamil Nadu and a smaller proportion from other Indian states. The hospital has all the specialty and super-specialty departments functioning out of a single campus. Most of the service users are patients who belong to the low-income bracket.

All cases presenting to the outpatient walk-in clinic were first screened by a senior resident (qualified psychiatrist) and subsequently, given an appointment for detailed evaluation. On this day, after a detailed history taking and physical examination, a diagnosis and management plan were formulated. All psychiatric diagnoses were made as per the International Classification of Diseases—10 (ICD-10).^[17] Patients with a diagnosis of bipolar disorder were asked to follow up in the Mood Disorders Clinic, and those with schizophrenia were assigned to the Psychotic Disorders Clinic. Allotted patients attended their respective clinics once in three weeks for their drug refills.

Subjects and methods

Participants were selected by convenient sampling from the Psychiatry outpatient department. We screened all patients who were on regular follow-up in both the clinics so that every patient had an equal chance of being recruited, and we did not resort to advertisements within or outside the clinic. Only clinically stable patients (who had no changes made to their medication schedule in the last one year) were selected for the study. Screening and recruitment were done by a single investigator and verified by a consultant psychiatrist. The inclusion criteria were outpatients ($n = 75$) in the age group 18–65 years, fulfilling the criteria for SMI as per Ruggeri *et al.*,^[18] which include two criteria:

1. Duration of treatment of two years or more, and
2. dysfunction, as measured by a Global Assessment of Functioning (GAF) Scale^[19] score of 70 or less.

Apart from documented intellectual subnormality, there were no other exclusion criteria. The Mini International Neuropsychiatric Interview (MINI)^[20] version 5.0 was used to confirm the diagnosis in all recruited patients. Sample size ($n = 75$) was determined based on twin considerations: study site sample from a previous similar paper^[16] as well as the time period available for the study. No formal assessment of mental health care capacity was undertaken because we reasoned that selecting clinically stable patients would give us a fair chance of eliciting desired responses.

Those patients fulfilling the above inclusion and exclusion criteria were recruited after taking written informed consent in the vernacular. Separate consents were sought from both the patient as well as the attendant. Basic sociodemographic data were collected by administering a semistructured pro forma.

Subsequently, questionnaire to assess mobile phone usage patterns, perspectives, and barriers in people with SMI^[16] was used to collect major outcome data. This is a nine-item questionnaire specifically developed by Indian authors for use in people with SMI that elicits information about usage patterns, ownership details, felt needs, and barriers to mobile phone usage for service delivery. The questionnaire was developed by authors after going through similar instruments from other countries^[21] and adapted for use in Indian conditions. Hence, it was thought to be a culturally appropriate tool for the present study and was utilized as such. Face and content validity checks were carried out at our center by running the questionnaire through three faculty experts. Based on their opinion, we included one additional question on the preferred frequency of health service delivery as it would be of relevance to planning future mobile phone based services. This was not covered in the original questionnaire. For certain questions, such as preferred services to be delivered and barriers to using mobile phones, patients were asked to tick as many options as they felt applicable to them. This, we hoped, would give a truer picture of the many barriers that may be operating in a single patient.

The entire process of data collection took about 10–15 min per patient. The study protocol had prior approval from the Institute Ethics Committee for Human Studies.

Data analysis

Baseline sociodemographic and clinical variables of recruited patients were represented as mean with standard deviation or frequencies and percentages for continuous and categorical data, respectively. For results on the main questionnaire, descriptive data using simple frequency distributions were used to describe

mobile phone ownership, usage patterns, and barriers to accessing services.

RESULTS

A total of 75 patients participated in the study, of whom 37 (49.3%) had a diagnosis of bipolar disorder, and 38 (50.7%) were diagnosed with schizophrenia.

The mean (\pm SD) age of the sample was 38.01 (\pm 11.3) years. There were 37 males and 38 females. Majority were married ($n = 42$, 56.0%), were unemployed ($n = 50$, 66.7%), had studied only till primary school ($n = 30$, 40.0%), and had a per capita monthly income of less than 1500 Indian rupees ($n = 70$, 93.3%), i.e., lower and lower-middle-class as per “modified BG Prasad classification.”^[22] Majority were from nuclear families ($n = 46$, 61.3%). A slender majority of subjects hailed from urban or semiurban areas ($n = 38$, 50.7%) as opposed to rural areas ($n = 37$, 49.3%).

Only 10.7% ($n = 8$) of respondents did not use mobile phones. Of the remaining, nearly equal numbers reported having a mobile phone registered in their name ($n = 34$, 45.3%) or using a phone registered in a family member’s name ($n = 33$, 44.0%). Two-third of the sample ($n = 50$, 66.7%) used only simple cell phone handsets, whereas 22.7% ($n = 17$) reported having a smartphone.

A good majority ($n = 63$, 84.0%) used prepaid phone connections, whereas only one respondent used a postpaid connection. More than half the sample ($n = 41$, 54.7%) preferred to use only the talk function on their phones, whereas texting ($n = 13$, 17.3%) and surfing the net ($n = 13$, 17.3%) were less widely used functions.

More than three-quarters of the sample ($n = 57$, 76.0%) reported using their phones daily, whereas eight subjects (10.7%) were using it only on a weekly basis. One person (1.3%) reported monthly usage, and another person (1.3%) was using his phone on a twice-weekly basis.

Reminders about hospital appointments and medication were the most preferred service through mobile phone mediums ($n = 35$, 46.6%). The distribution of mobile phone based services preferred is shown in Table 1.

Majority of the sample preferred voice calls ($n = 47$, 62.7%) as their preferred service delivery medium over text messages ($n = 14$, 18.7%) and email ($n = 1$, 1.3%). Thirteen subjects (17.3%) expressed their disinterest to receive service delivery through the mobile phone medium. Among the remaining who were not averse to

the idea, 31 subjects (50%) preferred to receive services on a twice-weekly basis, making it the most popularly preferred frequency of service delivery. The distribution of the preferred frequency of service delivery is shown in Table 2.

The signal strength was reported as excellent by majority ($n = 38$, 50.7%) of patients followed by good ($n = 23$, 30.7%) and poor ($n = 7$, 9.3%). Seven patients did not respond to this question. With regard to reported barriers to using mobile phones, 47 patients (62.7%) did not mention any barriers. Lack of perceived necessity to own a cell phone was the single largest barrier reported ($n = 10$, 13.3%). The distribution of other reported barriers is shown in Table 3.

DISCUSSION

The present study showed that most mental health service users with clinically stable SMI were using mobile phones, were favorably disposed to the idea of using mobile phones for health care service delivery, and reported no barriers to mobile phone usage for

this purpose. However, most of them used only basic handsets with prepaid connections. Prepaid connections refer to a plan wherein the users pay a certain amount of credit in advance of availing mobile services, whereas in postpaid, the billing and payment occur after availing the services. If there is no credit balance on the connection, the service provider suspends prepaid account services until the user credits money and recharges the account. This implies that there can be periods of temporary discontinuity in services in a prepaid plan, and this may adversely impact the continuity of mHealth-based care delivery. Most people belonging to the low socioeconomic strata in India find the prepaid plan to be more convenient as they are unlikely to run up huge bills, due to prior knowledge of amount credited. Hence, this finding may be a reflection of our sample demographics. The fact that signal strength was reported to be good or excellent in their locality by an overwhelming majority of our sample has favorable implications for the planning of services, such as crisis helplines, which require good and timely connectivity.

More pertinently, voice calls were endorsed over text messages for service delivery, and users preferred twice-weekly frequency of services. Reminders about medications and appointments and emergency helplines were the most sought-after service provisions. While these findings support the usage of basic mobile phone functions such as voice calls and one-way texting for select services, it also tells us that the populace is not ready for more sophisticated interventions, including interactive texting and smartphone “app” based service delivery. This calls for a graded and incremental approach to incorporating technology, in general, for mental health service delivery in our setting.

Only one previous study, from North India,^[16] has assessed mental health user needs and perspectives on mobile phone based service delivery. The types of phone (nonsmartphone) and mobile phone usage rates were largely similar to our study. The same authors also found that voice calls were the preferred mode of service delivery, similar to our findings. This is also supported by findings from nonpsychiatric populations.^[23] However, Chandra *et al.*, in a study on women from urban settings, noted that the respondents preferred text messages over voice calls.^[24]

Notably, no literature is available from India on the preferred frequency of mHealth service delivery among mental health service users. Our study has bridged this knowledge gap by adding information that service users prefer a twice-weekly service frequency. Furthermore, in our study, reminders about appointments and medications emerged as the most pressing need,

Table 1: Preferred services to be delivered via mobile phones

Preferred services	<i>n</i> (%)
Reminders about appointments and medications	35 (46.6%)
Helpline for emergency services	27 (36.0%)
Information about mental health services	22 (29.3%)
Regular check-ins with providers	15 (20%)
Not interested	13 (17.3%)
Telephonic follow-up in stable patients	11 (14.6%)

Values expressed as frequency (%); total responses may exceed sample size ($n=75$) as some have given multiple responses

Table 2: Preferred frequency of delivery services through mobile phones

Preferred service delivery frequency	<i>n</i> (%)
Twice weekly	31 (41.3%)
Once weekly	22 (29.3%)
Disinterested	13 (17.3%)
Once a month	4 (5.3%)
No response	3 (4.0%)
Daily	2 (2.7%)

Values expressed as frequency (%)

Table 3: Barriers to using mobile phones

Barriers	<i>n</i> (%)
No barriers reported	47 (62.6%)
Lack of perceived necessity	14 (18.6%)
Lack of interest	7 (9.3%)
Do not know to use	7 (9.3%)
Affordability	2 (2.6%)

Values expressed as frequency (%); total responses may exceed sample size ($n=75$) as some have given multiple responses

followed by helplines, and this is at variance with what was noted in the North Indian study.^[16]

These results have important implications for research translation. For instance, forgetfulness has been shown to be a major barrier to medication adherence,^[25] and therefore, daily reminders may make theoretical sense. Emerging evidence,^[26-28] however, has suggested that people are more likely to view daily reminders as spamming and suggest that twice-weekly reminders may confer advantages both in terms of clinical effects and patient retention. This, juxtaposed with our study findings, suggests a definite need to examine the comparative efficacy of twice-weekly versus daily reminders on target outcomes such as medication adherence in people with mental illness.

There are some limitations to the present study. This study was conducted wholly among patients with SMI attending a tertiary hospital, and the results may not necessarily generalize to other settings and common mental disorders. The questionnaire was presented in a multiple-choice format, and this limits the amount of information that can be captured as opposed to say open-ended questions or focus group discussions. However, we did include response options such as “others” for certain questions, to capture answers not included in the preprinted response categories and allowed multiple responses for questions wherever applicable, to elicit maximum information. No formal validity or pilot testing of the questionnaire was undertaken prior to using it. As the percentage of nonmobile phone users was small, we could not compare the groups meaningfully for differences. The cross-sectional study design also precludes conclusions about whether user felt needs and preferences might change with time and initiation to mHealth approaches.

The strengths of the study include studying the treatment needs and preferences among a population where mHealth approaches may have greater relevance due to a high treatment gap. We have used a prevalidated questionnaire but modified it with an additional question to elicit preferred service frequency among people with SMI about which there is no information thus far in our population. The study results are, therefore, expected to inform the planning and implementation of mHealth strategies that have maximum chances of success.

In conclusion, the study shows that mobile phones are a feasible and acceptable medium for service delivery and may be considered to overcome various health care challenges among patients with SMI. Majority of the patients desired to receive reminders about medications and appointments through twice-weekly voice calls. No

barriers to ownership were reported by most patients. However, a sizeable minority declined the need for mHealth service delivery, and health care providers must think of other strategies to take care delivery to the doorstep of such individuals.

Financial support and sponsorship

The study received financial support from the Indian Council of Medical Research (ICMR) through their Short-Term Studentship (STS) Scheme (Project no. 2017-02319).

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Mills A. Health care systems in low- and middle-income countries. *N Engl J Med* 2014;370:552-7.
2. Barik D, Thorat A. Issues of unequal access to public health in India. *Front Public Health* 2015;3:245.
3. Thirunavukarasu M. Closing the treatment gap. *Indian J Psychiatry* 2011;53:199-201.
4. Patel V, Xiao S, Chen H, Hanna F, Jotheeswaran AT, Luo D, et al. The magnitude of and health system responses to the mental health treatment gap in adults in India and China. *Lancet Lond Engl* 2016;388:3074-84.
5. Aggarwal NK. Applying mobile technologies to mental health service delivery in South Asia. *Asian J Psychiatry* 2012;5:225-30.
6. Singh S. The diffusion of mobile phones in India. *Telecommun Policy* 2008;32:642-51.
7. Bastawrous A, Armstrong MJ. Mobile health use in low- and high-income countries: An overview of the peer-reviewed literature. *J R Soc Med* 2013;106:130-42.
8. Ventola CL. Mobile devices and apps for health care professionals: Uses and benefits. *Pharm Ther* 2014;39:356-64.
9. Oliver N, Matic A, Frias-Martinez E. Mobile network data for public health: Opportunities and challenges. *Front Public Health* 2015;3:189.
10. Heron KE, Smyth JM. Ecological momentary interventions: Incorporating mobile technology into psychosocial and health behavior treatments. *Br J Health Psychol* 2010;15:1-39.
11. Istepanian R, Jovanov E, Zhang YT. Introduction to the special section on M-Health: Beyond seamless mobility and global wireless health-care connectivity. *IEEE Trans Inf Technol Biomed* 2004;8:405-14.
12. Torous J, Kiang MV, Lorme J, Onnela J-P. New tools for new research in psychiatry: A scalable and customizable platform to empower data driven smartphone research. *JMIR Ment Health* 2016;3:e16.
13. Menon V, Rajan TM, Sarkar S. Psychotherapeutic applications of mobile phone-based technologies: A systematic review of current research and trends. *Indian J Psychol Med* 2017;39:4-11.
14. El-Mallakh P, Findlay J. Strategies to improve medication adherence in patients with schizophrenia: The role of support services. *Neuropsychiatr Dis Treat* 2015;11:1077-90.
15. Brian RM, Ben-Zeev D. Mobile health (mHealth) for mental health in Asia: Objectives, strategies, and limitations. *Asian J Psychiatry* 2014;10:96-100.
16. Jain N, Singh H, Koolwal GD, Kumar S, Gupta A. Opportunities and barriers in service delivery through

- mobile phones (mHealth) for Severe Mental Illnesses in Rajasthan, India: A multi-site study. *Asian J Psychiatry* 2015;14:31-5.
17. WHO. The ICD-10 Classification of Mental and Behavioural Disorders. Clinical Descriptions and Diagnostic Guidelines. Geneva: World Health Organization; 1992.
 18. Ruggeri M, Leese M, Thornicroft G, Bisoffi G, Tansella M. Definition and prevalence of severe and persistent mental illness. *Br J Psychiatry* 2000;177:149-55.
 19. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed., text rev. Washington, DC: American Psychiatric Publishing; 2000.
 20. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, *et al*. The mini-international neuropsychiatric interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry* 1998;59:22-33.
 21. Ben-Zeev D, Davis KE, Kaiser S, Krzsos I, Drake RE. Mobile technologies among people with serious mental illness: Opportunities for future services. *Adm Policy Ment Health* 2013;40:3403.
 22. Singh T, Sharma S, Nagesh S. Socio-economic status scales updated for 2017. *Int J Res Med Sci* 2017;5:3264-7.
 23. DeSouza SI, Rashmi MR, Vasanthi AP, Joseph SM, Rodrigues R. Mobile phones: The next step towards healthcare delivery in rural India? *PLoS One* 2014;9:e104895.
 24. Chandra PS, Sowmya HR, Mehrotra S, Duggal M. 'SMS' for mental health – Feasibility and acceptability of using text messages for mental health promotion among young women from urban low income settings in India. *Asian J Psychiatry* 2014;11(Suppl C):59-64.
 25. Stentzel U, van den Berg N, Schulze LN, Schwaneberg T, Radicke F, Langosch JM, *et al*. Predictors of medication adherence among patients with severe psychiatric disorders: Findings from the baseline assessment of a randomized controlled trial (Tecla). *BMC Psychiatry* 2018;18:155.
 26. Horvath T, Azman H, Kennedy GE, Rutherford GW. Mobile phone text messaging for promoting adherence to antiretroviral therapy in patients with HIV infection. *Cochrane Database Syst Rev* 2012;CD009756.
 27. Shetty AS, Chamukuttan S, Nanditha A, Raj RK, Ramachandran A. Reinforcement of adherence to prescription recommendations in Asian Indian diabetes patients using short message service (SMS)-A pilot study. *J Assoc Physicians India* 2011;59:711-4.
 28. Finitsis DJ, Pellowski JA, Johnson BT. Text message intervention designs to promote adherence to antiretroviral therapy (ART): A meta-analysis of randomized controlled trials. *PLoS One* 2014;9:e88166.