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# Using telehealth to augment an intensive case monitoring program in veterans with schizophrenia and suicidal ideation: A pilot trial

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ABSTRACT

Veterans with schizophrenia admitted for suicidal ideation were recruited into a post-discharge program consisting of Intensive Case Monitoring (ICM) with daily monitoring with the Health Buddy (HB; experimental group) or ICM alone (control group). This study tested the feasibility of the telehealth monitoring intervention in this population. Secondly, we determined whether augmentation of ICM with our intervention for 3 months would result in a reduction in suicidal ideation. Twenty of 25 telehealth participants could set up the device. Monthly adherence for telehealth participants was > 80%. A qualitative analysis of endpoint surveys revealed that the majority of participants had positive responses. In both groups, there were improvements in Beck Scale for Suicidal Ideation (BSS) scores at endpoint relative to baseline. No group differences were present with survival analysis when using remission (i.e., BSS score = 0) as the outcome; however, in a subgroup with a history of suicide attempt, there was a trend (p = .093) for a higher rate of remission for those in the HB condition. In conclusion, telehealth monitoring for this population appears to be feasible for those who are able to start using the system. The pilot data obtained should help investigators design better telehealth interventions for this population.
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## 1. Introduction

Suicide is a leading cause of premature death among people with schizophrenia (Kasckow et al., 2011). Many patients with schizophrenia who are hospitalized for suicidal ideation or attempt require post-hospitalization follow-up (While et al., 2012). This is particularly important during the first 3 months post-discharge when patients are at highest risk for suicide (e.g., While et al., 2012). To have the greatest impact on suicide prevention during this high-risk time, the American Psychiatric Association has recommended intensive monitoring (American Psychiatric Association, 2006). Most monitoring strategies for suicide prevention rely on in-person or telephone contact with a clinician or health care provider (Valenstein et al., 2009).

Veterans are a select U.S. subpopulation experiencing greater than average increases in suicide rates. Suicide is a leading cause of death in Veterans (Bruce 2010). In 2010, it was estimated that up to 22 Veterans commit suicide each day. The VA has responded to escalating suicide rates since 2008 by including enhanced mandated monitoring, the creation of high risk suicide lists and a 24 h hot line along with placement of suicide prevention coordinators. When inpatient Veterans are placed on the high risk list, they undergo intensive monitoring. Upon discharge following a hospitalization for suicidal behavior, they are monitored for at least once a week for the first month and then at least monthly for the remaining 2 months after hospital discharge for suicidal behavior. Since this monitoring policy was implemented, suicides among Veterans who receive VHA services have decreased somewhat. However, they still remain elevated at an unacceptable level. For instance, Hoffmire et al. (2015) indicated that the number of observed veteran suicides is still approximately 20% higher than that which occurred in 2000. Thus, additional strategies for intervention are warranted.

Our research team has developed a telehealth monitoring system for suicidal patients with schizophrenia using the Health Buddy©, a telephone device that facilitates symptom assessment

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and patient-staff communication between visits. This telehealth intervention involves augmenting an Intensive Case Monitoring (ICM) program with daily use of the Health Buddy© system. ICM included weekly face-to-face meetings at the hospital clinic plus twice weekly phone calls in addition to standard VA monitoring. These visits and phone calls included assessment using the Patient Health Questionnaire (PHQ9; Kroenke et al., 2001) and the Beck Scale for Suicidal Ideation (BSS; Beck et al., 1979).

The purpose of the current study was to first test the feasibility of the telehealth monitoring intervention for suicidal behavior in this population of Veterans with schizophrenia or schizoaffective disorder. To address this, we asked whether participants would be willing to engage with the technology-based intervention, and continue to use it over a 3 month period. The secondary purpose was to assess with a random assignment trial, whether augmentation of ICM with our intervention would result in a significant reduction in suicidal ideation relative to a group that received only ICM.

We had previously reported that when augmenting the Health Buddy telehealth system with VA Treatment as Usual, there were improvements in suicidal ideation in at-risk Veterans with schizophrenia and suicidal ideation (Kasckow et al., 2015). There have been very few studies examining the use of telehealth for monitoring Veterans at risk for suicide. With the current study, our control condition, i.e., intensive case monitoring (ICM) was different and we obtained different outcomes compared to what we noted previously. Research in this area is expected to grow in the future and investigators will need guidance in the design of such approaches. Thus, it is important that we report our findings with this different control group to help provide guidance.

## 2. Methods

### 2.1. Recruitment and screening

All procedures were approved by the Institutional Review Board of the VA Pittsburgh Health Care System. The research team assessed recently admitted inpatients ≥18 years old for a diagnosis of schizophrenia/schizoaffective disorder and recent suicidal ideation; if an eligible patient was found, the clinician would be asked to refer the patient and ask the patient to sign a HIPAA form to provide permission for further screening and contact by the research team. If signed, the research team would discuss the protocol with the patient. If the patient was interested, s/he was invited to participate in an informed consent process wherein written informed consent was obtained. Following the consent procedures, the patients were further screened for the following inclusion criteria: a Mini Mental Status score ≥20 (Folstein et al., 1975); lack of a medical disorder which could influence diagnostic decisions, safety, and/or anticipated adherence. An example of a participant who had an exclusionary medical illness was an individual with recurrent hematemesis due to esophageal varices. Another example was an individual with motor dexterity problems due to neurologic diseases which prevented them from effectively using the telehealth device.

Other inclusionary criteria included a score > 0 on item 4 and/or 5 of the BSS which respectively assesses active suicidal ideation and passive suicidal ideation, and a score ≥8 on the 17-item Hamilton Depression Rating Scale (Hamilton, 1960). Patients also needed to have a land-line telephone. At baseline, we also obtained demographic and other clinical data using the Calgary Scale for Depressive Symptoms (Addington et al., 1992), the Scales for Assessment of Positive Symptoms (Andreasen et al., 1995) and Negative Symptoms (Andreasen, 1992) [see Tables 1 and 2]. Recruitment occurred from 2/2008 to 9/2011.

**Table 1**
Sociodemographic measures by treatment.

| Measure | Total (N=51) | HB (N=25) | ICM (N=26) | p-Value |
|---|---|---|---|---|
| Age (years) | 51.1 (11.3) | 51.0 (11.7) | 51.2 (11.1) | 0.838[a] |
| Race | | | | 0.136[b] |
| Black | 17 (34.0) | 6 (24.0) | 11 (44.0) | |
| White | 33 (66.0) | 19 (76.0) | 14 (56.0) | |
| Education (in years) | 12.6 (1.80) | 12.7 (2.29) | 12.5 (1.12) | 0.734[a] |
| Marital status | | | | 0.287[c] |
| Married/living with a partner | 8 (15.7) | 4 (16.0) | 4 (15.4) | |
| Separated/divorced | 15 (29.4) | 10 (40.0) | 5 (19.2) | |
| Never married | 23 (45.1) | 8 (32.0) | 14 (57.7) | |
| Widowed | 5 (9.8) | 3 (12.0) | 2 (7.7) | |

*Note*: ICM=Intensive Case Monitoring group; HB=Telehealth+ICM group.

[a] Mann-Whitney test.

[b] Chi-squared test.

[c] Fisher's exact. Values represent means (standard deviations) for continuous variables or N (percentages) for categorical measures.

### 2.2. Study description

Participants were randomized to ICM alone (control condition) or ICM with daily Health Buddy© monitoring (experimental condition). All participants received usual mental health care. This included weekly assessments with the BSS (Beck et al., 1979) and Personal Health Questionnaire 9 (PHQ9; Kroenke et al., 2001), which were administered face-to-face and also twice weekly on the phone by nurses; nurses' inter-rater reliability intra class correlation was >0.9. The Beck scale was the standard scale with 19 items and a range of 0−38 (Beck et al. 1979). Face-to-face assessments decreased to every other week if BSS scores were 0 for 4 weeks and then to monthly with once weekly phone assessments if BSS scores were 0 for another 6 weeks. Face to face assessments also included the Calgary Scale for Depressive Symptom (Addington et al. 1992), Hamilton Depression Rating Scale (Hamilton, 1960) and the Scales for Assessment of Positive Symptoms and Negative Symptoms (Andreasen et al. 1995).

Participants randomized to the telehealth group were provided the Health Buddy device upon discharge from the inpatient psychiatric unit. They were provided instructions on how to use the device. This involved standard procedures (provided by Bosch HealthCare) to ensure that participants were able to understand what power connections were needed and that participants were able to press the appropriate buttons to start the dialogues. In addition, staff ensured that participants could answer questions appropriately by pushing the buttons on the device, end the daily sessions and understand how information is sent to the care providers. They would also explain to participants that they should contact support staff about any equipment/power failures or any other questions.

Daily telehealth monitoring included queries for participants about suicide, depressive symptoms and medication adherence utilizing dialogues provided originally by Health Hero, the company which originally marketed the Health Buddy©. Bosch Healthcare now administers the Health Buddy system in the Department of Veterans Affairs. The Health Buddy© connected to the participant's land-line telephone; each day, for 10–15 min, a participant answered questions by pushing one of the buttons on the device. Responses were then electronically transferred to the hospital daily and read by staff within 4 h of transfer. The reason for the four hour time frame was to balance 2 factors: (1) minimizing the time in which a potentially high risk response would be transmitted by the patient and subsequently read by a clinician and (2) practical issues with regard to how frequently clinical staff could monitor the website.

The HB dialogues provided daily psychoeducational support and would assist participants in deciding whether they should contact their clinician with worsening symptoms. Participants would also be provided with the phone number for the crisis line if they stated they had suicidal intent and/or plan. Copies of the dialogues are available upon request. Furthermore, participants returned the telehealth devices at the end of the study.

If participants did not download responses within 24 h since the last time this was done, they would be contacted by staff to ensure that they were safe and to remind them to continue to use the device. In addition, staff would immediately contact patients if they responded 'yes' to a question that inquired about suicidal behavior. In this case, staff members would assess the situation and decide whether (1) no action was needed; (2) whether the participant needed to come in soon to see their clinician (if there was not an appointment scheduled in the near future); (3) whether participants needed to come to the emergency room or; (4) if urgent assessment was needed and if the participant was unwilling to come in, whether the police needed to go to the participants' home for further evaluation.

### 2.3. Qualitative data analysis

After they completed the study, participants completed a structured survey with the option of including open-ended responses. The survey asked them to write their assessment (i.e., judgement) of the telehealth intervention, including its strengths and how it could be improved. For the analysis of the participants' statements (i.e., actual words used), all comments by participants were linked together based on their study ID. Two trained qualitative coders judged whether each participant was: (1) generally positive about the program, (2) generally negative, or (3) whether no assessment of the program could be made. Each coder judged the patients' statements independently and then compared the results. There was a single disagreement between the coders (one selecting a 'positive' rating while the other assessed it as 'cannot judge'), which was resolved through discussion. The 'positive' rating was chosen as the final judgment. The overall inter-coder reliability kappa statistic was 0.857 which is what Landis and Koch (1977) has described as "near perfect' reliability. The senior qualitative analyst [SZ] then