Home telemental health implementation and outcomes using electronic messaging

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Summary

In 2007, the VA Connecticut Healthcare System began a home electronic messaging programme for mental health patients. During the first two years, 76 patients with diagnoses of schizophrenia, post traumatic stress disorder, depression and substance-use disorders received a home messaging device, which was connected via an ordinary telephone line. There were daily questions, which were based on disease management protocols, and included alerts, data and educational components. Patient data were sent to a nurse practitioner each day for triage and follow-up. Patients used the device for at least six months. In the six months prior to enrolment, 42 patients were hospitalized for 46 admissions. In the following six months, six patients were hospitalized for nine admissions ($P < 0.0001$). In the six months prior to enrolment, 47 patients had a total of 80 ER visits. In the following six months, 16 patients had a total of 32 ER visits ($P < 0.0001$). Questionnaire responses indicated a high level of satisfaction with the home messaging programme.

Introduction

In 2007, the VA Connecticut Healthcare System (VACHS) developed a home telehealth programme for mental health patients. High risk, high cost patients were targeted. These were patients with high numbers of hospital admissions, psychiatric emergency room visits, unscheduled urgent visits, no-shows and a history of self-harm attempts or gestures amenable to treatment. The inclusion criteria were: (1) agreement with and referral from the outpatient primary psychiatric clinician, (2) a primary psychiatric diagnosis of depression, post traumatic stress disorder (PTSD), schizophrenia or substance-use disorders, (3) house with a telephone line and (4) sufficient psychiatric stability to participate in the programme. The exclusion criteria were patients who were unable to use the equipment, who declined the programme, or who were clinically inappropriate as judged by the patient's treatment team. Inappropriate patients were those who were homicidal, patients with technology specific delusions and patients whose treatment would be compromised rather than enhanced by multiple providers.

A telehealth coordinator reviewed potential patients. If appropriate, the patient was assessed for enrolment. The patient was then taught to use the home telehealth unit. Emergency procedures were reviewed with the patient, since the home electronic messaging unit was not an emergency response device.

Patients were provided with an electronic messaging device (Health Buddy Appliance Models 2 and 3, Bosch Healthcare). Each unit was approximately 15 × 20 cm and required a conventional telephone line for communication. There was a screen on the front of the unit where a series of questions were displayed. The patient answered the questions by pressing large buttons on the front of the device. The patient was alerted each day by a small LED light on the unit.

The questions were scripted according to Disease Management Protocols (DMPs) in depression, schizophrenia, PTSD and substance-use disorder. The scripts consisted of 6–15 questions about items that had been demonstrated to trigger decompensation. Questions addressed daily medication compliance, follow-up with clinicians, diagnostic-specific symptoms, ratings (e.g. of mood, substance usage) and relevant activities of daily living. Additional questions reinforced information about the diagnosis and provided suggestions for therapeutic coping strategies.

The daily scripts focused on three areas: (1) symptoms and behaviours indicating potential for decompensation, which were forwarded as alerts to the clinician for priority triage, (2) quantitative symptom data, e.g. depression ratings or amounts of substances used, and (3) psychosocial educational material, generally adapted from evidence-based treatments such as motivational interviewing or cognitive behavioural therapy. The

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information was transmitted according to VA patient privacy regulations.

The response to each question was scored according to a pre-defined importance level, based on the severity of symptoms, compliance with treatment and the need for clinical intervention. Depending upon the seriousness, the patient received an appropriate response from the device and the information was transmitted to the coordinator. Level 1 indicated that there were no concerns in the response. Level 2 indicated potential concern, which required follow-up by the coordinator. Level 3 indicated the need for rapid intervention. The patient could be instructed to seek emergency help by the device and the nurse practitioner could also be alerted.

The telehealth coordinator was a psychiatric nurse practitioner who monitored the data sent from the patients by the home messaging device. She was part of a multi-disciplinary team treating the patient (psychiatrist, psychologist, social worker and other mental health clinicians).

Each day the nurse practitioner reviewed the transmitted data and contacted the patient by telephone for any Level 2 or 3 responses. The nurse conducted a telephone assessment to make decisions on interventions, ranging from no intervention, intervention by telephone (e.g. ordering, refilling or changing medications), scheduling or checking on appointments for face-to-face evaluation, or immediate intervention to bring the patient to the Emergency Room for evaluation.

The nurse practitioner contacted the patient's primary psychiatric clinician if there was any significant change in the patient's psychiatric condition and with this clinician made any subsequent decisions, e.g. making an appointment for the patient to see their clinician, arranging for the patient to come to the psychiatric Emergency Room for evaluation, contacting local police to check on the patient. All interventions were documented in the patient's electronic medical record.

We found that one full time (40 h/week) nurse practitioner could monitor 90–100 patients who were using home messaging devices.

The object of the present report was to assess the feasibility and outcomes of the home electronic messaging programme for a diverse psychiatric patient population.

Methods

Data were obtained for the first two years of the programme, beginning in July 2007. Information about performance improvement was obtained from the VACHS electronic medical databases, with no individual patient information nor patient identifiers. All veterans who had enrolled in the programme for at least six months were included.

Inpatient and emergency utilization were obtained for the six months immediately prior to patient entry into the programme and the first six months of their participation in the programme. Equipment usage information was obtained from electronic equipment tracking information. Veteran satisfaction ratings were obtained from patient responses entered on the home messaging device itself, as routine satisfaction questions were built into the DMPs at three-month intervals.

Results

During the first two years of the home telemental health programme, a total of 76 veterans were enrolled: 68 men and eight women. There were 60 white, 13 black and three Hispanic patients. Their mean age was 58 years (range 27–87). Their diagnoses were: 54 depression, 14 substance use disorders, five schizophrenia and three PTSD.

The patients used the home messaging device for at least six months. A total of 46 used the device 5–7 times/week (excluding days of hospitalization, known vacation or anticipated absences) and 20 used the device 1–4 times/week. If a patient's usage dropped below once a week, a decision was made as to whether continued participation was appropriate. On days when patients signed onto the device, they answered all of the questions on approximately 99% of occasions. The rare exceptions were usually related to a technology interruption or accidental termination on the part of the patient.

Hospital utilization

In the six months prior to enrolment in the programme, 42 patients were hospitalized for 46 admissions. In the following six months, six patients were hospitalized for nine admissions. This represents a decrease of 86% in the number of patients who were hospitalized and a decrease of 80% in the number of admissions (chi-square $P < 0.0001$).

Emergency room utilization

In the six months prior to enrolment in the programme, 47 patients had a total of 80 ER visits. In the following six months, 16 patients had a total of 32 ER visits. This represents a 66% decrease in the number of patients with ER visits and a 60% decrease in the number of ER visits following enrolment (chi-square $P < 0.0001$).

Satisfaction

Patients responded to three satisfaction questions. When asked, 'Are you happy with your electronic messaging device?' 54% reported that they were very satisfied, see Table 1. To the statement, 'Since I started answering the educational questions on the device, my understanding of my mental health condition is . . .' 55% reported they were much better. When asked to complete the following,

Table 1 Satisfaction responses of home telemental health users (196 responses from the 76 patients at 3 month intervals)

	Much improved	Somewhat improved	No change	Worse	Much worse
1. Able to manage mental health condition	40%	31%	27%	2%	0%
2. Understanding of mental health condition	55%	32%	11%	2%	0%
	Very satisfied	**Fully satisfied**	**Somewhat satisfied**	**Not satisfied**	**Not at all**
3 . Are you satisfied with the TMH device?	54%	23%	21%	2%	0%

'Since I started answering the educational questions on the device, my ability to manage my mental health condition is . . .' 40% reported they were much improved, see Table 1.

Discussion

The present report is one of the first to demonstrate the feasibility and outcomes of a home telemental health programme based on electronic messaging for a diverse psychiatric patient population. While a number of studies have demonstrated the effectiveness of home telehealth electronic messaging for medical conditions,[1–5] there are few reports about mental health. Some previous studies have employed interactive voice response (IVR) technology[6,7] or videophones.[8,9] The only report addressing electronic home messaging in pain and depression had a sample size of five patients.[10]

In our programme, the 76 patients demonstrated substantial reductions in hospitalization rates and ER visit rates. We postulate that the decrease in health-care resource utilization was the result of the daily monitoring, which allowed earlier intervention to alleviate the need for ER visits and hospitalization. Home monitoring allows a clinician to focus on the small proportion of patients in need of intervention each day.

The satisfaction data indicated a high level of satisfaction with the programme. In particular, the educational component was well received by the patients. We further hypothesize that patient education transmitted electronically can contribute to an improvement in illness outcomes.

A limitation of the present report was the before and after design, i.e. there was no comparison group or randomized controlled trial. Further work is therefore needed. In addition, outcomes should be analysed over longer periods following enrolment, e.g. one year or more.

Telehealth has advanced from the use of cumbersome equipment such as the 270 kg HANC Heath Assisted Nursing Care Telehealth Robotic Unit (HealthTech Systems Corp) to devices weighing less than 4 kg, that can be hand carried home from the medical centre for self-installation and take up little space. Future developments may allow patients to use web based applications to respond to psychiatric disease management questions.

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