Research Article

Unsustainable Home Telehealth: A Texas Qualitative Study

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Abstract

Purpose: Telehealth has emerged as an innovative approach to aid older individuals in managing chronic diseases in their homes and avoid hospitalizations and institutionalization. However, the sustainability of home telehealth programs remains a major challenge. This qualitative study explored the reasons for the initial adoption and the eventual decline of a decade-long home telehealth program at a Texas home health agency (HHA). Barriers to and facilitators for sustaining home telehealth programs were also explored.

Design and Methods: Semistructured interviews of 13 HHA nursing staff and administrators, 1 physician, and 9 patients aged >55 years and their informal caregivers who used telehealth were conducted in summer 2013. Interview transcripts were analyzed using conventional content analysis.

Results: Data analysis generated 5 themes representing the decline of the Texas home telehealth program: its impact on patient-centered outcomes, its cost-effectiveness, patient–clinician and interprofessional communication, technology usability, and home health management culture. Lack of significant impact on patient outcomes, in addition to financial, technical, management, and communication-related challenges, adversely affected the sustainability of this home telehealth program.

Implications: A home telehealth program that attains patient-centered outcomes, improves cost-effectiveness of managing chronic diseases, improves quality of communication among patients and clinicians, is user-friendly for older adults, and involves end users in decision making is likely to be sustainable.

Keywords: Home health, Telehealth, Chronic disease, Self-management, Sustainability

Older adults with chronic illnesses suffer a high rate of rehospitalizations or death within the first year following hospital discharge (Jencks, Williams, & Coleman, 2009). These poor outcomes have been attributed to, among other causes, a lack of continuity in care due to frequent transitions in health care settings (Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011), inadequate discharge instructions (Golden, Tewary, Dang, & Roos, 2010), and an inability among older adults to consistently self-manage their conditions, especially over time (Lainscak et al., 2007). Remote monitoring technologies such as home telehealth have therefore been developed to assist individuals in self-managing their care; such technologies typically consist of biometric devices used in the home to transmit data regarding blood pressure, heart rate, pulse oximetry, weight, and daily symptom status to healthcare settings such as home health agencies (HHAs; Bowles et al., 2011). Telehealth originally emerged as an innovative approach to help older adults manage their chronic diseases at home due to its potential to detect health crises early on (Radhakrishnan & Jacelon, 2012); it was intended to provide continuity in care, to facilitate timely communication with clinicians especially between visits (Bowles & Baugh, 2007; Radhakrishnan, Jacelon, & Roche, 2012), and to empower homebound older individuals to make informed decisions about their disease management (Radhakrishnan &
Jacelon, 2012). It was thought that telehealth would play a vital role in avoiding costly emergency department visits, reducing the frequency of hospitalizations and improving older individuals’ quality of life (Bowles et al., 2011; Gellis et al., 2012).

Nevertheless, despite the many potential benefits of telehealth programs, home health nurses and older individuals have consistently expressed dissatisfaction in using telehealth to manage chronic diseases (Radhakrishnan et al., 2012; Wade et al., 2011). Home health nurses and older individuals have cited increased clinician workload, patient preference for in-person care, problematic interprofessional communication, and technical difficulties as problems with home telehealth programs (Radhakrishnan et al., 2012; Sanders et al., 2012; Wade et al., 2011). Telehealth use has sometimes been discontinued (Juretic et al., 2012; LaFramboise, Woster, Yager, & Yates, 2009). Recently, for example, one Texas HHA (TxHHA) decided to scale back and ultimately discontinue its telehealth program after 10 years of use; that program is the focus of this study.

For the most part, research studies based in Australia, Canada, United Kingdom, or United States have explored the early adoption of community-based telehealth programs that were often less than 5 years old (Joseph, West, Shickle, Keen, & Clamp, 2011; Lamothe, Fortin, Labbé, Gagnon, & Messikh, 2006; Wade, Elliott, Karnon, & Elshaug, 2010; West & Milio, 2004). However, systematic investigation of the sustainability of home health system-based telehealth programs has not been widely studied and is therefore critical for understanding the reasons for discontinued or unsustained telehealth use by HHAs. The aim of this descriptive qualitative study was to employ a sociotechnical systemic approach to explore the reasons for the initial adoption and eventual decline of the decade-long TxHHA telehealth program and to identify barriers to and facilitators for sustaining home telehealth programs. The sociotechnical systems approach involves understanding the interdependencies and interconnections among technology (e.g., telehealth devices), work tasks (e.g., use of telehealth devices), processes (e.g., self-management behaviors), and organizational culture (e.g., in HHAs; Clegg, 2000).

Methods

Participants

In summer 2013, home health staff, physicians, home health patients, and their caregivers who used telehealth to assist with chronic disease care management in the past year in the TxHHA telehealth program were invited to participate in this study. Thirty out of 24 home health staff participated: 1 telehealth technician and 12 nurses. The nurses comprised 6 visiting nurses, 2 telehealth nurses, and 4 nursing administrators (2 managers and 2 directors). Nine patients participated, adults aged ≥55 years. Of these participating patients, 77% were ≥60 years, 33% were Hispanic, and all were Medicare beneficiaries.

The participating patients were representative of the adult health patient population at TxHHA, which had an average annual census of 1,400 with 70% of patients >70 years, all of them Medicare beneficiaries, and 42% Hispanic. One physician participated, who specialized in geriatric medicine. Demographics of the participating home health staff and patients are presented in Tables 1 and 2.

Description of Telehealth Program at the TxHHA

The Centers for Medicare and Medicaid Services (CMS) define HHA as an agency or organization primarily engaged in providing skilled nursing and other therapeutic services to patients in their homes (Centers for Medicare and Medicaid Services [CMS], 2013). The TxHHA provided telehealth services to their patients for chronic diseases related to cardiac disease, peripheral vascular disease, pulmonary disease, and diabetes for an average duration of 60 days, or one Medicare certification period. The telehealth devices at this agency transmitted patients’ biometric and symptom status data from patients’ homes to the HHA but lacked audio or video capability. The TxHHA used centralized telemonitoring: telehealth nurses reviewed patients’ vital signs daily at the agency’s main office. The telehealth nurse trained a technician and a licensed vocational nurse (LVN) to install telehealth and train patients to use telehealth in their homes. If a patient’s vital signs were above or below preset thresholds, the telehealth nurse called the patient and informed the home health visiting nurse responsible for that patient’s case. The visiting nurse would then call or visit the patient and contact the patient’s physician if needed. Data on utilization of telehealth services were obtained from monthly reports provided by the telehealth device company. Data on patient outcomes of hospitalizations and ER visits were obtained through the Outcomes and Assessment Information Set (OASIS) mandated by Medicare. The trajectory of the TxHHA telehealth program over the decade is shown in Table 3.

Procedure

This study was defined as a program evaluation, so ethical approval was not required by the University of Texas at Austin Institutional Review Board. However, we followed ethical practice standards for research for all the participants. During a monthly staff meeting, home health staffs were invited to participate. Physicians were recruited during a monthly in-service session conducted by the TxHHA at the affiliated hospital. The TxHHA staff notified their patients about the study through phone calls or during home visits. The phone numbers of interested participants were provided to the researchers, who then called the patients to recruit them. In-depth individual interviews with the home health staff were conducted at the TxHHA; with the patient participants at locations of their choice including their homes; and with the physician at the geriatric department.
of the hospital affiliated with the TxHHA. All participants also completed a short demographic survey. Each interview lasted from 20 to 45 min and was conducted by K. Radhakrishnan. Using a semi-structured interview guide, the interviewer explored all participants’ perspectives on the telehealth program, reasons for the declined telehealth use, and suggestions to improve sustainability of telehealth programs, as well as clinician participants’ perspectives on initial telehealth adoption. The interview items and questions were open-ended—“Describe the telehealth adoption process,” “Describe your experience with telehealth for managing chronic disease,” “Describe reasons for decline of the telehealth approach,” “Describe how to make telehealth program sustainable.” Supplementary and probing questions were also asked. The interviews were audio recorded and transcribed verbatim by a paid professional transcriber.

Data Analysis

Conventional qualitative content analysis of the interviews was performed, using coding categories derived from the texts (Hsieh & Shannon, 2005). Data analysis began after the first interview: The transcribed interviews were examined along with supplementary information from observation notes on participants.

Transcripts of all 23 interviews were read and coded separately by K. Radhakrishnan and B. Xie using Microsoft Word. Keywords or phrases that appeared to convey an attitude or perception about telehealth were noted in the margins of the text as initial codes. After all transcripts were coded, the coded data were examined and either combined if they belonged to similar contexts or split into subthemes. The final codes were organized hierarchically into codes, subthemes, and themes. For example, participants’ quotes describing patients’ motivation or cognitive level, physical ability, family support, level of disease process, and level of technology familiarity, all of which affected their use of telehealth, were placed under the subtheme of patient characteristics and classified under the theme of impact on patient-centered outcomes.

Coding reports were summarized and cross-checked to ensure consistency of interpretation. Whenever divergent interpretations occurred, transcripts were rereviewed and discussed until consensus was achieved on the tentative subthemes and themes. The authors agreed on 93% of codes (125/134). After discussing codes on which agreement did not exist, it was determined that the remaining 7% of codes were not germane to the research questions, so they were not included in the final analysis.
Results

Data analysis generated five themes related to the home telehealth program’s decline: impact on patient-centered outcomes, impact on cost-effectiveness, communication and collaboration, technology usability, and home health management culture. The themes and subthemes derived from the analysis were found to have similar frequencies and are detailed below (cf. Table 4).

Theme 1: Impact on Patient-Centered Outcomes

Participants’ conflicting perceptions regarding the contribution of telehealth for achieving patient-centered outcomes resulted in the TxHHA telehealth program’s decline.

Subtheme 1: Self-Management

Participants had conflicting views on the effectiveness of telehealth for accomplishing patient self-management of chronic disease. About 50% of the participants believed that telehealth provided daily information on patient health status and early indication of health crisis. The nursing staff reported that because telehealth provided automatic prompts and reminders to patients who otherwise lacked motivation or forgot to monitor themselves, it established a routine and inculcated a habit to self-monitor. Similarly, seven out of nine patients reported that telehealth helped them monitor their disease status. Other advantages of telehealth reported by the nurses at TxHHA included the ability to track patients’ compliance with medication or diet and empower patients to correlate their vital signs with their behaviors and disease process.

Telehealth nurse1: “Downside to that is, you know, when you go to discharge, that equipment comes out of the home and you’re instructing the patient, you need to really buy your own equipment.”

Three nurses perceived telehealth to promote patient dependence on healthcare providers, adversely affecting their disease self-management. Telehealth seemed to remove patients’ onus to self-monitor or follow up on abnormal readings with their physicians.

Visiting nurse2: “I think the disadvantage was that the patients did not use it as intended, and the reason for some of the patients not using it was lack of knowledge how to use it, or just not caring whether they transmitted their vital signs that day, or not calling when they knew their weight gain had exceeded either three pounds a day or five pounds in one week. Because they figured, well you’re going to see that anyway, so I’m not going to call.”

Subtheme 2: Quality of Life

Patient participants reported that telehealth improved their quality of life, providing a sense of security, and reassured their family members, allowing them to remain at home longer. Patient participants found in-home telehealth monitoring to be convenient, including the ability to monitor multiple vital signs simultaneously. Nurse participants reported on their patients’ growing attachment to the telehealth program.

Visiting nurse1: “they really didn’t want the Telehealth to go. Um, they felt very secure knowing that, you know, they didn’t feel well, they could always put the [telehealth] blood pressure cuff on.”

However, eight nurses and the one physician were neutral or negative about the use of telehealth to empower patients’ self-management, especially over the long term. The nursing administrators and the physician reported that telehealth provided only preliminary as opposed to in-depth investigation of patients’ adherence to disease self-management. In addition, temporary duration of telehealth equipment in patients’ homes and shortened length of home health stay were perceived by the nursing managers and the telehealth nurses as significant barriers to developing sustained self-management behaviors.

Manager1: “And then once you explained to them, “This is what it is.” But that extra fluid causes the blood pressure to go up and everything else. They really start to understand, “Oh. That it all works.” Even their diet, and how much fluid they take in controls how they’re going to feel that day.”

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However, almost all nurses and caregivers of three patient participants considered telehealth as potentially invasive to patient privacy and disruptive because telehealth testing times had to be adjusted to patients’ daily routines. Participants who were frail, elderly, and had complicated diseases found the process of daily telehealth use in the morning to be quite difficult. So did their caregivers.

Table 3. Trajectory of TxHHA Telehealth Program Over a Decade

<table>
<thead>
<tr>
<th>Year</th>
<th>No. telehealth units</th>
<th>No. patients</th>
<th>Days/week of telehealth monitoring</th>
<th>No. telehealth nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>25</td>
<td>15</td>
<td>7</td>
<td>1 Part-time</td>
</tr>
<tr>
<td>2004</td>
<td>135</td>
<td>120</td>
<td>7</td>
<td>1 Full-time</td>
</tr>
<tr>
<td>2007</td>
<td>135</td>
<td>100</td>
<td>7</td>
<td>1 Full-time</td>
</tr>
<tr>
<td>2010</td>
<td>100</td>
<td>40</td>
<td>5</td>
<td>1 Part-time</td>
</tr>
<tr>
<td>2012</td>
<td>100</td>
<td>6</td>
<td>5</td>
<td>1 Part-time</td>
</tr>
<tr>
<td>2013</td>
<td>100</td>
<td>6</td>
<td>5</td>
<td>1 Part-time</td>
</tr>
</tbody>
</table>
Table 4. Themes and Subthemes with Participants’ Perceptions of Barriers and Facilitators to Sustain Home Telehealth Programs

<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes</th>
<th>Barriers</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact on patient-centered outcomes</td>
<td>Self-management</td>
<td>1. Foster patient dependence on healthcare providers</td>
<td>1. Daily information on patient vital signs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Short home health length of stay</td>
<td>2. Prompted and Inculcated daily self-monitoring behaviors</td>
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<tr>
<td></td>
<td></td>
<td>3. Preliminary versus in-depth investigation of patient self-management behaviors</td>
<td>3. Identify nonadherent behaviors and teach accordingly</td>
</tr>
<tr>
<td></td>
<td>Quality of life</td>
<td>1. Perception of invasion to patient privacy</td>
<td>4. Identify early indication of health crisis</td>
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<tr>
<td></td>
<td></td>
<td>2. Disruptive to patient routine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Frail older adults overwhelmed by telehealth testing process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient characteristics</td>
<td>1. Physical or cognitive impairment</td>
<td>1. At-home convenience</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Lack of caregiver support</td>
<td>2. Patient/caregiver feeling of security/reassurance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Long duration of chronic disease</td>
<td>3. Allow older adults remain longer at home</td>
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<tr>
<td></td>
<td></td>
<td>4. Complexity of disease process (e.g., comorbidity of atrial fibrillation)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>5. Patient anxiety</td>
<td></td>
</tr>
<tr>
<td>Impact on cost-effectiveness</td>
<td>Return on Investment</td>
<td>1. Lack of reimbursement</td>
<td>1. Cost-sharing arrangement with other healthcare providers/institutions</td>
</tr>
<tr>
<td></td>
<td>Impact on healthcare utilization</td>
<td>1. Insignificant impact on rate of rehospitalization</td>
<td>2. Reduced nursing visits for trivial reasons and saved transportation costs</td>
</tr>
<tr>
<td></td>
<td>Telehealth update and maintenance costs</td>
<td>2. Insignificant impact on nursing caseload</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1. Updating and maintaining old equipment</td>
<td>1. Cost-effective service agreements with a telehealth company for regular equipment maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Changing telecommunication medium of patients</td>
<td>2. Upper management buy-in for device upgrades and maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Deinstestation costs</td>
<td></td>
</tr>
<tr>
<td>Patient–clinician and interprofessional communication</td>
<td>Nurse–patient communication</td>
<td>1. Preference for in-person interaction</td>
<td>1. Informed interactions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Reduced nurses’ sense of responsibility to assess or teach patients thoroughly</td>
<td>2. Convenient one-touch access to nurses</td>
</tr>
<tr>
<td></td>
<td>Nurse–physician communication</td>
<td>1. Physician frustration by nurse communication on telehealth data without additional information on patient context</td>
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<td></td>
<td></td>
<td>2. Nurse frustration by lack of timely response by physicians to telehealth data</td>
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<td></td>
<td></td>
<td>3. Incompatibility between electronic systems of TxHHA and physician offices</td>
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<tr>
<td></td>
<td>Patient–physician communication</td>
<td>1. Lack of any telehealth-facilitated communication</td>
<td>1. Telehealth data being a conduit to communicate health crises to physicians</td>
</tr>
<tr>
<td></td>
<td>Technology usability</td>
<td>1. Time-consuming</td>
<td>2. Involve patients along with clinicians in decision making on disease process</td>
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<tr>
<td></td>
<td>Cumbersome installation process</td>
<td>2. Difficult to locate electrical or phone outlets, especially in older homes</td>
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<tr>
<td></td>
<td>Device usability</td>
<td>1. Difficult to use by frail older adults by themselves</td>
<td>1. Easy to use by average older adults without significant physical or cognitive impairment</td>
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<tr>
<td></td>
<td></td>
<td>2. Poor understanding of the telehealth testing process</td>
<td></td>
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<td></td>
<td></td>
<td>3. Inaccurate results and numerous false alerts</td>
<td></td>
</tr>
<tr>
<td>Home health management culture</td>
<td>Top-down decision making</td>
<td>1. Lack of clinician end user input or involvement in decision making about telehealth</td>
<td>1. Involve end users in decision making for a strategic investment in hardware, technical, and software support</td>
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<tr>
<td></td>
<td>Support for supplementary telehealth resources</td>
<td>1. Lack of training/orientation to home health staff</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2. Lack of related technical and software support</td>
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</table>
patterns to TxHHA remained stagnant, because physicians were disappointed to observe that the physicians' referral increased physician referrals. However, the administrators hoped to recoup their investment in telehealth through payments from insurance agencies, but the TxHHA's administrators reported that TxHHA initially adopted the telehealth program with the goal of improving patient outcomes, reducing nursing visits, and attracting more physician referrals. The failure of the TxHHA home telehealth program to justify continued investment in telehealth.

Subtheme 2: Patient Characteristics.
Clinic participants reported on many patient characteristics that influenced the telehealth’s impact for improving patient self-management or reducing hospitalizations. Cognitive level and support by family caregivers were identified as important characteristics that influenced appropriate use of telehealth.

Manager1: It’s just that we have to educate them on how to use it. And if they don’t get it, and some patients with dementia, they’ll never get it. We try to get the family members. And sometimes the family members will help us. And sometimes they won’t. They’ll just get too busy and they’re not going to do it.”

Other patient characteristics reported by clinicians that influenced appropriate use of telehealth included physical ability, motivation level, level of disease process (e.g., recent diagnosis; presence of comorbidities), and level of technology familiarity. The following quote illustrates the characteristics of those patients who can use telehealth to their benefit.

Visiting Nurse2: “Some people; people that don’t have any mental deficit, that physically are capable of standing on a scale and what-not, and that they’re not totally compromised by their disease process, usually can do well.”

Theme 2: Impact on Cost-Effectiveness
The failure of the TxHHA home telehealth program to either increase revenue or improve older patients’ healthcare utilization was not cost-effective for TxHHA, and it contributed to this home telehealth program’s decline.

Subtheme 1: Return on Investment
The administrators reported that TxHHA initially adopted the telehealth program to improve patient outcomes, reduce nursing visits, and attract more physician referrals. This telehealth program did not receive reimbursement from insurance agencies, but the TxHHA’s administrators hoped to recoup their investment in telehealth through increased physician referrals. However, the administrators were disappointed to observe that the physicians’ referral patterns to TxHHA remained stagnant, because physicians were not always impressed with the telehealth program or the associated workload.

Administrator1: “We never really had any overwhelming satisfaction from the physicians. We were sending them reports pretty frequently and they did not like that. Also if there was an alert, we would be sending them reports all the time and they, they did not appreciate it.”

Subtheme 2: Impact on Healthcare Utilization
Participants had conflicting views on whether telehealth improved patients’ healthcare by reducing hospitalizations or nursing caseload (number of patients per nurse). About 30% of the clinicians believed that telehealth helped them intervene early and reduce hospitalizations.

Telehealth nurse2: “We would get a patient, maybe, that they had not refilled their prescriptions or something. So we would intervene, get the prescription filled. Whereas if the telehealth was not in place, that patient would have gone for a couple of weeks then started getting sick and then been in the hospital or had to go to the ER or something. So I do believe that we have greatly influenced the rehospitalization rate. Whether we have it down on paper or not, I don’t know.”

However, the two administrators and one other nurse perceived that the numbers of adverse events detected or hospitalizations prevented by telehealth were too small to justify continued investment in telehealth.

Administrator1: “I think just picking up the adverse events...was the advantage. I think that,—but the percentage of those were so small that I don’t know that you want to put that kind of money into a program that you’re not really going to get...anything back from. I think there are other ways of doing it that are just as...just as useful.”

Also, although most patients and nurses stated that telehealth had the potential to reduce or avoid unnecessary nursing visits, supervisors, and administrators did not believe that telehealth improved nursing caseload.

Subtheme 3: Telehealth Update and Maintenance Costs
Frequent updates of telehealth equipment to catch up with changes in telecommunication media were costly. When telehealth was introduced, for example, patients used traditional telephone service, but they moved to internet or cell phone service a few years later.

Telehealth nurse2: “It was pretty pricey purchase of the equipment. But then in two years it’s really kind of obsolete and it just kind of has evolved over time. And so I think the new technology now, you would think as computers and televisions, their prices dropped and you get more for the money. We haven’t seen that happen with the telemonitors”
Continued investment in telehealth equipment, whether for updates or for maintenance, increased costs. Equipment had to be debugged frequently, and lost equipment had to be replaced. The nursing administrators began to realize that providing patients with permanent low-tech health devices such as blood pressure cuffs and scales would be more cost-effective for improving patient outcomes.

Administrator1: “so I know that the overall cost of this [telehealth] might have been higher than just giving the patient a blood pressure cuff and giving the patient a scale. Which is going to stay with the patient... even after you leave.”

Theme 3: Patient–Clinician and Interprofessional Communication
Conflicting perceptions of telehealth’s impact on communication among nurses, patients, and physicians affected this telehealth program’s sustainability.

Subtheme 1: Nurse–Patient Communication
Forty percent of the nurses perceived the daily monitoring of patients facilitated through telehealth to enable informed interactions with patients and provide consistent information on patients who otherwise would not call the nurses.

Visiting nurse1: “Because, without telehealth, if I have patients on the blood pressure and the scale, I don’t know how they’re doing until I get there on my next visit, or I have to pick up the phone and tell them, “Okay. Did you test yourself today?”

However, telehealth was also perceived to diminish the quality of communication between nurses and patients. Clinicians more than patients perceived that in-person assessments provided a “personal touch,” a higher quality of interaction and teaching that were more trustworthy than perceived impersonal interactions through telehealth.

Physician: “I don’t like that [telehealth] for blood pressure monitoring because that doesn’t help me with knowing whether the patient was compliant with taking medications or not. But whereas if you have the nurse going to the home, she’s at least checking the pillbox or counting the pills or something to know whether a pill was really taken or not taken, and why we have a fluctuation in the blood pressure.” Patient9: “It’s always good to talk to a live person about things that’s happening that, you know, the monitor really can’t.”

Two senior nurses observed that nurses and patients grew dependent on telehealth equipment, which appeared to reduce the sense of responsibility among nurses to teach or assess patients thoroughly and among patients to report adverse health events.

Visiting nurse2: “the one-on-one communication between the patient and the nurse diminished with Telehealth, because the patient many times assumed that, well you’re seeing that anyway; I don’t need to call, or I don’t need to tell you when I come.”

Subtheme 2: Nurse–Physician Communication
Three home health nurses believed that the telehealth program eased the communication of patients’ data and health status to physicians in addition to validating the physicians’ receipt of patient data. However, other nurses and the physician believed that telehealth data were not being used effectively enough to guide patient care plans or interventions. The nurses were unsure whether telehealth data were being seen by physicians in a timely manner. Nurses reported frustration with physicians’ lack of interventions in response to telehealth data. The physician, on the other hand, was frustrated because the numerous faxes and phone calls regarding telehealth data from nurses lacked information about patients’ contexts.

Physician: “But all this just gives me the numbers. It doesn’t tell me really whether the patient is looking clinically good, the patient is feeling good, the patient is taking the medications, the patient is safe at home. It does not. It—I don’t think Telehealth can replace [a good nursing assessment].”

The administrators were frustrated by the traditional means of communicating telehealth data through phone or fax to physicians as opposed to other modern means, which further prevented timely and meaningful utilization of the telehealth data for patient care.

Administrator1: “You know, physicians right now are so busy with the volumes of patients that it’s really difficult for a home health nurse to, to get them on the phone. And I think, if there was a web way for them to be managed, then the physicians could just check it. I think they would be quicker. It’s less time for them, and they can, they can spot stuff and see stuff ahead of time.”

Subtheme 3: Patient–Physician Communication
None of the patients reported any communication with their physicians on the use of telehealth for their disease management. However, for some patients who perceived difficulties in accessing their physicians, home health nurses and telehealth data were a conduit to communicate health crises to their physicians.

Patient7: “Doctors are kind of removed. You know? You can’t really, patients rarely talk to a doctor these days. And so, I mean, the best way for me to communicate with the doctor is through the nurses. And if it’s really something really, uh, risky, they’ll [nurses] call the doctor. And the doctor will answer their call. But they [doctors] won’t, you know—me, I’m a patient”
Theme 4: Technology Usability

Ease of use of the telehealth devices and the installation process affected telehealth sustainability at TxHHA.

Subtheme 1: Cumbersome Installation Process

Both telehealth technicians and LVNs found telehealth device installation in patients’ homes to be time-consuming. Finding electrical plugs or suitable locations for compatible phone lines to receive telehealth transmission was difficult, especially in the homes of patients from low socioeconomic neighborhoods.

Administrator1: “trying to find phone lines in some of these houses is……is a real treat (Sarcasm). The second thing is the aging of the homes, the phone lines were not very good. So we had trouble with transmission then, so then we went to the bridge modems which added more expense…”

Subtheme 2: Device Usability

Six out of nine patient participants expressed that the telehealth device was simple and user-friendly; the other three reported that the telehealth device was “easy to use by an average person” but not by a frail, elderly person. Elderly participants often had to repeat the testing process from multiple positions, which was physically challenging, non-intuitive, and cumbersome.

Patient1: “I would say, at my age, someone should be with me. It was cumbersome. Getting it on, you know. Just the flexibility of it, and the understanding of, you know, you lie down first, then you sit up, then you stand up.”

Almost all clinicians agreed that their oldest patients found telehealth difficult to operate and that their own experiences with telehealth exposed hidden complexities in the use of telehealth devices.

Visiting nurse2: “The technology was a bit much for the generation of the folks that I usually took care of. The technology, it isn’t just as simple as pressing a button, and that’s what we demonstrated. You press a button, start, and then follow the prompts. But it doesn’t always work that way.” The administrators reported that inaccurate use of the telehealth devices by older individuals often resulted in repeatedly inaccurate results and false alerts. Administrator1: “If the patient didn’t do it exactly the way that they were supposed to, you would have really wild readings.”

Subtheme 1: Top-Down Decision Making

Decision making about the use of telehealth was top-down, restricted to corporate management and home health administrators. End users of the telehealth technology such as home health nurses were not consulted during the telehealth program’s adoption or discontinuation. Seven of the eight interviewed nurses including the telehealth nurse could only speculate but were unaware of the reasons for upper management’s decisions to end the telehealth program.

Researcher: “Why do you think this agency is moving away from Telehealth? Visiting Nurse1: “I have no idea, really.”

Subtheme 2: Support for Supplementary Telehealth Resources

The corporate management’s partial support of telehealth was frustrating to the nurses, because investments in telehealth hardware were not accompanied by technical and software support, periodic training on telehealth use, calibration of the telehealth devices, or quality assurance.

Telehealth nurse2: “we’re going to get new machines.” And then boom, all of a sudden, “Oh, did we tell you? We’re not going to do that. Corporate said no,” you know. And so the frustration was of the years that I was here, every time I’d look forward that we were going to get a new machine or we were going to get to upgrade—Oh, they would buy an upgrade, but they wouldn’t buy into the teaching behind it. The telehealth staff was not properly trained on how to use that data. So then how can we benefit a hundred percent from the machine if we’re not using it to its full benefit, you know.”

Discussion

This qualitative study explored the failure of a home telehealth program after a decade of use. Qualitative content analysis revealed five themes regarding sustainability of TxHHA’s home telehealth program.

Contrary to the intended goal of HHAs—to enable patients to become independent through self-management of chronic diseases—the telehealth program at TxHHA appeared to decrease patients’ ownership in managing their conditions and increase their reliance on home health nurses. The current reduced home health length of stay due to changes in home health reimbursement policies (Madigan, 2008) further appeared to diminish telehealth’s impact as a behavioral intervention to inculcate long-term self-management. Home health clinicians have debated the value of home telehealth programs that emphasize compliance with transmission of vital signs for patients’ self-management; such programs have been found to either increase patients’ confidence in managing their conditions or promote patients’ dependence on clinicians (Fairbrother
et al., 2012; Rogers, Kirk, Gately, May, & Finch, 2011; Sanders et al., 2012). In this study and others, dependence on clinicians preempted patients from making independent interpretations of their disease status or decisions about self-management activities (Fairbrother et al., 2012; Radhakrishnan et al., 2012; Rogers et al., 2011; Sanders et al., 2012).

Financial challenges significantly affected the sustainability of this telehealth program. Medicare does not reimburse home telehealth programs (Centers for Medicare and Medicaid Services, 2011), and Medicaid programs in some states such as Texas are still cautiously progressing toward providing such reimbursement (Texas Government Code, 2010). Other cost structures such as charging patients for telehealth services were not feasible for TxHHA, because several of their older adult clients could not afford it. Low referrals of patients to the TxHHA by physicians who were frequently dissatisfied by the telehealth program further diminished the program’s financial sustainability. Continued investment in telehealth at TxHHA could not be justified, because specific reductions in or prevention of hospitalizations could not be correlated with interventions initiated by telehealth data. Lack of appropriate statistical tools to demonstrate such correlations were unavailable at this agency and in another study (Hardisty et al., 2011).

The lack of innovation in communication between HHAs and physician offices hindered meaningful utilization of telehealth data for patient care both in this study and in others (Hardisty et al., 2011; Radhakrishnan et al., 2012). The physician in this study reported being inundated by correspondence related to telehealth data and frustrated by the lack of patient-specific context information. Vital sign numbers alone were meaningless in a patient-related communication unless accompanied by information such as the patient’s dietary, physical, or medication adherence behavior for that day. Unclear clinical roles and responsibilities, responses to abnormal telehealth vital sign data, and expectations about patient outcomes have also resulted in problematic interactions between various healthcare professionals involved in telehealth care delivery (Fairbrother et al., 2012; Hardisty et al., 2011; Lamothe et al., 2006).

Most participants found the telehealth devices for transmitting vital signs to be user-friendly. However, frail and elderly patients found the use of telehealth devices challenging in this study, especially when they had to retest their vital signs from multiple postures. In addition, location aesthetics and incompatibility of participants’ phones with telehealth transmission were found challenging. The TxHHA’s telehealth devices were at least 10 years old. Funding to update and maintain the program was not forthcoming, so the participants could not benefit from newer updates and improvements in telehealth devices, especially in phone compatibility. Different versions of telehealth devices may explain the mixed findings on telehealth usability that have been reported in the literature. Some researchers endorsed telehealth’s ease of use (LaFramboise et al., 2009; Sandberg et al., 2009) and others reported numerous problems with telehealth device connectivity and data transmission (Radhakrishnan et al., 2012; Sandberg et al., 2009).

Top-down decision making by corporate managers and home health administrators was associated with the decision to adopt telehealth, grow, invest in, and discontinue the program at TxHHA as at other HHAs reported in the literature (Fairbrother et al., 2012; Radhakrishnan et al., 2012). Such an organizational structure did not allow for the involvement of actual end users—home health nurses and patients—in decision making about telehealth use.

Based on exploration of telehealth programs in the first one to three years of implementation, Joseph et al. (2011) have provided a checklist of factors to guide the initial planning and implementation of successful telehealth programs. The study reported here is unique, because it examined a telehealth program after a decade in use at a HHA. The gradual change in the telehealth program at TxHHA from thriving to declining was related to a combination of sociotechnical issues, including perception of unimproved patient outcomes, poor cost-effectiveness with negligible return-on-investment, lack of strategic communication with referring physicians, technology usability issues, and top-down management culture.

**Strengths and Limitations**

A key strength of this study is the diverse ethnicity of participants, who included Caucasian, African, Hispanic, and Asian Americans. This enhances the generalizability of our findings across racial and ethnic groups.

Although we are confident that we achieved saturation in our themes and that our results are trustworthy, our analysis was based on participants who volunteered. Therefore, the results and subsequent conclusions represent the sample from which they emerged and can only be generalized to other situations or populations with caution.

**Implications for Research and Practice**

A most compelling finding from our study is that a health technology such as home telehealth is highly likely to be sustainable when it can motivate patients to take an active, independent role in their disease self-management. Telehealth program protocols that require patients to passively follow instructions without being involved in self-care decisions can fail to improve patient-centered outcomes. Home health providers should instead enable their patients to utilize the telehealth data to gain awareness of their health status, recognize symptoms, understand the impact of their behaviors on their health status, and set achievable self-management goals.

The potential of telehealth as a behavioral health intervention to achieve patient-centered outcomes can be enhanced through tailoring to patient characteristics...
such as health literacy, personality, or motivation (Lustria, Cortese, Noar, & Glueckhauf, 2009; Radhakrishnan, 2012). Telehealth may not be for everybody. A balanced evaluation of the use of telehealth for elderly individuals, especially those who are frail and lack family support, should replace the standardized recommendation of telehealth for all patients with certain chronic diseases.

Innovative cost-sharing models for the use of telehealth programs by multiple healthcare settings involved in patients’ care could be explored. Out-sourcing telehealth programs from HHAs to telehealth service companies might improve such programs’ financial viability (Rowan Consulting Associates, 2012), but unless such models improve patient-centered outcomes they will remain susceptible to failure. HHAs must develop data analysis capabilities that can effectively demonstrate hospitalizations prevented by telehealth programs. Perceptible improvements in patient-centered outcomes either through changes in behavior or reduction in hospitalizations will encourage important stakeholders such as physicians and high-level administrators to support telehealth.

The capability to collect and analyze patient-specific context information should be integral to any telehealth program. Communication methods similar to Situation-Background-Assessment-Recommendation (SBAR; Narayan, 2013) can guide nurse–physician communication that is rich in patients’ contextual information. In addition, interoperability of health information systems of HHAs and physicians’ offices can facilitate seamless electronic transfer of telehealth data. Such transfer is critical for meaningful utilization of telehealth data for chronic disease care management of older adults. Future research should explore data visualization techniques to enable efficient communication of telehealth data, patients’ contextual information, and their correlations with health status among clinicians. Research is also needed on patients’, nurses’, and physicians’ decision-making processes and abilities in disease management when informed by telehealth data.

Also, an interdisciplinary collaborative planning approach that involves end users of home health nurses and patients as well as physicians can inform design of future telehealth interventions that is effective, sustainable, and informed by user needs and current reality (Cabassa et al., 2014; Trivedi et al., 2013).

**Conclusion**

This study presents the unique perspectives of home health staff and patients involved with an actively declining telehealth program. The study’s findings have important implications for HHAs that incorporate telehealth in their care delivery for older adult patients. While the TxHHA telehealth program had supporters among home health nurses and patients, financial, technical, management, and communication-related challenges as well as a lack of significant impact on patient outcomes adversely affected the program’s sustainability.

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