A Qualitative Evaluation of a Telemedicine-Enhanced Emergency Care Program for Older Adults

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OBJECTIVES: To document the experiences of patients, their caregivers, healthcare personnel, and staff members with a program that provides telemedicine-enhanced emergency care to older adults residing in senior living communities (SLCs) and to delineate perceived barriers and facilitators.

DESIGN: Qualitative study.

SETTING: A primary care geriatric medicine practice.

PARTICIPANTS: Stakeholders associated with telemedicine visits: patients, family caregivers, telemedicine dispatcher, certified telemedicine assistants, telemedicine providers, and SLC staff.

MEASUREMENTS: Between June and August 2011, telemedicine encounters were observed, and field notes were recorded. After each telemedicine visit, all participants were interviewed using a semistructured guide. Discrete statements from interviews and field notes were coded and arranged into themes. Concordance or discordance in field notes and stakeholder responses were grouped for analysis.

RESULTS: After 10 telemedicine visits and 34 interviews from 21 unique participants, redundancy was achieved. Participants and their families overwhelmingly reported satisfaction with their care, remarking particularly on the convenience, speed, and completeness of the evaluation. Participants reported some unmet expectations regarding provider presence at home and visit length. Providers thought telemedicine made them more efficient overall and improved diagnostic certainty but considered in-person visits to be superior. All stakeholders, including patients, noted inadequate telemedicine technician training, leading to low confidence levels and performance difficulties. Participants, providers, and telemedicine technicians cited problems with the reliability, weight, and size of the equipment as serious challenges, decreasing their satisfaction and increasing their frustration.

CONCLUSION: Telemedicine-enhanced emergency care is an acceptable method of providing emergency care to older adults in SLCs. Stakeholders report a number of advantages. Training and technology barriers require particular attention. **J Am Geriatr Soc 61:571–576, 2013.**

Key words: telemedicine; emergency care; elderly

Older adults frequently require emergency care for acute illnesses and access that care through a medical system that serves them poorly.[1–3] The shortage of primary care providers (PCPs) and difficulty in accessing timely outpatient care creates a dynamic that encourages people to seek attention outside their medical home.[4–6] Emergency departments (EDs) serve as available resources for these older adults, but ED providers encounter challenges to providing efficient, high-quality, patient-centered care.[2,7–11] They frequently lack critical information such as medical history. They may lack needed resources such as social workers and other staff to handle older adults' complex and time-consuming physical and psychosocial needs.[12] Finally, structural and operational challenges such as the noisy environment, crowding, and processes not designed for older adults may impair care and put older adults at risk for conditions such as delirium or poor transitions.[2,13]

Telemedicine has the potential to enhance the delivery of emergency care for older adults. Studies have demonstrated that patient-to-provider telemedicine-enhanced emergency care services for children in schools and day-care centers are feasible, acceptable, effective, and efficient.[14–16] To the knowledge of the authors of the current study, a few studies have demonstrated the feasibility of

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telemedicine-enhanced emergency care for older adults in medical settings and for specific conditions such as stroke.[17–23] Before broad implementation of a telemedicine-enhanced emergency care program capable of addressing a wide range of acute complaints from older adults in non-medical settings can be encouraged, rigorously evaluated demonstration programs should ensure that the structure and processes of such a program are viable and optimized to reflect the needs and opinions of stakeholders.

Using unconstrained qualitative methods, the current study aimed to understand the opinions of participants, caregivers, and healthcare providers participating in a program that provided telemedicine-enhanced emergency care to older adults residing in independent and assisted living communities (referred to as senior living communities (SLCs)). This study was specifically designed to assess patients' and caregivers' experiences with telemedicine-enhanced care, providers' and staff members' experiences in providing telemedicine-enhanced care, and stakeholder-perceived barriers to and facilitators of the program.

METHODS

Study Design

This qualitative study involved individuals participating in an ongoing study of telemedicine-enhanced emergency care for SLC residents. Data were collected in June and July 2011, 7 months after initiation of the primary study. The University of Rochester research subjects review board approved the study.

Setting

This study took place in a primary care geriatric medicine practice with approximately 750 patients at 17 SLCs in Rochester, New York. In this practice, physician and nonphysician providers deliver care at the SLC's campuses. A central office handles calls for illness and administrative concerns. As part of the overarching study, telemedicine-enhanced emergency care was made available to consenting individuals at six SLCs.

Telemedicine Process

The program staff included a dispatcher, certified telemedicine assistants (CTAs), and telemedicine providers. The dispatcher tracked pending telemedicine-enhanced care visits and routed CTAs to participants. All CTAs were hospital clinical technicians who had completed 40 hours of training on practical skills such as obtaining blood pressure, working with patients, and safety. They had previous experience with a pediatrics telemedicine program but no geriatrics experience. Therefore, they were given 40 hours of additional didactic and practical clinic-based training with the geriatrics practice. They also successfully completed the institution's phlebotomy and electrocardiogram courses. For the program, CTAs collected participant history and examination findings using a Littmann 3200 electronic stethoscope (3M, St. Paul, MN), digital otoscope (Welch Allyn, Skaneateles Falls, NY), high-resolution camera (Nikon, Tokyo, Japan), and Agent V5 web camera (Liquid Digital Solutions, Rowville, Vic., Australia) linked to a laptop computer, scanner, and printer (Dell, Inc., Round Rock, TX). They also performed electrocardiograms, phlebotomy, and point-of-care testing. The CTAs executed protocols and relayed information but did not make clinical judgments. All information collected was captured in an electronic medical record (TeleAtrics; Trifecta Technologies, Allentown, PA) for review by the provider. All telemedicine providers were licensed physicians or advanced practice providers in geriatrics or emergency medicine.

Before telemedicine, when a SLC resident had an acute illness, the participant or a caregiver called the geriatrics practice for assistance. A nurse referred the call to a provider, who handled the illness by telephone, arranged an outpatient visit, or directed the individual to an ED. In the primary study, an in-home visit using telemedicine was added as an option for care. In cases deemed appropriate, a CTA was dispatched to the individual's residence the same day by car and followed a standard protocol to obtain the relevant history and conduct an examination. The CTA then contacted the telemedicine provider, who reviewed the findings (e.g., listened to lung sounds), interfaced with the participant and caregivers by telephone or video conference, determined the need for further evaluation or testing (e.g., mobile imaging), and initiated treatment (e.g., prescribed medications). The provider then completed discharge instructions that the CTA printed and gave to the participant and caregivers. The program did not provide any ongoing patient monitoring.

Participants

Telemedicine visits were sampled serially from the overarching study as care was requested. Stakeholder groups associated with telemedicine visits were of interest and sampled: patients, family caregivers, telemedicine dispatcher, CTAs, telemedicine providers, and SLC staff. To be eligible for this study, participants had to be involved in a telemedicine visit and have decisional capacity to consent to participate in the study, as determined by an institutionally approved process. If the participant lacked decisional capacity, proxy consent was obtained to permit observation of the telemedicine visit, but the participant was not interviewed.

Measurements

A research assistant observed and took field notes during the telemedicine-enhanced emergency care visit, capturing statements and behaviors related to study objectives. Once the telemedicine-enhanced visit was complete, the research assistant also completed semistructured interviews with individuals from each stakeholder group.

A semistructured interview guide was developed that was specifically customized for each respondent group. Given the general lack of knowledge of participants' views regarding the telemedicine program, a grounded theory approach was used. Follow-up and probing questions were used throughout the interview. Interviews were audio recorded and transcribed.

As with qualitative studies, sufficient sample size was determined when redundancy of responses occurred among all respondent groups. Redundancy was defined as existing when no new data emerged from additional interviews.[24]

Analysis

Descriptive statistics were used to describe the demographic and clinical characteristics of participants.

Transcribed data from field notes and interviews were broken down into discrete statements, and specific codes were developed. Coded data were arranged into basic themes, which were developed in an iterative process as coding ensued. Study team members (AD, DM, CMCJ, MNS) reviewed all coded statements for consistency and accuracy of categorization. Any discrepancies were reviewed and resolved by consensus.[25]

All data were triangulated using information from participant observation field notes and interviews. By interviewing multiple respondent groups for a given telemedicine visit, it was possible to perform paired analysis for each visit, making it possible to identify consistencies or discrepancies in opinions between respondent groups. Results from each data collection method were linked and compared, enabling the study team to corroborate interpretation across methods.

RESULTS

Study sample characteristics are presented in Table 1. All of the participants were white women with a median age of 92, reflective of the underlying population and the SLC residents who request care.

After reviewing 10 telemedicine visits and 34 interviews from 21 unique individuals, redundancy was achieved in terms of participants, family members, and telemedicine providers, and all eligible subjects in the other categories had been interviewed (Table 2). One individual was excluded because she lacked decisional capacity. SLC staff members were not involved in any case. From these interviews, 196 discrete statements were identified. Thirty-one codes were developed and assigned to the various statements. These statements were then organized into eight themes and three overarching domains (Table 3).

Table 1. Characteristics of Participants and Telemedicine Visit (10 Total Visits)

Visit Characteristic	Value
Age, median (IQR)	92 (77–97)
Female, n (%)	10 (100)
White, n (%)	10 (100)
Senior living community type, n (%)	
Independent living	8 (80)
Assisted living	2 (20)
Senior living community staff involved, n (%)	0 (0)
Family present, n (%)	4 (40)
Chief complaint, n (%)	
Cough or shortness of breath	4 (40)
Dizziness	1 (10)
Musculoskeletal pain	2 (20)
Ear pain	1 (10)
Face swelling	1 (10)
Chest pain	1 (10)
Disposition, n (%)	
Resolved at home via telemedicine	9 (90)
Sent to the emergency department	1 (10)
Visit length, minutes, median (IQR)	95 (60–165)

IQR = interquartile range.

Visit Expectations and Perceptions

All respondents commented that the telemedicine program had notable benefits such as eliminating the need to travel to an ED (Quotations 1–3, Observation 6) while allowing medical care to be obtained immediately (Quotations 4–5). Participants and family members stated that the telemedicine visit resulted in a thorough evaluation (Quotation 4). Providers and one family member noted that the structure of the telemedicine program increased overall provider efficiency (Quotations 7–8).

Unmet expectations were noted. Some thought that in-person care would be ideal and would have preferred that the physician be present in person (Quotation 9). Others noted that the visits were lengthy (Quotations 7–8, 10–11). Field observations corroborated these statements. CTA and provider expectations were not always achieved. Problems related to inadequate organizational processes, time-consuming clinical evaluation, and extremely lengthy visits did not match expectations, leading to dissatisfaction (Quotations 8–12).

Communications challenges were noted. CTAs experienced challenges when conversing with older adults (their ability to hear or focus on the acute events; Quotation 13). The presence of family members and caregivers ameliorated these challenges. CTAs were particularly uncomfortable completing their documentation in the participant's home (Quotation 14). In contrast, communication between CTAs and providers was viewed as generally good (Quotation 15).

Providers noted that telemedicine care was superior to telephone-only care but was more time consuming than and clinically inferior to traditional office visits (Quotations 16–18). One physician noted that, although definitive diagnosis using telemedicine was difficult, serious conditions could be excluded more easily than by telephone alone and that this attribute was clinically important.

Table 2. Respondent Characteristics (10 Total Care Visits)

Group	Interviews	Unique Individuals n	Eligible Individuals
Participant	9	9	10
Family members	4	4	4
Certified telemedicine assistant	10[a]	4	4
Telemedicine provider	10[a]	3	4
Dispatcher	1	1	1

[a]A participant was interviewed for more than one telemedicine-enhanced care visit.

Table 3. Representative Quotations

Domain	Theme	Quotation (respondent group is indicated bold text)
Visit expectations and perceptions	Perceived value	**1: Provider:** "I think it fills a hole in the system and improves access. I'm starting to become convinced that it is helping some with avoiding going to the ER."
		2: Participant: "Well, I just think it's wonderful that we can sit in our own home and have someone come and do this for us so we don't have to sit around in waiting rooms and doctor's offices."
		3: Family: "I was relieved we didn't have to drag her to the hospital and put her through that again. I thought it was extremely beneficial."
		4: Participant: "Well, they covered everything, you know, that should be covered. And if I mentioned anything maybe not on their list, then they looked into that too, which is good."
		5: Family: "It saves us a lot of time, especially if you are home-bound."
		6: Observational Notes: Participant expressed several times during the visit that she had been worried she was going to have to go to the hospital and that was something she didn't want to do.
	Unmet expectations	**7: Provider:** "It took 3 hours [for the CTA] to wrap this up, that's better than me spending an hour and a half wasting my time behind it. I spent maybe 10 or 15 minutes behind it and then I was done and able to go off and do other stuff."
		8: Provider: "The face-to-face visit that takes 10–15 minutes. But this takes me 30 and takes a lot of [the CTA's] time. Now, it's faster than driving out there, finding her, parking, doing the visit and driving back but it's not fast."
		9: Participant: "I really thought there would be a doctor here…I think I would have [preferred that]."
		10: Participant: "The only thing is it takes a little long for this type of visit. A little long. The first time I had it took longer even!"
		11: Dispatcher: "I do know the visits take a long time. They are not short visits."
		12: CTA: "It's too detailed. It's too long. It's too long!…It's too overwhelming for the CTA."
	Communication	**13: CTA**: "Having to go back to things, to redirect her back into the visit when she goes on a tangent."
		14: CTA: "…when I'm typing documentation, I really have to focus on documenting so I don't make an error or omission. I really want to talk with the patient but I can't."
		15: CTA: "…good interactions with the providers. I like it when the providers throw a little teaching in too."
	Diagnostic certainty	**16: Provider:** "Stuff that with a younger person you would just handle on the phone and not worry about; but in the geriatric patient telemedicine can be reassuring that they are not as sick as they could be."
		17: Provider: "It's not superior to in-person diagnostic, but from afar it is."
		18: Provider: "I was actually very uncomfortable with how I left this visit…. I got enough that it was safe for the patient, but other than oximetry, there wasn't that much that was added value of the telemedicine. So I think it added the oximetry, but that's about it."
Staff training	Confidence	**19: CTA:** "Geriatrics is an art and I'm not a master."
		20: Provider: "And the CTAs are uncomfortable with geriatric patients, so there is some learning curve there."
	Performance	**21: Observational Notes:** CTA did not appear comfortable with software or ECG setup.
		22: CTA: "None of us feel comfortable with blood draws."
		23: Participant: "I had the feeling it was sort of new to [the CTA]. He was a little slow, but someone had to learn."
Technical issues	Quantity of equipment and limited workspace	**24: CTA:** "Well, first of all it's too much. Our bags are packed full and overflowing some of the time. And the cases are like 60 lbs and it's just not worth it to carry it all in there because once you get in there not everything is going to work…. It's a pain in the butt."
	Functionality	**25: Provider:** "I think that [the technology] is kind of a chronic problem because it's always some equipment piece, or some upload or some connection that continually does not work on every single visit I've done. And that's really frustrating."
		26: CTA: "It's nice when [the medical technology] works, but it doesn't always work. I'd say 50/50 shot."

ER = emergency room; CTA = certified telehealth assistant; ECG = electrocardiogram.

Staff Training

Certified telemedicine assistant training was another overarching domain, with confidence and performance being two themes. CTAs thought that, despite their geriatrics training, their skill set was limited (Quotations 19–23). This led to disorganized workflow, a slow pace of completing the visits, and general discomfort with the encounters. All stakeholders noted performance concerns, which were consistent with field observations. CTAs and providers reported that the CTAs did not always have the necessary equipment and at times did not obtain sufficient information from participants. Despite training in use of the equipment and procedures, CTAs did not feel comfortable with them (e.g., phlebotomy, electrocardiogram acquisition). CTAs also noted that their lack of confidence and discomfort led to dissatisfaction.

Technical Issues

Certified telemedicine assistants and providers expressed concerns about the reliability of the technology, and these challenges were observed during visits. Problems such as broadband card failures, computer–medical device interface failures, and software problems caused delays. Digital stethoscopes at times provided unclear lung and heart sounds. These technological difficulties decreased satisfaction, increased visit times, and frustrated all parties (Quotations 25–26).

The CTAs also had significant concerns about the amount, size, and weight of the equipment, particularly in relation to the space available in the participants' residences (Quotation 24). Field observations corroborated these concerns.

DISCUSSION

To the knowledge of the authors, this is the first study to evaluate stakeholders' experiences and perceived barriers to and facilitators of a program that delivers telemedicine-enhanced emergency care to older adults in SLCs. Stakeholders believed that the program provided significant value. Participants and families appreciated avoiding travel to an ED, waiting in uncomfortable waiting rooms, and being cared for in inconvenient and unfamiliar surroundings. They also commented that their complaints and questions were investigated and addressed thoroughly. This valuing of telemedicine suggests that concerns regarding older adults' discomfort with advanced technology may not be a significant obstacle to adopting telemedicine,[26] although acceptance of telemedicine and use of technology was not universal and should not be presumed.

The ability of telemedicine technology to enhance diagnostic certainty appeared to have value to the healthcare providers. Older adults often have atypical presentations of disease and may lack symptoms that would be present in and reported by younger individuals. Cognitive impairment is prevalent in the elderly population and may influence telephone reports. Therefore, making recommendations about the delivery of care to older adults purely over the telephone can lead to errors, particularly in nonmedical settings such as SLCs, where staff members trained to report an accurate and complete patient history might be unavailable. Telemedicine was not viewed as superior to in-person care, but it provided enough data to reassure providers that patients are "not as sick as they could be." This added level of diagnostic certainty could improve clinical care but might also result in excessive use of this new technology, as is often seen with new healthcare technologies.[27] For instance, a problem that could have been managed over the telephone may be managed unnecessarily using telemedicine. Further studies on the effect of telemedicine on overall healthcare use and costs are needed.

Respondents identified two major concerns, both of which can be addressed. The CTAs' discomfort with and lack of confidence in caring for older adults was clearly a concern of stakeholders. This response is probably unique to this program, because the CTAs' expectations and performance reflected their limited geriatrics experience and insufficient geriatrics training. Because the ability to communicate well with patients and families, to perform a thorough examination, and to execute necessary procedures are critical to the success of the visit, substantial attention must be directed to training all personnel providing care to older adults, which has subsequently been implemented. Similar observations have been made regarding prehospital emergency medical technicians, a group that is comparable with the CTAs in terms of education, training, and clinical scope.[28] Ensuring that CTAs are trained adequately and perform efficiently should be a priority of any program.

The second concern identified, related to technology, is equally important. Equipment size, connectivity, and medical instruments sometimes presented problems. These concerns, once identified by any program, can be addressed. Usability testing of the equipment individually and when connected can ensure efficient use with minimal barriers and hazards.[29,30] Training specific to the equipment is also important to ensure that CTAs are comfortable with it and can troubleshoot inevitable problems. Improving equipment reliability and usability, including wireless communications, personal computer–device, and software interfaces, must receive significant attention and effort from the outset.

Several study limitations must be acknowledged. First, this study was performed in a single, community-based geriatrics practice. Other concerns might have been identified in other geriatrics practices or different types of SLCs. Others hoping to replicate this type of program must recognize the uniqueness of each setting. Second, data collection occurred early in this program's implementation and may not have identified all barriers and facilitators present in a more-mature program. Nevertheless, the primary intent of this study was formative; replicating this study in more-mature programs would have additional value. Third, only women accessed telemedicine-enhanced emergency care in this study. This is not surprising because 70% of the patients in the geriatrics practice are women. Interviewing only women could yield biased findings, but it was not possible to identify any biases that might have resulted from a lack of male participants. Thus, the authors felt comfortable terminating the study when redundancy was reached in the findings, despite the lack of male patients.

In summary, stakeholders find the convenience and speed of telemedicine-enhanced emergency care to be highly desirable. Providers felt that telemedicine-enhanced emergency care provided enough data, enhanced diagnostic certainty, and overall, improved care, even though they felt in-person visits to be superior. Barriers related to training and technology require particular attention.

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