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Original Research

Telehealth during COVID-19: Perspectives on Usability by US Physicians

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Abstract

Objective

To understand the usability of telehealth among physicians caring for older adults during the COVID-19 pandemic.

Methods

We interviewed US-based physicians specializing in emergency medicine, geriatrics, and primary care who provided care during the COVID-19 pandemic. The interview guide was grounded in the unified theory of acceptance and use of technology (UTAUT). After conducting interviews probing their experiences delivering care using telehealth, we performed framework analysis to reveal major themes in telehealth usability.

Results

Forty-eight physicians (15 emergency physicians, 18 geriatricians, 15 primary care physicians) participated in interviews from September 2, 2020 to November 20, 2020. Lack of prior use of telehealth, quick adoption of telehealth, technical deficiencies in platforms, and frequent visits with older adults made using telehealth more difficult. Physicians shared low self-efficacy when using telehealth for diagnosis in certain patient populations, like older patients, new patients, and patients with atypical presentations or non-specific symptoms. By contrast, they had high self-efficacy if they received training, had existing technical proficiency, or were meeting established patients. Key facilitating conditions include easy-to-use telehealth platforms, the inclusion of third parties—like patients' children or nurses—in virtual visits, and at-home medical devices like blood pressure cuffs or pulse oximeters.

Conclusions

While physicians largely found that telehealth platforms were usable to deliver care to patients remotely, there were several technical and training-related barriers that impeded telehealth's usability at the onset of the pandemic. Simpler telehealth platforms with easy-to-use features, involvement of caregivers, telehealth training, and remote diagnostic devices increased the usability of telehealth.

INTRODUCTION

Prior to the COVID-19 pandemic, clinicians and patients were inexperienced in using telehealth, as evidenced by substantial increases in insurance claims for telehealth visits during 2020 compared to 2019.[1] However, the rise of telehealth use was not universal. Low completion rates for telehealth visits among certain populations suggest a digital divide—whereby some patients, particularly older patients, have more trouble accessing and using telehealth technology. Such inequities could lead to greater disparities in access to care and jeopardize the longevity of telehealth,[2] if not addressed. Additionally, regulatory, legal, and reimbursement barriers have impeded the adoption of telehealth technologies by some hospital systems, clinicians, and patients, further limiting widespread, continuous use of telehealth.[3] Evolving regulations and best practices for telehealth and differing variations based on locality often generate misunderstandings among healthcare professionals using telehealth, who may be dissuaded from using the technology due to such barriers.[4] To better understand how usability factors may be contributing to disparities in access and limited longevity of telehealth,

both patient and clinician stakeholders' perspectives are essential.

Several studies have examined patients' perspectives on telehealth and structural barriers impeding uptake,[4-7] but there is a lack of studies on physicians' perspectives on telehealth usability. The literature that does investigate telehealth usability typically employs questionnaires, which focus on telehealth's ability to achieve clinical practice goals often without examining specific factors affecting usability.[8-10] The unified theory of acceptance and use of technology (UTAUT) is a useful framework to examine these specific factors. UTAUT can help investigators understand the purpose for using a technology and behaviors associated with using that technology, and has been used to evaluate physicians' adoption of EHR technology[11] and eHealth pain management interventions for patients.[12]

In this study, we performed interviews exploring the usability of telehealth from the perspective of emergency, geriatric, and primary care physicians who cared for older adults at the onset of COVID-19. By interviewing physicians on the usability of telehealth and using the UTAUT framework to evaluate adoption behavior, we aim to understand the conditions that lead to effective telehealth use and explore usability gaps that need to be addressed for the sustainability of telehealth. Identification of these gaps will enable healthcare systems to effectively train clinicians on using the technology and upgrade telehealth technology to better enable their ability to deliver care to patients.

METHODS

Study Design

We conducted 30-minute semi-structured interviews with a national sample of US-based physicians specializing in emergency medicine, geriatrics, and primary care, who provided care to older adults during the COVID-19 pandemic. We aimed to gather their perspectives regarding the usability of telehealth. The hospital's Institutional Review Board approved the study. Study methods and results are presented according to the consolidated criteria for reporting qualitative research (COREQ).

Theoretical Framework

We based our evaluative framework on the constructs of the UTAUT. UTAUT seeks to understand the adoption and use behaviors associated with using a given technology. We chose to utilize the UTAUT framework because the constructs of the UTAUT framework more directly address this study's research question of identifying the specific conditions, barriers, and facilitators that underlie effective telehealth use, when compared to competing usability frameworks like the Technology Acceptance Model (TAM). Additionally, other studies have used UTAUT to evaluate the usability of telehealth during the COVID-19 pandemic, albeit with a different study population,[13,14] showing that the framework had been successfully applied to a similar usage instance.

For this study, we specifically examined the UTAUT constructs of performance expectancy, effort expectancy, self-efficacy, and facilitating conditions. These four constructs account for physicians' intention to use the telehealth technology and their actual use of telehealth. Performance expectancy refers to participants' belief that telehealth technology will supplement their practice. Effort expectancy describes participants' perceptions on the ease of use of telehealth. Self-efficacy is participants' belief in their ability to use telehealth technology. Facilitating conditions describe the barriers and facilitators that impacted effective use of telehealth.

Study Protocol

We developed an interview guide consisting of open-ended questions probing the usability of telehealth for physicians, their staff, and patients and barriers & facilitators to telehealth use. Interview questions were refined after group discussion with the research team. The interviews were recorded and transcribed by professional medical transcriptionists. The research team de-identified transcripts and corrected incomprehensible passages. After each interview, the interviewer completed a debriefing summarizing key themes, suggesting new interviewing techniques, and adding context to the transcript. We maintained an audit trail of changes made throughout the study.

Study Setting and Population

Eligible participants were US-based physicians with specialties in emergency medicine, geriatrics, or primary care who provided care to patients aged 65 and older during the COVID-19 pandemic. We recruited physicians from social media and listservs to participate in interviews. Specifically, we targeted the "COVID-19 USA Physicians group" on Facebook (150500 members). We also recruited physicians on the listservs of the Academy for Geriatric Emergency Medicine (158 members) and the American Geriatrics Society Member Forum (7600 members).

We aimed to recruit 12 to 18 physicians in each specialty stratified by location (urban, rural, suburban) and practice type (academic/community) to include a variety of perspectives. Participants answered questions about their demographics, years of experience, and practice setting in a pre-enrollment survey over REDCap, and those eligible received an invitation to interview. Study participation occurred after verbal informed consent over video conference. Upon consent, we conducted 30-minute semi-structured interviews with physician participants

via Zoom.[15] Participants were offered compensation ($50 gift certificate) following the interview.

Data Analysis

We used applied thematic analysis based on our UTAUT framework to guide data analysis. First, members of the research team read initial transcripts and noted major themes and observations. Then, we developed a set of codes based on our interview questions and theoretical framework. We included both inductive codes—which emerged from the research goals—and deductive codes—which represented new material from participants. We used framework analysis to summarize content within categories into charts after transcription. Transcripts were double coded in rotating pairs, and discrepancies in coding were reconciled through group discussion; one coder summarized content within a code and the reviewer reread the transcript to ensure all content was included in the framework.

The first author searched for common themes related to telehealth usability, reviewed themes from the coded transcripts, and selected representative quotes. Coding definitions and decisions were recorded in an audit trail. We entered our transcripts and finalized coding schema into NVivo version 12.

RESULTS

Demographics

We recruited 48 physicians specializing in emergency medicine (n=15), geriatrics (n=18), and primary care (n=15) to partake in semi-structured interviews [Table 1]. Physicians had a median age of 38, had a median years of practice of 7, and 56% (n=27) were women. Physicians resided almost evenly in all four geographic regions of the US. Moreover, 54.2% (n=26) practiced in a metro setting, and 50% (n=24) worked in an academic practice. While 58.3% (n=28) of participants reported telehealth use prior to the pandemic, only 29.2% (n=14) had experience with video visits before COVID-19.

Performance Expectancy

Participants reported varying levels of experience with telehealth, and their confidence in the technology's ability to augment their practice—or performance expectancy—was moderated by this experience.

Participants with prior telehealth experience reported greater certainty that the technology could be incorporated into their practice. For instance, one geriatrician used telehealth with patients prior to the pandemic, so their shift to remote care was more seamless. Having experienced the utility of telehealth previously, they felt that the technology could be helpful for seeing patients:

> "I've been doing telehealth [with] my patients for a while. And, so, we're familiar with the workflows, but then we've had problems with different platforms, but we were all pretty well-trained on training our patients. So we've made a quick transition to remote work." (Participant 3; geriatrician in suburban, community-based setting)

Participants with little experience with telehealth often shared that they had low confidence in the technology's ability to suit their patient-care needs. For many, the sudden adoption of telehealth gave them the impression it was underdeveloped, since physicians only started using it out of necessity.

Technical difficulties were another source of low performance expectancy. Many physicians reported that problems connecting to video visits, cell or internet service issues, and inconsistent audio quality disrupted virtual visits. One physician recalled, "There were many difficulties with getting connected over video visit, and only 50% of visits actually worked and the others had to switch to phone (Participant 24, geriatrician in urban, academic setting)." This inability to consistently connect to the technology and low quality of information transfer led to skepticism about the benefits of telehealth.

Effort Expectancy

Many participants shared low effort expectancy—the level of ease experienced when utilizing telehealth—since the sudden transition to telehealth caught them unprepared. In addition to facing a steep learning curve, physicians frequently had to adjust telehealth delivery methods due to evolving best practices, hospital protocols, and government regulations. These recurrent changes required a greater amount of work for physicians. As one participant explained:

> "When we made that jump to telemedicine, it was just a... disaster. I think we've been trying to push telemedicine, but until the CMS said, 'Hey, you can do this.' then we're like, 'Okay, we *have* to do this now (Participant 14; geriatrician in urban, academic setting).'"

Some participants also experienced technical deficiencies in the telehealth platform and its integration with their clinical workflow. They had to develop convoluted workarounds to integrate telehealth protocols into their practice. For instance, one participant reported that they had to use two different EHRs to perform a telehealth visit and document it:

> "We actually ended up with kind of a dual documentation system where you'd have to put something in the platform and then do a separate note in a different system. It wasn't challenging from

Table 1. Interviewee and Practice Setting Characteristics and Telehealth Use Prior to and During COVID-19 Pandemic, for Total Sample and by Specialty.

	Total		Emergency Medicine		Geriatrics		Primary Care	
	N=48		N=15		N=18		N=15	
	N	%	N	%	N	%	N	%
Age (n, %)								
25-44	36	75.0%	12	80.0%	11	61.10%	13	86.70%
45-64	7	14.6%	3	20.0%	3	16.70%	1	6.70%
65 and over	5	10.4%	0	0.0%	4	22.20%	1	6.70%
Median (IQR)	37.5	(34-44.5)	37	(34-43)	40	(35-63)	35	(34-43)
Sex								
Men	21	43.8%	8	53.3%	10	55.60%	3	20.00%
Women	27	56.2%	7	46.7%	8	44.40%	12	80.00%
Years in Practice								
0-10	33	68.8%	11	73.3%	10	55.6%	11	73.30%
11-21	9	18.8%	4	26.7%	2	11.1%	3	20.00%
22-32	2	4.2%	0	0.0%	2	11.1%	1	6.70%
33 years or more	4	8.3%	0	0.0%	4	22.2%	0	0.00%
Median (IQR)	7	(3.8-13)	7	(3-11)	9	(4-27)	6	(3.5-11)
Region								
Northeast	19	39.6%	9	60.0%	6	33.3%	4	26.7%
Midwest	10	20.8%	4	26.7%	3	16.7%	3	20.0%
South	9	18.8%	1	6.7%	5	27.8%	3	20.0%
West	10	20.8%	1	6.7%	4	22.2%	5	20.0%
Practice Setting								
Metro	26	54.2%	7	46.7%	12	66.7%	7	46.7%
Suburban	18	37.5%	6	40.0%	4	22.2%	8	53.3%
Rural	4	8.3%	2	13.3%	2	11.1%	0	0.0%
Practice Type								
Academic	24	50.0%	10	66.7%	9	50.0%	5	33.3%
Community	24	50.0%	5	33.3%	9	50.0%	10	66.7%
Prior Telehealth Use								
Video-visit only	8	16.7%	3	16.7%	2	11.1%	3	16.70%
Non-video visit only	14	29.2%	3	16.7%	5	27.8%	6	40.0%
Video and non-video visits	6	12.5%	3	16.7%	2	11.1%	1	6.7%
No telehealth	20	41.7%	6	40.0%	9	50.0%	5	33.3%
Telehealth Patients Seen*								
Median [IQR]	224	[64-640]	100	[35-400]	250	[64-640]	500	[200-960]
Missing Data	5		0		3		2	

> a technology perspective, it was challenging from a technology integration perspective." (Participant 25; emergency medicine physician in urban, academic setting)

For others, low effort expectancy originated from working with older patients, many of whom were inexperienced with technology. Participants explained that older patients' lack of technical competency and high incidence of hearing and visual impairments mandated that they put in more effort. One participant noted, "I feel like [older patients are] just not getting the care they deserve because they can't do telehealth." (Participant 26; primary care physician in suburban, community-based setting). The extent of these accommodations for older adults varied by specialty, and geriatricians and primary care physicians were better able to prepare older adults for telehealth visits than participating emergency physicians.[16,17]

Self-efficacy

Participants across all specialties felt that there were certain patient populations for whom they lacked self-efficacy, or confidence in their ability to provide adequate care via telehealth. In particular, making assessments for new patients and diagnosing patients with atypical presentations, non-specific symptoms, or no access to vital readings was more challenging, led to uncertain diagnoses, and could necessitate an in-person visit. One physician said, "I have people who have belly pain, it's really hard to diagnose belly pain without seeing people in-person and putting your hands on [their] belly. I have a lot of patients who have heart failure and other chronic cardiac conditions, or lung conditions that are also hard to assess

through video visits." (Participant 47; primary care physician in urban, academic setting)

Similarly, some participants shared lower levels of self-efficacy for older patients. Lack of technical ability and difficulties in hearing and vision impeded the quality of telehealth visits. As a result, it was not only more difficult to deliver care to older adults, but, when they did receive care, physician participants felt that the quality of that care was substandard:

> "So, a lot of older people, obviously, aren't as comfortable with the technology... [Many say], 'I'm not going to learn this, it's new, and I want to see my doctor in-person,' and you're not going to change their opinion on it." (Participant 18, primary care physician in urban, academic setting)

Additionally, for some physicians, establishing rapport with new patients was more difficult over telehealth and necessitated new skills. These were arduous for some physicians during audio-only telehealth visits, as visual cues were often necessary to communicate with certain patients.

> "Even if I'm speaking louder, it just felt like there was something lost in translation without a sort of face-to-face contact. If you're looking at me, you're shaking your head, I know you're following me." (Participant 15; geriatrician in urban, academic setting)

Many physicians felt confident making assessments over telehealth in their areas of expertise or with established patients: "I actually think there are certain types of encounters for which telehealth is perfectly appropriate and more than adequate." (Participant 45; primary care physician in urban, academic setting)

Facilitating Conditions

Participants reported various facilitators that made diagnosis and treatment over telemedicine easier. One of the key facilitators of telehealth use is the telehealth platform used (eg, Zoom, Athena, Doximity Dialer). While all platforms connected clinicians to patients, participants found that different platforms had varying levels of success meeting patients' needs. Across the 13 platforms that participants used, Zoom, Doximity Dialer, and FaceTime were the most used, with Zoom being the most common first-choice platform.

Many participants stated that a one-step video sign-on process and a familiar platform helped connect them with patients more easily. Since many patients struggled with multi-step processes to get access to the video link, FaceTime emerged as a popular option in spite of privacy concerns and HIPAA regulations. Participants also reported that phone calls were an alternative when experiencing technological issues.

Clinicians also reported that third parties like patients' children, family caregivers, nursing home staff, or nurses could solve the technical and communication difficulties during visits, especially for older and less tech-savvy patients. Similarly, interpreters could also join telehealth calls and ensure that telehealth was accessible to more patients. One physician in a PACE program sent staff to older patients' homes to facilitate telehealth visits: "[M]ost of the visits now are done with either a visiting nurse or a med tech that's in the home and assists patients for the visits. And we've mainly used the video visits for this." (Participant 29; geriatrician in urban, community-based setting)

Participants also reported that at-home medical devices, like blood pressure monitors, pulse oximeters, and thermometers assisted them in making better diagnostic decisions during telehealth encounters. Some physicians also had medical assistants and nurses call the patients before the visit to obtain vitals and prepare the patient for the televisit and reported that sending patients information about potential problems before the visit improved their experience.

DISCUSSION

Our study of 48 physicians providing telehealth to older adult patients revealed several novel themes. As almost half of participants lacked experience with telehealth before the pandemic and did not receive training prior to beginning use, there was a learning curve that impeded effective use early on. This learning curve was steeper for physicians with less technological literacy. Participants had to experiment with different telehealth platforms to connect with patients and navigate several waves of changing security, documentation, and communication preferences within their practices or health systems. In spite of these barriers, physicians achieved varying levels of success with telehealth.

In a 2020 survey conducted with physicians, 33.1% of physicians reported that telehealth decreases their clinical abilities, while 34.5% reported a loss of the patient-physician relationship. Still, only 44.9% of physicians suggested that telehealth should play a larger role in healthcare delivery.[18] However, in our study, most physicians reported that their belief in telehealth increased as they gained more experience. Increased exposure and greater self-efficacy of telehealth use may increase optimism among physicians, and they may be more likely to advocate further use. The 2022 Commonwealth Fund International Health Policy Survey of Primary Care Physicians seems to corroborate this finding, as the majority of US-based primary care physicians surveyed reported that telehealth implementation was easy, that they were satisfied with telehealth, and that telehealth technology was able to aug-

ment their care, with 82% stating that telehealth improved timeliness of care.[19]

Still, there exist some barriers for physicians that diminish the usability of telehealth. Notably, most telehealth platforms do not integrate seamlessly with other medical technology that physicians use in their clinical practice. For example, many doctors need to "find" patients using calendars or document notes in another software while meeting with patients through telehealth platforms. This result is reflected in prior work that found that EHR integration, support from information technology services, and regular meetings with a telehealth leadership team improved telehealth uptake.[20] This highlights a need for better integration of systems between different healthcare technologies that would serve to streamline patient care and lighten technical workloads.

Moreover, participants had difficulty conducting telehealth visits with patients who are visually impaired, speak a language other than English, or are older and less tech savvy. Such groups often had difficulties connecting to virtual visits, interacting with the telehealth technology, and communicating with the physician. This echoes results by Lopez et al[21] that clinician barriers to telehealth include poorly designed interfaces and difficulty connecting with patients with physical and cognitive impairments. Participants thus highlighted the need for greater accommodations for such patient populations to help them better access telehealth care.

Participants suggested several areas of improvement that would improve the usability of the telehealth technology. These included prioritizing platforms that utilized one-step video sign-ins and ensuring that patients have access to at-home devices such as pulse oximeters. Additionally, they recommended having staff members prepare patients for the televisit and assist with technological issues beforehand. This confirms research by An et al[22] which found that increased accessibility and ease of telehealth usage increased perceived usefulness. Addressing these areas for usability improvements is critical for continued use of telehealth beyond the COVID-19 pandemic.

Additionally, the regulatory guidelines that encouraged telehealth during the pandemic may soon change, thus affecting usage behavior among many physicians and hospital systems. Updated policies waived geographic restrictions for the site of origin for telehealth care, allowed for improved access to behavioral and mental health telehealth services, and broadened Medicare payment policy for telehealth visits.[23] However, many of the elements of favorable policy will end in December 2024.[24] The lack of a permanent policy that favors telehealth and the prospect of continued changes make participants hesitant to commit to telehealth, as many of the perceived advantages of telehealth that arose due to these policies may disappear. This perceived lack of stability in the telehealth environment shows the need for the establishment of permanent telehealth policies broadening telehealth access, especially as a growing body of emerging research supports the feasibility of telehealth in different settings and patient populations.[25-27]

Furthermore, some studies have used usability testing, in the form of pre-field and feasibility testing, to iteratively improve patient experiences with telehealth.[28] Future research should examine how the telehealth platforms utilized during COVID-19 work in-practice through usability testing, and make changes to improve the experience for all stakeholders involved, including patients and clinicians. Finally, other factors—like policy and reimbursement considerations—impact telehealth usability on a more systemic level, as opposed to an individual level. These were out of the scope of this research but should be addressed in future analyses of clinician-level telehealth usability. The next key challenge is to optimize physicians' use of telemedicine to ensure it continues to be offered together with in-person care.[29]

While this study revealed a number of factors that impede and facilitate telehealth usability, there are some limitations that future research should aim to address. In particular, since participants were recruited over social media and email, it is possible that our recruitment strategy favored more technologically savvy participants. Additionally, we only recruited physicians specializing in emergency medicine, geriatrics, and primary care. Further research should seek to understand the usability of telehealth for other specialties and include other health care workers, like nurses or physical therapists. Finally, we interviewed physician participants during the first wave of COVID-19 in the United States. More studies will be needed to see if the concerns of physicians changed over the course of the pandemic or differed in other countries.

CONCLUSION

While physicians largely found that telehealth platforms were usable to deliver care to patients at the start of the pandemic, there were a number of technical and patient-related factors that impeded telehealth's usability. Physicians expressed a desire for simpler telehealth platforms, staff or caregivers to assist patients with low digital literacy, and access to remote diagnostic devices to obtain vital signs and other health parameters. Additionally, physicians appealed for greater integration of the EHR with telehealth platforms and updates to platforms to add simpler features—like one-click sign-in and seamless integration of third parties— to improve the usability of telehealth. Understanding physicians' experiences with telehealth usability is critical for improving remote care for older patients, informing improvements and upgrades to telehealth, and creating training that integrates best practices in telehealth.

Author Contributions

All authors have reviewed the final manuscript prior to submission. All the authors have contributed significantly to the manuscript, per the International Committee of Medical Journal Editors criteria of authorship.

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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