

Clinician and staff perspectives on potential disparities introduced by the rapid implementation of telehealth services during COVID-19: a mixed-methods analysis

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Abstract

The COVID-19 pandemic has rapidly altered ambulatory health care delivery and may have worsened disparities in health care access. To assess the telehealth implementation experiences of ambulatory personnel in different disciplines and their perspectives on potential telehealth disparities, and to make recommendations for more equitable telehealth delivery. We used a convergent parallel mixed-methods design. Clinic managers from geriatric medicine, internal medicine, and psychiatry e-mailed a survey to clinicians and staff regarding experiences with telehealth care delivery. Quantitative survey responses were analyzed with Fisher's Exact tests. Qualitative responses were coded thematically. Recommendations were categorized by type of implementation strategy. Quantitative and qualitative findings on telehealth disparities were merged in a joint data display. Respondents ($n = 147$, 57% response rate) were distributed across three specialties: 66% internal medicine, 19% psychiatry, and 14% geriatric medicine. Prior to 2020, 77% of clinicians had never delivered telehealth services. By Spring 2020, 78% reported conducting more than half of clinic visits by telehealth. Among clinicians, 52% agreed/strongly agreed that rapid telehealth implementation exacerbated access to care disparities to: older adult patients, those with limited internet access, and those needing interpretation services. Staff expressed similar difficulties with telehealth set-up especially for these patients. To improve telehealth equity, clinicians recommended to: (i) change infrastructure; (ii) train and educate stakeholders; and (iii) support clinicians. Clinicians and staff reported specific subpopulations had challenges in accessing telehealth visits. To avoid perpetuating telehealth access disparities, further co-discovery of equitable implementation strategies with patients and clinics are urgently needed.

Keywords

Telehealth, Health disparities, COVID-19, Implementation strategies

INTRODUCTION

It is difficult to overstate the significant disruption in clinical care posed by the novel coronavirus-19 (COVID-19) in early 2020. As news headlines reported on the rising death toll from COVID-19 across China and Italy [1], public health forces scrambled

Implications

Practice: As the use of telehealth care has become more widespread, clinics should be aware of existing practice resources and tools available to address challenges with access to telehealth care, particularly for older adults with limited digital literacy, poorer patients with limited cell phone data plans, and patients who need interpretation services.

Policy: Equitable access to telehealth services requires attending to multi-level determinants (i.e., patient, provider, and system) to ensure that the infrastructure, technical support, and training is available to all.

Research: Future research should be aimed at engaging patient and clinic stakeholders to identify and test implementation strategies to improve the equity of telehealth care delivery.

to address this in the US. By March 2020, as COVID-19 cases increased in the US, ambulatory practices pivoted over a few days to deliver telehealth visits for the majority of outpatient encounters [2].

Telehealth services prior to COVID-19

Access to health care in the US varies by factors such as geographic location, patient insurance, language spoken, and presence of a disability [3]. Telehealth originated as a solution for improved health care accessibility [4]. Telehealth refers to the “use of telecommunications and information technologies to share information, and provide clinical care, education, public health, and administrative services at a distance” [5]. When used for remote monitoring or asynchronous communication, telehealth approaches have improved outcomes for chronic cardiovascular and respiratory diseases and mental/behavioral health treatment [5–7]. Telehealth has also improved access to care for aging and

underserved populations, particularly in some rural areas, in studies explicitly designed to increase telehealth access and use [8, 9].

However, prior to March 2020, telehealth use in the US was optional and limited. Telehealth services were underutilized, with fewer than 1.5 claims per 10,000 outpatient visits between 2010 and 2015 [10]. Widespread adoption and implementation of telehealth was hindered by multiple factors: clinician inertia due to full in-person visits; variation in state-to-state licensure rules; information security concerns; and variable reimbursement policies for services based on the telecommunication method used (i.e., telephone, videoconference) rather than the actual services provided [6, 7, 11]. If reimbursed at all, telephone consultations were reimbursed at a much lower rate than an in-person office visit [7]. Practices also lacked protocols for telehealth integration, patient and provider technological readiness varied, and broadband or high-speed internet access was inconsistent [6, 12]. Limited data suggested that certain populations were less likely to engage in telehealth services, including older patients (≥ 65 years) and those with low socioeconomic status [13]. Telehealth services were also primarily delivered in majority English speaking countries (i.e., United States, Australia) and as a result, people who speak languages other than English may have had fewer opportunities to access telehealth services [14].

Surge in the use of telehealth services during COVID-19 and emerging challenges

In 2018, some early adopters began telehealth implementation with 34 states and District of Columbia enacting parity legislation to improve reimbursement and increase access to telehealth for Medicare beneficiaries [10]. By March 2020, access to telehealth services expanded exponentially due to the pandemic. Primary care and mental health care clinics shifted rapidly towards conducting telehealth visits to: (i) limit COVID transmission within the health care system and (ii) prevent overburdening emergency departments [15, 16]. Ambulatory clinics had little time to develop implementation protocols to overcome the pre-existing challenges. As a result, up to 50% of primary care practices reported significant financial strain due to lost clinic visit volume in the pandemic in early March 2020 [2]. Once clinics shifted to providing telehealth care, 65% of clinicians reported that patients were unable to join telehealth visits due to lack of technology or unstable or poor stable broadband networks [2]. This raised concerns of potential emerging health disparities for patients with worse “digital literacy,” limited internet access, or fewer resources [2].

Based on these concerns, we engaged multidisciplinary stakeholders (clinicians, clinic leadership, and experts in implementation science, health informatics, and/or health disparities research) through virtual conference calls and town hall meetings over a 4-month period. These stakeholders were affiliated with three different disciplines of ambulatory care: General Internal Medicine (GIM), Geriatric Medicine, and Psychiatry. These discussions led to an overarching research objective: to assess the experiences and acceptability of the rapid telehealth implementation among clinicians and staff in primary care and psychiatry, especially their perspectives on potential disparities that occurred during this transition. We hypothesized that clinicians and staff would identify concerns regarding health disparities related to technology use and access for telehealth. Accordingly, we sought recommendations on practical approaches and implementation strategies to improve telehealth care equity and sustainability.

METHODS

Study design and framework

This study was approved as a quality improvement project by the University Institutional Review Board and utilized a convergent parallel mixed-methods design. We applied Kilbourne’s framework to address disparities in health services research [17]. Phase 1 of this framework refers to detecting health disparities. Phase 2 refers to understanding multi-level determinants (patient, provider, or clinic) that reinforce health disparities. Phase 3 refers to reducing disparities through the implementation and evaluation of evidence-based interventions or policies. In this study, we applied both Phase 1 and 2 of this framework, by evaluating multi-stakeholder perspectives on telehealth disparities use and access, paying attention to any underserved groups.

Practice sites

The two GIM clinics involved in this study serve ~1500 patients/month in total, and provides the typical spectrum of primary care services for adults, including urgent evaluation of acute illness symptoms, chronic disease management and prevention, and age-appropriate wellness-focused visits. Two Geriatrics clinics serve as the geriatric primary care medical home for ~2600 patients in total (average patient age of 84 years old). The same group of interprofessional geriatric clinicians and staff provide care at both locations, focusing on comprehensive geriatric care such as dementia care, multi-morbidity and mobility concerns, and advance care planning. The Outpatient Psychiatry Clinic offers a full range of psychiatric services for ~1000 patients/month across the lifespan, with specialty clinics such as the LGBTQ Mental Health Clinic and the Refugee Mental Health Program.

Telehealth care experience survey and open-ended questions

With extensive input from our stakeholders, we adapted a valid, 18-item telehealth acceptability survey [18]; Likert-scale survey items focused on the acceptability and satisfaction with telehealth (Supplemental File 1). The survey was adapted to account for the telehealth platforms sanctioned for use at the University Health System: (i) Epic electronic health record system (Epic Systems, Verona, WI) and VidyoConnect (VidyoConnect.com, New Jersey, USA), (ii) Doximity (video visits or phone visits; doximity.com, San Francisco, USA), or (iii) telephone. We also included additional survey items and open-ended questions that addressed potential telehealth disparities, the telehealth care service experience, and recommendations to improve telehealth care equity. The survey focused on the period of telehealth use prior to Colorado's COVID-19 "stay-at-home" quarantine regulations (i.e., before March 2020) and during the early COVID-19 outbreak (i.e., March–May 2020).

Data collection

Clinic managers emailed a REDCap (Research Electronic Data Capture) [19] survey link weekly over a three-week period in June–July 2020 to all clinicians and staff ($n = 271$). All respondents reviewed the brief, embedded consent form prior to completing the survey. The initial portion of the questionnaire assessed demographic information and frequency of telehealth use prior to March 2020 and during COVID-19 in Spring 2020 (i.e., "March–May 2020"). Telehealth visits were described as clinical care delivery by either video-assisted or telephone visit. Participation in the survey was voluntary and without financial incentives.

Data analyses

In a convergent parallel mixed-methods design, quantitative and qualitative data are analyzed separately and then merged in a joint data display for comparison [20]. Qualitative data were used to explain the quantitative survey data of telehealth experience. Quantitative data were summarized as frequencies and percentages, and group differences among clinics were analyzed using Fisher's exact tests in R 3.6.3 [21] to determine statistical significance due to small sample sizes in some cells. Qualitative data were analyzed using a rapid thematic analysis [22] approach of open-ended responses. Open-ended responses on recommendations were coded using the nine Expert Recommendations for Implementing Change (ERIC) categories of implementation strategies; implementation strategies are conceptualized as the approach or strategy needed to enhance the uptake and use of a program [23].

RESULTS

The survey conducted across the four clinic sites yielded 147 respondents (57% overall response rate).

As the GIM clinics has more employees than the other clinics, the respondents were distributed as follows: 66% of both GIM clinics, 19% Psychiatry, and 14% of both Geriatrics clinics. Across all clinics, nearly 60% of respondents were attending faculty clinicians (i.e., physicians/psychiatrists, and advanced practice providers), residents/fellows, and mental/behavioral health clinicians; these respondent types are categorized as clinicians. The remaining respondents were categorized as staff: registered nurses, Doctor of Pharmacy (i.e., PharmDs), medical assistants or Licensed Practical Nurses, and administrative staff. As shown in Table 1, respondents were demographically diverse, including 27% non-white respondents, a nearly 2:1 ratio of female to male respondents, and a widely dispersed age distribution. Our study population distribution is comparable to the actual demographics of the clinic employees, with clinicians comprising 66% of employees across all four clinics (182 clinicians/275 total employees).

Prior to March 2020, 76% of clinician respondents reported they had *never* delivered telehealth services. Only about three-quarters ($n = 27$) reported that telehealth visits were <20% of their total volume prior to March 2020. By Spring 2020, 78%

Table 1 | Demographics of clinician and staff respondents ($n = 147$)

Demographic variable	N (%)
Gender	
Female	98 (66.7%)
Male	46 (31.3%)
Non-binary	3 (2.0%)
Age	
18–34	55 (37.4%)
35–54	68 (46.2%)
55+	24 (16.3%)
Race	
White	107 (72.8%)
Black/African-American	6 (4.1%)
Asian	8 (5.4%)
American Indian/Alaskan native	1 (0.7%)
Other/Multiple races	13 (8.9%)
Chose not to disclose	12 (8.2%)
Clinic role/Position	
Attending faculty clinician	51 (34.7%)
Resident/fellow clinician	28 (19.0%)
Medical assistant/Licensed practical nurse	28 (19.0%)
Registered nurse/other clinical specialist	11 (7.5%)
Administrative support team	14 (9.5%)
Mental/Behavioral health provider	9 (6.1%)
Other	6 (4.1%)
Length of time in this profession	
0–5 years	51 (34.7%)
6–10 years	25 (17.0%)
11–20 years	41 (27.9%)
21 years or more	30 (20.4%)

of clinicians noted that more than half of their visits were conducted by telehealth (Fig. 1). Psychiatry respondents reported the greatest shift in telehealth use (83% never used at baseline to 90% used by Spring 2020) followed by Geriatrics (86% never used to 71% used) and both GIM clinics (69–78% never used to 26–30% used).

Experiences and satisfaction with telehealth use: clinician responses

While the majority of clinician respondents agreed that, “For the most part, I am satisfied with the work I’ve done through telehealth visits,” the level of agreement was significantly higher for video-assisted visits than for phone visits (81% vs. 52%, $p < 0.001$). Clinicians were significantly more likely to agree/strongly agree that they had “meaningful connections with their patients” during video-assisted visits compared to telephone visits (92% vs. 72%, $p = 0.003$, Fig. 2A). Clinicians were also significantly more likely to agree/strongly agree to “meeting patients needs” via video-assisted visits than telephone visits (70% vs. 43%, $p < 0.001$, Fig. 2B). Clinicians agreed that they felt “confident and at ease when running telehealth visits” across the different telehealth platforms (86% agreement for Doximity video-assisted visits; 80% for Epic/Vidyo© video-assisted visits; 79% for telephone only visits). In contrast with quantitative data, clinicians across all clinics reported a limited sense of connection, even with video-assisted visits. This included limited capacity for physical examination, partly due to the constrained interpersonal interaction, “The visits feel much less personal. I do feel like I’m making judgments where I would feel more comfortable if I had a higher fidelity look at the patients and the ability to do an exam,” as well as feeling ineffective in

their care: “Many of the therapeutic benefits were gone, such as establishing a close connection and trust with new patients ... which are vital for psychotherapy.” This limited sense of connection also extended to the bigger “clinical team,” leading to challenges with care coordination: “I missed the contact with my colleagues and co-workers [and] ... access to our team helping with scheduling future appointments ... to PharmDs, LCSWs [licensed clinical social workers].”

Clinicians in all disciplines were mixed on whether telehealth improved patient care efficiency: 39% agreed/strongly agreed that telehealth visits were efficient, 32% disagreed/strongly disagreed, and 29% were neutral. Qualitatively, clinicians noted some new efficiencies as patients were no longer slowed by delays that commonly occurred for in-person visit: “It has led to greater efficiencies with clinic operations... nice to not have delays [from] waiting on late patients, late check-in, etc.” However, this was replaced by new delays, such as technical issues and dropped telephone calls: “It was somewhat more difficult to have in-depth goals of care conversations or complex care coordination conversations because of hearing limitations, technology issues (echoing/poor audio), or challenges in talking with multiple individuals (patient and care partner).”

With respect to teaching being a key part of these clinics’ mission, 50% of clinicians agreed/strongly agreed that they could easily adapt their existing teaching styles remotely. However, 69% and 65% of attending faculty and residents/fellows, respectively, strongly disagreed/disagreed that the quality of virtual trainee education was not as good as in-person training ($p = 0.46$ for attendings vs. residents/fellows).

Experiences and satisfaction with telehealth visits: staff responses

Given the limited use of telehealth services prior to the pandemic, clinic staff respondents reported

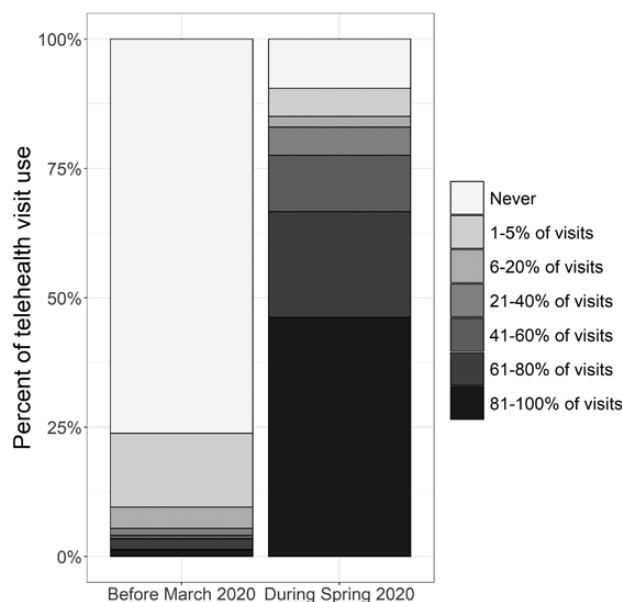


Fig 1 | Percentage of telehealth visits before March 2020 and during Spring 2020.

variation in the ease of set-up for telehealth: 81% agreed it was easy to set up telephone visits; for video visits, 53% agreed that Doximity was easy to set up and 44% found the Epic/Vidyo® platform easy to set up. Compared to in-person visits, some but not all staff perceived it took longer to set up visits for telehealth platforms: 55% for the Epic/Vidyo® platform, 31% for Doximity, and 8% for telephone calls. Qualitatively, clinic staff reported challenges with the electronic check-in processes that required many steps, especially when patients were new telehealth users and/or had poor internet connection.

Perception of impact on telehealth disparities

As shown in Fig. 3A of the mixed-methods joint data display, 50% of clinicians in the two GIM clinics and 75% of clinicians in the Geriatrics clinics agreed with the statement: “I am concerned that telehealth use exacerbated health disparities during the COVID-19 period” whereas only about 25% of the clinicians in Psychiatry agreed ($p = 0.076$, Fig. 3A). From the open-ended responses, clinicians conceptualized health disparities as lower access to video-assisted telehealth for (i) older patients due to digital literacy, (ii) limited English or non-English speaking patients

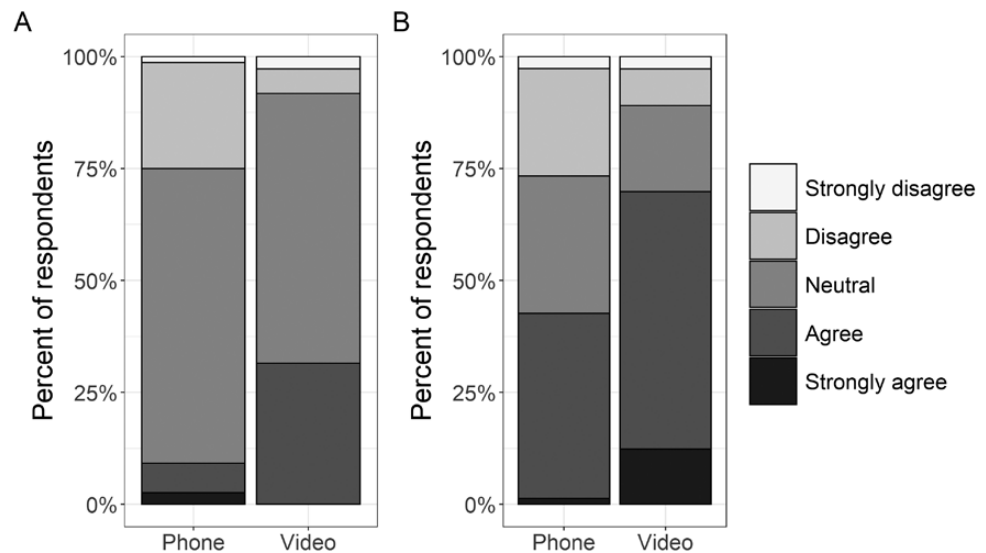


Fig 2 | (A, Left) Providers can meaningfully connect with patients in video visits over phone visits, $p = 0.003$. (B, Right) Providers can meet patients' needs well in video visits over phone visits, $p < 0.001$.

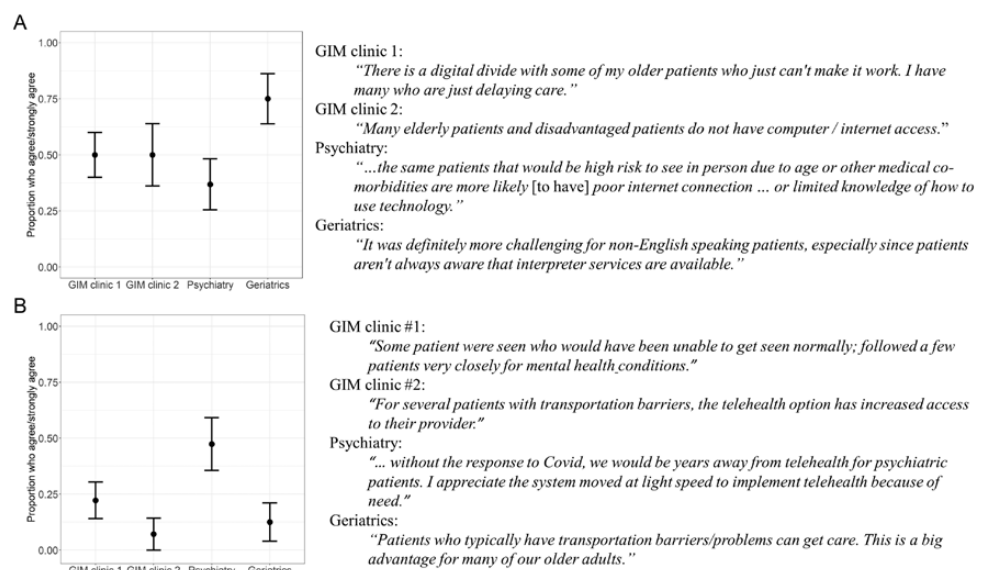


Fig 3 | (A, Top) Joint data display on clinician perception that health disparities worsened. (B, Bottom) Joint data display on clinician perception that health disparities improved. Quantitative results (left) displayed as mean \pm standard error bars; responses plotted as the percentage of respondents who agreed that “telehealth use exacerbated health disparities (A) or improved health disparities (B) from March to May 2020.” Example clinician responses (right) by practice.

who need language interpretation services, and/or (iii) patients with technological challenges, such as unstable internet access or limited cell phone data plans. Disparities were reported across all disciplines/clinics. One clinician noted that it was “*very challenging at times [to arrange] interpreter services and access. Patients would frequently not answer their phone, afraid the person was speaking English [only] ... I could not offer virtual visits because we could not get an interpreter in that way.*”

From the clinic staff’s perspective, over 50% of staff reported that patients periodically declined a video-assisted visit, preferring instead to connect via phone. According to clinic staff, the top five reasons that patients would decline a video visit are: (i) lack of computer/smart phone (reported by 83% of staff); (ii) lack of computer/technology knowledge (81% reported); (iii) lack of reliable internet access (61% reported); (iv) patients did not seem comfortable with telehealthcare (47% reported); and (v) patient concerned about appropriate foreign language translation via telehealth (14% reported).

Figure 3B of the mixed-methods joint data display highlights providers perception on whether disparities improved due to telehealth access, with 24% of clinicians agreeing with: “telehealth use improved health care disparities during the COVID-19 period.” This was conceptualized qualitatively as decreasing barriers to health care access. The extent to which respondents perceived disparities had improved varied across the three disciplines. Psychiatry clinicians indicated a greater agreement (48%) that disparities improved for “*patients who historically have difficulty attending appointments due to lack of transportation, psychological barriers, or other obstacles ...*

telehealth is a more viable option” and that “*telehealth has been most helpful for patients whose symptoms are typically what make them miss in-person visits (symptoms of depression, PTSD [post-traumatic stress disorder], anxiety, etc.)*.” In contrast, fewer clinicians from GIM (22% in GIM Clinic #1 and 7% in GIM Clinic #2) and Geriatrics clinics (13%) believed that disparities improved during this period ($p = 0.098$, Fig. 3B). One Geriatrics clinic provider did note that “*it’s easier to reach those with transportation issues. It’s also easier to coordinate with many family members as a phone call seems easier for them than coming into clinic.*” Use of telehealth services, albeit through phone, may have allowed some clinicians to glean important contextual information from caregivers that they could not obtain in a typical in-person visit.

Recommendations to improve the telehealth care experience

Implementation strategies are the approaches or strategies needed to improve or enhance the adoption or uptake of a program or innovation – more simply considered as “how” a program is implemented into a new setting [23]. Clinician recommendations to improve the telehealth care experience were thematically aligned with three of the nine ERIC categories of implementation strategies [23]: (i) change infrastructure; (ii) support clinicians; and (iii) train and educate stakeholders. Table 2 denotes each recommendation with the associated clinician responses. To highlight some of these recommendations, clinicians recommended that changes in infrastructure for video visits should include processes to grant patients free/low-cost access to tablets and other technological devices

Table 2 | Clinician recommendations according to ERIC categories of implementation strategies

Implementation strategy	Recommendations	Exemplar quote
Change infrastructure	Access to tablets or other tech; free Wi-Fi	“Standardized procedures, equipment provided to physicians also would like tablets or tech to be provided by the hospital to the patients.”
	Standardized, more reliable, easier technological equipment and video software	“The [tradename redacted] app is clunky, difficult to use, and often freezes. We need more reliable technology”
	Platforms that support multiple family members or translators	“Platforms that accommodate more than a few providers, family members, and other persons needed (e.g., translators) simultaneously.”
Support clinicians	Other ways to check vitals at home	“we would do better if patients had a way to check vitals at home.”
	Easier scheduling, more appropriate	“Make it easier for patients and physicians to schedule the visits on their own.”
	IT support is instantly available during visits	“Make available regular IT support for clinicians when problems arise in trying to conduct telehealth visits.”
Train and educate stakeholders	Clearer guidelines for patients to access video visits	“Patient support offered prior to appointments would be ideal, such as a Patient-facing how-to guide for technology challenged patients.”
	Assistance to troubleshoot common problems	“Ensure that patients can try to access telehealth prior to their visit to make the process quicker.”

needed for video visits. Further, clinicians strongly recommended that telehealth delivery platforms simultaneously accommodate family members and/or foreign language interpreters within the visit. In terms of clinician support, they requested access to instantaneous information technology (IT) support when problems arose during their video visits. In terms of training and educating patient stakeholders, clinician respondents recommended clearer guidance, including patient-facing how-to-guides and instructions, to access video visits.

Clinic staff recommendations for improvements in telehealth care delivery were also primarily in line with the ERIC implementation strategy categories of “support clinicians (staff)” and “train and educate patient stakeholder” that were voiced by clinicians. Specifically, staff reported a need to streamline the electronic check-in process for patients, as there are many questions that patients must answer to complete the process. When patients had problems completing this step, the burden then fell onto the clinic staff to call patients to troubleshoot the problem together, which one staff member reported could take up to 45 min each time. Some staff suggested that having a video or a detailed instructional “walk-through” to share with the patient could be helpful to address frequent problems with the patient check-in process. Another recommendation was to create an IT support team to work with patients who need troubleshooting or assistance with set-up.

DISCUSSION

In this convergent parallel mixed-methods study, we found that although 76% of clinicians from GIM, Geriatrics, and Psychiatry clinics never utilized telehealth services prior to the COVID-19, the majority reported that they could still meaningfully connect with their patients and address their needs, albeit with a significant preference for video visits over phone. Clinic staff also had limited experience in setting patients up with the telehealth care access prior to the pandemic, but ~50% of staff found it easy to set patients up for video visits and 80% found it easy for phone visits. Qualitatively, staff reported that set-up ease was dependent on whether patients had good “digital literacy” and a stable internet connection.

Moreover, 75% of Geriatrics clinicians, 50% of GIM clinicians, and 25% of Psychiatry clinicians perceived that health disparities worsened with telehealth implementation during the COVID-19 pandemic. Qualitative responses revealed that clinicians from all disciplines identified certain subpopulations who had challenges accessing telehealth visits. These included older patients, patients with limited resources due partly to lower socio-economic status (e.g., lack of smartphone; lack of stable, broadband

internet), and patients who need interpretation services. Explanations for the trend ($p = 0.076$) towards Geriatrics and GIM clinicians perceiving greater disparity rates than Psychiatry clinicians may include the greater number of older adults served in the GIM and Geriatrics clinics and thus, they may be more likely to observe or know of telehealth access challenges for their patients compared to clinicians in Psychiatry [24]. Further, telehealth may be better suited for some of the services provided by the Psychiatry clinic (e.g., psychotherapy, medication management and consultation, etc.) and MD psychiatrists may have less of a need to complete a physical exam beyond what can be seen via video compared to GIM and Geriatrics clinicians. Supporting this premise, data from the Colorado All Payer Claims Database demonstrate that telehealth use was on the rise pre-COVID and increased dramatically during the pandemic. By April 2020, two of the top three reasons that patients in Colorado were accessing telehealth services were for mental health conditions and counseling [25]. However, even our Psychiatry clinicians expressed difficulty with monitoring vitals and delivering structured evidence-based psychotherapy via telehealth.

On the other hand, 24% of all clinicians perceived that health disparities were reduced with telehealth use. Our qualitative responses on how disparities improved revealed an increase access to populations that may not otherwise connect to in-person services, particularly patients with transportation difficulties, childcare responsibilities, and challenges taking time off from work for visits. Some clinicians also noticed improvements in their no-show rates. Clinicians described a benefit to connecting with their patients via telehealth, given that in-person visits were either completely paused (Psychiatry) or limited only to patients whose needs could not be met by telehealth (GIM and Geriatrics). Specifically for the Psychiatry clinicians, the improvements in appointment no-show rates and reaching more patients could also be partly attributed to the increased rates of depression and anxiety during the pandemic that led patients to prioritize mental health services [26, 27].

From our respondents, recommendations for targeted strategies to reduce telehealth access disparities were categorized into three main implementation strategies: change infrastructure; support clinicians; and train and educate stakeholders. The recommendation to change infrastructure is line with a recent position statement by Behrman and colleagues from the Society of Behavioral Medicine [28]. Behrman et al. recommended that local, state, and federal governments provide free and widely available internet access, particularly in the context of school, business, and library closures that bridged community access to the internet. Others have recommended allocating funding to support video visit access for areas with more underserved populations

[29], noting that health care access inequities are likely to continue without telehealth parity and flexible funding arrangements [30, 31]. Additionally, our finding that staff had to provide technological assistance to help some patients troubleshoot the video visit check-in process suggests that telehealth payment models should consider reimbursements for the additional technical support provided. Finally, our staff suggested providing older adults with more detailed step-by-step guides with pictures on how to access video visits. This kind of guide has been developed for non-English speaking populations that could be adapted with step-by-step guidance for older adults [32].

Findings from this study build upon recent research published prior to and during the pandemic. Differences in the use of telehealth services were evident a year before the onset of the pandemic. In a retrospective cohort study on the national use of telehealth from March 2019–2020, younger adults aged 18–44 and those living in urban areas were more likely to utilize telehealth services compared to adults aged 45–64 and those living in rural areas [33] - in line with prior research demonstrating that adults aged 65+ and those with low SES are less likely to utilize telehealth [13]. However, limited evidence suggests that these barriers are modifiable, as two prior interventions have improved the local use of telehealth services for some older adults and people living in rural areas [8, 9]. By May 2020, findings from the Larry A. Green Center demonstrated that although digital health platforms helped many patients access care, 29% of patients did not have the broadband access to support digital platforms, 28% did not have tablets or computers at home, and 26% of patients lacked sufficient mobile phone data to accommodate use of digital health [34]. In a large cohort study of patients scheduled for primary care and specialty medical care within clinics affiliated with an academic medical center within the early phases of the COVID-19 pandemic, researchers also found that older patients and non-English speaking patients had lower rates of telemedicine and older patients and patients with lower socioeconomic status had less video use [35] - in line with our results that telehealth inequities have worsened during the pandemic.

Strengths and limitations

Strengths of our study include the use of Kilbourne's framework [17] to address disparities in health services research with the future aim of developing targeted strategies to reduce telehealth disparities, a robust response rate for clinical settings (>50%), and data collection from three different clinical disciplines and four separate clinics. However, there are also several limitations. Data were collected in a single health care system and as a quality

improvement project, and this limits generalizability to other health care settings. In addition, data were collected during the early phases of widespread telehealth implementation and the technology and support needs may have been addressed since these data were collected. We were also limited by the specific telehealth platforms available and queried in the survey, but the use of Epic and Doximity are also common across other systems. Also, only clinicians and staff participated in this study and the disparities noted reflect only their lens and experiences.

CONCLUSION

We found that the nearly overnight transition to telehealth services in ambulatory health care settings experienced telehealth access challenges for certain populations - particularly older adults, those with lower socioeconomic status, and/or needing language interpretation services - as well as unexpected benefits to this telehealth transition to boost access to care for populations that do not regularly seek care. As it appears that telehealth care will persist after the pandemic abates, these new challenges with telehealth access threaten to exacerbate longstanding disparities for adults with lower resources. Our participants' recommendations may serve as a starting point for further research and policies to address challenges with telehealth access. Co-creation of actionable and equitable strategies with patients, clinics, and policy makers are urgently needed to ensure all patients have the infrastructure and support needed to access the promising potential of telehealth services.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Translational Behavioral Medicine* online.

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Compliance with Ethical Standards

Conflict of Interest: All authors listed have contributed sufficiently to the project to be included as authors, and all authors approved this manuscript. All authors are faculty and/or clinical providers of the disciplines/clinical sites of interest in this project. All authors have also completed the Conflict of Interest form, which we have included in this submission.

Human Rights: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Colorado Multiple Institutional Review Board at the University of Colorado Anschutz Medical Campus.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Welfare of Animals: This article does not contain any studies with animals performed by any of the authors.

Transparency Statement: The survey instrument utilized in this study has been included in this submission as a [Supplemental file](#). The study protocol and de-identified data from this study is available upon request to the corresponding author.

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