Perceptions and Attitudes Toward Telemedicine by Clinicians and Patients in Japan During the COVID-19 Pandemic

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Abstract

**Background:** Coronavirus disease 2019 (COVID-19) has spread rapidly worldwide. In Japan, the spread of COVID-19 was recognized and a state of emergency declared in April 2020. In response, public health interventions, such as discouraging people from leaving their homes unnecessarily, were enacted across the country. Under these circumstances, telemedicine has received a great deal of social attention, and it has become necessary to identify the perceptions of and attitudes toward telemedicine by clinicians and patients and to clarify the problems and advantages.

**Materials and Methods:** Ten clinicians and 10 family members (if the patient was pediatric or elderly, a caregiver was included) were invited to participate in individual private interviews in 2020. All interviews were conducted from October to December 2020 using a semistructured interview guide. All transcripts were coded using thematic content analysis.

**Results:** Four categories from clinicians and five from patients were identified as perceptions of and attitudes toward telemedicine. Both evaluated the usefulness and convenience of telemedicine in the same manner, but there was a large gap in the content under the safety and problem categories.

**Discussion:** It is necessary to disseminate information about the communication techniques unique to telemedicine to doctors and to improve the “operation and introduction” and “communication environment and device settings” when starting or using telemedicine for all patients.

**Conclusions:** The perceptions and attitudes identified in this study will be useful for establishing and developing a telemedicine system in Japan.

**Keywords:** attitude; COVID-19 pandemic; Japan; perception; telemedicine

Introduction

**Background**

Coronavirus disease 2019 (COVID-19) was first detected in Wuhan (Hubei province, China) in December 2019 and since then has rapidly spread globally with the World Health Organization declaring COVID-19 a pandemic. To address the spread of COVID-19, Japan declared a state of emergency in April 2020. Subsequently, public health interventions, such as discouraging people from leaving their homes unnecessarily,
were conducted across the country. Under such circumstances, telemedicine has received a great deal of social attention. In utilizing telemedicine, it is important to provide continuous medical care while clarifying the perceptions and attitudes of both health care professionals and patients. This concern has been discussed in the national assembly.

The spread of COVID-19 has significantly changed health care. One of the major changes is the popularization of telemedicine, which has become prevalent in many parts of the world facing the spread of COVID-19 because of its improved access and remote treatment. Telemedicine is expected to become widespread as a new form of patient-oriented medical care for medical professionals and patients/residents.

However, it is important to evaluate both doctors’ and patients’ experiences of and feelings regarding telemedicine in medical treatment and consultation. Qualitative research methods, such as carefully prepared semistructured interviews and analyses of verbatim records, are useful for investigating people’s experiences, perceptions, and attitudes.

This study aimed to gather and assess the perceptions and attitudes of clinicians and patients toward telemedicine and to discuss the telemedicine system from both users’ perspectives, especially focusing on accessibility and usability in Japan. We expect that this study would be very useful given the lack of reports on clinician and patient perceptions of and attitudes toward telemedicine in Japan. This is the first qualitative study of interviews with clinicians and patients in Japan, making it novel research. In this study, “telemedicine” is defined as “synchronous medical consultations using video chat.”

Method and content of the interviews
The research manual and consent form were sent to each participant from the research office. When consent was obtained through the forms, the researcher scheduled interviews, which were later conducted over the telephone or Zoom. We used an interview guide to gather respondents’ perceptions of and attitudes toward telemedicine. All interviews were conducted between October and December 2020. We recorded all interviews and verbatim records.

Content analysis
The narrative element of respondents’ perceptions of and attitudes toward telemedicine was extracted by the first author to avoid impairing the context. Each narrative element was developed into a short sentence (data) that expressed the meaning and content in a simple manner. At regular meetings once a week, all the authors confirmed that the meaning of each narrative element for a short sentence (data) was preserved. These data were then compared and classified according to the similarity of their meaning and content, and data with a common meaning or content were collected and coded. Furthermore, subcategories were organized by meaning, and the degree of abstraction was increased by comparing them with other categories. The codes and subcategories were expressed using a sentence that clearly showed the meaning. In interpreting the data, we were supervised by five telemedicine practitioners and two public health professionals to ensure validity. In the data analysis stage, to ensure credibility, all authors were involved in discussions at each stage of the data extraction and subcategory- and category-naming processes.

Ethical consideration
This study was approved by the Institutional Review Board of Tetsuyu Institute Medical Corporation (Approval No. 20-4-2).

Results
Attributes of clinicians
The average interview duration was 39 min and 43 sec (±7 min and 10 sec (range 28 min and 17 sec to 48 min and 51 sec). All participants were engaged in telemedicine, and the introduction period was from 2016 to 2020 (Table 1). There was one participant in their 30s, two in their 40s, five in their 50s, and two in their 60s; the working areas were Tohoku, Kanto, Chubu, Kansai, and Kyushu. Six individuals worked...
Clinicians’ perceptions of and attitudes toward telemedicine during the COVID-19 pandemic

We extracted four main categories as clinicians’ attitudes toward or perceptions of the use of telemedicine, which are reported as follows at the subcategory level. First, 13 subcategories and 58 codes were extracted as the effectiveness of telemedicine. The contents of the subcategories are listed in Table 2. Second, 13 subcategories and 96 codes were extracted as the safety of telemedicine. In this study, “safety” is defined as “the degree of safety (the state in which the risk is suppressed to an acceptable level) regarding the information to be handled and the medical care to be provided.” Safety here also refers to a state in which individuals and the general public are limited in the extent to which they can tolerate harm, such as security incidents and medical accidents. The contents of these subcategories are listed in Table 3. Third, the responses to the problems with telemedicine itself as well as profitability and system operations were composed of 3 subcategories and 26 codes and 8 subcategories and 21 codes, respectively. The contents of the subcategories are listed in Table 4. Finally, related to the prospects and requests regarding telemedicine, 6 subcategories and 24 codes were extracted as prospects and requests. The contents of the subcategories are listed in Supplementary Table S1.

Attributes of patients
The average duration of the interviews with the participants was 27 min and 56 sec ±5 min and 32 sec (range 18 min and 00 sec to 37 min and 50 sec). All participants were using telemedicine, and the introductory period was from 2016 to 2020 (Table 5). The departments they visited were mainly internal medicine, and their main symptoms were migraines, hypertension, chronic rhinitis, and constipation. Their ages ranged from 6 to >70 years, but their area of residence was limited to the Kanto region. Four caregivers responded on behalf of the patients.

Patient’s and caregivers’ perceptions of and attitudes toward telemedicine during the COVID-19 pandemic
We extracted five main categories of patients’ and caregivers’ attitudes toward or perceptions of the use of
Table 3. Safety of Telemedicine as Perceived by Clinicians

- Whether it is possible to provide patients with proper information and take appropriate steps is the key to safety (N=10).
- Information must be obtained in advance to make a certain diagnosis for a first-visit patient with telemedicine, but it is also important to be able to extract the information while seeing the patient (N=2).
- Clinicians are aware of problems facing telemedicine in terms of complying with security and privacy standards (N=10).
- Clinicians should educate patients on the safe use of telemedicine (N=6).
- Telemedicine can minimize contact between patients and staff and provide safe medical care without causing nosocomial infections (N=10).
- They encourage face-to-face medical care for patients who use telemedicine as if it were a prescription pharmacy (N=1).
- They feel anxiety and hesitation regarding whether the appropriate medication has been prescribed (N=2).
- They encourage face-to-face medical care for patients who use telemedicine as if it were a prescription pharmacy (N=1).

The number of clinicians/patients who actually contributed to the topic/theme.

Table 4. Problems with Telemedicine as Perceived by Clinicians

"Profitability"
- It is not profitable in terms of management (N=10).
- Additional costs were incurred due to the need for personnel to explain its use (N=4).
- Disease restrictions and the control of medical scores in telemedicine should be reviewed (N=7).

"System operations"
- They were confused about communication problems, image quality limits, and how to use the device (N=3).
- It takes time and effort to teach the patient how to use the device (N=8).
- They are worried about the manners and literacy of the users (N=5).
- They struggle with effective operation due to regional issues related to medical use and aging users (N=3).
- It is difficult to increase the quota and numbers of telemedicine because they are exhausted from the dual work of telemedicine and face-to-face medical care (N=6).
- It is difficult to collaborate with other medical occupations (N=4).
- The clinicians around them are not trying to adopt telemedicine (N=3).

The number of clinicians/patients who actually contributed to the topic/theme.

Table 5. Patients and Their Families Interviewed About Telemedicine

| ID | Department | Age (years) | Main symptoms, ADL, etc. | Gender | Use start date | Area of residence | Number of telemedicine visits | Number of family members | Notes |
|----|------------|-------------|--------------------------|--------|---------------|------------------|-----------------------------|--------------------------|-------|
| 1  | Internal Medicine | 40s | Migraine | F | July 20 | Kanto | 2 | 2 |
| 2  | Internal Medicine | 30s | Migraine | F | May 20 | Kanto | 5 | 6 |
| 3  | Pediatrics | 20s | Allergic rhinitis, high fever | F | April 20 | Kanto | 11 | 11 |
| 4  | Pediatrics | 20s | Pediatric patient: M; Parent: F | M | March 20 | Kanto | 12 | 12 |
| 5  | Neurosurgery/Internal Medicine/Rehabilitation | 50s | Migraine, high blood pressure, heart attack, sleep apnea syndrome (nighttime CPAP) | M | March 19 | Kanto | 4 | 4 |
| 6  | Internal Medicine | 40s | Asthma, eosinophilic otitis media | M | July 5 | Kanto | 2 | 2 |
| 7  | Internal Medicine | 70s | High blood pressure | F | May 20 | Kanto | 4 | 4 |
| 8  | Internal Medicine | 40s | Allergic rhinitis, ADHD, constipation | M | March 20 | Kanto | 7 | 7 |
| 9  | Pediatrics | 6 and 11; Parent: F | Pediatric patients: M; Parent: F | M | July 5 | Kanto | 11 | 11 |
| 10 | Pediatrics | 30s | Chronic constipation | F | April 20 | Kanto | 7 | 7 |

ID 8 and ID 9 are husband and wife (living together).
ADHD, attention-deficit/hyperactivity disorder; ADL, activities of daily living; CPAP, continuous positive airway pressure.
telemedicine, which are reported as follows at the subcategory level. First, 8 subcategories and 17 codes were extracted as the triggers and reasons for deciding to use telemedicine. The contents of the subcategories are listed in Supplementary Table S2. Second, the responses to the effectiveness of telemedicine itself as well as the proper use of telemedicine and face-to-face medical care comprised 6 subcategories and 15 codes and 2 subcategories and 16 codes, respectively. The contents of these subcategories are listed in Table 6. Third, two subcategories and five codes were extracted as safety in the use of telemedicine as recognized by patients and their families. The contents of the subcategories are listed in Supplementary Table S3. Fourth, regarding problems related to using telemedicine, 5 subcategories and 22 codes related to “examination and prescription,” “current communication environment and device settings,” and “operation and introduction” were extracted. The contents of the subcategories are listed in Table 7. Finally, related to the prospects and requests regarding telemedicine, 5 subcategories and 24 codes were extracted as prospects and requests. The contents of the subcategories are listed in Supplementary Table S4.

Discussion
Clinicians’ perceptions of and attitudes toward telemedicine
Before the spread of COVID-19, Japanese clinicians considered it a matter of course that patients would

Table 6. Benefits of Using Telemedicine as Perceived by Patients and Their Families

| Effectiveness of telemedicine |
|-------------------------------|
| • They avoid getting infected with COVID-19 or influenza (N=11). |
| • With telemedicine, there is no waiting time, there is no waste of time, and it is possible to receive a medical examination in one’s spare time (N=11). |
| • If one’s symptoms are chronic and stable, they can be conveniently treated and managed without any problems (N=11). |
| • For unexpected symptoms, they can rest assured that preventive drugs will be prescribed through telemedicine as needed (N=11). |
| • The burden of going to the hospital is reduced for both the patient and their family (N=11). |
| • It was helpful to be able to use telemedicine when they were having severe symptoms and did not go directly to a medical institution (N=2). |

| Proper use of telemedicine and face-to-face medical care |
|---------------------------------------------------------|
| • If the patient’s symptoms remain stable and they merely want to be prescribed drugs, they can choose telemedicine (N=11). |
| • If their symptoms are unusual, they are sick, they need a test, or they cannot judge or identify the issue themselves, they can cancel telemedicine and choose face-to-face care (N=10). |

The number of clinicians/patients who actually contributed to the topic/theme.

Table 7. Problems in Using Telemedicine as Perceived by Patients and Their Families

| “Examination and prescription” |
|-------------------------------|
| • Unlike in face-to-face medical care, they felt anxious about medical examination, diagnosis, and drug prescription through telemedicine (N=3). |
| • They find it inconvenient to obtain prescriptions and receive medicine through telemedicine (N=5). |

| “Current communication environment and device settings” |
|-------------------------------------------------------|
| • It was difficult to understand how to use and operate the device (N=6). |
| • Patients had difficulty showing their throat and nose through the screen, doctors might have had difficulty seeing them, and hearing was poor as the audio was interrupted (N=4). |

| “Operation and introduction” |
|-----------------------------|
| • It is becoming more difficult to make a reservation (N=3). |
| • Only some medical institutions have introduced telemedicine (N=8). |

The number of clinicians/patients who actually contributed to the topic/theme.

visit medical facilities for examinations. However, in this study, clinicians pointed out the usefulness and safety of telemedicine during the pandemic; specifically, they found that they could “avoid the risk of infection and offer patients non-face-to-face examinations.” Clinicians stated that, although face-to-face examinations are essential when symptoms worsen, it is possible to examine and treat patients during the initial visits through visual examinations and interviews using telemedicine, demonstrating a change in attitude. Furthermore, clinicians believed that a patient’s ability to receive treatment from a specialist of their choice, regardless of their family doctor or area of residence, makes telemedicine effective. There are certain diseases and patient conditions for which telemedicine is appropriate. Clinicians in this study recognized that “telemedicine is effective if the patient has a stable chronic disease” and “telemedicine has a strong counseling element, so clinicians can communicate intimately with patients,” and they discussed experiences with telemedicine in which they were able to hear deeper concerns from patients about their diseases and treatments that had not been discussed in the outpatient examination room in the past.

Clinicians perceived the safety of telemedicine during the COVID-19 pandemic first as “minimizing the risk of human contact and infection through a non-face-to-face examination system” and second as “ensuring the safety of patient information handled before and after examinations, maintaining patient compliance during treatment, and educating patients for health literacy.” The majority of clinicians treated patients with the following clear-cut policy: “Patients
with some chronic illnesses in a stable condition can be seen with telemedicine, but those with sudden symptoms, poor control, heading in the wrong direction, or serious illness may be overlooked if not tested, so they encourage patients to have immediate face-to-face treatment. It is essential to promote education about the safe use of telemedicine for both patients and caregivers.

Clinicians felt that it was dangerous to prescribe medication using telemedicine. They thought that, without certain restrictions, this could be the same as online shopping for medication and that detailed guidelines for prescribing medication are essential. This also leads to the issue of the centralization and evaluation of personal health records and other medical information and, thus, a system and set of evaluation of personal health records and other medical information. This also leads to the issue of the centralization and evaluation of personal health records and other medical information. Clinicians are only responsible for examinations. Concerning profit, clinicians recognized that “it is not profitable in terms of management” and that “additional costs were incurred due to the requirement for personnel who provided explanations” and discussed this as one factor hindering the popularization of telemedicine. Regarding operations, the concern “about the manners and literacy of the users” was identified, and clinicians saw patients canceling without notice as a major operational issue under the current system, in which a scheduling fee cannot be charged for insurance medical services. This demonstrates the need to educate patients on how to use telemedicine. Simultaneously, there were many reports of patient complaints that their telemedicine appointments’ start time was delayed because appointments fell behind schedule. Clinicians were also found to be burdened by simultaneously engaging in face-to-face examinations and telemedicine. It was suggested that this burden could be reduced by establishing a system in which trained office staff are responsible for time management and paperwork, and clinicians are only responsible for examinations. This study also revealed that clinicians are at a loss because instruction and communication with patients, which are easy in face-to-face settings, do not work for telemedicine. This is thought to be directly related to the effectiveness and safety of the examinations. Thus, it is necessary to develop and disseminate educational videos explaining examination techniques specific to telemedicine for Japanese clinicians as soon as possible.

**Patients’ and families’ perceptions of and attitudes toward telemedicine**

All participants stated that they felt anxious about visiting a medical facility for a face-to-face examination during the COVID-19 pandemic. Telemedicine use primarily began between April and July of 2020, a period during and immediately after Japan’s state of emergency declaration, indicating a decision to switch from face-to-face to online care to avoid potential COVID-19 infections. A previous survey also found significantly higher rates of anxiety about visiting a hospital during the COVID-19 pandemic among telemedicine users compared with nonusers. In general, telemedicine was supported by Japanese patients and their families as a tool for avoiding the risk of being infected with COVID-19.

Patients mentioned the lack of time spent commuting to the hospital or waiting as one of the “benefits of using telemedicine,” whereas family members discussed being relieved of the hassle of traveling to the hospital and accompanying the patient. Most participants in this study were currently taking some sort of medication and recognized the effectiveness of telemedicine with the primary goal of prescribing drugs in cases in which there were no changes in symptoms. They were also aware that they could receive a face-to-face examination by a clinician in the event of worsening symptoms. A previous survey found that mothers were hesitant to use telemedicine because they felt that their children would receive a more accurate examination at a face-to-face appointment. It is necessary for clinicians to explain to all users that they can switch to face-to-face care immediately if their symptoms change or if their condition deteriorates.

The disadvantages of telemedicine include concerns that clinicians cannot perform palpation and have a higher chance of overlooking symptoms or misdiagnosis compared with face-to-face examinations because insufficient information makes it impossible for the clinician to accurately grasp the patient’s condition. Although we can expect that communication technologies will continue to advance, past research has argued that telemedicine has significant disadvantages in the examination and treatment of patients for whom the doctor–patient relationship has been
damaged. Building trusting relationships between clinicians and patients helps patients recognize that they can feel the same sense of security with telemedicine as they do with face-to-face care and leads to an increased desire to use telemedicine services. Simultaneously, the results of the interviews in this study suggested that, when necessary, patients and their families used telemedicine even without a long-term trusting relationship with the clinician. Thus, a trusting relationship with the clinician is not a prerequisite for all patients. As past research shows, to expand telemedicine in Japan, decisions regarding whether to use telemedicine or face-to-face services must be made appropriately according to both the patient’s disease and their condition at the time.

Johansson et al. reported two primary reasons why patients living in rural areas of Sweden did not choose telemedicine: (1) they wanted to be examined by a clinician directly, and (2) they did not know how to use communication devices. These findings are consistent with those of this study. To aid the dissemination of telemedicine in the future, it is necessary to establish a system in which even patients who are not accustomed to using communication devices are able to utilize telemedicine. Specifically, as patients stated that they were confused about which buttons they should press when they started to use such services on an unfamiliar device, it is suggested that medical staff demonstrate for patients (particularly older adults) and their families how to actually use the services. Despite recognizing several issues, patients and their families perceived more “benefits of using telemedicine,” which is likely to lead to its continued use. In addition, all participants in this study wanted to continue using telemedicine, and their “prospects and requests regarding telemedicine” included that automatic payment after telemedicine appointments, electronic prescriptions, medication delivery, and online medication instructions be provided together as a package. Thus, it is necessary to strive to improve patient satisfaction with these services.

This study is limited in that only clinicians and patients with experience using telemedicine were interviewed. In addition, as study limitations, we added the small sample sizes in both groups in this study and the lack of data on actual outcomes in this article. Although past studies reported the status of telemedicine use by the families of pediatric patients, this study offers significant new findings as we were able to identify perceptions of effectiveness and safety, problems, and prospects of telemedicine among doctors and patients of all ages. Going forward, multimethod longitudinal studies using larger and more diverse samples will be necessary to periodically explore the opinions of telemedicine users.

**Conclusion**
The spread of COVID-19 has driven increased telemedicine utilization across Japan, necessitating the analysis of the perceptions of and attitudes toward telemedicine by clinicians and patients conducted in this study. Some perceptions and attitudes were the same, whereas others differed. Communication techniques unique to telemedicine should be related to doctors, and the operation and introduction of systems and the communication environment and device settings should be improved for patients. The findings of this study will be useful for establishing and developing a telemedicine system in Japan.

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**Authorship Contribution Statement**
All authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. All authors provided final approval for the publication. R.W., H.K., K.O., H.O., K.Y., A.S., and S.M. conceived of or designed the study, analyzed data, contributed new methods or models, and wrote the article. R.W., H.K., and K.O. performed research.

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**Supplementary Material**
Supplementary Table S1
Supplementary Table S2
Supplementary Table S3
Supplementary Table S4
References

1. Blandford A, Wesson J, Amalberti R, et al. Opportunities and challenges for telehealth within, and beyond, a pandemic. Lancet Glob Health 2020; 8:e1364–e1365.
2. Hollander JE, Carr BG. Virtually perfect? Telemedicine for COVID-19. N Engl J Med 2020;382:1679–1681.
3. Lin S, Satller A, Smith M. Retooling primary care in the COVID-19 era. Mayo Clin Proc 2020;95:1831–1834.
4. Gois-Santos VT, Freire DA, Libório LDS, et al. Telehealth actions in times of COVID-19: information with evidence. Rev Assoc Med Bras (1992) 2020; 66:1320–1322.
5. Agarwal N, Jain P, Pathak R, et al. Telemedicine in India: a tool for transforming health care in the era of COVID-19 pandemic. J Educ Health Promot 2020;9:190.
6. Ramaswamy A, Yu M, Drangsholt S, et al. Patient satisfaction with telemedicine during the COVID-19 pandemic: retrospective cohort study. J Med Internet Res 2020;22:e20786.
7. Jiang S. The relationship between face-to-face and online patient-provider communication: examining the moderating roles of patient trust and patient satisfaction. Health Commun 2020;35:341–349.
8. Garcia-Huidobro D, Rivera S, Valderrama Chang S, et al. System-wide accelerated implementation of telemedicine in response to COVID-19: mixed methods evaluation. J Med Internet Res 2020;22:e22146.
9. Wakimizu R, Nishigaki K, Fujioka H, et al. How adolescent Japanese girls arrive at HPV vaccination: a semi-structured interview study. Nurs Health Sci 2015;17:15–25.
10. Wakimizu R, Fujioka H. Analysis of issues and needs of parents of children with developmental disabilities in Japan: using focus group interviews. J Nurs Res 2016;24:68–78.
11. Ministry of Health, Labor and Welfare, Medical Affairs Bureau, Medical Affairs Division, Pharmaceuticals and Living Hygiene Bureau General Affairs Division. Available at https://www.mhlw.go.jp/content/000620995.pdf Accessed April 10, 2021.
12. Jenkins-Guarnieri MA, Pruitt LD, Luxton DD, et al. Patient perceptions of telemental health: systematic review of direct comparisons to in-person psychotherapeutic treatments. Telemed J E Health 2015;21:652–660.
13. Roehrs A, da Costa CA, da Rosa Righi R, et al. Personal health records: a systematic literature review. J Med Internet Res 2017;19:e13.
14. Ryu B, Kim N, Heo E, et al. Impact of an electronic health record-integrated personal health record on patient participation in health care: development and randomized controlled trial of MyHealthKeeper. J Med Internet Res 2017;19:e401.
15. Wakimizu R, Saito Y, Mochizuki K, et al. Attitudes of primary caregivers of children whose family doctor is a pediatric clinician toward online medical treatment amid the COVID-19 pandemic. J Japan Soc Nurs Res 2021;44:25–38.
16. Burroughs M, Urts I, Viswanath O, et al. Benefits and shortcomings of utilizing telemedicine during the COVID-19 pandemic. Proc (Bayl Univ Med Cent) 2020;33:699–700.
17. Hammersley V, Donaghy E, Parker R, et al. Comparing the content and quality of video, telephone, and face-to-face consultations: a non-randomised, quasi-experimental, exploratory study in UK primary care. Br J Gen Pract 2019;69:e595–e604.
18. Johansson AM, Lindberg I, Söderberg, S. Patients’ experiences with specialist care via video consultation in primary healthcare in rural areas. Int J Telemed Appl 2014;9:1–7.
19. Badawy SM, Radovic A. Digital approaches to remote pediatric health care delivery during the COVID-19 pandemic: existing evidence and a call for further research. JMIR Pediatr Parent 2020;3:e20049.
20. Hageman JR. The emergence of pediatric telehealth as a result of the COVID-19 pandemic. Pediatr Ann 2020;49:e283–e284.
21. Siik B, Alexander J, Bodnar C, et al. Pediatrician attitudes toward and experiences with telehealth use: results from a National Survey. Acad Pediatr 2020;20:628–635.

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Abbreviation Used

COVID-19 = coronavirus disease 2019

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