Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Patient Satisfaction with Telehealth During the COVID-19 Pandemic in a Pediatric Pulmonary Clinic

Karen Y. Capusan, MSN, RN, CPNP-PC, &
Talia Fenster, MSN, RN, CPNP-PC

Introduction: The coronavirus disease 2019 (COVID-19) pandemic has drastically impacted health care delivery systems and has resulted in the rapid implementation of telehealth services across many health care specialties. As the COVID-19 pandemic highlighted the need to leverage digital mediums to increase patient access to health care, our pediatric pulmonary division sought to measure patient satisfaction with a new telehealth platform.

Method: A survey was sent to 281 pediatric pulmonary patients from March 2020 to April 2020. Parents were asked to rate their overall experience with telemedicine.

Results: Fifty surveys were completed, and results indicated that overall initial satisfaction with care was high. Eighty-two percent of participants either strongly agreed or agreed that they would use telehealth services again.

Discussion: The positive outcome measures may reflect increased patient comfort with integrating telehealth into routine pediatric pulmonary care services. Given high patient satisfaction ratings, we believe that the telehealth platform should be considered for use in routine practice after the COVID-19 pandemic has resolved. J Pediatr Health Care. (2021) *35*, 587–591

KEY WORDS

Telehealth, telemedicine, pediatrics, nurse practitioner, advance practice provider

INTRODUCTION

Similar to many outpatient practices throughout the country, the coronavirus disease 2019 (COVID-19) pandemic caused our pediatric pulmonary office to close for in-office patient appointments from March 2020 to June 2020. To ensure proper social distancing and stop the rapid spread of COVID-19, our office was able to immediately implement telephonic or video telehealth appointments to our patients through an application called AW Touchpoint. Our medical institution developed provider telehealth training sessions via online modules to allow a smoother transition to the digital platform. The telehealth platform allowed us to continue to manage our variety of pediatric pulmonary patients. Diagnoses range from asthma, bronchopulmonary dysplasia, interstitial lung disease, chronic cough, cystic fibrosis, and tracheostomy, and ventilator dependence.

In our pediatric pulmonary practice, the secretaries called patients before the visit and instructed parents how to download and use the application step-by-step. On the day of the visit, an Short Message Service link and an e-mail link to the video chatroom were sent to the patient. Providers evaluated new and established patients throughout the pandemic virtually. The providers obtained the history and reviewed any current respiratory symptoms. It is well established that clinical history taking is a critical component of the patient's diagnosis and plan. It has been estimated that 70% to 90% of medical diagnoses can be made through history taking alone (Muhrer, 2014). The history portion of the examination was

Karen Y. Capusan, Pediatric Nurse Practitioner, Cohen Children's Medical Center, Division of Pediatric Pulmonary Medicine & Cystic Fibrosis Center, New Hyde Park, NY.

Talia Fenster, Pediatric Nurse Practitioner, Cohen Children's Medical Center, Division of Pediatric Pulmonary Medicine & Cystic Fibrosis Center, New Hyde Park, NY.

Conflicts of interest: None to report.

Correspondence: Karen Y. Capusan, MSN, RN, CPNP-PC, Cohen Children's Medical Center, Division of Pediatric Pulmonary Medicine & Cystic Fibrosis Center, 1991 Marcus Ave., Suite 302, New Hyde Park, NY.; e-mail: kchu7@northwell.edu.
J Pediatr Health Care. (2021) *35*, 587-591

0891-5245/$36.00

Published online July 30, 2021.

https://doi.org/10.1016/j.pedhc.2021.07.014

largely unchanged using the telehealth platform. The provider would then conduct a virtual physical examination primarily based on inspection of the chest to assess work of breathing, inspection of fingernails for clubbing, and listening for any audible respiratory sounds (stridor, wheezing, and stertor).

TELEMEDICINE BACKGROUND

In the setting of the COVID-19 pandemic, public health safety became a primary concern throughout the world. The public health emergency led to the rapid adoption of telemedicine. Before the pandemic, the general use of telehealth had been relatively uncommon because of issues related to policy, insurer coverage, and reimbursement rates. Provider barriers included lack of training, the uncertainty of the value of telehealth, and cost of equipment. In 2017, 76% of hospitals had partial to full implementation of telehealth (American Hospital Association, 2019). One study in 2017 found in a large commercial insurance population there were 6.57 telehealth visits per 1,000 members (Barnett, Ray, Souza, & Mehrotra, 2018).

Because of the COVID-19 pandemic, barriers to the implementation of telehealth have been reduced dramatically. The Centers for Medicare and Medicaid Services announced on March 6, 2020 that health care providers may provide telehealth services to treat COVID-19 and other medically reasonable purposes. Centers for Medicare and Medicaid Services also granted payment between telehealth and in-person visits for Medicare. The Federal Communications Commission allocated $200 million for increasing broadband coverage to help provide connected care (Jaffe, 2020).

During the peak of the COVID-19 pandemic, there was a significant increase in telehealth appointments. In April 2019, 0.1% of Medicare primary care visits were conducted via telehealth compared with 43.5% in April 2020. According to a database of commercial and Medicare claims run by Fair Health, there was a reported increase in telehealth claims from 0.15% in April 2019 to 13% in April 2020, an increase of 8,336%. After this peak in April, the percentage of telehealth visits has continually declined as offices have reopened and patients are scheduling in-person visits (Brotman and Kotloff, 2021).

TELEHEALTH BENEFITS

The telehealth platform increased our patients' ability to access pediatric pulmonary care. This served to ensure that remote care services could be used by our diverse patient population. Telehealth can also enhance patient comfort as they are able to receive care directly in their own homes. In addition, telehealth eliminates transportation time and wait time from their visit, which helped improve appointment compliance and resulted in a significant decrease in our no-show rate. There is also a unique bonding experience between the provider and patient when allowing each other into the privacy of their own homes. For the asthmatic population, it was helpful to assess the patient's home environment to determine allergic triggers (pets, dust, and mold). It was also beneficial to visualize airway clearance device setup, ventilator set up and alarms and medications. Many asthmatic patients and parents continue to confuse their rescue and maintenance inhalers. It was helpful for parents to show us medication via telehealth and review the child's well plan and sick plan with the provider.

Brotman & Kotloff (2021) write that, overall, telehealth has been embraced by both patients and providers. It helps reduce or eliminate travel time and reduces wait time for visits. According to a patient survey, an in-person visit is still important for building trust and rapport (Welch, Harvey, O'Connell, & McElligott, 2017). Patients are more willing to have a telehealth visit with a provider they know than with someone with who they have no previous relationship.

TELEHEALTH LIMITATIONS

Limitations to telehealth include those that are modifiable and those that are nonmodifiable. Modifiable limitations include technological or connectivity issues. Some parents were unable to download the application, had issues troubleshooting the application, or had poor connection during the visit. If any of the previously mentioned issues occurred, the visit was then converted to a telephone visit. The families who had the most difficulties with telehealth were typically families with lower socioeconomic status and spoke a different primary language. There is literature that purports significant health disparities existed in telehealth use during the COVID-19 pandemic, such as age, race, residence, and payer (self-pay, Medicaid, and Medicare). For example, the use of full audio-video telehealth visits was reduced for patients who are older, Black, from urban areas, self-pay, Medicare or Medicaid payer status (Pierce & Stevermer, 2020).

The most restricting nonmodifiable limitation is the incomplete physical examination. We were also unable to obtain spirometry or pulmonary function tests. There is little evidence of whether the quality of diagnosis and management for telehealth is equivalent to in-person visits. In addition, the rate of malpractice telehealth claims is unknown. There is lack of literature on the effect of greater telehealth use on health inequities. Many people in the United States delay medical care because of issues with transportation. Transportation issues disproportionally affect people of Latino ethnicity, lower socioeconomic status, and functional limitations (Brotman and Kotloff, 2021). If telehealth is adopted and used by more medical practices, it would be important to study its effects on health inequities and the underserved and vulnerable populations.

METHODS

A total of 281 surveys were e-mailed to each pediatric pulmonary parent after each video or audio telehealth appointment from March 1, 2020 to April 15, 2020. The survey was developed by a research team and sent to multiple pediatric specialty practice patients. A total of 50 surveys were completed and returned. Thirty questions were included in the survey. Categories included questions regarding technology (i.e., type of device used, the platform used. etc.), the

experience of the visit, overall satisfaction, and likelihood to use the telehealth platform again. The survey also included an option for additional comments. Redcap was used to capture and store the data.

RESULTS

We conducted a chart review on the basis of 2 of the following survey questions to rank overall patient satisfaction and willingness to use this service in the future.

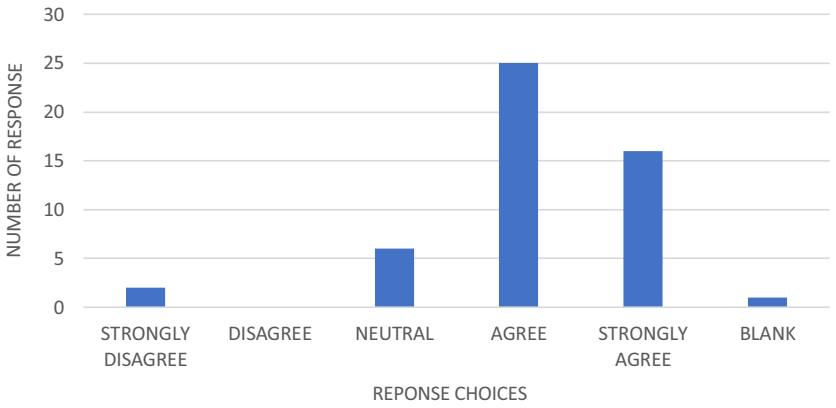
1. I would use telehealth services again (see Figure 1): 41 out of 50 participants (82%) either strongly agreed (n = 16) or agreed (n = 25); 6 participants were neutral (12%); 2 participants disagreed (4%); and 1 person left this question blank.
2. Overall, I am satisfied with this telehealth system (see Figure 2): 37 out of 50 participants (74%) either strongly agreed (n = 16) or agreed (n = 21); 8 participants were neutral (16%); 2 participants disagreed (4%); 1 person strongly disagreed (2%); and 2 participants left this question blank.

Figures 3 and 4 show the additional questions regarding the likelihood of recommending virtual visits to others and other questions related to the user's experience with telehealth.

The implementation of telehealth services in a pediatric pulmonology practice has the potential to meet patient satisfaction goals of care. Findings from our patient surveys indicate strong initial patient satisfaction with the telehealth model. Fifty surveys were completed, and we found that overall satisfaction with telehealth was high. 82% of participants either strongly agreed or agreed that they would use telehealth services again. Given high patient satisfaction ratings, we believe that the telehealth platform should be considered for use in routine practice after the COVID-19 pandemic has resolved.

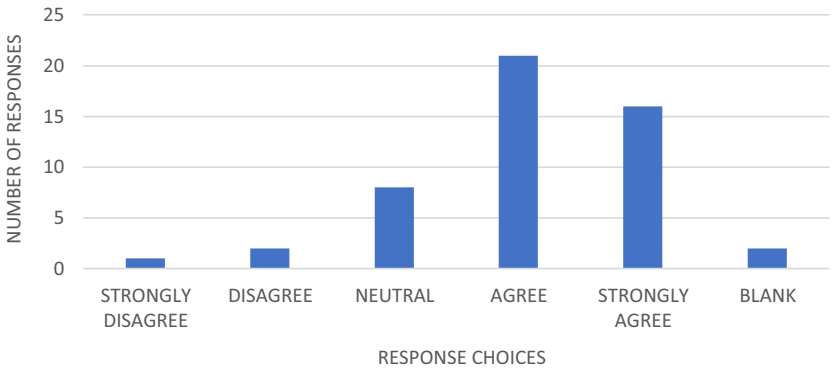
Limitations of the survey include a low response rate of 18%. Another limitation is the length of the survey was only conducted for a month. The high patient satisfaction captured in the survey may be a response to the novelty and excitement of telehealth. Tracking a longer period would allow for positive and negative feedback.

FIGURE 1. Survey question: I would use telehealth services again.



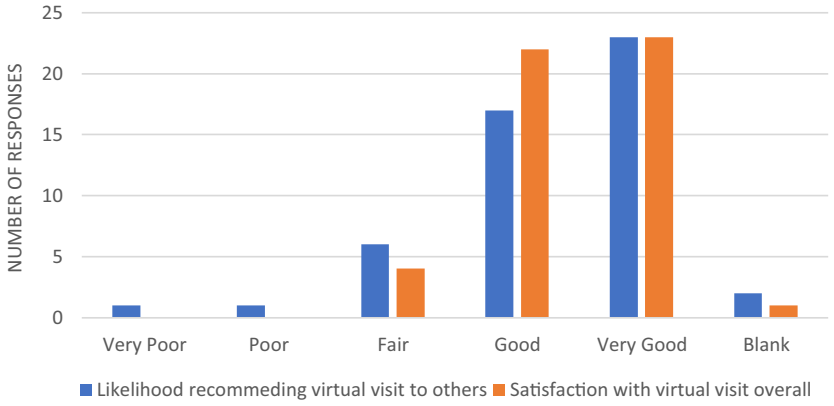
This figure appears in color online at www.jpedhc.org.

FIGURE 2. Survey question: Overall, I am satisfied with this telehealth system.



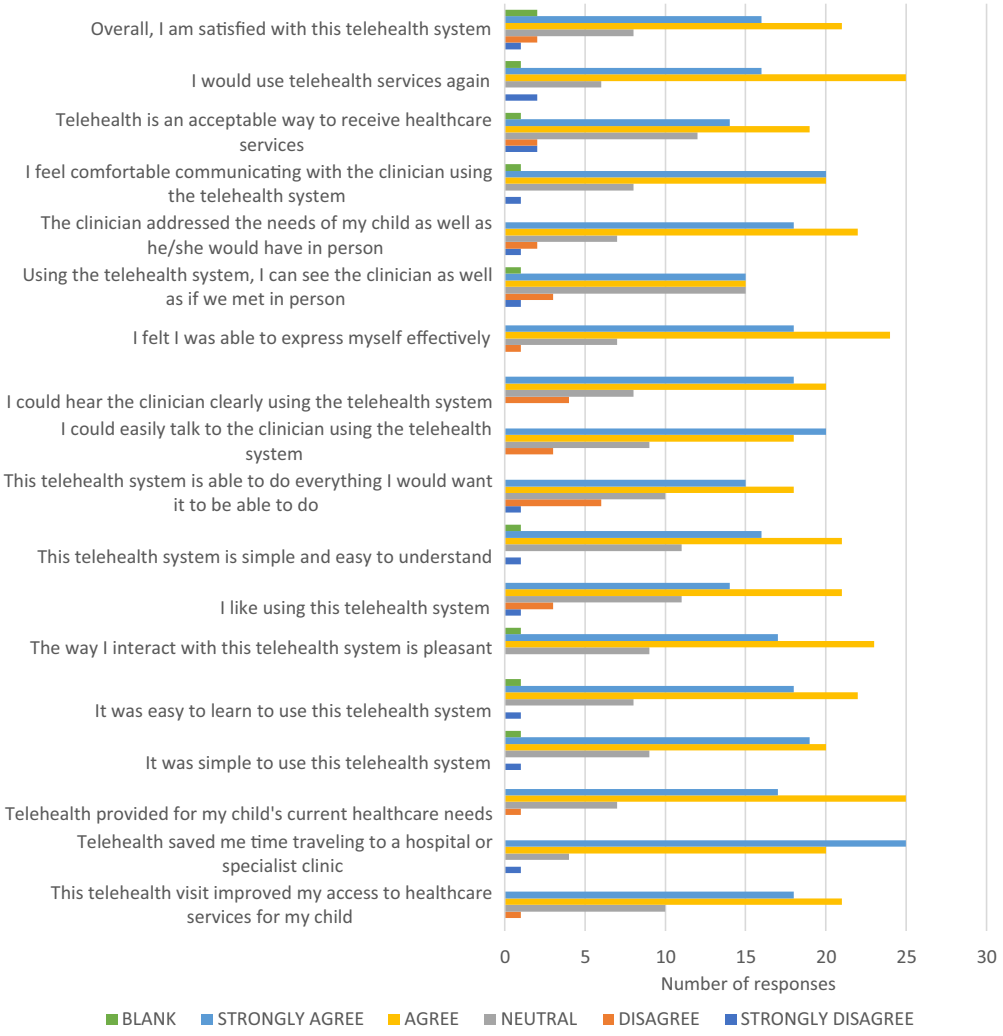
This figure appears in color online at www.jpedhc.org.

FIGURE 3. Additional survey questions: Likelihood of recommending virtual visit to others (blue), and satisfactionwith virtual visiti overall (orange).



This figure appears in color online at www.jpedhc.org.

FIGURE 4. Additional survey questions.



This figure appears in color online at www.jpedhc.org.

Although we recognize the limitations presented by telehealth services for certain pediatric pulmonary patients, there are certain populations we believe could benefit from its long-term use. For our technology-dependent patients, scheduling ambulance services for transportation can be cumbersome. Using telehealth would ensure our high-risk tracheostomy and ventilator patients have routine follow-up. Typically our technology-dependent patients are required to be seen at minimum every 6 months for nursing, respiratory medication, and equipment orders. These patients could be seen on an alternating schedule: in-office and telehealth to ensure their current management is optimal for their respiratory function. A study was done evaluating nurse practitioner-led telehealth visits with outpatient pediatric tracheostomy patients in South Texas (Moreno & Peck, 2020). Telehealth was offered to patients who lived more than 241.4 km from the primary clinic site. The results included no tracheostomy-associated complications, emergency department visits, or unnecessary hospitalizations. They also found that caregiver knowledge, satisfaction, self-efficacy, and competence in tracheostomy skills increased after the protocol was initiated. These results indicate that telehealth visits can be accessible and valuable to patients who are high-risk for complications. Limitations of this study include a small sample size (n = 2). More studies should be done exploring the benefits of telehealth in a high-risk population such as tracheostomy-dependent patients.

In addition, patients with stable, mild persistent asthma who may defer routine follow-up visits with providers when feeling well would likely benefit from a convenient telehealth follow-up. This would be a good opportunity to review well and sick plans. Using telehealth platforms in these cases and others may serve to enhance treatment compliance.

Further research in the area of pediatric pulmonary telehealth services should be conducted to support its use beyond the COVID-19 pandemic. We would recommend future studies should examine at least 6 months of data regarding telehealth services. Future studies could also examine outcome measures of care such as increased or decreased symptom frequency, use of oral corticosteroids, emergency department visits and hospitalizations, and mortality rate.

The authors would like to thank Dr. Maria Santiago and Dr. AnnabelleQuizon for their mentorship.

REFERENCES

American Hospital Association. (2019). *Fact sheet: Telehealth*. Retrieved from https://www.aha.org/system/files/2019-02/fact-sheet-telehealth-2-4-19.pdf

Barnett, M. L., Ray, K. N., Souza, J., & Mehrotra, A. (2018). Trends in telemedicine use in a large commercially insured population, 2005–2017. *JAMA*, *320*(20), 2147–2149.

Brotman, J. J., & Kotloff, R. M. (2021). Providing outpatient telehealth in the United States: Before and during COVID-19. *Chest*, *159*(4), 1548–1558.

Jaffe, D. H., Lee, L., Huynh, S., & Haskell, T. P. (2020). Health inequalities in the use of telehealth in the United States in the lens of COVID-19. *Population Health Management*, *23*(5), 368–377.

Moreno, L., & Peck, J. L. (2020). Nurse practitioner-led telehealth to improve outpatient pediatric tracheostomy management in South Texas. *Journal of Pediatric Health Care*, *34*(3), 246–255.

Muhrer, J. C. (2014). The importance of the history and physical in diagnosis. *Nurse Practitioner*, *39*(4), 30–35 quiz 36.

Pierce, R. P., & Stevermer, J. J. (2020). Disparities in use of telehealth at the onset of the COVID-19 public health emergency. *Journal of Telemedicine and Telecare*, 1–7.

Welch, B. M., Harvey, J., O'Connell, N. S., & McElligott, J. T. (2017). Patient preferences for direct-to-consumer telemedicine services: A nationwide survey. *BMC Health Services Research*, *17*(1), 784.