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Equal Access to Telemedicine during COVID-19 Pandemic: A Pediatric Otolaryngology Perspective

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Objectives/Hypothesis: During the current COVID-19 pandemic, the demand for direct-to-home telemedicine services has risen to an unprecedented level. Equal access to specialty care was assessed to identify potential barriers that may negatively impact telemedicine utilization.

Study design: Retrospective case series.

Methods: We examined the 6-week period between March and May 2020 when the only access to nonurgent pediatric otolaryngology service was through telemedicine and compared it to in-person visits during the same period in 2019. We compared patient demographics, including age, gender, preferred language, zip code of residence, and primary insurance plan.

Results: A total of 1,495 visits were conducted through telemedicine from March 23, 2020 to May 1, 2020, and 1983 in-person visits were completed in 2019. There was no difference in patient age and gender. The proportions of Spanish-speaking families were similar (15.8% in 2019 vs. 14.4% in 2020, $P = .96$). The percentage of Medi-Cal-insured patients (51.4% in 2019 vs. 49.8% in 2020, $P = .73$) and the mean poverty level (12.6% in 2019 vs. 12.2% in 2020, $P = .38$) also remained the same. Spanish-speaking families were statistically more likely to require rescheduling of their telemedicine visits (17.2%) when compared to the overall rescheduling rate of 11.9% ($P = .0083$).

Conclusions: We were able to successfully provide access to telemedicine services to our vulnerable populations during the current COVID-19 pandemic. Telemedicine is likely to remain an essential mode of delivering patient care going forward. It is important to evaluate and identify potential disparities to telemedicine access and proactively implement changes to address these barriers.

Key Words: Telemedicine, COVID-19, access.

Level of Evidence: 4.

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INTRODUCTION

Telemedicine utilizes electronic communication to facilitate encounters when the patient and provider are in different geographic locations. Technology has been used in medicine as early as 1879 when physicians reported using a telephone to reduce unnecessary office visits.[1] In our current era, telemedicine is most commonly used for patients in rural locations with barriers to accessing medical care. The use of telemedicine for pediatric otolaryngology is well established, with institutions such as Nemours Children's Hospital in Delaware regularly using telemedicine to provide services since 2015. The University of California San Diego (UCSD)/Rady Children's Hospital Medical Foundation division of pediatric otolaryngology has been providing telemedicine services on a limited basis for more than 3 years, with an average of four visits per month. The recent increase in demand for direct-to-home telemedicine services secondary to the COVID-19 pandemic has necessitated a rapid ramp-up in the volume of telemedicine services we provide, with the swift adoption of technology by both patients and providers. This required an evaluation of our practice to ensure that the current platform and workflows provide a seamless transition to virtual visits from in-person clinical encounters. Given our geographic location at the border between the United States and Mexico, the San Diego county population is made up of 34.1% Hispanic or Latinos according to the 2019 US Census.[2] A particular concern is that language and technology barriers may limit the use of telemedicine by families who are not native English speakers or have limited digital literacy due to low socioeconomic status. Given the large percentage of our patients who are primarily Spanish speakers, revisions in the current telemedicine platform may be necessary to correct disparities in access to care. We evaluated the percentage of telemedicine visits completed by patients whose primary language is Spanish or other languages and compared it to the percentage of in-person visits completed. Other factors analyzed were the poverty level of the patient's geographical residence and type of insurance (commercial vs. government supported).

MATERIALS AND METHODS

We conducted a retrospective review of telemedicine visits completed between March 23 and May 1, 2020 when our pediatric otolaryngology clinic was closed for routine outpatient visits due to county-mandated "stay-at-home" restrictions during the

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TABLE I.
Total Number Of Patients per Period, Age Distribution, Number and Percentage of Spanish-Speaking Patients, Patients that Speak Other Languages, and Patients Who Have Medi-Cal Insurance.

		Age Distribution (yr) $P = .39$					
	Number of Patients	Mean	Median	SD	Spanish (n/%) $P = .96$	Other Languages (n/%) $P = .65$	Medi-Cal (Medicaid) (n/%) $P = .73$
2019	1983	7.13	5.8	5.38	314/15.8	89/4.5	1021/51.4
2020	1495	7.23	5.9	5.33	215/14.4	32/2.1	745/49.8

SD = standard deviation.

COVID-19 pandemic. Per institutional protocol, this study was submitted to the UCSD Institutional Review Board (IRB) and was granted exemption as no protected health information was collected. We compared the data to the same period in 2019, when all patients were seen in person.

Telemedicine Setup

To conduct video visits in a secure environment, we implemented Zoom integration with the electronic medical record (EMR) system Epic. Using context-aware linking in Epic, a link to a Zoom video session is placed in an Epic encounter. This enables Epic users to launch Zoom video interaction when using Epic for documentation simultaneously.

Physicians are able to initiate a visit and launch directly into a video visit within the EMR. Patients are able to launch into Zoom from their Epic MyChart patient portal on their personal computer or smartphone. All communications between Zoom and Epic, as well as Zoom video sessions, use AES-256 bit encryption and are dynamic password-protected, making this integrated process secure and HIPAA-compliant.

However, the process is moderately technology intensive. Prior to scheduling, all patients were contacted by phone, and our clinic staff obtained verbal consent for a telemedicine visit and went through the process of enabling the MyChart patient portal if they were not previously enrolled. They were also required to download Zoom on their personal computer or smartphone prior to the scheduled video visits.

On the day of the visit, medical assistants contacted family by phone and completed the verification process to ensure that all the audio and video features were functional. They also conducted their portion of the workflow, recording vital signs and reviewing history, medication, and allergy, prior to providers joining the visit. If patients had difficulty launching Zoom within the MyChart portal, they were given a separate password-protected invite to a Zoom session with the provider to complete the video portion of the encounter.

Due to time constraints, if there were any significant technical issues with the connection or setup, the visits were rescheduled for another session once the technical difficulties have been resolved. We analyzed this rate of rescheduling as a surrogate for technology barriers that caused delay in access to telemedicine care.

Study Design

To reduce the spread of COVID-19, the San Diego county health department issued mandates on March 19, 2020 that required the closure of our clinic for routine, nonurgent visits. The order was lifted on May 4. With the closure of the clinics, there was a rapid ramp-up period of telemedicine services where all providers and staff received training for video visits.

We examined the 6-week period where the only access to nonurgent pediatric otolaryngology services for our patients was through telemedicine visits. We included all completed visits during this period and examined the rate of rescheduling, which can indirectly reflect possible barriers to access, such as lack of access to technology, lack of digital literacy, and language barriers.

Data were generated through reporting workbench tools available within the EMR. We reported on patient demographics, including age, gender, preferred primary language, zip code of the patient's residence, and primary insurance plan. We also examined whether the visit was for a new or established patient, primary diagnosis, and whether the visit was rescheduled and how many times. The zip codes were used to obtain the poverty level of the patients' geographical residence, which is available in the 2019 US Census.[2]

To compare the demographics of the patients to in-person visits, we examined a similar 6-week period between March and May in 2019, evaluating for any intrinsic differences between the patient populations. Comparing the same period between the 2 years helped eliminate any seasonal variability in visit patterns.

Statistical Methods

Statistical analysis was performed with the JMP® Pro 14.2.0 by SAS Institute. Associations between classifications were evaluated by Pearson chi-square statistics. The dependence of responses on quantitative variables was analyzed by logistic regression and the corresponding receiver operating characteristic (ROC) curves. In all cases, we presented the calculated significance values. Descriptive statistics are presented for all variables.

RESULTS

There was a total of 1,495 telemedicine visits conducted between March 23, 2020 and May 1, 2020 and 1983 in-person encounters in the same 6-week period in

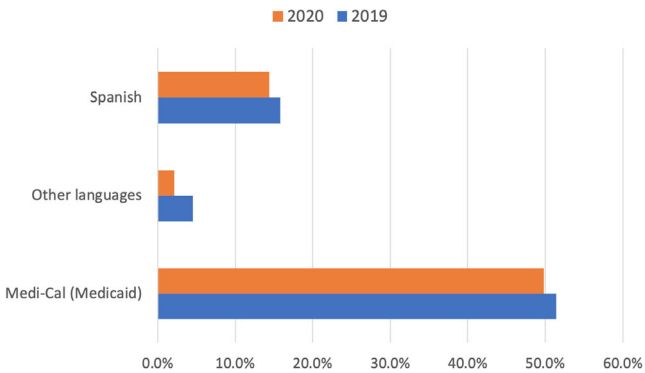

Fig. 1. Patient visits by language, Spanish speaking and other languages, and insurance (Medi-Cal) during the studied periods in 2020 when compared to 2019.

TABLE II.
Poverty Level for Patients Seen in 2019 and 2020.

	Poverty Level (%) P = .38		
	Mean	Median	SD
2019	12.6	11.0	8.6
2020	12.2	11.3	7.8

SD = standard deviation.

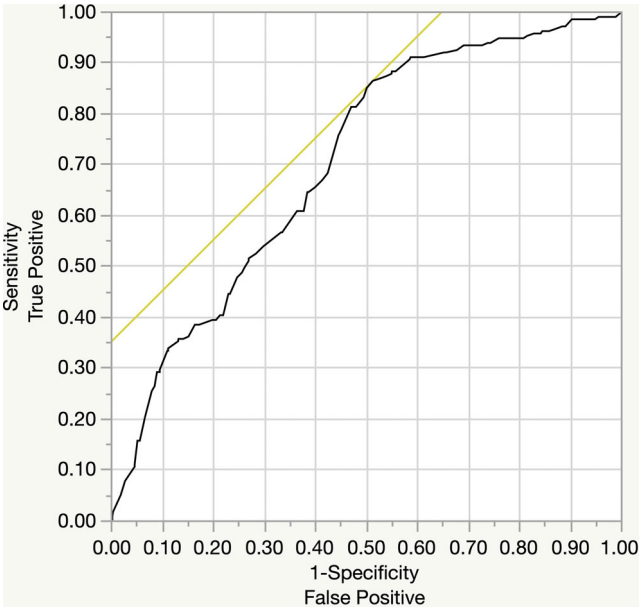

Fig. 2. Receiver Operating Characteristic (ROC) of Spanish-speaking patients by poverty level. We used Spanish = "1" to be the positive level; area under the ROC curve = 0.70393 [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

2019. The patients' ages were similar, with a mean of 7.23 years (range 0–27.6) for 2020 and 7.13 years (range 0–39.6) for 2019 (Table I). Comparing both periods, there were also no significant differences in patients' gender (56% male in 2019 and 57% male in 2020, P = .43), Spanish-speaking patients (15.8% in 2019 vs. 14.4% in 2020), patients who speak languages other than English or Spanish (4.5% in 2019 vs. 2.1% in 2020), and patients who have Medi-Cal insurance (51.4% in 2019 vs. 49.8% in 2020) (Table I, Fig. 1).

Zip codes were used to evaluate the poverty level of the geographic area of patients' residence. The poverty level was reported as the percentage of households with income below the poverty threshold. In 2020, in the United States, the poverty threshold for a single person under 65 years of age was an annual income of US $12,760; the threshold for a family of four with two children was US$26,200. We compared the poverty levels of patients seen in 2019 and 2020 using data reported for each zip code,[2,3] and there were no significant differences (Table II). The mean poverty level for patients seen in 2019 was 12.6% and 12.2% in 2020.

In 2020, there were 563 (37.7%) new patients and 932 (62.3%) return patients. Of all patients, 178 (11.9%) rescheduled their telemedicine visits. Among patients who are Spanish speaking, 37 (17.2%) required rescheduling. When testing for independence of Spanish-speaking patients and patients who rescheduled their visits, we found that these two classifications were not statistically independent (chi square = 6.733, P = .0083). Poverty level (P = .4), Medi-Cal insurance (P = .07), and new patients (P = .74) status did not statistically affect the rate of rescheduling. Spanish speaking was statistically associated with poverty level as evaluated by the logistic regression of the poverty level on the classification of Spanish speaking (yes/no). The area under the ROC curve (AUC) was 70.4% (Fig. 2).

Of the patients seen in 2020, 49% of them were seen for otologic diagnoses, 20% for problems with the tonsil/adenoids, 14% for sinonasal issues, and 11% for airway/voice problems (Table III).

DISCUSSION

The use of telemedicine in otolaryngology has been increasing steadily in the last decade with the expansion of technology capabilities and faster broadband connections accessible to the general population. Previous telemedicine applications were mostly focused on providing care to rural populations such as Alaska[4] and remote areas of Australia[5] and to manage chronic diseases[6] where telemedicine reduces the need for frequent in-person visits. It has been shown to decrease barriers to medical care for those with limited access.

The current COVID-19 pandemic with many county- and state-mandated "stay-at-home" restrictions have compelled healthcare systems across the country to adopt telemedicine at an unprecedented speed to continue providing care to all patient populations from pediatrics to geriatrics and from primary care to specialty care. Due to the technology requirement, our concern is that telemedicine

TABLE III.
Chief Complaints of Patients Seen in Telemedicine Visits, 2020.

Chief complaint	Otologic	Tonsil/Adenoids	Sinonasal	Airway/Voice	Head and Neck	Others
Number of patients	728	293	211	170	65	33
%	49	20	14	11	4	2

may potentially exacerbate pre-existing disparities for access to specialty care. According to the 2015–2016 California Health Interview Survey datasets, individuals who frequently use technology for health were more likely to be younger (odds ratio [OR]: 0.1, 95% confidence interval [CI] 0.1–0.2 for ≥60 years vs. <60 years), female (OR: 1.6, 95% CI 1.3–1.9 compared to males), and non-Hispanic white (OR: 0.54, 95% CI 0.4–0.7 for Latinos and OR: 0.2, 95% CI 0.2–0.4 for African Americans) and have a higher socioeconomic status (>400% of Federal Poverty Guidelines; OR: 1.3, 95% CI 1.4–2.4).[7]

In a recently published article by Nouri et al, the authors found that, in a primary care practice managing chronic diseases, a significantly smaller proportion of the visits after scaled-up telemedicine implementation was observed for vulnerable patients: age 65+ years, non-English language preference, and those insured by Medicare or Medicaid.[8] In contrast, we did not see any difference between the patient demographics when we compared 2019 in-person visits and 2020 telemedicine visits. Patients were of similar age and gender. The proportion of non-English speakers and those with Medi-Cal insurance remained the same, along with the poverty level.

One of the reasons for our equal access finding may be due to the nature of pediatric care. For a pediatric practice, we did not expect to observe a difference in the age and gender of the patients during the two periods. Parents of children are likely to be younger (<60 years of age) and may be more likely to adopt technology when compared to older adults. Using a self-administered survey, DeMartini et al reported a high level of digital technology access among parents in an urban pediatric primary care clinic setting with a high percentage of African American and Medicaid-insured families in a low socioeconomic area.[9] Of respondents, 80% reported having internet at home, and 71% had a smartphone. In that population, 70% of respondents reported that they would use healthcare information supplied digitally if approved by their child's medical provider. It is possible that the younger age of both our patients and their parents, when compared to the general population, has the greatest effect in terms of access to digital technology that may negate the effect of other language and/or socioeconomic barriers.

Another major reason for the lack of difference in patient characteristics may be the fact that we are a tertiary specialty care clinic. Our patient population comes from referrals by pediatricians. During the scheduling process, our clinic staff proactively contacted patients who were previously scheduled for in-person visits or those with an active otolaryngology referral. This scheduling process is likely to be quite different in a primary care clinic setting, where the majority of the visits are initiated by the patients themselves. However, this may serve as an example for other pediatric specialty care practices depending on the level of resources available. There may also be an intrinsic advantage to pediatrics where parents are interested and likely to use technology for the management of their child's health.[10]

It was interesting that the most common reason for a telemedicine visit was for otologic complaints. Most publications regarding visits for these issues discuss the use of video endoscopy, where the physician can evaluate the patient's ears.[11,12] We did not have these systems available, so the visits occurred without otoscopy. Nevertheless, there were no complaints from the families, and limited postencounter surveys were uniformly positive. Due to the limitation of the exam, we had initial concerns that patients with otologic complaints may prefer telephone encounters. However, the majority of the patients chose video visits with the ability to connect face-to-face with the providers. To continue providing telemedicine services in the post-COVID-19 era, it will be essential for us to elicit feedback and review patient and provider satisfaction with both initial and subsequent visits to determine which diagnoses are best suited for video versus in-person visits. This knowledge will help us create a more nuanced triage/scheduling system to maximize the benefit of telemedicine in the future.

One important barrier we identified in our population is the rate of rescheduling, which is significantly higher among Spanish-speaking families. This is despite the fact that we have all Spanish-speaking medical assistants and provide translation services through Epic-linked Zoom calls to all patients whose preferred language is not English. This finding reflects an increased difficulty with technology adoption in Spanish-speaking families. The language barrier did not prevent them from accessing our telemedicine specialty service, but it did require longer time and sometimes multiple rescheduled visits to complete the encounter successfully. To provide a sustainable level of telemedicine care beyond the COVID-19 pandemic era and well into the future, we need to be cognizant of the language barrier and consciously structure future encounters with increased staff support and longer allotted time and examine more efficient ways to provide digital education and translational services to this population. This may pose a financial challenge at an organizational level in this already difficult time. However, we feel that this is an essential commitment as healthcare providers to create equal access to all of our patients.

Our early experience with this large-scale telemedicine adoption process made us realize that, to complete a successful telemedicine encounter, the scheduling and previsit workflow is extremely labor- and time-intensive. Despite the different outcomes reported, we echo the point made by Nouri et al[8] that, as an organization, we need to reach out to our vulnerable patient population and provide help in terms of setting up video platforms, inclusive of the language needs, and partner with local organizations to increase the overall digital literacy of the entire patient population.

In addition, in contrast to the opinion of Nouri et al., that requiring patient portal enrollment presents a barrier and logistical challenge when scheduling video visits,[8] our experience indicated that patients have enthusiastically embraced the ability to sign up for the patient portal. Our MyChart adoption rate went from 20%–30% pre-COVID to nearly 100% currently. This will have long-lasting positive effects on improving patient–provider communication. Many patients, including Spanish-speaking ones now, are able to enjoy the ease with which they can contact and communicate with their providers electronically through the patient portal. We will need to remain proactive and continue to strive for

better adoption of the patient portal even when in-person visits resume so that we can continue to provide enhanced electronic patient–provider communication.

There are several limitations to our study. First, our practice is situated in a fairly large metropolitan area with a county population of 3 million. Technology usage is expected to be high in terms of internet access and broadband connections. The differences in the rate of electronic technology adoption between the vulnerable and the general population may be small and could not be detected using the current study design. Findings may be different in a practice that includes more rural or remote populations. Second, our unique location at the United States and Mexico border with a large Hispanic population may preclude the generalization of our findings to other communities. Third, we used the rescheduling rate as a proxy for barriers to access due to technology, which may or may not be completely accurate. Some patients may have rescheduled due to other personal reasons. We also were unable to capture those who were never able to be reached by phone, and due to the small numbers, we did not include those who were unable to successfully complete the telemedicine encounter at all. Finally, we analyzed the patient population as a whole and did not assess each patient/family's level of technology availability or digital literacy. A more nuanced analysis using patient-completed surveys may be able to give us more insights into our population's digital landscape, but it is outside the scope of the current study.

CONCLUSION

Telemedicine developed from a need to improve access to medical care for patients residing in rural locations; however, an increasing number of patients living in urban areas have adopted telemedicine as a means to receive medical care. The current public health crisis caused by the COVID-19 pandemic has dramatically increased the utilization of telemedicine services when patient travel is severely restricted. In our pediatric otolaryngology practice, we found that Spanish-speaking patients had a higher incidence of rescheduled visits compared to other patients. It is essential to evaluate, understand, and address potential barriers to technology-based platforms for delivering care to prevent further disparities in access to healthcare.

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