Otolaryngology Patient Satisfaction with In-Office Appointments and Virtual Visits Due to COVID-19

Annie E. Arrighi-Allisan, BA1, Anni Wong, MD1, Sunder Gidumal, MD1, Janki Shah, MD1, Peter Filip, MD1, Aisosa Omorogbe, BS1, Joshua Rosenberg, MD1, Satish Govindaraj, MD1, and Alfred-Marc Iloreta, MD1

Abstract

Background: The COVID-19 pandemic forced otolaryngologists to seek new methods of providing patient care in a remote setting. The effect of this paradigm shift on patient satisfaction, however, remains unelucidated. This study compares patient satisfaction with telehealth visits during the COVID-19 pandemic to that with in-office visits during the same period in 2019.

Methods: Press Ganey survey responses of patients seen by otolaryngologists within a large, academic, multicenter hospital system were gathered. Responses were included in analyses if they corresponded with a visit that occurred either in clinic March to December 2019 or via telehealth March to December 2020. Chi-Square Test of Independence and Fisher’s Exact Test were employed to detect differences between years. Binary logistic regressions were performed to detect the factors most predictive of positive telehealth experiences.

Results: Patient overall satisfaction with in-office and telehealth visits did not differ significantly (76.4% in 2019 vs 78.0% in 2020 rated visit overall as “very good,” P = .09). Patients seen by a Head and Neck (odds ratio 4.13, 95% confidence interval 1.52-11.26, P = .005), Laryngology (OR 5.96, 95% CI 1.51-23.50, P = .01), or Rhinology (OR 4.02, 95% CI 1.55-10.43, P = .004) provider were significantly more likely to report a positive telehealth experience.

Conclusions: Patients seen via telehealth during COVID-19 reported levels of satisfaction similar to those seen in-office the year prior. These telehealth satisfaction levels, however, are contextualized within the expected confines of a pandemic. Further research is required to determine whether satisfaction remains consistent as telemedicine becomes a ubiquitous component of medical practice.

Keywords
quality of life, patient reported outcomes, otolaryngology, telemedicine, COVID-19

Introduction

The widespread adoption of telehealth technologies allowed many patients to seek or continue care during the COVID-19 pandemic. While a paltry 0.1% of Medicare primary care visits were conducted through telehealth in February 2020, that number rose to 43.5% just 2 months later.1 As a precipitous change to remote interactions in early spring proved enduring throughout the summer and fall, providers augmented efforts to provide routine care in a remote setting. While initially sought as a temporary remedy, the expectation of a majority of stakeholders in the American healthcare system is that telehealth will become an accepted and ubiquitous component of medical practice in the United States.2-5 Some experts estimate that up to $250 billion dollars in healthcare expenditures could be feasibly and effectively translated to a virtual platform.6

Prior to the pandemic, providers had the luxury of cherry-picking the types of visits occurring remotely. Rehabilitation, radiology, and genetic counseling services gained easy patient acceptance as the substance of these visits was well-suited to a remote setting,7-10 but telemedicine visits overall remained a stark minority due to limited reimbursement rates and patient and provider reticence.11,12 Patient acceptance and perceived value are integral to the
successful widespread adoption of telehealth in American medical practice.

Though the expansion of telemedicine is in its nascent stages, several studies have begun to explore the impact of expanded telehealth on patient satisfaction. Early reports in internal medicine, family medicine, gastroenterology, and oncology have evidenced relatively high levels of overall patient satisfaction. There remains a paucity of research, however, exploring this dynamic within surgical fields. A small number of studies within otolaryngology have reported promising results, but the interpretation of satisfaction is innately relative, and these studies fail to contextualize their findings within preexisting patient satisfaction levels prior to the pandemic. The authors hypothesize that patient satisfaction with otolaryngology telehealth visits during the COVID-19 pandemic will be comparable to that with in-office visits during the same period in 2019. We examine these satisfaction levels at the patient, divisional, and departmental levels to elucidate the factors most predictive of a positive telehealth experience.

Materials and Methods

Participants

Press Ganey survey responses of patients seen by an otolaryngologist within a large, academic, multicenter hospital system were gathered. Telehealth visits were universally offered to patients seeking an initial or follow-up visit. Though the proportion of new to return visits varied by month, new visits comprised slightly more than one-third of all visits in 2020, which was a slightly lower proportion than the year prior (33.93% in 2020 vs 38.34%). Providers were required to offer these visits. Responses were included in analyses if they corresponded with a visit that occurred either in clinic from March to December 2019 or via telehealth from March to December 2020.

Study Design

This study was approved by the Mount Sinai Program for the Protection of Human Subjects. Patient satisfaction was assessed by both quantitative and qualitative measures. Numerical responses to Press Ganey patient satisfaction surveys were grouped and compared by both year (2019 vs 2020) and subspecialty. In-office and telehealth patient satisfaction surveys from 2019 and 2020, respectively, asked patients to rate different aspects of their visit. Questions not shared by both surveys (i.e., cleanliness of clinic, nurse or assistant friendliness, etc.) were excluded from analyses. A composite telehealth satisfaction score was calculated by averaging each individual’s numerical responses to telehealth-related questions. A binary variable was then created to indicate whether an individual had assigned the telehealth component of their visit a perfect rating, which constituted a “strongly positive” telehealth experience. Press Ganey satisfaction survey comments were analyzed and assigned a valence of positive, neutral, mixed, or negative (+1, 0, and −1, respectively) based on pre-coded keywords. For patients who commented on more than one aspect of their visit, aggregate scores were calculated by averaging all available values. Blank comment sections were counted as neutral and assigned a valence of 0.

Statistical Analyses

Descriptive statistics were employed to examine baseline patient characteristics. Chi-Square Test of Independence and Fisher’s Exact Test were utilized to compare numerical ratings and comments from both years. Binary logistic regressions, controlling for patient age, race/ethnicity, and sex were performed to detect factors predictive of strongly positive telehealth experiences. All statistical analyses were performed using IBM’s Statistical Product and Service Solutions software (SPSS; IBM, Chicago, Illinois). Statistical significance (P value) was set at less than .05.

Results

A number of 4713 (4434 in 2019, 279 in 2020) numerical survey responses were received and included in analyses. The 2020 telehealth response cohort skewed significantly younger than those responding to in-office visits in 2020 (62.7% below age 65 in 2019 vs 69.5% in 2020, P = .001). The vast majority of responses in both years were from patients whose primary language was English (98.7% vs 98.9% English speakers responding in 2019 and 2020, respectively, P = .91). Type of otolaryngology provider seen varied considerably between cohorts, with significantly fewer patients responding to general otolaryngology versus subspecialty visits in 2020 when compared with 2019 (19.0% vs 31.7% general, respectively, P < .0001). Demographics of the 2019 and 2020 response cohorts can be found in Table 1.

Table 2 compares patient satisfaction with a multitude of visit elements between 2019 and 2020. Patients reported comparable overall satisfaction with 2019 in-office and 2020 virtual visits (76.4% vs 78.0%, respectively, rated visit overall as “very good,” P = .09). Patient satisfaction with the provider overall was slightly higher in 2020, though not to a significant level (83.3% in 2019 vs 87.5% in 2020 rated provider as “very good,” P = .46). Satisfaction with office and provider accessibility in 2020 exhibited a bimodal distribution when compared to 2019; though a greater overall number of patients in 2020 found the clinic much easier to contact (69.9% in 2020 vs 64.9% in 2019), patients were also more likely to rate accessibility poorly than were their 2019 counterparts (14.7% rated contact ease as “very poor” to “fair” in 2020 vs 11.0% in 2019, P = .0004 for both). Respondents in 2019 were more likely to recommend the practice to others than were those seen via telehealth in
Table 1. Demographics of Patients Seen In-Office in 2019 and via Telehealth in 2020.

| Demographic               | 2019 (n = 4434) | 2020 (n = 279) | P value |
|---------------------------|-----------------|----------------|---------|
| Sex (Female)              | 50.4% (2236)    | 52.0% (145)    | .62     |
| Age, y                    | .001            |                |         |
| 0-17                      | 6.2% (273)      | 2.9% (8)       |         |
| 18-34                     | 10.3% (458)     | 15.4% (43)     |         |
| 35-49                     | 14.8% (658)     | 19.7% (55)     |         |
| 50-64                     | 31.4% (1394)    | 31.5% (88)     |         |
| 65-79                     | 30.3% (1344)    | 26.5% (74)     |         |
| 80+                       | 6.9% (307)      | 3.9% (11)      |         |
| Language                  | .91             |                |         |
| English                   | 98.7% (4377)    | 98.9% (276)    |         |
| Spanish                   | 1.2% (55)       | 1.1% (3)       |         |
| Race/Ethnicity            | <.0001          |                |         |
| Hispanic or Latino        | 14.3% (635)     | 0% (0)         |         |
| Asian                     | 1.4% (62)       | 1.8% (5)       |         |
| Black or African American | 3.9% (175)      | 5.4% (15)      |         |
| White                     | 34.1% (1512)    | 49.5% (138)    |         |
| Unknown                   | 46.1% (2044)    | 42.7% (119)    |         |
| Provider subspecialty     | <.0001          |                |         |
| General                   | 31.7% (1404)    | 19.0% (53)     |         |
| Facial plastics           | 5.8% (255)      | 3.9% (11)      |         |
| Head and neck surgery     | 10.2% (454)     | 26.5% (74)     |         |
| Laryngology               | 10.6% (472)     | 12.2% (34)     |         |
| Otology                   | 6.9% (305)      | 4.3% (12)      |         |
| Pediatric ENT             | 5.1% (227)      | 2.5% (7)       |         |
| Rhinology                 | 20.3% (898)     | 22.9% (64)     |         |
| Sleep medicine            | 9.4% (419)      | 8.6% (24)      |         |

2020 (95.6% vs 90.4% likely or very likely to recommend, \( P = .002 \)). No other significant differences emerged between 2019 and 2020 satisfaction elements (Table 2).

A number of 905 (747 in 2019, 158 in 2020) free-text survey responses were received, assigned valences (strongly positive, positive, neutral, negative, or strongly negative), and included in analyses (Table 3). Similar levels of satisfaction in 2019 and 2020 were elicited in the department overall (\( P = .63 \)), and across all 8 otolaryngology subspecialty practices: General, Facial Plastics, Head and Neck, Laryngology, Otology, Pediatrics, Rhinology, and Sleep Medicine (\( P = .07 \), .77, .51, .69, .71, 1, .52, and .35, respectively). A full report of comment valence analyses can be found in Table 3.

A multivariable logistic regression was performed (Table 4), controlling for patient sex, age, and race/ethnicity, to examine whether otolaryngology division correlated with a patient’s likelihood of having a strongly positive telehealth experience. Patients seen by a provider within Head and Neck (odds ratio 4.13, 95% CI 1.52-11.26, \( P = .005 \)), Laryngology (OR 5.96, 95% CI 1.51-23.50, \( P = .01 \)), or Rhinology (OR 4.02, 95% CI 1.55-10.43, \( P = .004 \)) were approximately 4, 6, and 4 times as likely, respectively, to have a strongly positive telehealth experience than were patients seen by generalists.

Discussion

The COVID-19 pandemic has compelled otolaryngologists to seek new methods of providing patient care in a remote setting. Our study demonstrates that otolaryngology patient satisfaction with telehealth visits in 2020, assessed by both quantitative and qualitative means, was high and comparable across numerous measures to that with in-person visits prior to the pandemic. Our study is the largest, in both patient sample size and time period examined, to explore telehealth satisfaction within otolaryngology, and just the second to compare otolaryngology patient satisfaction with virtual and in-person formats.

The cohort of patients who completed the telehealth satisfaction survey were significantly younger than those whose survey answers corresponded to an in-person visit (Table 1). Age has been found, in many settings, to inversely correlate with technological proficiency.\(^{15,23,24}\) A smaller proportion of older patients therefore may have opted for remote visits, yielding a correspondingly lower number of survey responses from adults over age 65. An additional source of this discrepancy may lie in the format in which the surveys were presented. Patients seen in 2019 were given the option of completing their survey in person; this option, in contrast, was unavailable to those seen remotely, perhaps precluding patients with lower technological familiarity from responding.

The present analyses found overall patient satisfaction levels with in-person and virtual visits to be equivalent (Table 2). Just one extant study has compared patient satisfaction levels with otolaryngology visits before and during the pandemic. In contrast to our findings, Itamura et al\(^{19}\) reported that otolaryngology patients consistently rated their telehealth visits more poorly than in-person ones. Perceived provider listening and effective conveyance of information were most notably reduced. There are several potential etiologies for these differences in perception. First, Itamura et al’s analysis included responses to telehealth visits for just the months of March and April 2020, 2 months at the very inception of the pandemic. Our data spans March through December of 2020, during which providers underwent additional telemedicine training and practices optimized their virtual workflows. Our augmented time period also allowed our study a threefold increase in sample size. Patient demographics and visit details, such as patient age, gender, or subspecialty seen, were not included in Itamura et al’s analyses, which precludes us from drawing any conclusions between patient population composition and resultant telehealth satisfaction levels. Nonetheless, the aforementioned differences in setting may have played a significant role.

Table 1. Demographics of Patients Seen In-Office in 2019 and via Telehealth in 2020.

| Demographic               | 2019 (n = 4434) | 2020 (n = 279) | P value |
|---------------------------|-----------------|----------------|---------|
| Sex (Female)              | 50.4% (2236)    | 52.0% (145)    | .62     |
| Age, y                    | .001            |                |         |
| 0-17                      | 6.2% (273)      | 2.9% (8)       |         |
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| 65-79                     | 30.3% (1344)    | 26.5% (74)     |         |
| 80+                       | 6.9% (307)      | 3.9% (11)      |         |
| Language                  | .91             |                |         |
| English                   | 98.7% (4377)    | 98.9% (276)    |         |
| Spanish                   | 1.2% (55)       | 1.1% (3)       |         |
| Race/Ethnicity            | <.0001          |                |         |
| Hispanic or Latino        | 14.3% (635)     | 0% (0)         |         |
| Asian                     | 1.4% (62)       | 1.8% (5)       |         |
| Black or African American | 3.9% (175)      | 5.4% (15)      |         |
| White                     | 34.1% (1512)    | 49.5% (138)    |         |
| Unknown                   | 46.1% (2044)    | 42.7% (119)    |         |
| Provider subspecialty     | <.0001          |                |         |
| General                   | 31.7% (1404)    | 19.0% (53)     |         |
| Facial plastics           | 5.8% (255)      | 3.9% (11)      |         |
| Head and neck surgery     | 10.2% (454)     | 26.5% (74)     |         |
| Laryngology               | 10.6% (472)     | 12.2% (34)     |         |
| Otology                   | 6.9% (305)      | 4.3% (12)      |         |
| Pediatric ENT             | 5.1% (227)      | 2.5% (7)       |         |
| Rhinology                 | 20.3% (898)     | 22.9% (64)     |         |
| Sleep medicine            | 9.4% (419)      | 8.6% (24)      |         |
| Element of visit                  | 2019       | 2020       | P value |
|----------------------------------|------------|------------|---------|
| Very poor | Poor | Fair | Good | Very good | Very poor | Poor | Fair | Good | Very good |
| Visit overall | 0.9% (41) | 1.1% (47) | 3.9% (177) | 17.8% (800) | 76.4% (3440) | 1.0% (3) | 2.4% (7) | 5.1% (15) | 13.9% (41) | 78.0% (231) | .09 |
| Ease of scheduling appointments | 1.0% (45) | 1.9% (84) | 6.6% (293) | 21.7% (969) | 68.8% (3066) | 1.4% (4) | 2.0% (6) | 7.5% (22) | 16.0% (47) | 73.1% (215) | .16 |
| Ease of contacting               | 1.6% (65) | 1.8% (76) | 7.6% (319) | 24.1% (1012) | 64.9% (2722) | 0.7% (2) | 4.1% (12) | 9.9% (29) | 15.4% (45) | 69.9% (204) | .0004 |
| Ease of video visit instructions | 1.4% (4) | 3.4% (10) | 6.2% (18) | 17.9% (52) | 71.1% (207) |
| Provider overall                 | 0.9% (39) | 0.8% (35) | 2.4% (106) | 12.7% (566) | 83.3% (3713) | 0.3% (1) | 0.3% (1) | 1.7% (5) | 9.8% (29) | 87.5% (258) | .46 |
| Ease of scheduling appointments | 0.6% (25) | 0.8% (35) | 2.6% (113) | 12.7% (559) | 83.4% (3686) | 0.3% (1) | 0.7% (2) | 1.0% (3) | 10.6% (31) | 87.3% (255) | .40 |
| Ease of contacting               | 0.7% (29) | 0.7% (29) | 2.3% (102) | 13.6% (604) | 82.8% (3679) | 0.3% (1) | 0.3% (1) | 1.7% (5) | 9.8% (29) | 87.8% (259) | .33 |
| Ease of video visit instructions | 1.0% (3) | 0.7% (2) | 1.7% (5) | 11.3% (33) | 86.3% (253) | .59 |
| Ease of scheduling appointments | 1.6% (72) | 0.8% (36) | 1.9% (83) | 10.3% (451) | 85.4% (3750) | 0.3% (1) | 0.3% (1) | 2.4% (7) | 8.8% (26) | 88.1% (259) | .31 |
| Ease of scheduling appointments | 0.9% (39) | 0.9% (36) | 2.5% (106) | 13.3% (565) | 82.4% (3503) | 0.3% (1) | 0.3% (1) | 1.7% (5) | 11.3% (33) | 86.3% (253) | .59 |
| Staff took care for you           | 0.5% (20) | 0.6% (27) | 2.8% (120) | 17.3% (756) | 78.8% (3437) | 1.0% (3) | 0.7% (2) | 1.7% (5) | 15.1% (44) | 81.5% (238) | .34 |
| Likelihood of recommending practice | 1.3% (55) | 0.8% (33) | 2.4% (105) | 12.2% (534) | 83.4% (3663) | 1.4% (4) | 2.4% (7) | 5.8% (17) | 15.1% (44) | 75.3% (220) | .002 |
| Telemedicine overall              | 1.7% (5) | 4.4% (13) | 7.1% (21) | 15.6% (46) | 71.1% (209) |
| Ease of scheduling appointments | 0.7% (2) | 3.7% (11) | 6.1% (18) | 14.6% (43) | 74.8% (220) |
| Video connection                  | 2.0% (6) | 4.4% (13) | 7.2% (21) | 14.7% (43) | 71.7% (210) |
| Audio connection                  | 1.4% (4) | 4.1% (12) | 8.6% (25) | 16.8% (49) | 69.1% (201) |
| Ease logging in                   | 1.0% (6) | 5.5% (16) | 6.8% (20) | 17.1% (50) | 68.6% (201) |
Table 3. Comparison of 2019 and 2020 Comment Valence Analyses.

| Subspecialty      | Year          | Strongly positive | Positive | Neutral | Negative | Strongly negative | P value |
|-------------------|---------------|-------------------|----------|---------|----------|-------------------|---------|
|                   | 2019          |                   |          |         |          |                   |         |
|                   | 36.9% (276)   | 5.0% (37)         | 41.9% (313) | 3.2% (24) | 13.0% (97) |                   |         |
|                   | 2020          | 36.1% (57)        | 3.8% (6) | 46.8% (74) | 3.8% (6) | 9.5% (15)     | .63     |
| General           |               |                   |          |         |          |                   |         |
| Facial plastics   | 41.9% (13)    | 0.0% (0)          | 45.2% (14) | 3.2% (1)  | 9.7% (3)  |                   |         |
| Head and neck     | 40.0% (40)    | 10% (10)          | 38.0% (38) | 2.0% (2)  | 10.0% (10) |                   |         |
| Laryngology       | 38.3% (44)    | 8.7% (10)         | 39.1% (45) | 2.6% (3)  | 11.3% (13) |                   |         |
| Otology           | 11.1% (1)     | 0.0% (0)          | 44.4% (4)  | 0.0% (0)  | 44.4% (4)  |                   |         |
| Pediatric ENT     | 36.7% (18)    | 2.0% (1)          | 53.1% (26) | 0.0% (0)  | 8.2% (4)   |                   |         |
| Rhinology         | 32.7% (35)    | 1.9% (2)          | 50.5% (54) | 3.7% (4)  | 11.2% (12) |                   |         |
| Sleep medicine    | 38.5% (35)    | 4.4% (4)          | 37.4% (34) | 2.2% (2)  | 17.6% (16) |                   |         |
|                   | 2020          |                   |          |         |          |                   |         |
|                   | 36.1% (57)    | 3.8% (6)          | 46.8% (74) | 3.8% (6)  | 9.5% (15)  |                   |         |
| General           |               |                   |          |         |          |                   |         |
| Facial plastics   | 41.9% (13)    | 0.0% (0)          | 45.2% (14) | 3.2% (1)  | 9.7% (3)  |                   |         |
| Head and neck     | 40.0% (40)    | 10% (10)          | 38.0% (38) | 2.0% (2)  | 10.0% (10) |                   |         |
| Laryngology       | 38.3% (44)    | 8.7% (10)         | 39.1% (45) | 2.6% (3)  | 11.3% (13) |                   |         |
| Otology           | 11.1% (1)     | 0.0% (0)          | 44.4% (4)  | 0.0% (0)  | 44.4% (4)  |                   |         |
| Pediatric ENT     | 36.7% (18)    | 2.0% (1)          | 53.1% (26) | 0.0% (0)  | 8.2% (4)   |                   |         |
| Rhinology         | 32.7% (35)    | 1.9% (2)          | 50.5% (54) | 3.7% (4)  | 11.2% (12) |                   |         |
| Sleep medicine    | 38.5% (35)    | 4.4% (4)          | 37.4% (34) | 2.2% (2)  | 17.6% (16) |                   |         |
The present study revealed that patients found providers and practices significantly easier to contact during the pandemic (Table 2). Office staff who have transitioned to a work-from-home format are more readily available to staff phonelines and respond to patient queries. Patients seen virtually do not have to be transported from waiting to examination rooms, improving the likelihood that providers remain on schedule and reducing a patient’s overall wait time. These findings are supported by numerous studies of patient satisfaction, both within and beyond otolaryngology, that laud decreased scheduling and day-of wait times as significant advantages of telemedicine. 

Though not explicitly recorded in our analyses, it follows logically that telemedicine eliminates significant commute times for patients, which can be up to several hours in each direction. Hence, the practice gap has been met with the rapid expansion of remote examination technologies. Smartphone attachments are now capable of enabling otoscopy or anterior rhinoscopy and capturing oropharyngeal images. Mobile technology has proven efficacious in tracking and improving functional outcomes of patients following septoplasty, functional endoscopic sinus surgery, and allergic rhinitis. A handheld device now allows otoscopic visualization and records heart and lung sounds at higher image and sound qualities than those produced by traditional otoscopes and stethoscopes. Though the daily utility and affordability of these technologies in a remote otolaryngology setting remains unelucidated, these new tools have garnered auspicious initial reviews.

Multivariate analysis revealed that provider type correlated significantly with positive telehealth experiences. Specifically, when controlling for age, sex, and race/ethnicity, patients seen by Rhinology, Head and Neck, and Laryngology providers were significantly more likely than those seen by generalists to report a strongly positive telehealth experience. This may be partially explained by the degree to which these visits routinely incorporate interventions, and the rapidity with which specialists responded to a shifting paradigm. A deluge of patients over the last year have sought rhinology consultation for anosmia resulting from COVID-19, the purported treatments for which may all be explained or prescribed virtually. Patients with allergic rhinitis or chronic sinusitis may be evaluated virtually.5 Patients with previously identified vocal pathologies, excluding those who have been seen in person the previous year. Telehealth patient satisfaction studies in other fields have reported similar dichotomous findings. The vast majority of patients who scheduled telehealth visits with otolaryngologists in 2020, however, did so because it was a necessity, and not necessarily because they perceived telemedicine as materially benefiting their quality of care under all circumstances. Accordingly, a patient’s satisfaction with their individual provider and gratitude for care received may not be commensurate with a desire for telehealth permanence.

Providers and patients agree that telemedicine, in its current form, is unable to entirely replace in-person interactions. While the classic model of patient care was defined by the in-person history and physical exam, little more than a cursory physical examination is possible during most telehealth visits. This limitation is magnified in a field such as otolaryngology, where endoscopic and microscopic exams are routine elements of a patient visit. One survey study performed last year found that nearly one-third of rhinology patients seen via telehealth felt that something was missed or left unaddressed in the absence of an in-person examination.

This practice gap has been met with the rapid expansion of remote examination technologies. Smartphone attachments are now capable of enabling otoscopy or anterior rhinoscopy and capturing oropharyngeal images. Mobile technology has proven efficacious in tracking and improving functional outcomes of patients following septoplasty, functional endoscopic sinus surgery, and allergic rhinitis. A handheld device now allows otoscopic visualization and records heart and lung sounds at higher image and sound qualities than those produced by traditional otoscopes and stethoscopes. Though the daily utility and affordability of these technologies in a remote otolaryngology setting remains unelucidated, these new tools have garnered auspicious initial reviews.

**Table 4. Predictors of Strongly Positive Telehealth Experiences.**

| Factor                  | Odds ratio | 95% confidence interval | P value |
|-------------------------|------------|-------------------------|---------|
| **Sex**                 |            |                         |         |
| Female                  | Ref        |                         |         |
| Male                    | 1.15       | 0.59-2.24               | .69     |
| **Age**                 |            |                         |         |
| 0-17                    | Ref        |                         | .69     |
| 18-34                   | 0.55       | 0.07-3.9                | .42     |
| 35-49                   | 0.55       | 0.07-3.9                | .42     |
| 50-64                   | 0.55       | 0.07-3.9                | .42     |
| 65-79                   | 0.55       | 0.07-3.9                | .42     |
| 80+                     | 0.55       | 0.07-3.9                | .42     |
| **Race/Ethnicity**      |            |                         |         |
| White                   | Ref        |                         |         |
| Black or African American| 1.01     | 0.25-4.36               | .99     |
| Hispanic or Latino      | 189.526561.69 | 0.1 |         |
| Asian                   | 0.76       | 0.07-8.52               | .82     |
| Unknown                 | 1.92       | 0.51-2.05               | .95     |
| **Subspecialty seen**   |            |                         |         |
| General                 | Ref        |                         |         |
| Facial Plastics         | 1.00       | 0.24-4.19               | 1.00    |
| Head and Neck           | 4.13       | 1.52-11.26              | .005    |
| Laryngology             | 5.96       | 1.51-23.50              | .01     |
| Otology                 | 1.17       | 0.31-4.51               | .82     |
| Pediatric ENT           | 5.41       | 0.1                     |         |
| Rhinology               | 4.02       | 1.55-10.43              | .004    |
| Sleep Medicine          | 1.45       | 0.48-4.43               | .51     |
allowing new patients to initiate voice therapy prior to stroboscopic evaluation. These factors may all contribute to a laryngology patient’s improved telehealth experience.

The link between telehealth and improved patient experience in head and neck surgery has been previously described. One randomized control trial found that head and neck cancer patients who were monitored via telehealth reported significantly improved symptom burdens and quality of life scores when compared to those monitored through standard-of-care in-person appointments. Head and neck cancer often requires a multidisciplinary approach with consultations from numerous specialties. Allowing many of these to proceed via virtual means, in addition to a shorter scheduling latency, may provide substantial comfort to patients feeling overwhelmed by their diagnosis.

These particular findings should be taken as preliminary, however, as they may be limited in their generalizability. Some subspecialized otolaryngologists still see a small portion of patients whose primary otolaryngologic symptoms lie outside the confines of their subspecialty. Lower numbers of Press Ganey responses for individual providers may additionally skew results. Regardless, our data illustrate that a greater proportion of virtual visits in 2020 occurred with subspecialists than in 2019, perhaps suggesting that patients with specific and complex problems requiring subspecialty care are more likely to readily engage with telehealth. Further investigation into the nuances of telehealth preferences across otolaryngology subspecialties is warranted.

Our study is limited by several factors. First, data are based on voluntary patient responses, and are therefore subject to sampling bias, heightened by low response rates (approximately 4% in 2019 and 1% in 2020). In addition, the 2020 telehealth satisfaction survey administered by the department did not ask whether respondents identified as Hispanic or Latino, which precluded us from assessing those specifically identifying with this ethnic group in 2020. Nonetheless, the combined race/ethnicity variable was found to be highly uncorrelated with patient responses, suggesting that this difference did not meaningfully impact results. Due in large part to lower patient volume during COVID’s peak, our sample for 2020 telehealth visits was significantly smaller than for in-person visits in 2019. Additionally, patients seen in 2019 were given the option of completing their survey in person, while those seen remotely were only offered an emailed survey. This difference may also have contributed to a lower capture rate of responses in 2020 when compared to 2019. This likely means that our ability to comment on divisional differences was underpowered. As patient satisfaction data was deidentified, we were unable to retroactively link patient responses with insurance type, a variable often used as a proxy for socioeconomic status. This demographic variable may modulate patient satisfaction levels, perhaps to a greater degree in a telehealth setting, as computer and internet speed significantly affect the quality and quantity of virtual visits.

Conclusion

The present analyses demonstrated that patients seen via telehealth during COVID-19 experienced levels of satisfaction similar to those seen in-office the year prior. Telehealth satisfaction levels, however, are contextualized within the expected confines of a pandemic. Future studies should address and seek to mitigate barriers to telehealth accessibility such as socioeconomic status, age, or health literacy, as well as those exclusive to specific otolaryngology subspecialties. Sophisticated remote examination technology represents the next frontier and must be incorporated in order for telemedicine’s full value within otolaryngology to be realized.

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ORCID iD

Annie E. Arrighi-Allisan https://orcid.org/0000-0002-1686-6963

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