

# Initial Patient Satisfaction With Telemedicine in Neurosurgery Outpatient Clinic During the Early COVID-19 Pandemic

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**BACKGROUND:** Throughout the COVID-19 pandemic, the medical community has been saturated by the necessity for telemedicine, or “telehealth”, appointments. With limited prior exposure, the many challenges that accompany telehealth visits have affected how physicians conduct daily tasks and how patients perceive healthcare experiences. In the early stages of the COVID-19 pandemic, telemedicine was new to most neurosurgical patients. This study seeks to evaluate the overall neurosurgical patient experience with telemedicine.

**OBJECTIVE:** To assess overall neurosurgical patient satisfaction with telemedicine to build an understanding of the effectiveness of these encounters for future planning.

**METHODS:** After a telemedicine appointment, patients received an electronic survey. Survey questions focused on demographic information, encounter type, medical history questions, and overall satisfaction with telemedicine. Responses for the survey questions were formulated using a 5-point Likert scale.

**RESULTS:** Two hundred seventy patients were seen via telemedicine by 1 of 4 providers included in this study. 43 patients returned the surveys, with a completion rate of 16%. Patients indicated higher scores for overall satisfaction and quality of appointment. Of note, 23% of participants responded that they would be willing to pay out of pocket for a telemedicine appointment, while 77% responded they would not be willing to pay out of pocket.

**CONCLUSION:** Our survey results show patients felt comfortable discussing healthcare issues using telehealth, that appropriate levels of care were received, and they would be willing to use telehealth again. Future efforts will be necessary to educate providers and patients about the utilization of technological devices, ensure patient access to telehealth, and standardize ethical guidelines.

**KEY WORDS:** Telemedicine, Neurosurgery, Patient satisfaction, COVID-19 pandemic

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Over the course of the COVID-19 pandemic, in an effort to comply with social distancing precautions, the medical community has been galvanized by the necessity for telemedicine, also known as “telehealth,” patient appointments. The unique challenges that accompany telehealth visits have affected not only the ways in which physicians conduct their daily tasks, but also how patients perceive their satisfaction with and opinions of their overall healthcare experience. In the early stages of the COVID-19 pandemic, telemedicine was new to most

neurosurgical patients. Thus, we conducted a survey during that time to understand patients’ initial impressions of this modality and to survey and assess overall neurosurgical patient satisfaction with telemedicine appointments to build an understanding of the effectiveness of these encounters for future planning.

## METHODS

Patients were eligible for this study if they were seen at our institution via telemedicine between March and August of 2020, the first several months of the COVID-19 pandemic in the United States. Patients seen

**ABBREVIATION:** PHE, public health emergency.

by 4 neurosurgeons at our institution were included in the study, representing tumor, functional, spine, and vascular subspecialties of neurosurgery. Patients younger than 18 years were excluded. Telemedicine appointments were conducted by accessing a video chat directly through the Epic interface. After their telemedicine appointment, patients were verbally asked if they would like to participate in a brief electronic survey. If the patients provided verbal consent, a survey link was sent to each patient. The survey questions included demographic, encounter type, and medical history questions. The telemedicine satisfaction survey was also included to assess satisfaction with telemedicine. This used a 5-point Likert scale (1-strongly disagree, 5-strongly agree). Patient satisfaction with the provider was also assessed and included a “likelihood to recommend” score, which also used a 5-point Likert scale (1-very poor, 5-very good). We also included a yes or no question regarding participants’ willingness to pay out of pocket for telemedicine if insurance did not cover the encounter. Anonymized survey responses were compiled and analyzed using Excel 2016 (Microsoft). For survey questions involving a Likert scale, mean, minimum, and maximum scores were calculated. This study was approved by our institutional review board.

## RESULTS

### Demographics and Visit Type

Over the course of our study, 270 patients were seen via telemedicine by 1 of the 4 attending neurosurgeons included in the study, all from varying specialty clinics. These patients were sent a link to our survey via their preferred email address. 43 patients returned the surveys, with a completion rate of 16%. Of

these patients, the mean age was  $62.8 \pm 13$  years (range 34-85 years). Sixty-five percent of the respondents were female. New patients and return patients made up 14% (6 patients) and 86% (37 patients) of survey participants, respectively. The neurosurgical subspecialty of the provider conducting the telemedicine encounter included 35% for spine, 23% for vascular, 14% for tumor, and 28% for functional. 58% of patients had previously undergone surgery with their provider, whereas 42% had not. Of those who had previously undergone surgery with their provider, 17% had surgery within the past 3 months, 30% had surgery between 3 and 6 months before the appointment, and 52% had surgery more than 6 months before. Had the participants traveled to reach the appointment in person, 12% would have traveled fewer than 15 miles, 16% would have traveled 15 to 30 miles, and 72% would have traveled more than 30 miles. Patients were not surveyed on whether or not they had used telemedicine before this appointment.

### Telemedicine Satisfaction Survey

The results of the telemedicine satisfaction survey are summarized in Table 1. The survey used questions with a 5-point Likert scale (1-strongly disagree, 5-strongly agree).

### Patient Satisfaction

The results of the patient satisfaction survey are summarized in Table 2. The survey used a 5-point Likert scale (1-very poor, 5-very good).

**TABLE 1. Overall Telemedicine Satisfaction Survey Results**

Telemedicine satisfaction	Mean $\pm$ SD	Maximum	Minimum
I could easily talk to my healthcare provider during the visit	4.53 $\pm$ 0.77	5	1
I could hear my healthcare provider clearly during the visit	4.3 $\pm$ 1.21	5	1
My healthcare provider is able to understand my current healthcare conditions	4.49 $\pm$ 0.94	5	1
I do not need assistance using the system	4.35 $\pm$ 1	5	1
I feel comfortable communicating with my healthcare provider via telemedicine	4.3 $\pm$ 0.96	5	1
I think the health care provided via telemedicine is consistent	3.98 $\pm$ 1.08	5	1
I am able to better access healthcare services by using telemedicine	3.72 $\pm$ 1.1	5	1
Telemedicine saves me time that I would otherwise have to spend traveling to a hospital or specialist clinic	4.47 $\pm$ 0.83	5	1
I did not receive adequate attention during my telemedicine visit	1.51 $\pm$ 0.86	5	1
Telemedicine provides for my healthcare needs	3.72 $\pm$ 1.08	5	1
I find telemedicine to be an acceptable way to receive healthcare services	3.86 $\pm$ 1.01	5	1
I will use telemedicine services again	4.21 $\pm$ 0.89	5	2
Overall, I am satisfied with the quality of service being provided via telemedicine	4.26 $\pm$ 0.85	5	2

Telemedicine satisfaction survey: The results of the telemedicine satisfaction survey are summarized in this table. The survey used questions with a 5-point Likert scale (1-strongly disagree, 5-strongly agree).

**TABLE 2. Patient Satisfaction Survey Results**

Patient satisfaction	Mean $\pm$ SD	Maximum	Minimum
Please rate the friendliness/courtesy of the healthcare provider	4.91 $\pm$ 0.29	5	4
Please rate the explanations the care provider gave you about your problem or condition	4.67 $\pm$ 0.64	5	3
Please rate the concern the provider showed for your questions or worries	4.65 $\pm$ 0.65	5	2
Please rate the care provider's efforts to include you in decisions about your treatment	4.6 $\pm$ 0.76	5	2
Please rate the amount of time the care provider spent with you	4.58 $\pm$ 0.66	5	3
Please rate your overall confidence in this care provider	4.79 $\pm$ 0.47	5	3
Please rate your likelihood of recommending this care provider to others	4.74 $\pm$ 0.54	5	3

Patient satisfaction: The results of the patient satisfaction survey are summarized in this table. The survey used a 5-point Likert scale (1-very poor, 5-very good).

The final question in our survey was, “If your insurance does not cover a telemedicine visit, would you be willing to pay out of pocket for this option?” Of the participants surveyed, 23% responded that they would be willing to pay out of pocket, while 77% responded they would not be willing to pay out of pocket.

## DISCUSSION

By definition, telemedicine is the practice of medicine using technology to deliver care when the patient and the provider are in different physical locations. Telemedicine patient appointments can be conducted over the phone or using a real-time audiovisual connection using a desktop computer, laptop, tablet, or smartphone. The modality used is typically based on the ability to access the required technology by both the patient and the provider. At the beginning of each encounter, it is necessary that the provider verifies the identity of the contacted patient, establishes if this is an appropriate time to converse, discusses who might be present beside the patient during the appointment, and discloses if the provider is accompanied by anyone else, such as another provider, resident physician, scribe, or medical student.

This survey was conducted during the first months of the COVID-19 pandemic in the United States. This was a particularly interesting time period to study because outpatient visits rapidly shifted from in-person to telemedicine, with the majority of neurosurgeons and patients having little prior familiarity with these visits.

The results of our survey overall show high rates of patient satisfaction with telemedicine appointments during this time. Most patients stated that they either agreed or strongly agreed to feeling comfortable discussing healthcare issues using telemedicine. Moreover, most patients felt appropriately cared for, with their concerns adequately addressed. Most patients expressed a willingness to use telehealth services again. Our survey demographics also demonstrated that our patient population would have experienced significant travel times to appointments in the

absence of telemedicine, with 72% noting they would have traveled 30 miles or more for an in-person appointment. Despite the travel savings of the telemedicine visit, the survey scores for whether patients believed telemedicine improved access were somewhat lower. Moreover, scores on the questions pertaining to technical quality of the telemedicine platform and the patients' ability to use the platform included several very low scores (even if the average response was excellent). Given this, it may be that the lower access scores are due to patients' and providers' difficulties with the telemedicine platforms during these first few months of regular use.

Interestingly, patients rated telemedicine lower on questions regarding consistency of care and whether they thought the telemedicine visit adequately provided their needs. This suggests that, while patients were comfortable engaging with providers using telemedicine services, there existed certain barriers to care with these modalities at that time. These barriers may have included patient understanding of the required technology (computer, smartphone in general, required apps, and websites) and patient access to both a stable internet/Wi-Fi connection with sufficient bandwidth and transmission speed.<sup>1,2</sup> Thus, it became apparent that appropriate patient education on how to participate in a telemedicine appointment is crucial to the success of this enterprise. Moreover, the increase in telemedicine during the COVID-19 pandemic has revealed the extent of patients' access to an adequate phone or other electronic device for telemedicine.<sup>3</sup> In addition, there is literature to suggest that providers not familiar with certain technological devices could benefit from education on telemedicine encounters as well.<sup>4,5</sup>

Another key concern when considering the utilization of telemedicine services is the perception by the patient of the overall quality of care provided without a face-to-face interaction. Lower average survey scores were noted for the following statements, “Telemedicine provides for my healthcare needs” and “I think the health care provided through telemedicine is consistent.” Importantly, when asked if participants would be willing to pay out of pocket for telemedicine services if not covered by insurance,

77% of participants indicated they would not be willing to pay for the telemedicine encounter. This is a key statement because, before the COVID-19 pandemic, telemedicine services were either not covered at all by many third-party insurance plans, or covered only under certain specific scenarios, such as the coverage previously provided by Medicare.<sup>6</sup> During the COVID-19 pandemic, wider access to telemedicine coverage has been allowed under the conditions of the public health emergency (PHE).<sup>7</sup> However, the coverage policies for telemedicine once the PHE subsidies are uncertain at this time. Based on these results, there was an evident trend early in the COVID-19 pandemic that overall patient satisfaction and perception of quality of care may have been lower for telemedicine visits vs in-person patient visits. This suggests the emphasis patients may place on the value of an appointment type, assuring that they feel they receive the value of their invested healthcare dollars, when funds come directly from the patient themselves instead of an insurance company. Further data could be collected to determine if these trends have persisted now that the COVID-19 pandemic is 2 years old.

### Limitations

There were a few limitations of our overall study. Only 43 of 270 surveyed patients finished the survey, for a completion rate of 16%. This represents a small sample size overall and is significant when extrapolating data trends. The reasoning behind this small survey return rate can be theorized to be due to lack of incentive for survey participation, technological difficulties, and inability to locate the email with the survey link, but the exact cause is unknown. Furthermore, survey participants represented the patients of only 4 neurosurgeons from our institution. The 4 participating neurosurgeons represented subspecialties of neurosurgery including tumor, functional, spine, and vascular. It is unknown if significant changes in our overall data results would occur with additional neurosurgeons' participation, perhaps because of varying differences between the interactions of neurosurgeons and their patient populations. In addition, the 4 participating neurosurgeons did not complete surveys indicating their perception and opinions of the utilization of telemedicine for patient appointments, which could be explored in a future study.

Other considerations include factors that could affect patient satisfaction scores in survey results. The implications of how the diagnosis being discussed, an acute vs chronic problem, and distance a patient would travel for an appointment would affect survey scores were not explored in this particular study. In addition to increasing study sample size, future research endeavors could be conducted to understand the relationship between patient satisfaction rates and survey scores when considering different variables.

Although our survey was not intended to address this issue, the expanded availability of telemedicine during the PHE has led many patients to favor telemedicine instead of making the journey to an in-person appointment to save time and expense. Neurosurgeons are still in the process of determining which visits can be effectively conducted via telemedicine and which require face-to-face

encounters for an appropriate opinion. It remains to be seen how much agreement exists on these questions between neurosurgeons and their patients.

Finally, while there are significant possibilities for the increased use of telemedicine services to expand access to health care, an emerging concern accompanying this expansion surrounds the regulation of such encounters. Several studies conducted during the COVID-19 pandemic evaluating different aspects of telemedicine services note a necessity for stricter regulations and guidelines as well as continued concerns about how to ensure patient confidentiality on both the part of the provider and on the part of the patient.<sup>8-10</sup> Unless consistency can be ensured for how each encounter is conducted, what documentation is required, and who is actually present on both ends of the encounter, there exists a pertinent need for further research into telemedicine guidelines.

## CONCLUSION

The results of our survey overall provided trends of positive opinions from patients regarding the use of telemedicine appointments for patients in an outpatient neurosurgical setting. Overall, patients felt comfortable discussing healthcare issues using telemedicine appointments, felt appropriate levels of care were received, and that they would be willing to use telehealth services again. However, to successfully integrate telemedicine encounters into common practice, a heightened effort will be necessary to educate providers and patients about the utilization of technological devices, ensure patient access to telehealth modalities, and standardize ethical guidelines on telemedicine consultations.

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### Disclosures

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## COMMENTS

**T**he authors have done a nice analysis and review of their preliminary experience with telemedicine in their neurosurgery outpatient clinics during the early part of the COVID-19 pandemic. Their findings relating to patient satisfaction are intriguing and offer opportunities for further exploration and improvement. The authors saw 270 patients via telemedicine, yet their survey completion rate was only 16%. This makes it difficult to draw any solid conclusions from the 43 responses. Nonetheless, the authors found that overall satisfaction over the quality of the appointment was good. The willingness to pay for possible out-of-pocket telemedicine visits was only 23%. The authors discuss possible reasons for this low rate but felt that a large number of the patients still value the face-to-face traditional visits and examinations.

The use of telemedicine in neurosurgery dates back to the 1990s. However, its adoption and implementation were slow because of the need to overcome regulatory, HIPPA, billing, and technological issues. The COVID-19 pandemic “fast-tracked” the resolution of many of these issues. Recent advances in technology and the integration into the EPIC platform in particular makes this widely available for neurosurgeons and their patients. The authors utilized the EPIC system in their study. We used this routinely at our institution for our neurosurgery telemedicine evaluations during the early part of COVID-19 and continue to offer this to patients. It is surprising the number of patients that continue to request this. We have found in our experience that patients who favor this are those who live at a distance or have mobility difficulties. This is similar to the

findings of this paper. What was not used in this paper is the “share screen” option of EPIC that allows us to show the patients the MRI/CT findings and point out the pertinent findings. Patients and their families find this very valuable. This may help to increase their affinity to this option.

Telemedicine appears to be here to stay. This paper helps to set the groundwork for how we can best utilize it in neurosurgery outpatient visits and delivery safe evaluations and generate good patient satisfaction.

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**T**his article is an initial attempt to evaluate the overall neurosurgical patient experience with telemedicine. It is important as an initial contribution but also to because it raises questions on how and what to evaluate with regard to patient experience. It is significantly limited by size with only 43 patients responding between 4 neurological surgeons with 4 different subspecialties: tumor, vascular, spine, and functional. It is noteworthy and provocative that in this patient population, 77% would not pay for this service out of pocket. It raises the question of why? Do patients not perceive the same value in telemedicine that they do with on-site visits a general change in the mindset toward privilege vs right for healthcare in medicine. As this is a fundamental entry into this topic, it suggests a number of future considerations to survey including: difference between subspecialty care; difference in new vs subacute, vs long-term follow-up care within those subspecialties; differences in the acuity of problem (new brain tumor vs chronic back pain); and the effect of travel time and distance on satisfaction. Finally, to make these types of studies have a 360° impact, I believe the surgeons should be quivered on how satisfied they are with these types of patient interactions.

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