Change in Ophthalmic Clinicians' Attitudes Toward Telemedicine During the Coronavirus 2019 Pandemic

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Abstract

Background: *Ophthalmic clinicians report low confidence in telemedicine-based eye care delivery, but it may have changed given its rapid expansion during the coronavirus 2019 (COVID-19) pandemic.*

Introduction: *The purpose of this study was to determine clinician confidence in telemedicine-based eye care services during COVID-19.*

Materials and Methods: *An electronic survey was sent to clinicians at University of Michigan Kellogg Eye Center (April 17, 2020–May 6, 2020) when nonemergent in-person visits and procedures were restricted. The primary outcome was clinician confidence in using telemedicine-based eye care during COVID-19. Secondary outcomes included telemedicine utilization and its association with clinician confidence using Fisher's exact test.*

Results: *Of the 88 respondents (90.7% response rate;* n = *97 total), 83.0% (*n = *73) were ophthalmologists and 17.0% (*n = *15) were optometrists. Telemedicine utilization increased from 30.7% (*n = *27) before the pandemic to 86.2% (*n = *75) after the pandemic. Clinicians' confidence in their ability to use telemedicine varied with 28.6% (24/84) feeling confident/extremely confident, 38.1% (32/84) somewhat confident, and 33.3% (28/84) not-at-all confident. Most felt that telemedicine was underutilized (62.1%; 54/87) and planned continued use over the next year (59.8%; 52/87). Confident respondents were more likely to have performed three or more telemedicine visits (*p = *0.003), to believe telemedicine was underutilized (*p < *0.001), and to anticipate continued use of telemedicine (*p = *0.009). Clinician confidence was associated with telemedicine visit volume and intention to continue using telemedicine.*

Conclusions: *Policies that foster clinician confidence will be important to sustain telemedicine-based eye care delivery.*

Keywords: *telemedicine, e-health, pandemic telehealth, ophthalmology*

Introduction

In March 2020, 25 states across the United States restricted nonemergent in-person medical appointments and procedures in response to the coronavirus 2019 (COVID-19) outbreak.[1] Visits to ophthalmologists dropped by 80%[2] and telemedicine became the only way many clinicians were able to deliver eye care to their patients.[3] In a pre-COVID-19 survey of ophthalmic clinicians' attitudes toward telemedicine for eye care delivery, 70% of respondents did not use telemedicine and 60% were not confident in their ability to effectively manage eye-related disease outside of a traditional office-based encounter.[4] However, it remains unclear how clinicians' attitudes toward telemedicine-based eye care changed during the COVID-19 pandemic, when mandated to modify practices.

The purpose of our study was to evaluate ophthalmic clinicians' confidence about telemedicine-based eye care delivery during the COVID-19 pandemic. Our study was carried out at a tertiary referral center in Michigan, a state with state government mandated restriction on nonemergent in-person eye care starting in March 2020. These data are crucial for informing the implementation of sustainable telemedicine-based eye care delivery.

Materials and Methods

STANDARD PROTOCOL APPROVALS, REGISTRATIONS, AND PATIENT CONSENT

The study was reviewed by the University of Michigan Institutional Review Board and determined to be exempt.

STUDY POPULATION

All clinical ophthalmologists, optometrists, and clinical ophthalmology fellows at the University of Michigan were sent an electronic survey through e-mail. Three e-mails were

sent to all clinicians from April 17, 2020, to May 6, 2020. During this time, all nonemergent clinical visits and procedures were restricted. Clinicians completed the survey once, even if practice patterns changed over the survey period.

SURVEY INSTRUMENT

The survey was adapted from a prior survey of clinician attitudes regarding telemedicine readiness[4,5] (*Supplementary Methods S1*). It included questions about duration of clinical practice, telemedicine utilization, confidence in using telemedicine to manage eye diseases, and likelihood of continued telemedicine use.

STATISTICAL ANALYSIS

Frequencies summarized respondent characteristics and responses. Confidence was collapsed into three categories: extremely confident/confident, somewhat confident, and not-at-all confident. Telemedicine use during COVID-19 was collapsed into two categories: "≥3 times" and "<3 times" based on the reported number of telemedicine visits. Associations between confidence and years in practice, telemedicine utilization (past, present), and ongoing use were assessed using two-sided Fisher's exact tests to compare proportions. $p < 0.05$ was considered statistically significant. Analyses were performed with R version 3.6.2 software (R Foundation for Statistical Computing, Vienna, Austria).

Results

Of the 97 clinicians contacted, 88 responded (response rate = 90.7%). Respondents were representative of the department clinicians (*Supplementary Table S1*). Most (83.0%, $n = 73$) were ophthalmologists and years in practice ranged from 28.7% ($n = 25$) for <5 years to 41.4% ($n = 36$) for >15 years. All major subspecialties were represented (*Table 1*).

Table 1. Composition of Respondents to the Survey

	TOTAL, NO. (%)
Clinical position	$N = 88$
Ophthalmologist or clinical ophthalmology fellow	73 (83.0)
Optometrist	15 (17.0)
Years in practice	$N = 87$
<5 years	25 (28.7)
>5–10 years	21 (24.1)
>10–15 years	5 (5.7)
>15 years	36 (41.4)
Ophthalmology subspecialty	$N = 88$
Cornea	10 (11.4)
General ophthalmology	17 (19.3)
Glaucoma/neuro-ophthalmology	13 (14.8)
Oculoplastics	3 (3.4)
Pediatrics	8 (9.1)
Vision care/contact lens/optometry	14 (15.9)
Retina	23 (26.1)

Most respondents (69.3%, $n = 61$) indicated that they never used telemedicine services before COVID-19 compared with only 13.8% ($n = 12$) never using telemedicine during the pandemic (*Table 2*). Among those who provided telemedicine services before COVID-19, most (58.9%; 14/21) performed telephone visits. After the pandemic began, telephone visits were also most common (79.3%; 69/87) followed by interprofessional consultations (37.5%; 33/88) and video visits (34.1%; 30/88).

After COVID-19 began, 28.6% (24/84) of clinicians felt confident/extremely confident in their ability to use telemedicine to deliver eye care compared with 38.1% ($n = 32$) and 33.3% ($n = 28$) who felt somewhat or not-at-all confident. A majority (66.2%) ($n = 45$) of ophthalmologists and 71.4% ($n = 10$) of optometrists felt at least somewhat confident. Most clinicians believed they would continue to provide telemedicine services for the next year (59.8%; 52/87) and felt that telemedicine was still underutilized for eye care delivery (62.1%; 54/87). Bivariate comparisons of clinician confidence and telemedicine utilization are given in *Table 3*.

Discussion

In this study of ophthalmic clinician attitudes about telemedicine utilization during the COVID-19 pandemic, a similar proportion of clinicians felt confident/extremely confident (28.6%) compared with not confident at all (33.3%) in their ability to use telemedicine to deliver eye care remotely. This represents an increase compared with the 2013 survey of the same practice, in which 60% of clinicians were not confident.[4] The rise in confidence is likely explained by a number of factors such as the rapid increase in telemedicine utilization during the pandemic, expanded reimbursement for telemedicine services, and the slow increase in telemedicine acceptance for the past 7 years. Telemedicine utilization has increased greatly between 2013 and 2020, with 30% of clinicians reporting use in 2013 and just

Table 2. Self-Reported Telemedicine Utilization and Attitudes

SURVEY QUESTIONS	TOTAL, NO. (%)
Before the coronavirus epidemic, did you provide any of the following telemedicine services?	*N* = 88
None	61 (69.3)
Interprofessional e-consultations	3 (3.4)
Phone visits	14 (15.9)
Phone visits, interprofessional e-consultations	6 (6.8)
Phone visits, video visits	3 (3.4)
Phone visits, video visits, interprofessional e-consultations	1 (1.1)
Since the coronavirus epidemic began, how many times have you conducted video visits with patients?	*N* = 87
Never	57 (65.5)
1–2 times	17 (19.5)
3–10 times	13 (14.9)
Since the coronavirus epidemic began, how many times have you conducted phone visits with patients?	*N* = 87
Never	18 (20.7)
1–2 times	12 (13.8)
3–10 times	29 (33.3)
>10 times	28 (32.2)
Since the coronavirus epidemic began, how many times have you conducted consults with other health care providers that included photographs or videos provided in person, through e-mail, or online?	*N* = 88
Never	55 (62.5)
1–2 times	18 (20.5)
3–10 times	14 (15.9)
>10 times	1 (1.1)
Based on your experience with telemedicine since the coronavirus epidemic began, how would you describe your confidence in using remote screening for eye care?	*N* = 84
Extremely confident	5 (6.0)
Confident	19 (22.6)
Somewhat confident	32 (38.1)
Not at all confident	28 (33.3)
Since the coronavirus epidemic began, how do you feel about telemedicine utilization in ophthalmology?	*N* = 87
Highly underutilized	15 (17.2)
Somewhat underutilized	39 (44.8)
Utilized appropriately	22 (25.3)
Somewhat overutilized	10 (11.5)
Highly overutilized	1 (1.1)
How likely are you to continue to provide eye telemedicine services (video visits, phone visits, e-consultations) for the next 1 year?	*N* = 87
Likely	31 (35.6)
Somewhat likely	21 (24.1)
Unsure	11 (12.6)
Somewhat unlikely	11 (12.6)
Unlikely	13 (14.9)

before the pandemic versus 80% utilization once the pandemic began. Higher confidence was significantly associated with higher utilization. Our findings suggest that although clinicians may not initially feel confident in delivering eye care through telemedicine, practice and exposure likely boost confidence.

Clinicians' confidence appears necessary to sustain telemedicine-based eye care delivery. Confident clinicians were significantly more willing to continue telemedicine for the next year and see opportunities for expansion. Acceptance and willingness to use telemedicine have been key to building sustainable systems in studies of specialty care delivery.[6,7] Therefore, understanding and supporting clinician confidence will be critical as health systems and individual practices transition from rapid implementation to long-term care.

This study has limitations. First, academic ophthalmic clinicians at a single institution were surveyed, so data may not be generalizable to those in other care settings. Second, we did not use a validated survey instrument, as none exist. However, our survey was based on prior work, so responses could be compared with clinician attitudes about telemedicine before COVID-19. Third, confidence is a complex construct without a specific definition and, therefore, could have been variably interpreted by respondents. Fourth, the eye care delivered during the early days of the pandemic may have been viewed

Table 3. Association Between Ophthalmic Clinicians' Confidence and Telemedicine Utilization (Past, Present, Future)

	EXTREMELY CONFIDENT/CONFIDENT *N*=24 (%)	SOMEWHAT CONFIDENT *N*=32 (%)	NOT AT ALL CONFIDENT *N*=28 (%)	*p* Value[a]
Since the coronavirus epidemic began, how do you feel about telemedicine utilization in ophthalmology?				
Highly overutilized	0 (0.0)	0 (0.0)	1 (100.0)	<0.001
Somewhat overutilized	1 (10.0)	1 (10.0)	8 (80.0)	
Utilized appropriately	4 (19.0)	7 (33.3)	10 (47.6)	
Somewhat underutilized	13 (34.2)	21 (55.3)	4 (10.5)	
Highly underutilized	6 (42.9)	3 (21.4)	5 (35.7)	
How likely are you to continue to provide eye telemedicine services (video visits, phone visits, e-consultations) for the next one year?				
Likely	12 (38.7)	15 (48.4)	4 (12.9)	0.009
Somewhat likely	7 (33.3)	8 (38.1)	6 (28.6)	
Unsure	3 (33.3)	3 (33.3)	3 (33.3)	
Somewhat unlikely	2 (20.0)	3 (30.0)	5 (50.0)	
Unlikely	0 (0.0)	3 (23.1)	10 (76.9)	
Telemedicine services used before the coronavirus pandemic				
No	14 (24.6)	22 (38.6)	21 (36.8)	0.467
Yes	10 (37.0)	10 (37.0)	7 (25.9)	
Telemedicine services use during the coronavirus pandemic				
<3 Times for all telemedicine categories	2 (8.3)	8 (33.3)	14 (58.3)	0.003
≥3 Times for any one of the telemedicine categories	22 (36.7)	24 (40.0)	14 (23.3)	

[a]Two-sided Fisher's exact test.

by clinicians as only temporary and, thus, acceptable, until an in-person examination could take place. Clinicians' attitudes may change as telemedicine-based eye care systems are established and barriers arise.[8,9]

Conclusions

The COVID-19 pandemic has driven increased telemedicine utilization in most fields of medicine, including eye care.[10–13] Telemedicine strategies that support optimal care of patients, balancing clinical needs, and patient safety in and after the pandemic will be those that gain the most support and confidence of clinicians.

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Dr. Woodward and Dr. De Lott had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Supplementary Material

Supplementary Methods S1
Supplementary Table S1

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