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Implementing Telemedicine Visits in an Underserved Ophthalmology Clinic in the COVID-19 Era

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Abstract

Introduction: Many of the potential barriers to providing telehealth services already disproportionately impact vulnerable populations. The purpose of this study was to assess the incorporation of synchronous ophthalmology telemedicine visits in a tertiary university-based ophthalmology clinic for low-income and uninsured patients in the COVID-19 era. **Methods:** The records of 18 patients who were due for an in-person visit in the medically underserved patient clinic at our institute were reviewed. Patients considered high risk of ocular morbidity progression were approved to proceed with an in-person visit. Patients with non-urgent visit indications were attempted to be contacted by telephone to be offered a telemedicine telephone visit as an alternative to a postponed in-person office visit. **Results:** Clinical triage by an attending ophthalmologist determined that 17 patients (94.4%, n = 18) had visit indications appropriate for evaluation by telemedicine. Six patients (35.3%, n = 17) were successfully contacted and offered a telemedicine visit as an alternative to a postponed in-person office visit. All 6 patients accepted, scheduled, and completed a telemedicine visit. Eleven patients (64.7%, n = 17) were not able to be successfully contacted to offer and schedule either a telemedicine visit or a postponed in-person office visit. Patients who were not able to be successfully contacted were on average younger in age and more likely to be female, Hispanic/Latino, from Latin America, with a preferred language of Spanish. **Conclusions:** Synchronous ophthalmology telemedicine visits can be successfully incorporated in a tertiary university-based setting for low-income and uninsured patients. The primary barrier to providing telemedicine visits in this population was the ability to successfully contact patients to offer and schedule these visits.

Keywords

telemedicine, telehealth, underserved, uninsured, ophthalmology, COVID-19

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Introduction

The coronavirus 2019 (COVID-19) pandemic has resulted in drastic changes in the delivery of medical care in an effort to minimize transmission of SARS-CoV-2. In the month following declaration of the pandemic, telehealth visits increased 300-fold compared to the same time frame in 2019.[1] However, as healthcare delivery continues to evolve and the role of telehealth is further defined, consideration must be taken to ensure that health disparities are not further widened during this period of transition.

Telehealth has been envisioned as a method to minimize health disparities by increasing access to care. However, level of digital literacy, access to broadband internet and modern technology, and language barriers may limit the ability to utilize telehealth.[2] Many of these potential barriers already disproportionately impact vulnerable populations. Adults with limited digital literacy are more likely to be older in age, less educated, Black or Hispanic, foreign-born, and have limited English proficiency.[3,4] Some studies have already demonstrated a decrease in the proportion of visits

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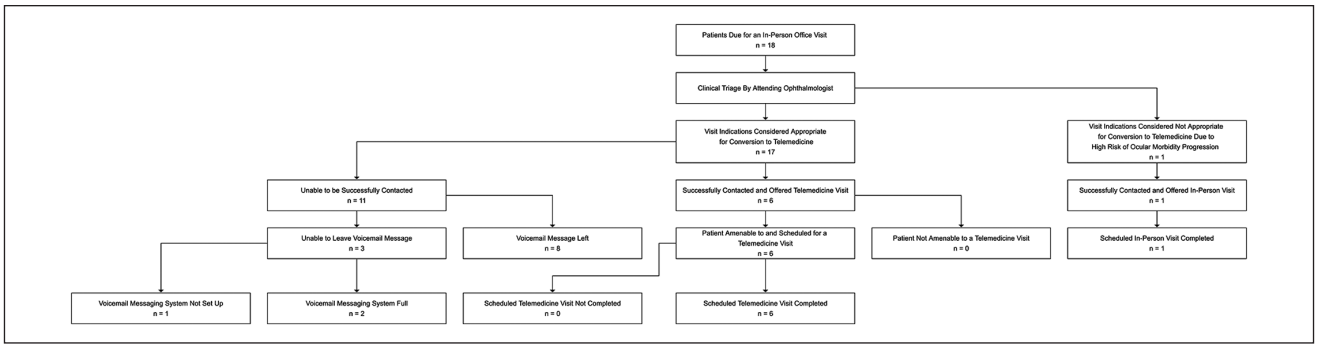

Figure 1. Flow diagram demonstrating the triage process for the medically underserved patient clinic. A total of 18 patient visits required triage due to the coronavirus 2019 pandemic. Six visits were successfully completed as telemedicine visits.

with these vulnerable populations since the implementation of telemedicine services during the pandemic.[5]

It is therefore critical to study these populations in the context of providing telemedicine services. Our tertiary university-based ophthalmology department has an underserved patient clinic designed to see referrals of low-income and uninsured patients from community organizations. Due to COVID-19, all non-urgent patient visits in our department were rescheduled or converted to telemedicine visits using the guidelines established by the American Academy of Ophthalmology telemedicine task force.[6] The medically underserved patient clinic, similarly to our other scheduled clinics, was forced to adapt and find alternative methods to provide appropriate care during this period. The purpose of this study was to assess the incorporation of synchronous ophthalmology telemedicine visits in our tertiary university-based ophthalmology clinic for low-income and uninsured patients in the COVID-19 era.

Methods

Study Participants

The records of 18 patients who were due for an in-person visit in our tertiary university-based ophthalmology clinic for low-income and uninsured patients were retrospectively reviewed. This descriptive cross-sectional study followed the tenets of the Declaration of Helsinki and was deemed exempt from Institutional Review Board (IRB) review. Patients of all ages who were due for an in-person visit between 01 March 2020 and 01 June 2020 in the medically underserved patient ophthalmology clinic were included in this retrospective review.

New and established patients were triaged via review of medical records by an attending ophthalmologist. Patients with high risk of ocular morbidity progression were approved to proceed with an in-person visit. Patients with non-urgent visit indications were considered appropriate to be offered a telemedicine telephone visit as an alternative to a postponed in-person office visit. All patients were attempted to be contacted by telephone to arrange their visits, using either the telephone number within the referral documentation or the telephone number in the electronic medical record for new and established patients, respectively. A minimum of 3 attempts was made to contact each patient. If unable to be contacted by telephone, a voicemail message was left when able.

Study Parameters and Data Analysis

The contents of the electronic medical record, including referral documentation from community clinics, were reviewed to obtain the following data: demographics (including age, gender, ethnicity, race, region of origin, and preferred language), visit indications and ocular diagnoses, visit type (established or new patient visit), and various telemedicine visit parameters. These variables were studied due to prior associations with limited digital literacy, which may affect ability of patients to utilize telehealth, as well as associations with eye care underutilization.[2-4,7] The telemedicine visit parameters included ability to contact patient to offer telemedicine visit, patient amenability to scheduling a telemedicine visit, whether interpreter services were used during the visit, the language used to communicate during the visit, and follow-up instructions.

Continuous variables are summarized as mean ± standard deviation (SD) and range. Categorical variables are summarized as frequencies and percentages. Descriptive analyses were used to describe the study findings. Statistical analyses and frequencies were calculated using the program RStudio version 1.2.5033 (RStudio Inc., Boston, MA, USA).

Results

Between 01 March 2020 and 01 June 2020, a total of 18 patients were due for an in-person visit in the medically underserved patient clinic at our tertiary university-based ophthalmology department. All patients were attempted to be contacted by telephone to arrange the recommended visit type based on clinical triage by an attending ophthalmologist. Figure 1 depicts the triage and communication process

of the study patients. One patient was triaged as high risk for ocular morbidity progression associated with advanced glaucoma and scheduled for an urgent in-person visit during the study period.

The remaining 17 patients (94.4%, n = 18) had non-urgent visit indications considered appropriate for a telemedicine visit as an alternative to a postponed in-person office visit. Six of these patients (35.3%, n = 17) were successfully contacted and offered a telemedicine visit. All successfully contacted patients were amenable to a telemedicine visit with an attending ophthalmologist, and all patients who accepted a telemedicine visit completed the visit as scheduled. Eleven patients (64.7%, n = 17) were not able to be successfully contacted during the telephone triage and scheduling process. Of the patients who were not able to be successfully contacted, 8 patients (72.7%, n = 11) received voicemail messages but did not return the calls, 2 patients (18.2%, n = 11) had full voicemail messaging systems, and 1 patient (9.1%, n = 11) did not have a voicemail messaging system set up. Due to the inability to contact these patients, they were not able to be scheduled for a postponed in-person office visit either.

The demographics and clinical characteristics of the patients with non-urgent visit indications considered appropriate for evaluation by telemedicine (n = 17) are presented in Table 1. The mean ± SD (range) age of the patients was 50.3 ± 13.7 (31-82) years. Eight patients (47.1%, n = 17) were female, while 9 patients (52.9%, n = 17) were male. The vast majority of participants originated from Africa (41.2%, n = 17) or Latin America (47.1%, n = 17), comprising a total of 88.2% of the patients. Eight patients (47.1%, n = 17) self-identified as Hispanic or Latino.

The mean ± SD (range) age of the patients who were successfully contacted to offer a telemedicine visit was 53.5 ± 15.2 (31-72) years. The patients in this group were predominantly male (66.7%, n = 6), not Hispanic/Latino (66.7%, n = 6), Black (50.0%, n = 6), from regions other than the United States (100.0%, n = 6; predominantly from Africa in 50.0%, n = 6), with a preferred language other than English (83.3%, n = 6; preferred language of Spanish in 33.3%, n = 6), and established patients (66.7%, n = 6).

The mean ± SD (range) age of the patients who were not able to be successfully contacted to offer a telemedicine visit was 48.5 ± 13.2 (34-82) years. The patients in this group were predominantly female (54.5%, n = 11), Hispanic/Latino (54.5%, n = 11), Black (45.5%, n = 11), from regions other than the United States (90.9%, n = 11; predominantly from Latin America in 54.5%, n = 11), with a preferred language other than English (81.8%, n = 11; predominantly preferred language of Spanish in 54.5%, n = 11), and established patients (63.6%, n = 11).

Comparing these 2 groups demonstrates that patients who were successfully contacted were on average older in age and more likely to be male, not Hispanic/Latino, and from Africa. In contrast, patients who were not able to be successfully contacted were on average younger in age and more likely to be female, Hispanic/Latino, from Latin America, with a preferred language of Spanish. Established patients were predominant in both groups. Diabetic eye disease and glaucoma suspect were the most common visit indications among both groups.

The telemedicine visit parameters of the patients who successfully completed visits are presented in Table 2. Medical interpreter services were offered based on the preferred language indicated in the clinical medical record. 50.0% of visits (n = 6) were completed in English without interpreter services. There were no technologic or connectivity issues that prevented completion of any visit. Five patients (83.3%, n = 6) were recommended to follow up within 2 to 4 months with comprehensive ophthalmology. One patient (16.7%, n = 6) was recommended to follow up with subspecialists (retina and glaucoma providers) within 2 months.

Discussion

The field of ophthalmology has utilized telehealth in the screening and monitoring of eye diseases such as diabetic retinopathy and retinopathy of prematurity for years. However, this has historically involved "store-and-forward" or asynchronous methods of reviewing remote retinal imaging.[8,9] Further advances in the implementation of ophthalmology telemedicine services prior to the COVID-19 pandemic were hindered in large part due to physician perspectives regarding the ability to provide appropriate patient care remotely.[10,11] More recently and due largely to the pandemic, synchronous ophthalmology telemedicine services have been reported in the literature in rural regions as well as academic settings.[12,13]

To the best of our knowledge, this is the first report of a tertiary university-based ophthalmology clinic for low-income and uninsured patients to incorporate telemedicine visits as an alternative to in-person visits during the COVID-19 pandemic. We found it important to specifically study this population in order to identify barriers to providing appropriate care during the COVID-19 pandemic and beyond as telemedicine services become more routinely incorporated into medical care. High-risk populations for eye care underutilization include racial and ethnic minorities, specifically Black and Hispanic individuals; individuals of low socioeconomic status; and the uninsured. Additional barriers to eye care include low education level, language other than English, and immigration status.[7] Concerningly, many of these same patient characteristics have also been associated with limited digital literacy, which could compound their effects on health disparities as telemedicine services are implemented.[3,4]

Our study found low-income and uninsured patients to be amenable to ophthalmology telemedicine visits when offered. The primary barrier to providing telemedicine

Table 1. Patient Demographics and Clinical Characteristics.

Characteristics	Successfully contacted to offer telemedicine visit. n = 6	Unable to be successfully contacted to offer telemedicine visit. n = 11	Overall. n = 17
Age in years - mean (SD)	53.5 (15.2)	48.5 (13.2)	50.3 (13.7)
Range	31-72	34-82	31-82
Gender - n (%)			
Female	2 (33.3)	6 (54.5)	8 (47.1)
Male	4 (66.7)	5 (45.5)	9 (52.9)
Ethnicity - n (%)			
Hispanic/Latino	2 (33.3)	6 (54.5)	8 (47.1)
Not Hispanic/Latino	4 (66.7)	5 (45.5)	9 (52.9)
Race - n (%)			
Black	3 (50.0)	5 (45.5)	8 (47.1)
White	2 (33.3)	2 (18.2)	4 (23.5)
Other	1 (16.7)	2 (18.2)	3 (17.6)
More than one race	0 (0.0)	1 (9.1)	1 (5.9)
Not available	0 (0.0)	1 (9.1)	1 (5.9)
Region of origin - n (%)			
Africa	3 (50.0)	4 (36.4)	7 (41.2)
Latin America	2 (33.3)	6 (54.5)	8 (47.1)
Middle East	1 (16.7)	0 (0.0)	1 (5.9)
United States	0 (0.0)	1 (9.1)	1 (5.9)
Preferred language - n (%)			
Amharic	1 (16.7)	0 (0.0)	1 (5.9)
English	1 (16.7)	2 (18.2)	3 (17.6)
Farsi	1 (16.7)	0 (0.0)	1 (5.9)
Fulani	0 (0.0)	1 (9.1)	1 (5.9)
Somali	0 (0.0)	1 (9.1)	1 (5.9)
Spanish	2 (33.3)	6 (54.5)	8 (47.1)
Twi	1 (16.7)	1 (9.1)	2 (11.8)
Visit indications and ocular diagnoses - n (%)			
Diabetic eye disease	2 (33.3)	3 (27.3)	5 (29.4)
Glaucoma suspect	3 (50.0)	2 (18.2)	5 (29.4)
Anatomical narrow angle	1 (16.7)	1 (9.1)	2 (11.8)
Blurry vision	1 (16.7)	1 (9.1)	2 (11.8)
Hydroxychloroquine screening exam	1 (16.7)	1 (9.1)	2 (11.8)
Vitreous degeneration	1 (16.7)	1 (9.1)	2 (11.8)
Chalazion	0 (0.0)	1 (9.1)	1 (5.9)
Diabetes mellitus screening exam	0 (0.0)	1 (9.1)	1 (5.9)
Dry eye	0 (0.0)	1 (9.1)	1 (5.9)
Macular drusen	0 (0.0)	1 (9.1)	1 (5.9)
Pigmentary retinopathy	1 (16.7)	0 (0.0)	1 (5.9)
Thyroid eye disease	0 (0.0)	1 (9.1)	1 (5.9)
Visit type – n (%)			
Established	4 (66.7)	7 (63.6)	11 (64.7)
New	2 (33.3)	4 (36.4)	6 (35.3)
Completed telemedicine visit – n (%)			
Yes	6 (100.0)	0 (0.0)	6 (35.3)
No	0 (0.0)	11 (100.0)	11 (64.7)

visits in this sample was the ability to successfully contact patients to offer and schedule these visits. The majority of patients (64.7%, n = 17) with visits considered appropriate for conversion to telemedicine were not able to be successfully contacted to offer this option. These patients who were not able to be successfully contacted were on average younger in age and more likely to be female, Hispanic/Latino, from Latin America, with a preferred

Table 2. Telemedicine Visit Parameters.

Telemedicine parameters	Completed telemedicine visits. n = 6
Interpreter services used – n (%)	
Yes	3 (50.0)
No	3 (50.0)
Language used to communicate during visit – n (%)	
Amharic	1 (16.7)
English	3 (50.0)
Spanish	2 (33.3)
Follow-up instructions – n (%)	
2 months in office with subspecialist	1 (16.7)
2 months in office with comprehensive	4 (66.7)
4 months in Office with Comprehensive	1 (16.7)

language of Spanish. Interestingly, there was no trend in visit type (established versus new visit) between the groups.

Prior to the COVID-19 pandemic, visits in our medically underserved patient clinic have always been scheduled by telephone. New patient referrals are called with their initial appointment information. Established patient visits are also scheduled in this manner, with follow-up telephone calls made to arrange their next visits, rather than being scheduled at the time of their prior in-person visit. This has historically been the case due to the logistics of scheduling this bimonthly evening clinic. However, as we have found that the primary barrier to scheduling visits in this population is the ability to contact patients by telephone, future efforts will involve scheduling visits (regardless of visit type—telemedicine or in-person) when the patient is present whenever possible.

This study has several limitations, including those inherent to a retrospective study design. Due to the small sample size, we only assessed the data in the context of general trends and recognize that this limits our ability to draw conclusions. In addition, all patients included in this report were from 1 urban university-based ophthalmology department. Thus, the findings of this study may not be generalizable to the medically underserved patient population in other settings.

Future research using larger sample sizes and independent sub-groups is necessary to better elucidate the value of telemedicine in ophthalmology clinics for low-income and uninsured patients. Additionally, follow-up communication with patients who have completed telemedicine visits as well as with providers who provide these visits could provide useful information regarding the patient and provider experiences with these visits.

Conclusion

This study found that synchronous ophthalmology telemedicine visits were able to be incorporated in a tertiary university-based ophthalmology clinic for low-income and uninsured patients as an alternative to postponed in-person visits in the COVID-19 era. Importantly, all successfully contacted patients accepted, scheduled, and completed a telemedicine visit. The primary barrier to providing telemedicine visits in this population was the ability to successfully contact patients to offer and schedule these visits. Further research must be conducted on vulnerable populations as telehealth services are implemented to minimize disparities in access to care and health outcomes.

Declaration of Conflicting Interests

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Ethical Approval

This descriptive cross-sectional study followed the tenets of the Declaration of Helsinki and was deemed exempt from Institutional Review Board (IRB) review by The Ohio State University IRB. Informed consent was waived by the Ohio State University IRB for the purposes of this retrospective chart review of existing clinical records.

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