



Ophthalmology Encounters During the COVID-19 Pandemic in a Student Run Free Clinic

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Abstract

Background: Ophthalmology services at student run free clinics (SRFC) serve an important role for the socioeconomically underserved within a city. The coronavirus disease 2019 (COVID-19) pandemic has worsened gaps in care for ophthalmology tertiary clinics, but its effects on ophthalmology encounters at SRFCs are not known.

Methods: This was a retrospective chart review from a single center that compared patient encounters in the ophthalmology SRFC six months prior to its closure (pre-COVID group) with patient encounters in the ophthalmology SRFC six months after its reopening (post-COVID closure group).

Results: There was a decline (47.3%) in the number of encounters in the post-COVID closure group (n=20) when compared to the pre-COVID group (n=38). While the number of encounters for routine screening stayed about the same in both groups, there was a 90.5% decline in encounters with active disease (21 pre-COVID vs. 2 post-COVID closure). Sub-group analysis of the pre-COVID group showed that patients with active disease tended to have worse vision (-0.33 : logarithm of the Minimum Angle of Resolution (logMAR), p=0.034 OD; -0.27 logMAR, p=0.048 OS) than those undergoing routine screening.

Conclusions: Patients in West Texas with active eye diseases are not presenting to SRFC after its reopening. Early recognition of this is critical to address the potential gap in care in a vulnerable population.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic caused a quarantine that prevented patients from receiving eye care in the ophthalmology departments.¹ Current studies have shown that delays in treatment of certain ocular diseases have worsened during gaps of care during the pandemic.² The lack of follow-up has resulted in worse outcomes in established tertiary centers.^{3,4} Existing studies have shown that after the pandemic, there was a decrease in office visits, which disproportionately affected certain specialties including ophthalmology.^{5,6}

Student run free clinics (SRFC) are present in 23 of 106 allopathic medical schools as of 2021. Of these SRFCs, 19 have an ophthalmology clinic,

which on average runs about five hours a month.⁷ These clinics serve a unique role in addressing the needs of the socioeconomically underserved population in the city.^{7,8} This population was difficult to coordinate during the pandemic even with attempts of scheduling telemedicine visits.^{9,10}

The ophthalmology SRFC serves as an essential educational exposure for medical students that are interested in ophthalmology. Students learn basic ophthalmology clinical skills including how to perform a slit lamp exam and a manifest refraction. Additionally, telemedicine education is incorporated into the clinic. The students take fundus photos of each patient and do an interpretation of the images. The images are then reviewed by a retina specialist, who then discusses

Table 1. Demographic of ophthalmology patients from the ophthalmology SRFC

Variable	Pre-COVID*	Post-COVID closure†	p-value
Encounters, n			
Total	38	20	-
New	33	20	-
Follow-up	5	0	-
Number of patients	33	20	-
Race, n (%)‡			
Asian	1 (3.0)	NR	-
Black	3 (9.1)	NR	-
Hispanic	16 (48.5)	NR	-
White	8 (24.2)	NR	-
Unknown	5 (15.2)	NR	-
Sex			
Male	12 (36.4)	8 (40.0)	-
Female	21 (63.6)	12 (60.0)	-
Income status (yearly in dollars)‡			
0-499	13 (39.4)	NR	-
500-4999	4 (12.1)	NR	-
5000-9999	3 (9.1)	NR	-
10,000-19,999	2 (6.1)	NR	-
20,000-29,999	3 (9.1)	NR	-
30,000-39,999	0 (0)	NR	-
40,000 or more	1 (3.0)	NR	-
Unknown	7 (21.2)	NR	-
Average age, years	52.8±9.1	50.5±11.9	0.42
Systemic history, n (%)			
Bell's Palsy	1 (3.0)	0 (0.0)	-
Cardiac heart failure	1 (3.0)	1 (5)	-
Cerebrovascular accident	1 (3.0)	0 (0.0)	-
Depression	1 (3.0)	0 (0.0)	-
Diabetes mellitus	19 (57.6)	9 (45.0)	-
Dyslipidemia	2 (6.1)	0 (0.0)	-
Epilepsy	1 (3.0)	0 (0.0)	-
Hearing loss	1 (3.0)	0 (0.0)	-
Hypertension	15 (45.5)	6 (30.0)	-
Hypothyroidism	1 (3.0)	2 (10.0)	-
Osteoarthritis	1 (3.0)	0 (0.0)	-
Pemphigus vulgaris	0 (0.0)	1 (5.0)	-
Reactive hypoglycemia	1 (3.0)	0 (0.0)	-
Sjogren Syndrome	0 (0.0)	1 (5.0)	-
Systemic lupus erythematosus	0 (0.0)	1 (5.0)	-
VA OD, logMAR [§]	0.48±0.66	0.26±0.28	0.09
VA OS [§]	0.39±0.39	0.28±0.32	0.25
IOP OD, mmHg [§]	17.0	15.5	0.52
IOP OS [§]	17.7	15.2	0.21

Diagnosis			
Amblyopia – strabismic	0 (0.0)	1 (5.0)	-
Cataract – visually significant	6 (15.8)	1 (5.0)	-
Non-proliferative diabetic retinopathy	5 (13.2)	3 (15.0)	-
Proliferative diabetic retinopathy	1 (2.6)	1 (5.0)	-
Dry eye	1 (2.6)	0 (0.0)	-
Esotropia	0 (0.0)	1 (5.0)	-
Glaucoma	4 (10.5)	0 (0.0)	-
Hyperglycemia – visually significant	0 (0.0)	1 (5.0)	-
Loss of vision – unknown history	1 (2.6)	0 (0.0)	-
Keratoconus	1 (2.6)	0 (0.0)	-
Narrow angles	0 (0.0)	1 (5.0)	-
Nyctalopia	0 (0.0)	1 (5.0)	-
Pterygium	1 (2.6)	0 (0.0)	-
Ptosis	1 (2.6)	0 (0.0)	-
Refractive error	15 (39.5)	8 (40.0)	-
Follow-up			-
Follow up in 1-2m	10 (26.3)	1 (5.0)	-
Follow up in 3-6m	3 (7.9)	0 (0.0)	-
Follow up in 7-11m	0 (0.0)	0 (0.0)	-
Follow up in 1 year	17 (44.7)	18 (90.0)	-
Referral to tertiary ophthalmology clinic	8 (21.2)	1 (5.0)	-
Glasses prescriptions	14 (42.4)	10 (50.0)	-

*The pre-COVID group was defined as patients that attended the ophthalmology SRFC between October 2020 to March 2021.

†The post-COVID closure group was defined as patients that attended the ophthalmology SRFC from June 2020 to November 2021.

‡The race and the income level for the post-COVID closure group were not recorded.

§6 VA OD and 5 VA OS were not recorded in the pre-COVID group. There were 23 encounters in the pre-COVID group for whom the IOP was not recorded. There was one patient in the post-COVID closure group for whom age was not recorded. IOP was not recorded for 9 encounters.

SRFC: student run free clinic; COVID: coronavirus disease; NR: not recorded; VA: visual acuity; OD: right; OS: left; logMAR: logarithm of the Minimum Angle of Resolution; IOP: intraocular pressure; m: months.

the findings with the medical student. Lastly, students learn the administrative duties of running a clinical practice. The student leadership council is responsible for providing supplies to the clinic including the purchase and maintenance of new equipment and medicine for the clinic. Students call patients to remind them of upcoming follow-up appointments. All pertinent information is recorded on paper charts that are later scanned into the system by the students.

The SRFC also serves as a referral center for socioeconomically disadvantaged patients in the Lubbock, Texas area. The clinic is held bimonthly during most months of the year. During a visit, the medical students perform a comprehensive ophthalmic evaluation including medical history, best-corrected visual acuity (VA), measurement

of intraocular pressure (IOP), anterior segment slit-lamp biomicroscopy, dilated fundus examination and digital photography of the retina. Patients are triaged and examined by a medical student and then staffed with an attending. Patients needing a higher level of care are referred to a tertiary ophthalmology clinic, Texas Tech Physicians Eye Clinic.

Materials and Methods

This was a retrospective chart review from a single center that compared patients that attended the ophthalmology SRFC prior to its closure during COVID with patients that attended the ophthalmology SRFC post-closure. The ophthalmology SRFC was closed from April 2020 to

Table 2. VA of ophthalmology patients

Variable	Encounters with patients for routine screening	Encounters with patients for active disease	Difference	P value
Number, n (%)	17 (44.7)	21 (55.3)	4 (10.5)	-
Visual acuity (logMAR)				
Right	0.28±0.25	0.61±0.50	0.33	0.034
Left	0.24±0.26	0.51±0.45	0.27	0.048

VA of ophthalmology patients with routine screening versus active problem in the six-month period prior to the closure (pre-COVID group) of the ophthalmology student run free clinic (SRFC). A routine screening was defined as a visit that had recommended follow-up at the ophthalmology SRFC in 12 months. An active problem was defined as a visit that recommended follow-up in less than 12 months.

VA: visual acuity; logMAR: logarithm of the Minimum Angle of Resolution; COVID: coronavirus disease.

May 2021. The pre-COVID group was defined as patients that attended the ophthalmology SRFC between October 2019 to March 2020. The post-COVID closure group was defined as patients that attended the ophthalmology SRFC from June 2021 to November 2021. Institutional review board (IRB) approval was obtained from the participating center. The study adhered to the principles of the Declaration of Helsinki and was approved by the respective institutional research body.

Univariate analysis was done for the various characteristics at baseline. A student t-test was used to calculate statistical significance of the difference between groups. A p-value of <0.05 was considered as significant. Excel (v2402, Microsoft, Redmond, Washington) was used for all analysis.

Results

The ophthalmology SRFC serves an important part of underserved eye-care in Lubbock Texas. Based on the data from the pre-COVID group, 60.6% of the patients had a yearly income below the federal poverty level for an individual.¹¹ The clinic also served a variety of demographic of patients including people of color, who made up 60.6% of the pre-COVID group patients.

Table 1 shows the demographic data of ophthalmology patients seen in the last six active months of the ophthalmology SRFC before and after its closure during the pandemic. There was no statistically significant difference between the age, VA or IOP of either eye between the pre- and post-COVID closure patients.

After its reopening on June 2020, the ophthalmology SRFC saw a decrease of 47.4% in encounters in the post-COVID closure group when compared to the pre-COVID group. In the pre-COVID group eight patients (24.2%) were referred for further evaluation and treatment to the tertiary ophthalmology clinic. Out of the two patients that followed-up, one underwent cataract surgery, and the other received three intravitreal bevacizumab injections in the right eye with the retina service and was referred to anterior segment for her advanced cataracts. In the post-COVID closure group, two patients (10.0%) were referred for further evaluation and treatment and both have yet to follow-up.

Table 2 shows sub-group analysis of the pre-COVID group. Out of the 38 encounters, 17 were defined as a routine screening encounter, which included any encounter that recommended a subsequent follow-up in 12 months. This included annual diabetic exams, update of prescription for glasses and non-visually significant cataract evaluations. The 21 encounters that were defined as active disease were when a recommendation was made to a follow-up either at the tertiary clinic ophthalmology clinic or the SRFC within the next 12 months. Overall, patients in the routine screening group had a better visual acuity that was statistically significant for both eyes (p=0.034 OD, p=0.048 OS). Sub-group analysis was not performed in the post-COVID closure group because of the small sample size of total encounters and encounters with active disease (2/20 or 10%).

Discussion

There was a noticeable decline in the number of encounters in the post-COVID closure group (47.3 %) when compared to the pre-COVID group. This rate is similar to the patient decline experienced by other non-ophthalmology and ophthalmology SRFCs after reopening during the pandemic.^{8,12} While there was no statistically significant visual acuity difference between pre- and post-COVID closure groups, there has been a significant shift in the type encounters in the ophthalmology SRFC.

Prior to COVID, the ophthalmology SRFC was serving two different patient populations. The first were those that were getting their annual eye check-up in routine screening encounters. For example, refractive error is a common presentation for ophthalmology encounters in SRFC. In the pre- and post-COVID closure groups, 42.4% and 50.0% of patients were prescribed glasses, respectively. This rate was comparable to the published rate of an ophthalmology SRFC over a seven-year period, where 44.4% of patients were given either free glasses or provided with a prescription for glasses.¹³

A second patient population were those with active eye disease that required closer management and follow ups. For example, patients with diagnosis like moderate non-proliferative diabetic retinopathy, glaucoma and dry eyes required multiple visits within a year for evaluation and treatment. This group is especially difficult to treat within the SRFC context, since one of the main challenges in ophthalmology SRFCs is the lack of patient follow-up in subsequent visits.⁷ In the pre-COVID months, the ophthalmology SRFC was engaging with these groups, as over half of the encounters in the pre-COVID months were with patients with active diseases. In fact, pre-COVID, 5/33 (15.2%) of the patients had multiple visits within the six-month period. Not surprisingly, patients with active disease had worse visual acuity (-0.33 logarithm of the Minimum Angle of Resolution (logMAR), $p=0.034$ OD; -0.27 logMAR, $p=0.048$ OS) when compared to their routine screening group counterparts.

However, after its reopening, 18/20 (90.0%) encounters in the post-COVID closure group were for routine screening. There were only two

encounters with active disease, and both were sent for referrals to tertiary ophthalmology clinic. In the post-COVID closure group, there were no patients that had multiple visits within the six-month period. When comparing the pre- to the post-COVID closure group, the number of routine screening encounters has remained about the same (17 vs. 18, increase 5.9%), but the number of encounters with active disease has sharply fallen (21 vs. 2, decrease 90.5%). Since the reopening of the ophthalmology SRFC, healthy patients are still presenting to get routine screenings, but there has been a sharp decline in patients with active visual disease presenting to clinic.

Another way of evaluating the acuity of the patients seen at the ophthalmology SRFC is by tracking the percentage of patients that were recommended for a higher level of care at the tertiary ophthalmology clinic. In the pre-COVID group, six patients were referred to the main clinic for cataract surgery and two patients were referred to a specialty service in the pre-COVID group (8/33 patients, 24.2%). There has been limited studies on referral rates to tertiary ophthalmology clinic from ophthalmology SRFC. However, data from another ophthalmology SRFC over a period of seven years had a referral rate of 20.3%, similar to the rate seen in the pre-COVID group.¹³ In the post-COVID closure group, fewer patients (2/20 patients, 10%) were referred to a tertiary ophthalmology clinic—one for cataract surgery and one for further evaluation with retina. Therefore, the number of patients that were referred to a higher level of care declined by 8.2%.

The decreased follow-up rates of patients post-COVID closure is troubling, especially in the contexts of barriers that may lead to loss in follow-up even prior to the pandemic. Patients that are referred to the tertiary ophthalmology clinic must either pay with insurance or self-pay. Qualified uninsured patients that are residents of Lubbock County can apply for a Lubbock County Medical Indigent (LCMI) program. Obtaining the LCMI card requires an appointment with a financial counselor and an approval process. This process can be responsible for a delay or loss in follow-up of these patients. Consider that even in the pre-COVID group only one out of the six patients referred to anterior segment for visually significant cataract ended up having surgery.

This study examines the encounters of an ophthalmology SRFC during the COVID-19 pandemic period. When compounded with the trends in the pandemic, patients with active eye disease are especially vulnerable. It is unclear on the reasoning behind the decline of encounters with active disease at the ophthalmology SRFC in the post-COVID closure group. It is possible that patients are avoiding going to the ophthalmology SRFC multiple times during a pandemic. Patients with active disease may be self-selecting themselves to avoid presenting with a chief complaint that would require multiple follow-ups (e.g. IOP checks for glaucoma patients).

There are limitations to this study. Each encounter with a patient is recorded on a paper chart that is later uploaded to a cloud storage folder. Therefore, due to the retrospective nature of the study, encounters that were not properly recorded or uploaded could potentially affect the results of the study. Another limitation of this study is its generalizability. It is unclear at this point whether the trend seen at the ophthalmology SRFC in West Texas is an isolated event or represents a larger trend nationwide. However, further investigation needs to be done to address the potential gaps in care in a vulnerable population. Despite the limitations, this study provides valuable data regarding trends in ophthalmic care in a SRFC.

Disclosures

The authors have no conflicts of interest to disclose.

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