Change in Ophthalmology Practice during COVID-19 Pandemic: Egyptian Perspective

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Abstract

Purpose: To assess the impact of the COVID-19 pandemic on ophthalmology practice in the Cairo metropolitan area. **Methods:** This is a cross-sectional observational analytic study among ophthalmologists practicing in different hospitals in the Cairo metropolitan area. The data were collected through a self-administered questionnaire covering general measures taken during practice. **Results:** The questionnaire was sent to 250 ophthalmologists, with an 82% response rate. Most of the participants were concerned about the economic impact of the pandemic, as there is a 60–80% reduction in the flow of patients with a consequent 80–100% reduction in surgical cases. Most of the participants have access to personal protective equipment, and the safety protocols are followed, especially by the older ophthalmologists. Thus, the surgeons are willing to perform elective surgeries, adhering to strict safety protocols (70.8, 42.6, and 18.8% of the refractive surgeons, corneal surgeons, and retinal surgeons, respectively; $p = 0.00$). Furthermore, 63.9% of

the participants, especially the young ophthalmologists, are willing to see COVID-19 patients and operate on them if needed. **Conclusions:** The COVID-19 pandemic could go on for months or even years with a significant impact on ophthalmology practice. Trying to keep a balance between safety and economic burden, the majority of ophthalmologists are willing to see elective patients and urgently operate on a COVID-19 patient, under adherence to the safety protocols.

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Introduction

The World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) a pandemic on March 11, 2020. With the spread of COVID-19, many health care professionals including ophthalmologists have had many concerns and fears regarding the possibility of having to close down clinics or limit their practice to urgent cases, as well as the possibility of having to convert operating rooms into intensive care units (ICUs) if needed. Also, many of the ophthalmologists' concerns are directed towards their patients, especially if the shutdown of their practice will be continuing for a longer period.

Medical students and young staff members such as residents in teaching institutions could be affected regarding their training program with the reduction of all elective surgeries [1]. As the COVID-19 pandemic is spreading across the USA, the American Academy of Ophthalmology has recommended that ophthalmologists restrict seeing patients to urgent or emergency cases. It also recommends proper patient screening and using proper protective equipment [2].

By the April 13, 2020, Egypt had been under partial curfew since March 25, 2020, and schools, universities, and educational institutions had been closed since March 15, 2020. The partial curfew (7 p.m. to 6 a.m.) was also associated with halting most nonessential activities during the day, such as entertainment venues, sporting clubs, and non-health-related public services. By the time the questionnaire was administered, the country had already experienced 1 month of major and rapid social and economic changes that required special adaptations, as had every other country. In addition, the country's institutions were in their first steps to identify the magnitude and extent of virus spread. Thus, the number of cases were generally escalating, but with no precise confirmed data.

Therefore, we decided to conduct a questionnaire study in the Cairo metropolitan area to assess the impact of the COVID-19 pandemic on ophthalmology practice, ophthalmologists' psychological and economic concerns, changes in safety measures, and changes in the flow of emergency cases.

Materials and Methods

This is a cross-sectional observational analytic study among ophthalmologists working in the Cairo metropolitan area to assess the change in ophthalmology practice after the emergence of the COVID-19 pandemic. The participating ophthalmologists work at different types of hospital: university hospitals, private hospitals, private clinics, and governmental hospitals. The study was approved by the Ophthalmology Department's Scientific Committee at Cairo University, and was conducted on April 13, 2020, using a self-administered questionnaire.

The questionnaire was composed of separate sections inquiring about (1) demographic data (age, current position, work place, and geographic location of the practice), (2) ophthalmologists' and patients' concerns related to the pandemic, (3) changes of practice in the COVID-19 era, (4) changes of practice regarding safety measures during the COVID-19 pandemic, and (5) changes in the flow of emergency cases. As there had been no previous studies on similar populations available before study initiation, no formal sample size calculation was performed. A target sample size of 250 participants was found reasonable for recruitment.

We included participants with an age ranging from 25 to 70 years. We divided them into two groups: a young group aged between 25 and 45 years and an old group aged more than 46 years. The 46-year age cutoff between the young and the old group was chosen because this is the average age for ophthalmologists to be consultants in Egypt, and we aimed to study the differences in practice and response to the pandemic between junior and senior doctors.

Statistical Analysis

Descriptive analyses were used to study the baseline characteristics. χ^2 analyses were used to compare the young with the old group regarding their concerns regarding economic and psychology issues, the following of safety measures, and changes in their practice. Statistical significance was set at $p < 0.05$. All analyses were two-tailed. All statistical analyses were performed using the SPSS statistical package version 25.0 for Windows (2003; SPSS Inc., Chicago, IL, USA).

Results

Participants

The questionnaire was sent to 250 ophthalmologists practicing ophthalmology in the Cairo metropolitan area (Egypt), and we received responses from 205 of them (82%). The rest were excluded due to inability to obtain informed consent or incomplete data. More than half of our responders (61.5%) were young ophthalmologists (25–45 years), and 38.5% were older than 46 years. About 35.4% in the older age group were at high risk of contracting the disease (being diabetic, having cardiac disease, having pulmonary disease, or being on immunosuppressants) as compared to 7.1% in the younger group ($p = 0.00$). The demographic data on the participants are shown in Table 1.

Participants and the COVID-19 Pandemic

Few of our participants (5.4%) were in contact with someone positive for COVID-19, and 1.9% were returning from an endemic area, yet 61.5% did not have access to any health facility at that time in case they had symptoms. The participants graded their and their patients' concerns about the pandemic on a Likert scale (Table 2). Despite these concerns, only 24.4% of the responders thought they might need psychological assessment and help; these thoughts were found more often among the young ophthalmologists (34.2%, vs. 16.5% in the older age group; $p = 0.01$). Accordingly, 20.5% of all participants were considering early retirement, and 14.6% were considering a career shift. In spite of concerns about economic loss, only 10.7% of the ophthalmologists were considering laying off some of their staff.

Table 1. Demographic data about the participants

	Responders, n (%)
Age	
25–30 years	20 (9.8)
31–45 years	106 (51.7)
46–60 years	63 (30.7)
>60 years	16 (7.8)
Current position	
Resident	13 (6.3)
Assistant lecturer	26 (12.7)
Lecturer	42 (20.5)
Assistant professor	24 (11.7)
Professor	56 (27.3)
Specialist	18 (8.8)
Consultant	26 (12.7)
Place of practice ¹	
University hospital	148 (72.2)
Private hospital	136 (66.3)
Private clinic	100 (48.8)
Governmental hospital	38 (18.5)
Geographic location of practice	
6th of October/Shiekh Zayed (PH, PC)	44 (21.5)
Manial/Kasr Al Ani/Downtown (UH, PC, GH)	103 (50.2)
Dokki/Mohandeseen/Zamalek (PH, PC, GH)	99 (48.3)
Haram/Faysal (PH, PC)	28 (13.7)
Maadi/Helwan (PH, PC, GH)	11 (5.4)
Masr Elgadida/Madenat Nasr (PH, PC, GH)	35 (17.1)
5th District (PH, PC)	9 (4.4)
Outside Cairo (PH, PC)	31 (15.1)
Participants among high risk group ²	
High risk	37 (18)
Not high risk	168 (82)

UH, university hospital; PH, private hospital; PC, private clinic; GH, government hospital. ¹ Doctors could practice in more than 1 health facility. ² Older than 60 years; with diabetes, cardiac disease or pulmonary disease; or on immunosuppressant therapy.

Despite being distanced from the ICU and critically ill patients, 82% of the participants were not feeling safe and felt instead that they might be infected during their practice; these concerns were found among 87.3% of the young ophthalmologists compared to 73.4% of the older ophthalmologists ($p = 0.01$). However, 48.8% of all participants were willing to volunteer in the emergency department, ICU, or hospital in case of medical staff deficiency.

With the current country lockdown in Egypt, 80% of the participants had more time for academic work, 60.5% were more frequently attending scientific web seminars,

Table 2. Ophthalmologists' and patients' concerns related to the pandemic

	Responders, n (%)
Ophthalmologists' psychological concern	
0	5 (2.4)
1	31 (15.1)
2	4 (23.9)
3	79 (38.5)
4	26 (12.7)
5	15 (7.3)
Ophthalmologists' concern regarding economic loss	
0	6 (2.9)
1	15 (7.3)
2	36 (17.6)
3	66 (32.2)
4	57 (27.8)
5	25 (12.2)
Ophthalmologists' grading of their patients' concern about the pandemic	
0	7 (3.4)
1	25 (12.2)
2	47 (22.9)
3	75 (36.6)
4	41 (20)
5	10 (4.9)

Scale from 0 to 5 (0 = no anxiety; 5 = extremely anxious).

and 89.3% had more time to reconnect with family and old friends via phone or social media.

Changes in Ophthalmology Practice during the COVID-19 Pandemic

Although 72.7% of the participants were still seeing patients, a reduction in patient flow of about 60–80% was reported among practices by about 40.5% of our participants. Although more than half of our participants were using phone and video calls in only 20% of cases in their practice, 67.3% would consider telemedicine in their practice in the future (Table 3).

Among 40.5% of our participants, elective patients constituted just 0–20% of practice patients. We noticed that the surgeons were still willing to perform elective surgeries, most frequently refractive surgeons (70.8%), then corneal surgeons (42.6%), and least often retinal surgeons (18.8%), with statistically significant differences between them ($p = 0.00$) (Fig. 1).

Around 63.9% of the participants were willing to examine and operate on COVID-19-positive patients with emergency conditions needing intervention, and 82%

Table 3. Change in practice in the COVID-19 era

	Responders, n (%)
Are participants deferring patient care?	
No (seeing patients)	149 (72.7)
Yes (deferring patients)	56 (27.3)
Percentage of change in patient flow in the clinic	
The same	0
Decreased by 0–20%	11 (5.4)
Decreased by 20–40%	12 (5.9)
Decreased by 40–60%	66 (32.2)
Decreased by 60–80%	83 (40.5)
Decreased by 80–100%	32 (15.6)
Percentage increased	1 (0.5)
Percentage of elective patients among the served ones	
0–20%	83 (40.5)
20–40%	41 (20)
40–60%	33 (16.1)
60–80%	31 (15.1)
80–100%	17 (8.3)
Percentage of patients contacted by phone and video calls	
0–20%	109 (53.2)
20–40%	49 (23.9)
40–60%	25 (12.2)
60–80%	14 (6.8)
80–100%	8 (3.9)

were willing to see other ophthalmologists' emergency cases. It was evident that participants in the young ophthalmologist group were significantly more willing to perform emergency interventions on COVID-19 patients than those in the older ophthalmologist group (70.6 vs. 53.2%, $p = 0.01$).

As it has come to our knowledge that COVID-19 can present with conjunctivitis, 88.3% of our responders have seen 0–5 cases of atypical conjunctivitis per week, while 10.2% have seen about 6–10 cases. Another issue to be considered is that ophthalmologists are providing more consultations about the effect of hydroxychloroquine intake on the eyes. Although its toxicity following high doses for short periods is still unknown, 63.9% of the participants agreed to give it to their patients with macular pathologies if they got coronavirus.

Changes in Safety Measures in Practice during the COVID-19 Pandemic

Regarding safety measures in health care facilities, 48.8% of the facilities had a noncontact temperature check at its entrance, and 27.8% had a questionnaire for incoming patients, screening if they had recently experienced symptoms, had contact with COVID-19 patients,

Fig. 1. Bar chart showing the percentage of surgeons willing to perform elective surgeries during the ongoing pandemic among refractive, corneal and retinal surgeons.

or returned from an endemic area within the last 14 days. If the results of this screening were flagged, 86.3% of the participants refused to see those flagged patients, as 61% of the participants had no clear protocol for further management of flagged patients who are suspected to be COVID-19 positive.

About 78.5% of our participants had access to personal protective equipment (PPE), and 64.9% were feeling comfortable while using them. The most available pieces of PPE were surgical masks (82.4%) and gloves (87.8%), followed by gowns (40.5%), while the least available pieces were eye goggles (29.3%) and N95 masks (28.8%). The majority of the participants (91.7%) wore surgical masks even when seeing asymptomatic patients, 80% did not offer masks to asymptomatic patients, and 27.3% were offering masks only to suspected cases.

We noticed that safety precautions were significantly more often followed by the older ophthalmologist group. This was evident as 73.4% in the older age group had a protocol for PPE and 27.8% were offering masks to patients, versus 53.2 and 15.1%, respectively, in the young age group ($p = 0.004$ and $p = 0.02$, respectively). All participants used slit lamp shields, and with regard to intraocular pressure measurement, about 60.2% of the participants preferred to use applanation tonometry with sterilization using 70% alcohol solution to using the non-contact air puff tonometer.

Emergency Cases during the COVID-19 Pandemic

There was no change in the number of trauma cases compared to the pre-pandemic era, as noticed by 153 participants who received trauma patients. There was no

Fig. 2. Bar chart showing the differences between young ophthalmologists (25–46 years) and older ophthalmologists (above 46 years) in different aspects assessed in the study.

change in the percentages of open and closed globe injuries and chemical injuries. Sixty-three participants had encountered patients with accidental chemical injuries from sanitizers. We also noticed that the young age group was seeing more trauma cases ($p = 0.001$) and more chemical injuries from sanitizers (37.3 vs. 20.3%, $p = 0.01$) (Fig. 2).

Discussion

Ophthalmology is a challenging profession with its unique techniques of examination, diagnosis, and treatment which require close contact to patients with an increased risk of exposure to infections for both the ophthalmologists and the patients. Not to mention that a significant proportion of our patients are in the high-risk group who are more susceptible to severe infection with high rates of mortality. One of the new challenges to our profession is that the first presentation of the novel coronavirus might be conjunctivitis with no other symptoms [3, 4].

The emergence of the pandemic has created a major international public health crisis. All physicians, including ophthalmologists, are challenged by the reality that the COVID-19 pandemic could go on for weeks or even months with a potentially significant impact not only on daily life but also on global economy, including ophthalmology practice.

Economic and Psychological Concerns Related to the Pandemic

According to the questionnaire, more than half of the responders were concerned about the economic impact of the pandemic on their practices, with a significant reduction in the number of patients seen by the providers and a consequent reduction in surgical cases. However, only a small percentage (10.7%) of the responders, in private practices, considered laying off employees to reduce the economic burden on their practices.

The psychological concerns about the pandemic were grave enough that 66% of the participants graded their concerns related to the pandemic health issues and economic loss to be 3 on the Likert scale. Around a quarter of our study sample were considering psychological assessment and help later, and a lower percentage were considering early retirement or a career shift. Also, one of the most distressing concerns was the feeling of insecurity, with the probability of getting infected while working even when using good protective equipment, and this concern was found among 82% of our participants. The same concern was reported by 80% of the participants in a survey done in three major hospitals in the UK [4].

Educational Concerns among Trainees

We found that most of the concerns among the young ophthalmologists were regarding their learning, which was similarly reported for another teaching institute [5]. After implementing an elective case deferral

policy, younger ophthalmologists, mainly the residents, were missing important time for their training and learning program. Moreover, in endemic areas, most of the young ophthalmologists were spending more working hours in the hospital and the emergency department, with a greater risk of exposure to infection as well as a higher probability of transferring the infection to their family or elderly parents once they returned home.

PPE Protocol

This pandemic significantly changed safety measures in all types of health care facility. After reports of deaths among physicians in China and Italy – including the first ophthalmologist to raise alarm about the novel COVID-19, Dr. Li Wenliang [6] – all hospital staff were mandated to wear PPE to reduce asymptomatic transmission [2]. Protective precautions for ophthalmologists include wearing an N95 mask, gown, gloves, and eye protection (a face shield or goggles). Also, the use of slit-lamp barriers or breath shields is recommended, as well as instructing patients to minimize speaking during the slit-lamp biomicroscopic examination.

In our study, 48.8% of the health care facilities developed protocols for screening patients before clinical examination via a noncontact temperature check and a questionnaire to flag patients with suspected symptoms or previous exposure. The majority of our participants have access to PPE, mostly surgical masks and gloves. The questionnaire also showed that older ophthalmologists strictly follow safety precautions more often than do young ophthalmologists, which can be explained by the fact that some of the former are elderly or classified as belonging to a high-risk group.

All participants used slit-lamp shields but were uncomfortable with face shields during examinations. Regarding intraocular pressure measurement, more than half of our participants preferred to use applanation tonometry with sterilization by 70% alcohol solution, as recommended by the American Academy of Ophthalmology [2].

Protocols for the Clinic and Surgery

Regarding guidance for outpatient clinics and elective surgery, the American Academy of Ophthalmology supports the recommendation from the American College of Surgeons and the guidelines from the CDC regarding postponing elective surgeries [7]. It was also recommended that ophthalmology offices should for now continue to provide only emergent/urgent care,

making efforts to decompress their waiting areas, and considering alternatives such as encouraging patients to wait in other locations (e.g., their cars or outdoor spaces). Mobile phone calls or other approaches could be used by office staff to notify patients when they should return to the office. Telemedicine should be used as much as possible for screening and for nonurgent patient concerns [7].

About 72.7% of our participants were still seeing patients; yet, 40.5% of them reported reductions in the flow of patients by 60–80%. Similarly, the Commonwealth Fund reported that ophthalmology is the most affected subspecialty, with a 79% reduction in patient flow [8]. We noticed that surgeons were still willing to perform elective surgeries. This may be related to their opinion that there would be no harm operating on elective cases with the use of strict safety protocols. The surgeons most willing were the refractive surgeons, followed by the corneal surgeons and the retinal surgeons.

Despite the risk of infection, about 63.9% of the participants were willing to operate on COVID-19-positive patients who needed emergency interventions. It was evident that participants in the young group were more willing to perform emergency interventions on COVID-19 patients than participants in the old group.

Trauma Overview

Regarding ocular trauma, it was reported by the Oxford Eye Hospital that there was an increase in the number of trauma cases due to do-it-yourself tasks [9]. In our study, there was no change reported in trauma case flow as compared to the pre-pandemic era, while there was an increase in reported accidental chemical ocular injuries from sanitizers, which can be explained by the more frequent use of alcohol sanitizers or bleaching materials for frequent cleaning.

Conclusions

Finally, health care providers are on the front lines fighting against this COVID-19 pandemic and facing many challenges. This pandemic could go on for months or even years with a significant impact on ophthalmology practice. In our country, we adopted a partial ban policy to avoid an economic collapse, with strict application of safety protocols in health care facilities and PPE. Trying to keep a balance between safety and economic burden, the majority of ophthalmologists are willing to see elective patients and operate on an urgent COVID-19 patient,

under adherence to the safety protocols. We found that our practice is going along with the new interim American Academy of Ophthalmology guidelines on resuming elective ophthalmic care [9]. Eventually, most of the world will be considering a gradual and careful return back to near-normal life.

The COVID-19 pandemic and its consequences show the importance of making greater investments in health care facilities. They also draw our attention to the importance of telemedicine, which should become an integral part of our practice. Distant learning and online conferences and courses are alternative solutions during the current situation, and may continue to be so after the pandemic; however, surgical training is still a challenge.

Statement of Ethics

Informed consent was obtained from all participants. The study protocol was revised and approved by Ophthalmology Department Ethics Committee at Cairo University.

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Conflict of Interest Statement

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Author Contributions

A.M.A.: design of the work, analysis and interpretation of the data, and review and revision of the manuscript. H.S.M.: acquisition of the data, conceptualization of the manuscript with review and synthesis of the literature, and drafting of the manuscript. M.M.H.: conceptualization of the manuscript with review and synthesis of the literature, drafting of the manuscript, and review and revision of the manuscript. T.A.M.: design of the work, analysis and interpretation of the data, and critical review and revision of the manuscript. H.M.A.E.-S.: design of the work, acquisition of the data, and drafting of the manuscript.