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Global Ophthalmology Practice Patterns during COVID-19 Pandemic and Lockdown

Srinivasan Sanjay ^a, Seo Wei Leo ^b, Kah - Guan Au Eong ^{c,d}, Gitalisa Andayani Adriono^e, Kenneth CS Fong ^f, Kartik Anand ^g, Rumita S Kadarisman^h, David B Granet ⁱ, Padmamalini Mahendradas ^a, Rohit Shetty ^j, Sharon D Souza ^k, and Swaminathan P Iyer ^k

^aDepartment of Uvea and Ocular Immunology, Narayana Nethralaya, Bengaluru, India; ^bDr Leo Adult & Paediatric Eye Specialist Pte Ltd, Mount Elizabeth Medical Centre, Singapore; ^cInternational Eye Cataract Retina Center, Mount Elizabeth Medical Center and Farrer Park Medical Center, Singapore; ^dDepartment of Ophthalmology & Visual Sciences, Khoo Teck Puat Hospital, Singapore; ^eDepartment of Ophthalmology, Faculty of Medicine Universitas Indonesia, Mangunkusumo Hospital, Jakarta, Indonesia; ^fOasisEye Specialists, Kuala Lumpur, Malaysia; ^gGreat Plains Health Callahan Cancer Center, University of Nebraska, North Platte, Nebraska, USA; ^hAini Eye Clinic, Jakarta Hospital, Jakarta, Indonesia; ⁱRatner Children's Eye Center, Shiley Eye Institute, University of California, San Diego, USA; ^jDepartment of Cornea and Refractive Services, Narayana Nethralaya, Bengaluru, India; ^kDepartment of Medicine, University of Texas MD Anderson Cancer Center, Houston, Texas, USA

ABSTRACT

Aim: To assess the impact of practice patterns amongst global ophthalmologists during severe acute respiratory syndrome Coronavirus 2 (SARS Cov2) causing Corona virus disease (COVID-19) and understand the various modifications made to address emergency surgeries and practice needs.

Methods: An online survey was sent to practicing ophthalmologists around the world through email, Whatsapp™ ListServ17.0™ (for pediatric ophthalmologists), WeChat™ (China) and ophthalmology associations (Indonesia, Philippines, Ireland). All queries were collected and categorized. Responses to the queries were given according to the recommendations by the Ophthalmology association. Practices ability to deal with the COVID were also classified according to country and type of access to PPE. Statistical analyses of the association between these data and queries, where appropriate were carried out.

Results: One thousand nine hundred sixteen ophthalmologists were invited to participate in a survey between April 10th and April 30th, 2020 of which 1207 responded, which is a response rate of approximately 63%. The majority of respondents were from India, Indonesia, China, Singapore and the USA. Our study indicates a precipitous drop in surgical procedures with 46% (n = 538) ophthalmologists ceased to operate on their patients and almost 40% (n = 486) were doing less than 25% of their original number of surgeries. The intent to resume elective surgeries was a consideration in 41% (n = 495) after an evaluation of the situation and in consultation with professional bodies. More than 2/3 of the respondents (n = 703) made it a priority to use and mandate their patients to practice physical distancing, wearing masks, and hand disinfection for protection to limit the spread of infection.

Conclusion: This global survey provides a real-world assessment of diverse practices that were in various forms of "shut down mode" and circumstances with varying capabilities to deal with COVID. It is unprecedented that the collective wisdom for a curtailment of practice has had an enormous immediate and far reaching implications on the livelihoods of ophthalmologists, their staff, and their families. Nevertheless, ophthalmologists and their staff remain resilient and have adapted to these changes pragmatically.

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COVID19; PPE; telehealth; ophthalmic surgery; outpatient consultations

Introduction

Dr. Li Wen Liang, an ophthalmologist was the first to bring attention to the Corona Virus Disease 19 (COVID-19) in Wuhan. Dr. Liang died after becoming infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in Wuhan, China, on Feb 7, 2020, at age 33.¹ Since then over 100 countries have instituted partial or complete lockdown.² Ophthalmology practices all over

the world have changed dramatically over the last few months and will continue to evolve, while adjusting to these changes and at the same time continuing to address the emergencies particularly arising from COVID-19. The American Academy of Ophthalmology (AAO) issued interim guidelines in March 2020 that recommended that all ophthalmologists provide only urgent or emergent care.³ This care is solely determined by the medical circumstances and the capabilities of the various

CONTACT Srinivasan Sanjay  sanjaygroup24@gmail.com  Department of Uvea and Ocular Immunology, Narayana Nethralaya, Bengaluru, India

 Supplemental data for this article can be accessed on the publisher's website

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ophthalmologic practices. Moreover, it is now becoming increasingly clear that there are many asymptomatic persons who continue to shed the virus and can act as carriers.^{4**5} Due to the lack of availability in testing everyone and ongoing reasons to consult for their ophthalmic symptoms, many ophthalmologists have adopted different approaches to deal with this problem. Some of these include reduction in staff, frequent sanitization of the offices, limiting accompanying family member/caregiver and restricting the exam visit with only the patient. Additional modifications of the slit lamps/ binocular indirect ophthalmoscope with “do it yourself (DIY)” splash guards.

As the COVID-19 cases rise and abate in different parts of the world, there is a specific concern with eye care practitioners who have to be close to the patients while examining them. They have geared themselves to conduct business with evolving best practices that limit the spread of the disease with minimal inconveniences to the patients and ongoing support for colleagues in need. Additionally, practices have to deal with medicolegal issues arising out of adopting the Interim guidance for triage of ophthalmology patients that may limit or even deny treatments for certain situations. Nevertheless, it is clear that adoption of safe, innovative practices that can be openly shared amongst the ophthalmic fraternity will guide the way in dealing with patients during these un-paralled and vulnerable times against the COVID-19, which has no identified cures as of now.

In order to better understand how our collaborators and colleagues are coping with this unprecedented situation, we conducted an online survey with the aim to assess the impact of practice patterns amongst global ophthalmologists and understand the various modifications made to address emergency surgeries and practice needs.

Methods

An online questionnaire was sent to practicing ophthalmologists around the world through email, Whatsapp™ ListServ17.0™ (for pediatric ophthalmologists), WeChat™ (China) and ophthalmology associations (Indonesia, Philippines, Ireland). The potential respondents were identified by our co-authors through their personal contacts, their ophthalmological associations and their professional WhatsApp™ /WeChat™ groups. All valid responses were tabulated and analysed. Ethics approval was obtained by the corresponding author with his hospital internal ethics committee vide number EC Reference Number: C/2020/06/04 (Virtual_1). All the co-authors gave a letter of approval to disseminate survey forms and participate in the study.

Statistical analysis

Descriptive statistics were used to summarize the data; the results are reported as means and medians, as appropriate. Where relevant, ordinary one-way ANOVA was performed using GraphPad Prism 8 for macOS version 8.4.2 (464), April 7, 2020, GraphPad Software, San Diego California USA, www.graphpad.com; p-value less than 0.05 was considered significant.

Results

One thousand nine hundred sixteen practising ophthalmologists were contacted as mentioned in the methods mentioned above. One thousand two hundred and seven respondents agreed to participate in the survey by answering the survey, which translates into a response rate of approximately 63%. (Figure S1).

Figure 1a-f, illustrates the characteristics of the respondents based on gender, geography, type, and years of practice. With slightly more female respondents (Figure, 1a), (M: F = 537:655), the majority of the input was from the three most populous countries namely India, Indonesia, and China (n = 305, n = 276, and n = 196), respectively, followed by Singapore and USA (n = 101, n = 96). The majority of the respondents were in private practice 49% (n = 595) (Figure 1b) while those in government set up constituted the next major group 22% (n = 264). The remainder were doing a combination of private, Government, and academics. The majority of our respondents were in practice for more than 5 years (Figure 1c). The difference in the range of years of practice by the respondents in their countries was statistically significant (p-value <0.0001). The respondents in China, Hong Kong, and Singapore had practiced ophthalmology for over 10 years. The respondents from other Asian countries like India, Indonesia, and Thailand had slightly more than 5 years of practice. (Figure 1d).

This difference was not noted from the respondents from America, Europe, and Australia.

Paediatric ophthalmologists (Figure 1e) constituted the largest group and were about 45% (n = 304) among the respondents who had specified their sub speciality in 56% (n = 676). The majority of them (n = 250) practised pediatric ophthalmology alone while the rest did other specialities in addition to paediatric ophthalmology (Figure 1f). There were equal number of respondents who practised orbit, oculoplasty, and aesthetic ophthalmology (n = 84) and cataract & refractive surgery (n = 82). These

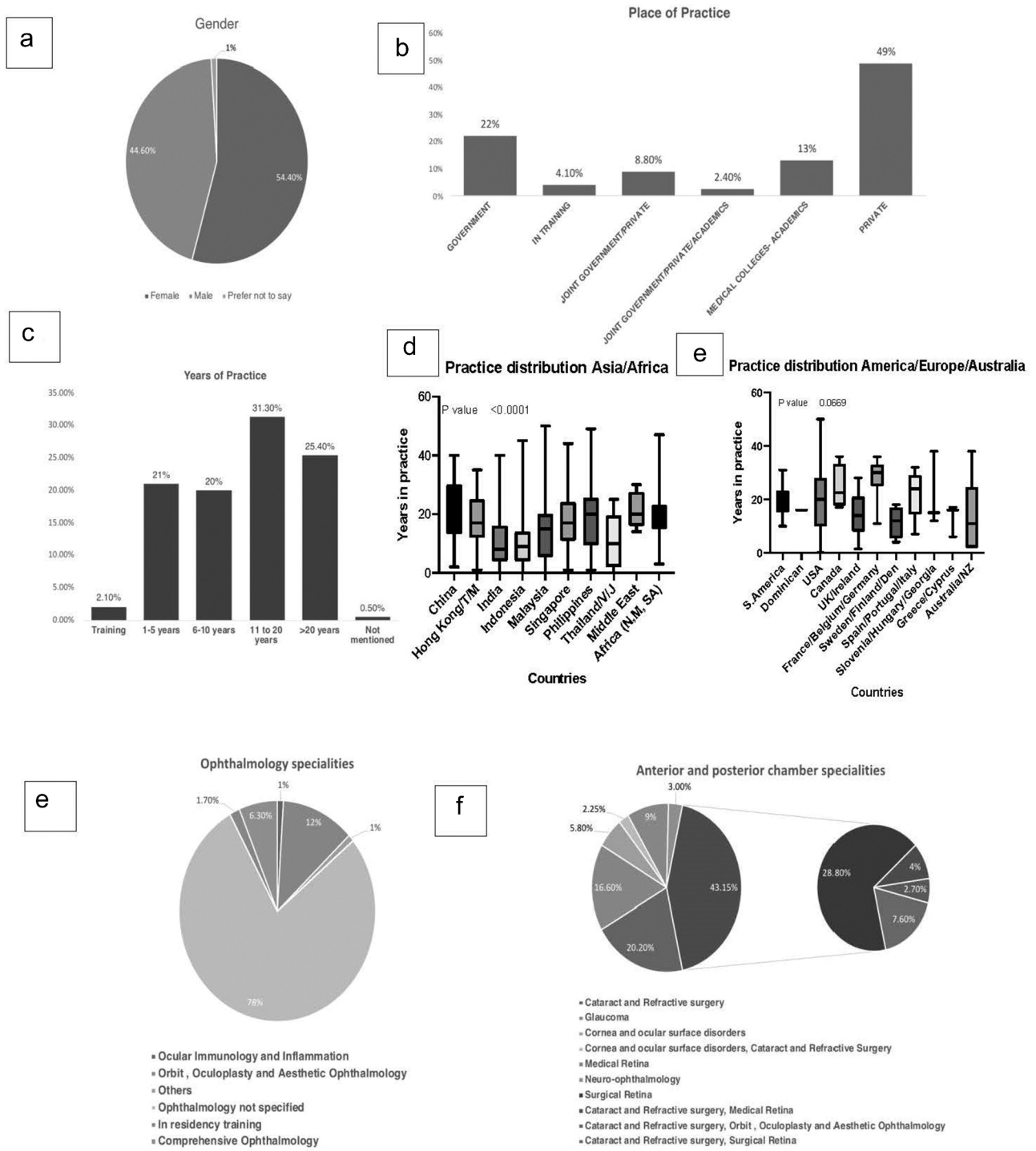


Figure 1. A-E. Characteristics of the respondents based on gender, geography, type and years of practice. A. Male to Female (M:F) ratio of 5377:655; B-Place of Practice; C-Years of Practice; D- Country specific practice experience Asia and Africa; E- Country specific practice experience America, Europe and Australia.

two specialities generally cater to elective procedures and bring in higher remuneration. There were 84 respondents in retina predominantly in surgical practice (n = 64). Twenty six of the respondents were undergoing training in ophthalmology as residents or

as sub speciality fellows. We were unable to capture the sub-speciality practice in nearly 44% (n = 531).

Adapting to the new consultation model (Figure 2 a-f)

When queried about the ongoing consultations majority 59% (n = 711) used a mix of face- to-face (F2F) and tele-consultations (Figure 2a). A small subset of 7% (n = 89) used teleconsultations only. Forty-two percent (n = 511) predominantly practised F2F consultations, 76–100% of the time (Figure 2b). There was striking differences amongst the various countries - countries in Asia like India, Indonesia, Philippines (p -value<0.0001), used F2F only half the time, relying on telephone-based consultations (Figure 2f). Overall, there were no differences in the preferences from America, Europe, and Australia.

The type of tele-consultations were (Figure 2c) telephone based 20% (n = 242) and video consultations

6.2% (n = 75) or both of them. Respondents were further using telephone with other modes of consultation 23% (n = 277) (Figure 2c), and video consultation with other modes of consultation in 17.2% (n = 208). Application-based approach was low at 6.6% (n = 80), which is likely due to lack of specific or customised platforms at this time. Other options of consultation included emails and texts.

We also surveyed the impact of the COVID-19 lockdown on future consultation approaches. Respondents reported possible changes in the nature of consultation in the future with 41% (n = 494) more willing to use telehealth and reduce the frequency of post-operative visits 25% (n = 298). Only 29% (n = 344) did not wish to change the current method of consultation in future.

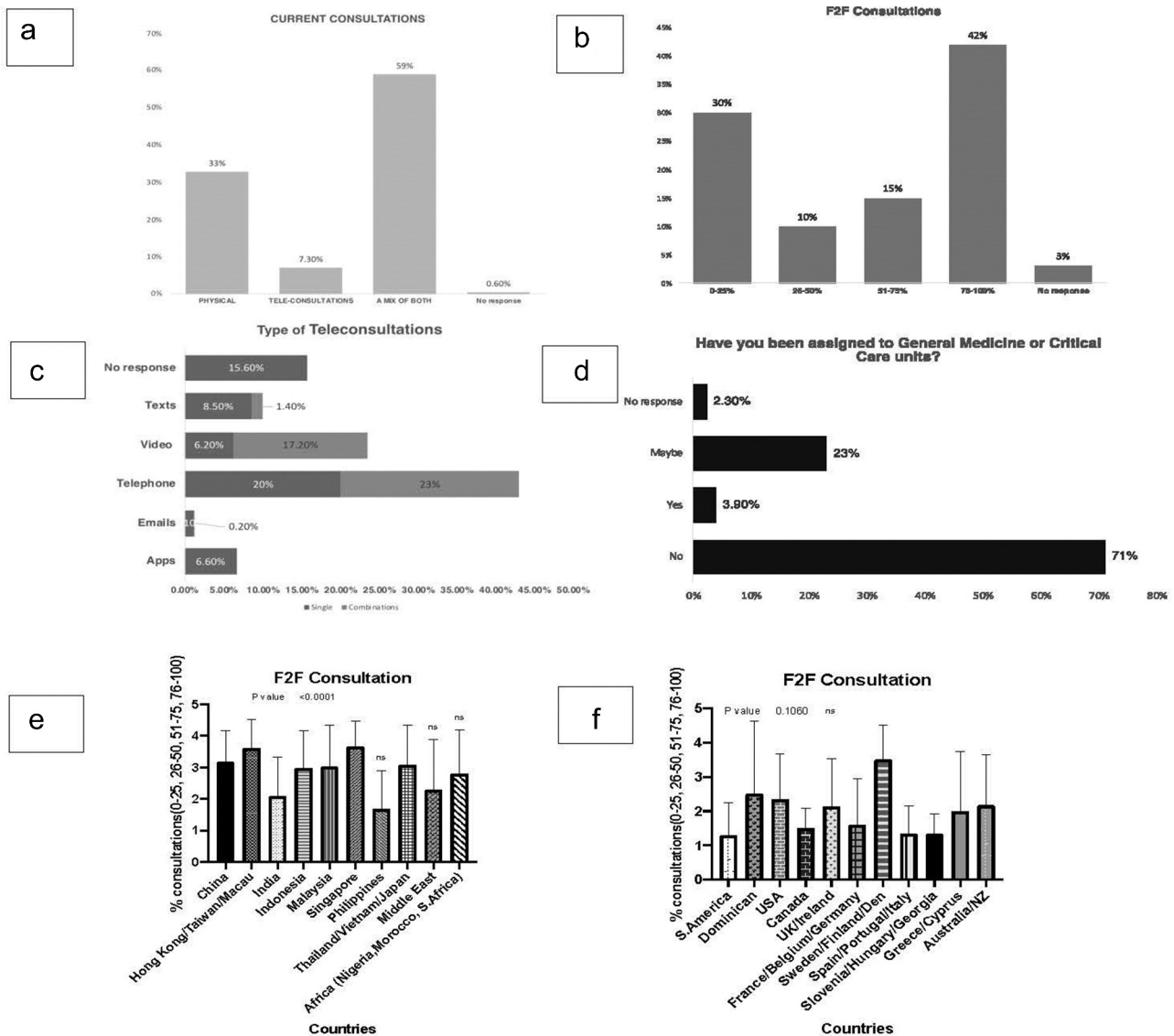


Figure 2. A-F Ophthalmic consultations during COVID-19 pandemic: A- Current Consultations; B-Face to Face (F2F) Consultations; C-Types of Teleconsultations; D-Deployment to COVID units; E- Country specific F2F Consultations Asia and Africa; F-Country specific F2F Consultations America, Europe and Australia. p-value less than 0.05 was considered significant.

Analysing F2F by countries showed that in Asia/Africa continents (Figure 2e), F2F was still practiced in China, Hong-Kong, and Singapore, while it was less so in India and Philippines (p-value <0.0001). This difference was not noticed from the respondents from America, Europe, and Australia (Figure 2f).

Deployment to other roles (Figure 2d)

Majority of the ophthalmologist respondents 71% (n = 853) reported that they were not deployed to provide general or critical care for the patients. Only 3.9% (n = 46) were assigned to take care of non-ophthalmic patients. Twenty three percent of the respondents (n = 280) may have been assigned to do non-ophthalmic work but were non-committal.

Exposure to COVID-19: (Figure 3a)

A majority of the respondents 53% (n = 623) stated that this was not applicable to their practice at the time of our survey and 39% (n = 459) did not encounter any COVID-19 patients. Only 64 respondents (5.5%) reported treating COVID-19-related conjunctivitis patients.

Patient care recommendations (Figure 3c)

Sixty seven percent (n = 703) respondents informed and advised all their patients to practice physical distancing, wearing masks, and hand dis-infection to protect themselves and prevent spreading to others. Nineteen percent (n = 204) even advised wearing gloves whenever possible in addition to the above. Overall 86% (n = 907) of the respondents were very concerned about the vulnerability of the patients and provided the prevailing measures to prevent the spread of infection.

PPE safeguards in the clinic/hospital and perceptions of support (Figure 3b)

Since this pandemic disrupted the traditional models of care, respondents reported the substantial changes to their ophthalmology practices. Majority of them 75% (n = 907) practiced active dis-infection, physical distancing, and used masks and gloves. Ninety one percent (n = 1096) utilized a surgical nose mouth mask, 74% (n = 889) gloves and 87% (n = 1044) had a slit lamp barrier when they were examining the patients.

More than 49% (n = 583) were satisfied with the protective gear provided by their place of practice. About 29% (n = 343) chose to remain neutral.

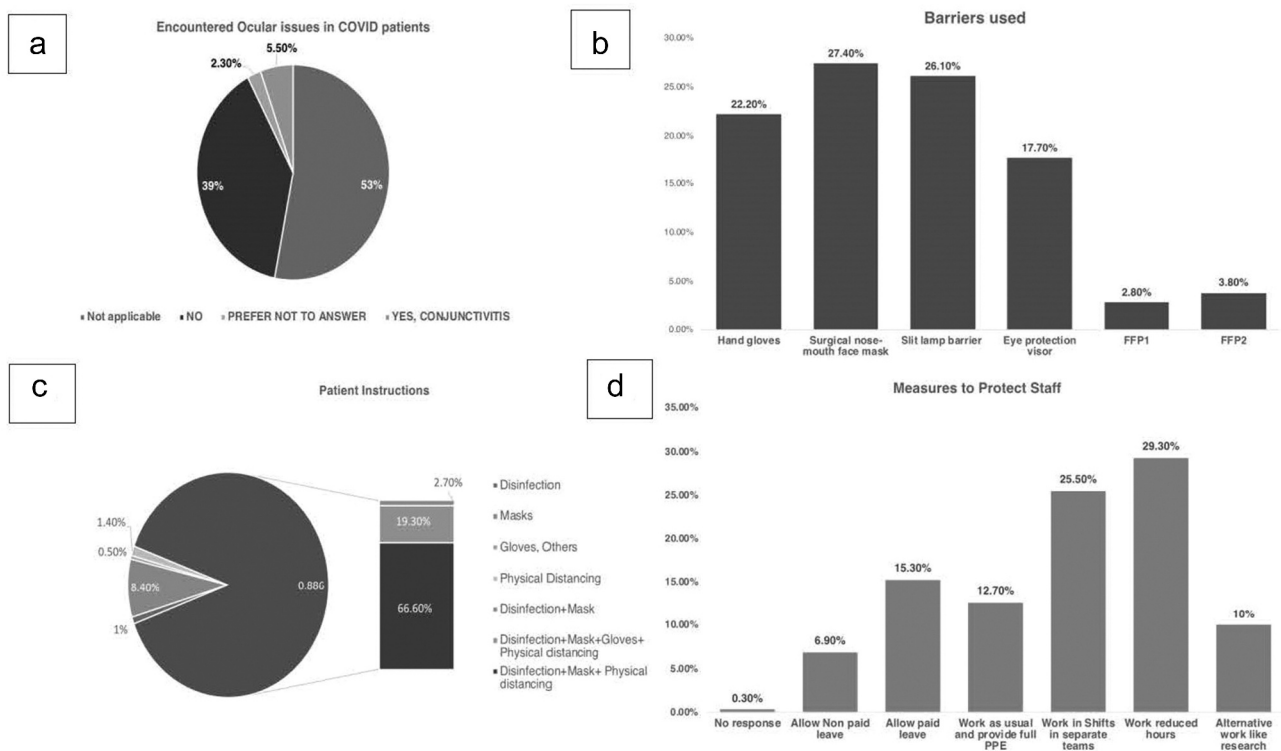


Figure 3. A-D Safety measures recommended for the patients and the staff: A-COVID positive patient encounter; B-PPE safeguards used by the staff; C-Patient safety recommendations; D-Measures to protect staff-safety and jobs.

Governments all over the world are trying their best to battle the pandemic. We had asked our respondents about their perception of the response of their Governments. Sixty one percent (n = 739) were very satisfied with adoption of their Government's policies. Sixteen percent (n = 194) were dissatisfied with the response (data not shown). In general, there was satisfaction with the hospitals and the government response in China, Hong Kong, Singapore, Malaysia and most countries in North America, Europe, and Australia/New Zealand. The personal protective equipment (PPE) provided to the practitioners and its satisfaction among respondents was different across the countries. The PPE satisfaction was different across the countries on a scale of 0–100 in quartiles. The PPE dissatisfaction rate was higher in India, Philippines, Nigeria, South Africa, and South America (p-value <0.0001) in Asia; (p-value-0.5) in America/Europe/Australia.

Care of the support staff (Figure 3d)

The next important aspect was the care of the staff. The survey strongly pointed to the humane approach to work and job retention. The cumulative tabulation of the response combinations showed that many allowed paid leave (15.3%), reduced working hours (29.3%), work in shifts (25.5%) and even deployed in non-clinical activities like research, medical records (10%). Some of the respondents resorted to alternatives like allowing for a non-paid leave (6.9%) and working with full personal protective equipments (PPE) (12.7%).

Surgical practice (Figure 4 a-f)

The practice of ophthalmology is surgical based with a few non-surgical specialities like neuro-ophthalmology and uvea and ocular inflammation. During the survey period, the majority of the ophthalmologists 46% (n = 538) had ceased to operate on their patients and almost 40% (n = 486) of the respondents were doing less than 25% of their original number of surgeries compared to their average in preceding month (Figure 4b). This meant that the lock-down had an overwhelming impact on the practice of ophthalmology; nearly 89% (n = 1024) were not gainfully employed. However, ophthalmologists had to cater to emergency services as reported by 81% (n = 971), in combination with other services (Figure 4c). Slightly more than half (55%, n = 537) provided emergency and post-operative care, which is very crucial to the patients. Around 16% (n = 194) could provide elective surgery services in addition to the emergency and post-operative care. Full range of services including laser, ocular injections, and

those mentioned previously were provided by 14% (n = 168).

Only 19% (n = 236) performed elective surgeries in combination with laser/intravitreal injections/ aesthetic procedures (Figure 4d). Almost all respondents from countries reported doing no or very little (<25%) surgeries, with a small exception of a few from China (Figure 4e). It is somewhat disappointing that so many ophthalmologists were unable to render help to their patients for elective procedures.

At the time of the survey, it was not evident if testing was being offered for asymptomatic ophthalmic patients (Figure 4a). Accordingly, 60% (n = 722) were not decided about offering the testing. Thirty six percent (n = 434) reported that they would test their patients-including 7.9% (n = 95) reporting for all ophthalmic patients, 6.5% (n = 79) for those undergoing elective surgeries, 9.5% (n = 114) for those with symptoms, and the rest in combinations of above.

COVID-19 and future (Figure 5a-e)

We surveyed the future projections of the practices. Twenty nine percent (n = 344) foresaw no change in their patterns even in the future (Figure 5a). Forty one percent (n = 494) stated that they would plan for both F2F consultation incorporated with phone and video consultations whenever possible (Figure 5b). We also reviewed the intention to resume surgeries (Figure 5c) and found only 41% (n = 495) planning to do so after an evaluation of the situation and in consultation with colleagues and professional bodies. About a quarter (n = 307) planned to resume surgeries in 1–2 months. A smaller subset of 7% (n = 83) had already resumed the surgeries. Another 7.7% (n = 93) indicated that they would decide about the surgery after 3 months. Post-operative visits for routine uncomplicated elective surgery was projected to be reduced by 25% (n = 298) in future. China was the only country (Figure 5d-e) wherein the respondents indicated that they already have resumed their practice.

Supplementary Table 1 shows comparison between survey questionnaires on the practice patterns among the ophthalmologists.

Discussion

Coronavirus disease 2019 has left an indelible impact on the world and in particular to the practice of ophthalmology. Despite the recommendations from AAO, World Health Organization (WHO) and Center for Disease Control (CDC) about practice to reduce transmission, ophthalmologists are asked to

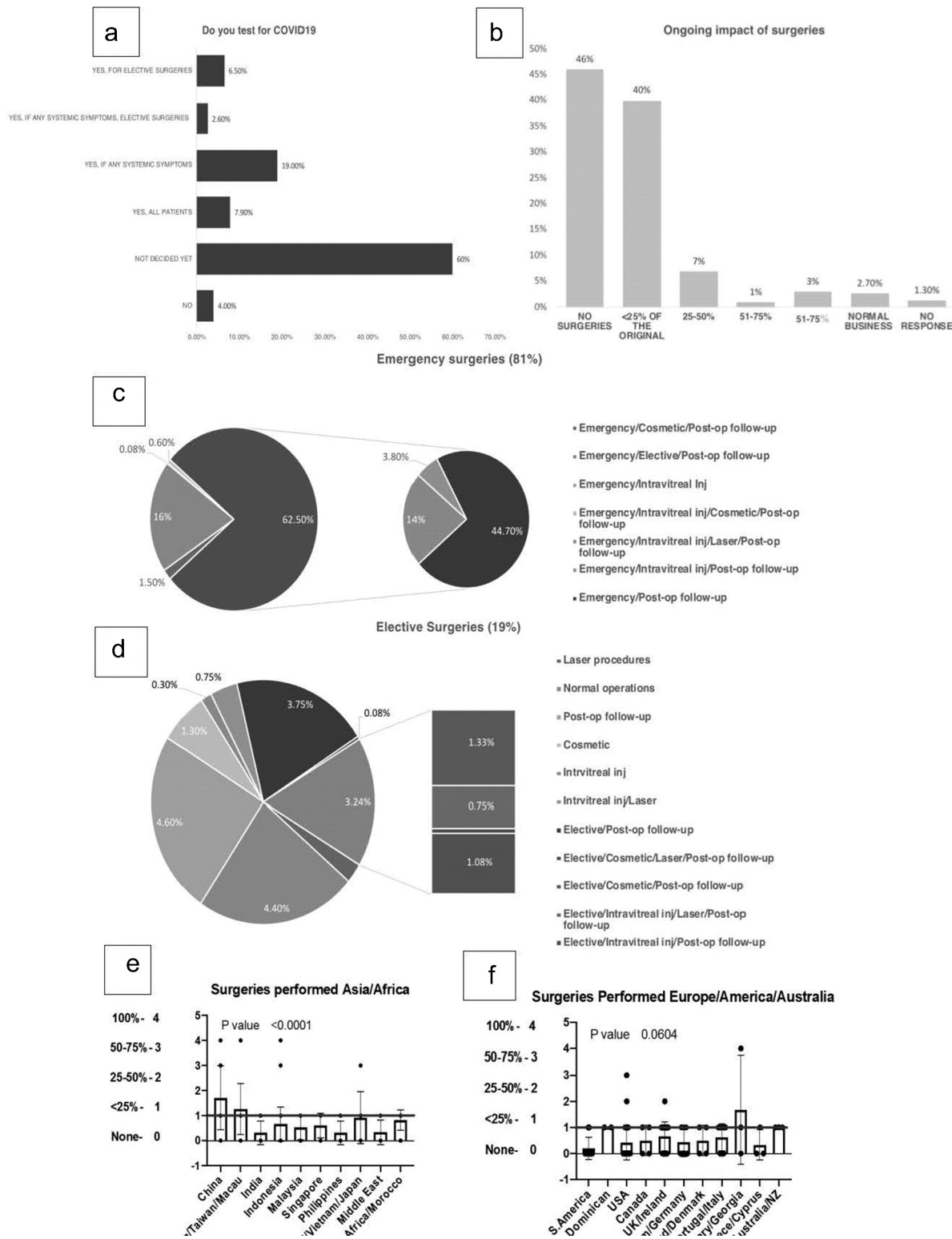


Figure 4. A-F Impact of COVID 19 on surgeries: A-Testing for COVID19; B-Ongoing impact on surgeries; C-Details of Emergency surgeries; D-Details of Elective surgeries; E-Country specific impact on surgeries in Asia and Africa; F-Country specific impact on surgeries in America, Europe and Australia. p-value less than 0.05 was considered significant.

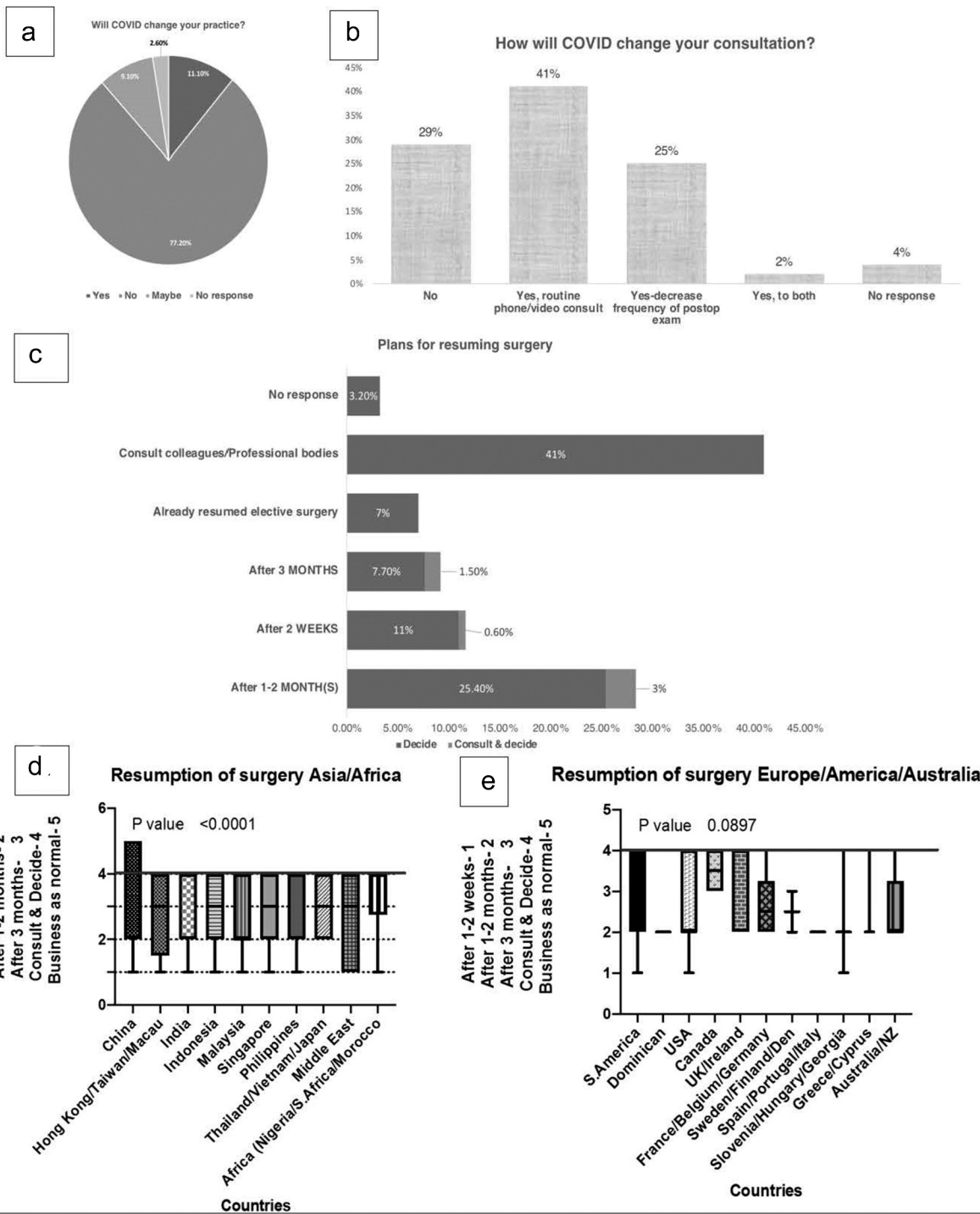


Figure 5. A-E Potential impact of COVID 19 on future practice: A-Perception of COVID changing practice; B-Future Consultations; C-Estimated timeline for resuming surgeries; D-Country specific estimates for resumption of surgeries in Asia and Africa; E- Country specific estimates for resumption of surgeries in America, Europe and Australia. p-value less than 0.05 was considered significant.

continue care despite the multiple challenges of providing safety for themselves, their staff, and their patients during the pandemic.¹⁴⁻¹⁷ Even though this was an open-ended recommendation, the lack of remediable solutions have put an onus on individual

practices to balance the risk of spreading infection with the potential loss of income and service to the patients. Since it is possible that respiratory droplets from an infected person with SARS-Cov-2 could enter the mucous membranes through the eyes, we reviewed

the responses for encounters with COVID19 positive patients.¹⁸

Our global survey captures this truly representative snapshot across the Asia-Pacific, North America, Europe and to some extent in South America and Africa. We had major representations from the populous countries of the world India, Indonesia, China, United States of America, including Singapore which has the highest density of ophthalmology practice. Our survey was inclusive of responses from those in private, government, academic practices along with those in training as well. Majority of our respondents had at least 5 years or more experience in ophthalmology and this meant that they had a good grasp of their practice while answering the queries. At the outset majority were forced to stop their procedures and with a lot of uncertainty about many aspects of future care. More than a third were unsure about when to resume their practice and preferred to get an assessment of the situation and building consensus through professional societies.

Moreover, majority were undecided about their asymptomatic patients being tested for COVID-19. As ophthalmologists work in close proximity to the eyes, and the nose, the portal of entry for SARS-CoV2, there is a theoretical risk of contracting the infection. Xia et al¹⁹ in their prospective interventional case series study of 30 confirmed cases of COVID, analysed tear samples by RT-PCR assay and found only one conjunctivitis patient tested positive for SARS-CoV-2. In a study of 1099 COVID patients, Guan et al,²⁰ conjunctival congestion was observed in 9 (0.8%) patients. Zhou et al in a retrospective study of 63 COVID patients, conjunctival swabs were positive only for three patients and negative in one patient with conjunctivitis.²¹ These studies indicate that the risk of eye-related transmission may be lesser than expected.

Ophthalmology practice around the world during the pandemic lockdown

Various surveys have been carried out to assess how ophthalmologist perceive this threat of COVID-1.²² The American Academy of Ophthalmology²² surveyed about 2500 private practitioners in United States of America (USA) from April 23rd to April 27th, 2020. The response rate was 16%, with 400 respondents and results had a confidence interval of 95% ±4% margin of error. Most of the respondents (95% of the practices) were seeing 25% or less of their pre-COVID patient volume, and 81% were seeing 10% or less of their pre-COVID surgical volume. Practices anticipate being closed 3 to 5 months and have concerns about when and how

Table 1. Summarises the COVID-19 practice from different countries at the time of writing this article.

Country	Patient	Ophthalmologists	Hospital and staff measures
Italy ⁶⁻⁸	<ul style="list-style-type: none"> Worst affected nation during the pandemic 	<ul style="list-style-type: none"> Ophthalmologists were expected to wear at least filtering face piece (FFP) 2; FFP3 was necessary during slit-lamp examination if they were attending to suspects or confirmed COVID-19 patients Goggles with good adhesion to the face was also a recommendation 	<ul style="list-style-type: none"> Triage was initiated at the entrance. to attend to patients with suspected or confirmed cases of coronavirus. Personnel had mandatory instructions to wear masks and practice hand hygiene.
Slovenia ⁹	<ul style="list-style-type: none"> Obligatory masks for the patients Symptomatic or confirmed COVID-19 patients were seen in a dedicated room 	<ul style="list-style-type: none"> Complete PPE for the ophthalmologists; A dedicated operating room was also available on COVID positive patients Ophthalmologists were advised to avoid physical consultations. Telemedicine was used as means of communication between ophthalmologists at secondary and tertiary levels. 	<ul style="list-style-type: none"> Reduced frequency of appointments to reduce congestion in waiting rooms and increased air flow in the rooms.

(Continued)

Table 1. (Continued).

Country	Patient	Ophthalmologists	Hospital and staff measures
Singapore ¹⁰ Ophthalmology department supporting the National Centre for Infectious Diseases, in Singapore came out with COVID-19 guidelines	<ul style="list-style-type: none"> • Patients were screened and proper isolation was recommended for high risk patients. • Patients were actively encouraged to have less presence if the ailments were minor with staggered appointments. 	<ul style="list-style-type: none"> • Senior ophthalmologists screen through clinical notes to determine patients with stable conditions whose appointments can be safely rescheduled, while the eye center, administrative team contacts patients at least 1 week prior to their scheduled appointments to update them • Reduced our ambulatory day surgeries by about 50% • Appropriate PPE with the N95 mask is required for all operating staff • Recommend the use of visor masks or cover specs over the use of goggles, as although both increase the working distance from the operating microscope and affects visualization during surgery, the latter further impairs vision due to condensation. • Postponing elective surgeries • Longer clinic hours to cater to backlog and adopt social distancing 	<ul style="list-style-type: none"> • PPE for healthcare workers and routine cleaning of "high-touch" surfaces. • To support a new work flow adequate logistics support with manpower was identified.
Denmark ¹¹ High volume of surgical procedures (10,000) speciality hospital	<ul style="list-style-type: none"> • Elective patients were asked to defer their appointments so that emergency patients could be prioritized. • COVID-19 testing was advocated for all patients who needed general anaesthesia and those who needed lacrimal duct surgery. • Routine day-care surgeries for patients were not tested. 	<ul style="list-style-type: none"> • Ophthalmologists were provided N95 masks for COVID 19 positive or suspected patients. • Protective shields were installed at slit lamps. • Hand hygiene was mandatory before and after each consultation with disinfection of instruments after the patient left the exam room. • Ophthalmology resident schedules were reorganized into three teams. One team covered the hospital and clinic setting for a given week, followed by 2 weeks at home in quarantine from the other groups to mitigate any cross-contamination. • Inpatient ophthalmology consultations are offered remotely by telephone, photograph, or video with primary teams when deemed appropriate • Adopted measures to reduce the outpatient numbers by prioritising appointments. • Staff received training for infection control. Slit lamp barriers, disinfection of equipment were adopted. • Self-reporting of symptoms by the staff of upper respiratory tract infection, vomiting or diarrhoea were encouraged. 	<ul style="list-style-type: none"> • Staff were redeployed from the eye department to COVID19 areas. • Waiting areas had less patients and air-puff tonometry for eye pressure was stopped as it was presumed to create aerosol-generated contamination. iCare™ or applanation tonometry with single-use head was used instead.
USA ¹²	<ul style="list-style-type: none"> • Patients were triaged into three groups: • Needing immediate care without which vision loss would occur • Who would do with video consults and • Who can be safely rescheduled • Rescheduled glaucoma unless it was acute, as the work-up was more involved compared to ophthalmology which could be planned potentially with a video consult. • Video consults were basically to check on the patient's symptoms and compliance to medication, responding to queries and providing reassurance. • Elective procedures were suspended. • All were mandated to wear masks and practice hand hygiene; • Additional PPE in areas with suspected or positive COVID-19 patients was provided. 	<ul style="list-style-type: none"> • Ophthalmologists were provided N95 masks for COVID 19 positive or suspected patients. • Protective shields were installed at slit lamps. • Hand hygiene was mandatory before and after each consultation with disinfection of instruments after the patient left the exam room. • Ophthalmology resident schedules were reorganized into three teams. One team covered the hospital and clinic setting for a given week, followed by 2 weeks at home in quarantine from the other groups to mitigate any cross-contamination. • Inpatient ophthalmology consultations are offered remotely by telephone, photograph, or video with primary teams when deemed appropriate • Adopted measures to reduce the outpatient numbers by prioritising appointments. • Staff received training for infection control. Slit lamp barriers, disinfection of equipment were adopted. • Self-reporting of symptoms by the staff of upper respiratory tract infection, vomiting or diarrhoea were encouraged. 	<ul style="list-style-type: none"> • Air ventilation was enhanced in waiting areas. • All clinic staff are required to wear masks during all patient encounters. • Providers are required to use N95 masks for encounters with patients who have confirmed disease or a positive symptom screen • Waiting room chairs are arranged approximately 6 feet apart to promote social distancing. • Appointment desk check-in lines are labelled with floor markers to indicate 6 feet of separation.
Hongkong ¹³			

they will be able to resume patient care. Sixty three percent had either granted leave or laid off their existing staff. Respondents felt that without substantive federal grants and loans that their practices will be smaller, financially unhealthy or both by the end of the year. It was projected 2% ophthalmic practices would be closed.

In Table 1, we summarize the COVID-19 practice from different countries at the time of writing this article.

This survey is only a snapshot of what happened at the beginning of pandemic when Ophthalmologists had to rapidly adapt to the raging pandemic. Some of the limitations include the impact was dynamic and so many of the stated answers may have changed according to the needs of the individual practices and along the changing guidelines from the respective countries' health authorities. The survey also did not capture the direct impact of patient care and the relapses in the illnesses; moreover, the responses reflected the collective opinions of various groups of Ophthalmologists who practiced in urban areas and may not have capture the impact on rural practices.

Conclusion

Our survey captured the preparedness of ophthalmologists to heed to the recommendation of professional bodies and their resilience to live up to the challenges posed by the pandemic. This survey is not at all encompassing for global practice, but is a real-world assessment of diverse practices that were in various forms of "shut down mode". Our study indicated a big drop in ophthalmic consultations and surgical procedures. It is unprecedented that the collective wisdom for a curtailment of practice has had an enormous immediate and far reaching implications on the livelihoods of ophthalmologists, the staff, and their families. Furthermore, there is uncertainty regarding scheduling future surgeries and whether to test for COVID-19 in all pre-operative patients. Despite all of these changes, this survey has some important take home messages for the ophthalmologists, their staff and most importantly their patients. Ophthalmologists and their staff remain resilient and committed to adapt to changes pragmatically. The guiding principle is that of balancing the risk of reducing infection by advising patients to practice hand hygiene, using surgical masks while continuing to offer ophthalmic services.

Author Contributions











Conception and design: SS, and SPI
Manuscript writing: SS LSW, KGAE, KCSF and SPI

Data Collection and analysis: SS, LSW, KGAE, GAA, KCSF, KA,DBG, SDS, RS,PM, RSK, and SPI

Final approval of manuscript: SS and SPI

Accountable for all aspects of the work: SS and SPI

ORCID

Srinivasan Sanjay  <http://orcid.org/0000-0001-9756-1207>
Seo Wei Leo  <http://orcid.org/0000-0002-0910-1620>
Kah - Guan Au Eong  <http://orcid.org/0000-0002-7373-8925>
Kenneth CS Fong  <http://orcid.org/0000-0001-5070-2690>
Kartik Anand  <http://orcid.org/0000-0003-4480-1443>
David B Granet  <http://orcid.org/0000-0001-8011-2480>
Padmamalini Mahendradas  <http://orcid.org/0000-0002-6137-8870>
Rohit Shetty  <http://orcid.org/0000-0002-4556-1587>
Sharon D Souza  <http://orcid.org/0000-0003-4584-2343>
Swaminathan P Iyer  <http://orcid.org/0000-0002-1646-813X>

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