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Ensuring the safety of clinical instruction in optometry schools at the university level: Perspective of COVID-19

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***Abstract*---**Global propagation of COVID-19 epidemic has been ongoing for months. There have been unprecedented changes in everyday social interactions because of the virus's characteristics, including its ease of transmission from one person to another and the serious clinical course it has taken in certain cases. Optometry schools around the world were forced to temporarily halt large portions of clinical instruction. The difficulties that optometry schools faced in the early to mid-2020s are discussed in this article. Six universities from five nations on four continents share their insights in this study. COVID-19 presents a number of obstacles, but there are ways to minimise the danger of virus transmission and provide safe clinical optometric education. Optometric education can be improved, according to this report.

***Keywords*---**optometry, clinical instruction, safety, COVID-19, optometric education.

Introduction

The acute respiratory syndrome (sars sickness coronavirus 2 (SARS-CoV-2) first appeared in December of last year and has since spread around the globe at an unprecedented rate. Easy human transmission, variable incubation period, and a potentially severe clinical course characterize the newly discovered virus. While elderly persons and those with comorbidities are more likely to die from influenza, younger people can also spread the virus in schools and communities [1]. As a result of these changes, kids and their families as well as the broader community are less at risk of being infected by viruses [2]. Various countries have begun a widespread lockdown of their society as of January 2020, but at different paces and with varying degrees of rigor and rigorousness.

To this end, educational institutions around the world have taken moves that were essentially unprecedented in modern times and stopped offering face-to-face instruction, shut down their physical campuses for students and employees, and shifted their activities online. SARS-CoV-2 has had a significant impact on the training and services provided by optometry schools around the world [3]. In clinical courses like optometry, the curriculum's emphasis on hands-on experience has proven difficult; comparable difficulties have been documented in medical school. Online and blended learning delivery was implemented with little to no advance notice or planning. Academics and students alike have a lot to learn as a result of these adjustments. Lab-based and clinical education are difficult to replicate in online virtual learning systems, while other skills and experiences are inaccessible [4]. A concern for optometry schools is that students' studies may be delayed or even jeopardized by this, and it may prevent students who are in the process of applying for university courses from enrolling in an optometry course.

COVID-19's effect on the eye was reported in a recent editorial and review. COVID-19 has had a significant impact on teaching in optometry schools around the world, and this paper will describe the difficulties that have arisen and continue to arise. In this paper, the authors provide their own ideas about how to make clinical teaching in optometry schools as safe and successful as possible. Six institutions from five nations and four continents are used to illustrate four fundamental solutions to these problems. The responses of optometry schools in Australia, China (Hong Kong), Spain, the United Kingdom, and the United States, as well as the current state of optometry university education, are discussed. The student experience and mental health of students are also taken into account on a broader scale. As a last point, the lingering dangers of returning to clinical teaching practice are explored. In cases where it is available, the data is as of September 2020 at the earliest.

Responses from Institutes of Higher Education in Five Nations and Three Continents

Countries around the world took action to stop the spread of Covid 19 after WHO declared the virus to be a pandemic back in March 2020. Many universities throughout the world have taken safeguards to ensure the safety of their students and employees, as well as their patients in medical and health profession departments [5]. The authors' institutions implemented a variety of strategies, including ending in-person instruction, rapidly switching to distance learning, closing optometrist clinics on campus and in the university, and discontinuing patient care. To secure broad agreement on any measures adopted, optometry schools coordinated their discussions with regulatory agencies. As a result of these and other national professional and regulatory organisations, optometry schools in various countries, including the UK Optometry Schools Council, Spanish National Board of Optometry Deans, Optometry Council of Australia and New Zealand, and the Association of Schools and Colleges of Optometry (in the United States), kept in regular contact with one another. Following is a list of nation and institution-specific responses to this question.

Teaching Methods and Their Effect on Pupils Have Changed

Academics were asked to switch to online delivery after the end of in-person teaching as well as the closure of physical university campuses. Many professional and academic services staff members were put under a great deal of stress by this rapid transition to online instruction, which took place over the course of only a few days. Students were unable to complete the required number of clinical case episodes because to the closing of on-campus optometry clinics. There are a variety of ways in which universities have tried to address the lack of clinical experience [6]. Students were also unable to complete required externships, such as those at eye hospitals. Many optometry schools encountered unexpected challenges at the conclusion of the semester when assessing students' knowledge to determine module (course) marks (grades). Finally, the change to online teaching and learning necessitated a steep learning curve for academics and students alike. Personal protection equipment (PPE) and social distance restrictions are required for clinical instruction. We'll take a look at a few institutions' methods here, as well as the enormous difficulties that come with bringing back clinical instruction on university campuses.

Scotland's Glasgow Caledonian University

COVID-19 has killed more than 41,000 people in the United Kingdom, with more over 400,000 verified cases. After a three-month lockdown that ended in September of 2020, Scotland has re-emerged. A week before the country-wide shut down, GCU had responded fast and successfully by halting face-to-face teaching in March. The academic year at GCU is divided into three distinct trimesters, each of which lasts a total of nine months. By the time of the switch to online-only instruction in the second trimester, 75% of the course material had already been supplied. The General Optical Council in the United Kingdom has given its approval to the proposed amendments to the regulations. The team ensured that each module's learning objectives were met. Timed online assessments, including open-book, short-answer questions, were used in place of written exams. Instead of clinical exams, students now participate in one-on-one case discussions that focus on improving their ability to communicate with one another and managing patients.

In other cases, overseas students who had returned to their home countries were unable to participate in online sessions because they had to undergo quarantine upon arrival. The lockout and campus shutdown had a negative impact on several students' mental health. GCU offered a wide range of methods to enhance student well-being, such as phone and chat hotlines for students. ' Academic advisors provided a wide range of services, including weekly virtual coffee chats with students. Some students found themselves in a bind and needed to ask for financial assistance from the GCU hardship funds when all part-time employment options were eliminated. After graduating from university in the United Kingdom, students enroll in the College of Optometrists' 'Scheme for Registration' (pre-registration trainees). To become eligible to practice as an optometrist, one must successfully complete this training programme. GCU's final year students, who had expected to begin preregistration training in summer 2020, now fear that their training could be delayed by up to a year. During the summer, GCU's

clinical facilities reopened, and important optometric patient care will begin in August 2020, following updated standard operating procedures. Students in their final year of study will be granted special consideration when clinical teaching resumes in the autumn of 2020. Large group lectures can be delivered in real time or asynchronously, with the development of webinars and narrated lectures of 20-30 minutes in length, leaving face-to-face/in-person capacity for the hands-on training that is a vital aspect of an optometry degree programme.

Chinese Polytechnic University of Hong Kong (HKPU)

With only 1,778 confirmed cases and 12 reported fatalities, COVID-19 had a very moderate impact on Hong Kong, indicating that the disease had only a limited spread inside the city. Immediately after a verified case of COVID-19 on January 23, 2020, the government instituted border controls and advised the general public to wear face masks as a precautionary measure. On February 10, 2020, Hong Kong Polytechnic University (HKPU) began its second academic term online-only. During a one-week recess period, academic staff were able to examine their online teaching and assist students who were having difficulty. Teaching staff implemented a clinical distance learning programme, based on the American Academy of Optometry Student Online Clinical Case Education Program (SOCEP) with the Association of Schools and Colleges of Optometry, to help students who had logged less than expected patient encounters . Aside from reading the textbooks, students in the junior year were urged to watch videos on clinical skills. Written tests were held in person in May, following social distancing standards, with students wearing face masks and disinfecting their desks, as the university re-opened. As a result, final-year optometry students were once again able to complete their clinical rotations at the clinic. On June 1, 2020, junior students will resume in-person practical training. Compared to the other institutions on this list, these changes took place far earlier. However, hospital ophthalmology department postings have not yet resumed.

School of Optometry at the University of California, Berkeley, United States

The number of confirmed COVID-19 illnesses and fatalities in California has risen steadily over the months of June and July of 2020, totaling 391,460. (as of 20 July 2020). Southern California is disproportionately affected, but the northern section of the state isn't as much. The state, county, and local governments of California have taken a variety of steps, including the shutdown of public training and education institutions, such as schools and colleges, in response to the economic crisis. Shelter-in-Place (lockdown) began on March 16, 2020, for the majority of the Bay Area, including Berkeley. Face masks are a must-have. For the safe reopening of schools employing tight case monitoring criteria and health regulations, such as masks and symptoms checks, the California Department of Public Health has published recommendations. Covid-19 had a significant impact on Berkeley Optometry's educational programmes. On March 16, 2020, the campus was closed to all save the most essential workers. The clinic remained open for urgent & emergency care, as well as on-call services available round the clock, seven days a week. As with the other optometry schools cited in this report, adjustments were made to learning and teaching [7]. Students in third and fourth year were required to attend online classes during Shelter-in-Place in order to

receive synchronous, remote, on-line instruction. The university's optometry clinic will reopen in June 2020 under tight safety procedures, allowing students to continue clinical training. At the same time, external placements started up again as well. More safety precautions and social separation in the clinic have resulted in around half of the pre-pandemic capacity. All steps are being assessed on a regular basis to prevent the emergence of clusters of COVID-19 cases in California. During the late summer, first- or second students returned to college.

At University Optometry Schools, the Teaching Atmosphere, Student Placements, and the Resulting Issues

There are numerous optometry colleges around the world that offer a blend of theoretical and clinical instruction. While large-group instruction, such as lectures, can be efficiently delivered via a number of online platforms, clinical teaching and internships at hospital ophthalmology & optometry departments or private optometry clinics necessitate face-to-face contact. Small groups or individuals can examine patients under the close supervision of clinically certified staff in specific clinical teaching rooms, which are commonly divided into smaller units (examination booths). This type of hands-on learning necessitates unavoidable contact between students and patients, putting students, supervisors, and patients at greater risk of injury or harm. Aside from the fact that COVID-19 disturbed the conventional face-to-face relationship between supervisors and students and patients at least for the time being; According to some, eye care practitioners should pay extra attention to patients with the virus in their eyes. Symptom screening, body temperature checks for all clinic staff and patients, the use of surgical masks, and frequent hand washing are only some of the standard precautions that are taken [8]. Higher degrees of personal protective equipment (PPE) are often required when evaluating symptomatic patients or patients who are unable to wear face masks, including N95 respirators that may provide better protection against viral transmission than single-layer masks when using PPE. In addition to optometrist offices, these regulations also apply to educational institutions.

Face-To-Face Ophthalmic Examination and Tool Use

Many clinical diagnostic procedures, including as subjective refraction, direct ophthalmoscopy, and slit lamp biomicroscope, necessitate patient-practitioner distances of only an arm's length or less. While interactive teaching methods such as video, simulation, and analysis of provided data sets can be used to teach some skills, the online teaching modality is not appropriate for all clinical skills. There are a number of procedures that necessitate close closeness that could be replaced by alternatives that allow for greater distances. With electronic phoropters instead of trial frames, the examiner can keep a larger distance from the patient during subjective refraction. Teaching students how to do eye exams on paying patients at university optometry clinics is one aspect of clinical teaching that has come up. Volunteers over 60 may be reluctant to attend university campuses because of the perceived higher risk of SARS-CoV-2 infection when being tested by a student optometrist and in close proximity to other students and employees. In order to continue to do is provide high-quality education to students, optometry schools are facing a number of challenges that

include: 1) campus closures; 2) social trying to distance requirements; 3) increased personal protection prerequisites for patients, students and staff, and 4) apprehension and potential anxiety of students and patients when attending university optometry ops. It is necessary to come up with and put into action new approaches to training future optometrists for the issues they will face in the field. At the institutions of the writers, academic practices are rapidly changing, and optometry training is being completely reimagined. Here are some strategies for making this change in a safe and successful manner.

The Following are Some Possible Solutions to the Problems

Optometry schools must take into account a variety of aspects in order to ensure the safe & effective delivery of clinical instruction. Students, staff, and patients using clinics at the same time; the creation and protection of aerosol droplets; the hazards and benefits of all the ophthalmic methods being taught; these are all factors to consider. One of the most effective ways to minimize the spread of the virus is to place as many students, employees, and patients as possible in separate areas of the clinic. However, it is impossible to avoid inhaling and speaking at close range when seeing patients or training trainees, so it is important to apply adequate PPE. Plastic barriers for slit lamps and other equipment can reduce the spread of droplets and aerosols. There must be an evaluation of the risks and advantages of each technique. Direct ophthalmoscopy, for example, carries a significant risk but a modest reward. Replacements for these include slit lamp fundoscopy, headband binocular direct ophthalmoscopy, centralized fundus retinal photography, and ocular coherence tomography. Non-contact tonometry has been recommended by the National Health Service (NHS) and the College of Optometrists in the UK because it has been suggested that it creates an aerosol of tears and so increases the chance of transmission of COVID-19. iCare tonometry is an option, although it still necessitates close contact.

Expanding the exchange of instructional resources within optometry departments, such as clinical case scenario databases, is another avenue for future-looking reforms in optometric education. Some clinical abilities can also be taught through alternate methods, such as via guided remote demonstration & student observation or simulation-based education, and/or virtual / mixed reality to imitate eye exams. It will take some time for these technologies to mature, and they should be thoroughly tested for both safety and effectiveness before being broadly implemented. Academics, with the help of digital learning technologists, will film themselves practicing a clinical skill on a real-life colleague for the purpose of creating these videos. For the pupil, a voice-over description will explain each step and point out any faults they should avoid. Focimetry (lensometry), slit lamp biomicroscope, and Goldmann applanation tonometry are a few examples of talents that could benefit from video demonstration and observation.

Clinical case discussion has already been described as a means of providing extensive diagnostic or patient management training. Clinical distance learning schemes like those at Hong Kong Polytechnic University (HKPU) are examples of how digital clinical teaching may be used to facilitate on-the-job training and education. Finally, final-year students could complete their programme of study

thanks to an excellent teamwork between academic and medical professionals [9]. Students learned about a wide range of ocular disorders by studying actual cases from the clinic staff logs that were used in the teaching process. However, a combination of in-person and remote education may be preferred. The in-depth online conversations provided a good substitute to in-person instruction. One teacher to one student was used to give cases, which allowed all pupils (even the more reserved ones) to express their ideas without fear of being subjected to group judgement. Students in their final year were exposed to advanced optometric management techniques, while those in their first year were exposed to narrated clinical demonstrations recorded on video & made available on the school's online learning platform. Digital remote clinical teaching in optometry has yet to be studied for its long-term effectiveness; however, the authors are optimistic that digital clinical teaching can help students achieve their academic goals.

For staff and students, the usage of mixed and digital forms allows them to have greater freedom in accessing lectures or transcripts electronically, as well as the option of re-using online learning material. Students of optometry now have the opportunity to study more about infection management, public health, and telemedicine as a result of the COVID-19 pandemic, in addition to clinical teaching adjustments and the creation of remotely presented case discussions and videos. As a whole, the changes that optometry schools are going through and pushing represent a significant reorganization of higher education and the way optometry education is offered. In order to maintain social distance, the return to campus is being done in accordance with government rules, which include limiting the number of students in labs and other instructional locations. This could mean, in the future, that the current improvements must be maintained or that additional changes are required, especially if there is another outbreak (or intensify).

Requirements for Social Isolation

All institutions will need to maintain a certain level of social distance. Students, personnel, and patients are separated by detailed protocols that have been devised and implemented. There are a variety of parameters, with a separation of 1-2 m being the most typical. In order to speed up clinical skills training, small group teaching under tight conditions has been implemented. Teaching schedules had to be reworked to accommodate a lower practical class size (say, 50%) and repeated tasks. The number of days that first- and second-year students must attend in person during a given week has been reduced in order to encourage social distancing. The UK Optometry Schools Council has recommended a maximum patient examination time of 20 minutes rather than the 90-120 minutes traditionally required in a teaching clinic because of the ongoing uncertainty as to whether asymptomatic individual people are likely to transmit COVID-19 and emerging evidence that academic institutions such as high schools facilitate transmission. Face-to-face consultations can be supplemented with virtual or simulated consultations, depending on the needs of the patient and the clinicians involved.

A patient's or student's or staff member's personal protection needs

There has been some debate over how this virus spreads, but it is now widely accepted that droplets and aerosols from coughing and sneezing, even inhaling, or contact with an infected person or potentially contaminated surfaces are the most likely routes of transmission. Face masks are commonplace in Hong Kong, but not completely accepted in Western nations, even though they are becoming increasingly necessary. Countries like Australia, which have seen only a few of new cases, have not made the wearing of face masks mandatory. When using public transportation or shopping in the UK, facial covers are becoming increasingly necessary. Local bans and advise on facial coverings are frequently established and repealed at short notice based on local virus transmission data in California, New York, Scotland, and Spain. There will be a new recommendation issued by the World Health Organization (WHO) in June 2020 stating that face masks should be worn by everyone who works in clinical areas of a healthcare facility, including patients. In circumstances where physical separation isn't an option, the recommendation involves wearing a face mask for specific age groups, such as individuals 60 years and older. A systematic study of preventative strategies made similar recommendations before these recommendations were made. In optometry schools, masks have already been implemented, and visors can be used as an additional layer of protection. An rising number of public health messages emphasise the importance of thorough hand washing for preventing the spread of disease, which entails washing hands at least 20 seconds with soap or a special hand cleaner before and after every patient visit. The gels can also be used as the patient enters the clinic, during procedures, and when they leave the clinic. Maintaining the cleanliness of ophthalmic instruments is an ongoing priority. The public health campaign has emphasized the importance of hand washing, the use of hand sanitizer, and the avoidance of touching one's face. Throughout the day, surfaces such as handrails and doorknobs are sanitized. Transparent shields installed at reception desks can further safeguard clinic employees.

The risk of transmission of SARS-CoV-2 has been considerably decreased as clinical teaching continues under the tight combination safety procedures indicated above. Not all optometric investigation techniques, however, can be carried out or even exhibited while keeping a secure distance. Refraction utilising a trial frame or phoropter with the iCare tonometer is one example (www.icareworld.com). Any remaining hazards must be communicated to students, teachers, and patients in order to provide the greatest possible ethical practice. This could be accomplished through launching public service announcements on social media, email, and the clinic's website, as well as communicating directly with patients before the clinic even opens. Similar to the necessity of obtaining eye care when necessary, such as the importance of retinal screening appointments and COVID-19 screenings in diabetes patients, should be underlined to patients.

Students, Staff, and Patients May Feel Nervous or Apprehensive

Remaining concerns could make students and patients unwilling to attend an optometry eye clinic for educational purposes. (i.e., nonurgent clinical needs).

During the epidemic, there have been indications that the number of patients seeking medical care from their primary point of contact, which in many cases is a general practitioner, has decreased, potentially delaying the identification of life-threatening disorders (or vision-threatening conditions). To guarantee that everyone's needs are satisfied while also working to give safe and successful clinical education in optometry schools around the world, an empathic & pragmatic approach is needed. This applies to students, staff, and patients alike. Students at SUNY and UCB can request a leave of absence from their studies if they are unable to return to college.

Conclusions

Right now optometry education is rapidly shifting from a predominantly in-person model to one that incorporates a greater amount of online content and simulation. Distance learning and telehealth have reshaped clinical education and patient care to include increasingly virtual components. The response to the COVID-19 epidemic has hastened these changes and they will continue to evolve. In-person, hands-on instruction is required for several clinical optometric abilities that are critical to patient care and cannot be taught online. New risk-benefit analyses of social distancing versus in-person activities are likely to be required for these methods. More emphasis must be placed on approaches that offer the most clinical benefit while also posing the lowest risk of SARS-CoV-2 transmission in locations where more than one clinical method is available, such as when evaluating the posterior segment. The emphasis on training strategies that provide little clinical information and/or have a higher risk of viral transmission should be reduced or eliminated altogether. As a result of the pandemic, "conventional" techniques that have resisted efforts to discontinue them will be eliminated, resulting in a positive impact on optometric education.

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