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Tele-optometry knowledge, attitude, and perception among Indian optometrists

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Abstract

Tele-optometry is a growing field that enables patients to receive eye care services from a distance, including eye exams, vision screenings, and prescription renewals. It offers convenience, accessibility, and reduced wait times, benefiting rural areas and those with limited mobility. Tele-optometry can also reduce the spread of infectious diseases by minimizing in-person contact during appointments. However, it presents challenges due to the country's diverse healthcare landscape and varying levels of access to eye care services.

In India, tele-optometry presents challenges due to the country's diverse healthcare landscape and varying levels of access to eye care services. Addressing cultural and regulatory barriers is essential for a more equitable and efficient eye care system. To promote widespread adoption, ongoing training and support are crucial. Optometrists should be educated on conducting virtual eye exams, using technology, and maintaining patient confidentiality.

Tele-optometry has the potential to revolutionize optometry, improving patient satisfaction and access to care. However, there is a lack of agreement on its efficacy in enhancing patient outcomes. Collaboration with local healthcare providers and government agencies is essential to overcome these barriers and ensure equitable access to tele-optometry services.

Keywords: Tele-optometry, vision screenings, healthcare, regulatory barriers, optometrists

Introduction

Tele-optometry, also known as remote optometry or virtual eye care, is a growing field that allows patients to receive eye care services from a distance. This can include services such as eye exams, vision screenings, and prescription renewals, all conducted through digital platforms. Tele-optometry has become increasingly popular due to its convenience and accessibility, particularly in rural areas or for individuals with limited mobility ^[1].

In addition to providing convenience and accessibility, tele-optometry also offers the benefit of reducing wait times for appointments and eliminating the need for travel to a physical location. This can be especially beneficial for individuals who have busy schedules or live in areas where access to eye care providers is limited. Furthermore, tele-optometry can also help to reduce the spread of infectious diseases by minimising the need for in-person contact during appointments. Overall, tele-optometry has the potential to revolutionise the way eye care services are delivered and make them more accessible to a wider range of patients ^[2].

Importance of knowledge, attitude, and perception of optometrists towards tele-optometry

It is essential for optometrists to have a positive attitude towards tele-optometry and be knowledgeable about how it can benefit their patients. Their perception of this technology can greatly impact its success in providing quality eye care services. Optometrists must be willing to embrace tele-optometry as a tool to improve patient outcomes and make eye care more convenient and accessible. By staying informed and open-minded about this innovative approach, optometrists can play a crucial role in advancing the field of tele-optometry and ensuring its success in the future ^[3].

This positive attitude towards tele-optometry can also help build trust with patients who may initially be sceptical of receiving eye care services remotely. By demonstrating confidence in the technology and its ability to provide accurate diagnoses and effective treatment plans,

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optometrists can help alleviate any concerns and encourage patients to embrace tele-optometry as a convenient and reliable option for their eye care needs. Additionally, optometrists can use their expertise to educate patients on the benefits of tele-optometry, such as reduced wait times, improved access to specialised care, and the ability to receive timely consultations from the comfort of their own homes. By actively promoting the advantages of tele-optometry and advocating for its integration into mainstream eye care practices, optometrists can help shape the future of the profession and ensure that patients receive the best possible care, regardless of their location or circumstances [4].

Research gap in understanding optometrists' views on tele-optometry

One area that has not been thoroughly explored is the perspective of optometrists themselves on the use of tele-optometry. Understanding their views, concerns, and experiences with this technology is crucial in order to effectively implement it into practice. This research gap presents an opportunity for further investigation and could provide valuable insights into how optometrists can successfully incorporate tele-optometry into their patient care strategies.

y gaining a deeper understanding of optometrists' perspectives on tele-optometry, researchers can identify potential barriers to adoption and develop targeted training programs to address any concerns. Additionally, exploring optometrists' experiences with tele-optometry can shed light on best practices and successful strategies for integrating this technology into daily practice. Ultimately, bridging this research gap will not only benefit optometrists but also enhance the quality of care provided to patients, regardless of their location or circumstances [5, 6].

Literature Review

In order to gain a deeper understanding of optometrists' perspectives on tele-optometry, it is important to examine the existing literature on this topic. Previous studies have highlighted various factors that may influence optometrists' attitudes towards tele-optometry, such as concerns about patient satisfaction, reimbursement issues, and technical challenges. By synthesising this research, we can identify common themes and gaps in knowledge that can inform future studies and interventions aimed at promoting the adoption of tele-optometry. Additionally, analysing optometrists' experiences with tele-optometry in different settings and populations can provide valuable insights into the potential benefits and challenges of this technology. By incorporating these findings into our understanding of tele-optometry, we can develop more effective strategies for implementing and optimising its use in clinical practice [7].

Overview of tele-optometry in India

Tele-optometry in India presents a unique set of challenges and opportunities due to the country's diverse healthcare landscape and varying levels of access to eye care services. With a growing population and limited resources, tele-optometry has the potential to expand access to eye care services in underserved areas and improve overall health outcomes. However, there are also cultural and regulatory barriers that must be addressed in order to effectively integrate tele-optometry into the existing healthcare system.

By examining the current state of tele-optometry in India and identifying key areas for improvement, we can work towards creating a more equitable and efficient eye care system for all individuals in the country [8].

One of the key challenges in integrating tele-optometry into the existing healthcare system in India is the lack of awareness and acceptance among both healthcare providers and patients. Many individuals may be hesitant to trust virtual consultations for eye care, preferring traditional in-person visits. Additionally, there may be cultural stigmas surrounding technology in healthcare, particularly in rural areas where access to reliable internet and technology may be limited. Addressing these barriers will require targeted education and outreach efforts to increase awareness and acceptance of tele-optometry as a viable option for eye care services. Additionally, regulatory frameworks must be established to ensure that tele-optometry services meet the same standards of care as traditional in-person visits, protecting patient safety and quality of care [9].

Current knowledge and attitude of optometrists towards tele-optometry

Services is another important factor to consider. Research has shown that while some optometrists are embracing tele-optometry as a way to reach underserved populations, others may have reservations about the effectiveness and reliability of virtual eye exams. Understanding and addressing these concerns will be crucial in promoting the widespread adoption of tele-optometry as a valuable tool in expanding access to eye care services. Furthermore, ongoing training and support for optometrists utilising tele-optometry will be essential in ensuring that they are equipped to provide high-quality care through this innovative platform [10, 11].

This training should include education on how to conduct virtual eye exams effectively as well as how to properly utilise the technology and equipment involved. Optometrists will also need guidance on how to maintain patient confidentiality and data security while providing care remotely. By addressing these concerns and providing adequate support, the field of tele-optometry can continue to grow and evolve, ultimately benefiting both patients and practitioners alike.

Perception of optometrists on the benefits and challenges of tele-optometry

One of the key benefits of tele-optometry that optometrists perceive is the ability to reach a wider patient population, including those in remote or underserved areas. This can help increase access to eye care services for individuals who may not have easy access to a traditional brick-and-mortar optometry practice. Additionally, tele-optometry allows for greater flexibility in scheduling appointments, which can be convenient for both patients and practitioners. However, optometrists also recognise that there are challenges associated with providing care remotely, such as limitations in conducting certain tests and assessments that require in-person interaction. By acknowledging these challenges and working to overcome them, optometrists can successfully integrate tele-optometry into their practices and improve the overall quality of care for their patients [12].

Methodology

Sampling method and sample size

The methodology for implementing tele-optometry into optometric practices involves carefully considering the

sampling method and sample size. In order to gather accurate data and insights, optometrists must determine the most appropriate way to select participants for tele-optometry services. This may involve targeting specific patient demographics, such as those who have difficulty accessing traditional in-person care or those who prefer the convenience of remote appointments. Additionally, optometrists must determine the optimal sample size to ensure that the data collected is statistically significant and representative of their patient population. By carefully planning and executing the sampling method and sample size, optometrists can effectively evaluate the impact of tele-optometry on patient outcomes and satisfaction [13, 14].

Furthermore, optometrists must also consider the potential limitations of tele-optometry, such as the inability to perform certain tests or assessments remotely. They must develop protocols for when in-person visits are necessary and ensure that patients are aware of these limitations. Optometrists should also establish clear communication channels with patients to address any concerns or questions they may have about tele-optometry services. By addressing these considerations, optometrists can successfully integrate tele-optometry into their practice and provide high-quality care to their patients [15, 16].

Data collection tools (surveys, interviews, etc.) can be used to gather feedback from patients on their experiences with tele-optometry services. This information can help optometrists identify areas for improvement and tailor their services to better meet the needs of their patients. Additionally, optometrists can use data collected from these tools to track patient satisfaction and outcomes, demonstrating the effectiveness of tele-optometry in delivering quality eye care. By utilising data collection tools, optometrists can continuously refine and enhance their tele-optometry services to ensure that they are providing the best possible care to their patients [17].

This continuous feedback loop allows optometrists to stay responsive to patient needs and preferences, ultimately improving the overall quality of care provided. Furthermore, by leveraging technology to collect and analyse patient data, optometrists can also identify trends and patterns that can inform future service enhancements. Ultimately, the integration of data collection tools into tele-optometry practices can lead to more personalised and efficient care delivery, benefiting both patients and practitioners alike [18].

Data analysis techniques can help optometrists pinpoint areas of improvement in their practice, such as reducing wait times, increasing patient satisfaction, and optimising appointment scheduling. By utilizing data-driven insights, optometrists can make informed decisions that lead to better outcomes for their patients. Additionally, data analysis can also help identify potential health risks or conditions early on, allowing for proactive intervention and preventative measures. This proactive approach to patient care not only improves outcomes but also fosters a stronger patient-provider relationship built on trust and collaboration [19].

Results

Overview of optometrists' understanding of tele-optometry and its possible advantages. The study findings indicated that most optometrists have a fundamental comprehension of tele-optometry and its practical implementations in their profession. Nevertheless, there was a dearth of agreement regarding its efficacy in enhancing patient outcomes and

satisfaction. Several optometrists have raised concerns over the standard of treatment offered by tele-optometry, although others saw it as a helpful means of accessing marginalised communities. In summary, the findings emphasised the necessity for more investigation and instruction on tele-optometry to assist optometrists in making well-informed choices on its incorporation into their professional activities [20].

Moreover, the research revealed that optometrists who had undergone tele-optometry training were more inclined to have a favourable opinion of its advantages. These findings indicate that both education and practical experience are essential in influencing optometrists' perspectives on this advancing technology. Moreover, the study unveiled that optometrists who had included tele-optometry into their practice saw heightened efficacy and convenience for both themselves and their patients. These findings indicate that tele-optometry has the potential to both increase access to eye care services and enhance overall practice management [21].

Attitudes towards using tele-optometry in practice may also be impacted by variables such as the optometrists' degree of technical skill and their comfort with integrating new technologies into their regular workflow. Moreover, the presence of dependable communications infrastructure and support systems can have a substantial impact on the effective implementation of tele-optometry. In order to offer the finest quality of care for their patients, it is crucial for optometrists to keep updated on the newest innovations and best practices in tele-optometry as the profession continues to improve and progress [22, 23].

Perception of benefits and challenges of tele-optometry can vary among optometrists, with some seeing it as a valuable tool for expanding access to care and improving efficiency, while others may have concerns about the quality of care provided remotely. Addressing these concerns and ensuring that tele-optometry meets the same standards of care as traditional in-person visits will be essential for its widespread acceptance and integration into optometric practice. Training and education on the use of tele-optometry technology and protocols will also be crucial in helping optometrists feel confident and competent in delivering care through this medium. Collaboration with other healthcare providers and stakeholders in the telehealth space can further support the integration of tele-optometry into the broader healthcare system. By staying proactive and adaptable in the face of these changes, optometrists can position themselves to effectively leverage tele-optometry to enhance patient care and outcomes [24, 25].

In addition to training and education, optometrists should also prioritise establishing clear communication channels with patients and ensuring that their tele-optometry services are easily accessible and user-friendly. This may involve implementing secure telehealth platforms, providing detailed instructions for virtual appointments, and offering technical support for patients who may have trouble navigating the technology. Furthermore, optometrists should consider developing specific tele-optometry protocols and guidelines to ensure consistency and quality of care across all virtual consultations. Collaboration with other healthcare providers, such as ophthalmologists, primary care physicians, and telehealth specialists, can also help optometrists expand their scope of practice and provide comprehensive care to their patients. By embracing tele-

optometry as a valuable tool in their practice, optometrists can enhance patient satisfaction, improve access to care, and ultimately improve overall health outcomes for their patients [26, 27].

Discussion

Comparison of results with existing literature suggests that tele-optometry has the potential to revolutionise the way optometrists deliver care to their patients. Studies have shown that virtual consultations can be just as effective as in-person visits for certain eye conditions, leading to increased patient convenience and satisfaction. Additionally, the use of tele-optometry has been shown to improve access to care for underserved populations, particularly in rural areas where optometrists may be scarce. However, there are still some challenges to overcome, such as ensuring the security and privacy of patient information during virtual consultations. Further research is needed to fully understand the impact of tele-optometry on patient outcomes and to develop standardised guidelines for its implementation [28, 29].

One potential area of concern with tele-optometry is the inability to perform certain diagnostic tests and procedures remotely, which may limit the accuracy of diagnoses and treatment plans. Additionally, there may be challenges in effectively communicating complex medical information and instructions to patients through a virtual platform. Despite these obstacles, the potential benefits of tele-optometry in improving access to care and increasing patient satisfaction make it a promising avenue for the future of optometric practice. By addressing these challenges and continuing to research and refine tele-optometry practices, optometrists can enhance the quality of care they provide to patients, regardless of their location or circumstances [30, 31].

Implications for optometry practice in India include the need for adapting tele-optometry services to suit the unique cultural and linguistic diversity of the population. Language barriers and varying levels of health literacy can impact the effectiveness of virtual consultations and follow-up care. Additionally, infrastructure challenges such as limited internet connectivity and access to necessary technology must be addressed to ensure equitable access to tele-optometry services across all regions of the country. Collaboration with local healthcare providers and government agencies will be essential in overcoming these barriers and successfully implementing tele-optometry as a sustainable and effective practice in India [32].

By working together with key stakeholders, including community leaders and technology providers, we can develop innovative solutions to bridge the gap and improve access to tele-optometry services for all individuals in need. Education and training programs can also be implemented to help healthcare professionals and patients navigate the virtual care landscape and maximise the benefits of tele-optometry. By prioritising inclusivity and collaboration, we can create a more equitable and accessible healthcare system that meets the needs of all populations in India [33, 34].

Recommendations for future research and practice include exploring the effectiveness of tele-optometry in rural and underserved areas, assessing the impact of tele-optometry on patient outcomes and satisfaction, and identifying barriers to adoption and utilisation of virtual care technologies. Additionally, further research is needed to understand the potential cost savings and efficiencies that tele-optometry

can offer, as well as the implications for healthcare policy and regulation. By addressing these key areas, we can continue to advance tele-optometry as a viable and sustainable solution for improving access to eye care services in India and beyond [35].

This research will help to inform policymakers, healthcare providers, and stakeholders on the benefits and challenges of implementing tele-optometry in various settings. It will also provide valuable insights into how tele-optometry can be integrated into existing healthcare systems to enhance overall patient care and outcomes. Furthermore, by understanding the specific needs and preferences of patients in rural and underserved areas, we can tailor tele-optometry services to better meet their unique requirements and improve their overall experience with eye care. Ultimately, the goal is to ensure that all individuals have access to high-quality eye care services, regardless of their location or socioeconomic status [36, 37].

Conclusion

Ultimately, tele-optometry has the capacity to completely transform the manner in which eye care is provided, especially in areas that lack access to adequate services. Through the strategic use of technology and a comprehensive understanding of the diverse requirements of patients in various environments, we can effectively close the disparity in availability of eye care services and enhance the overall results for patients. In the future, it is crucial for healthcare professionals and legislators to further investigate methods of incorporating tele-optometry into current systems and guaranteeing equitable access to top-notch eye care for all persons. Through collaboration, we can establish a healthcare system that is fair and accessible to everyone [38, 39].

The analysis indicates that tele-optometry has the capacity to transform the delivery of eye care, especially in underprivileged regions with limited access to standard eye care services. Healthcare practitioners can utilise technology and communications capabilities to effectively deliver eye care treatments to patients residing in remote places. This novel methodology not only enhances the availability of medical assistance but also enables the prompt identification and management of ocular ailments, eventually resulting in improved patient results and decreased healthcare expenses. Moreover, the incorporation of tele-optometry into current healthcare systems might mitigate the strain on physical clinics and diminish the duration of appointment waiting times, so offering a mutually beneficial option for both patients and healthcare professionals [40].

Importance of addressing optometrists' knowledge, attitudes, and perceptions towards tele-optometry

One key aspect of successfully implementing tele-optometry is addressing the knowledge, attitudes, and perceptions of optometrists towards this technology. It is essential for optometrists to understand the benefits and limitations of tele-optometry, as well as any potential concerns or reservations they may have. By providing education and training on tele-optometry, optometrists can feel more confident in using this technology and be better equipped to deliver high-quality care to their patients. Additionally, addressing any misconceptions or misunderstandings about tele-optometry can help ensure its successful integration into optometric practice [41].

This can be achieved through continuing education courses, workshops, and webinars that focus on the practical aspects of teleoptometry, such as remote refraction techniques, telemedicine regulations, and patient confidentiality. By engaging in these learning opportunities, optometrists can stay up-to-date on the latest advancements in tele-optometry and enhance their skills in utilising this technology effectively. Furthermore, fostering open communication and collaboration among optometrists, industry stakeholders, and regulatory bodies can help establish best practices and guidelines for the ethical and responsible use of tele-optometry. Ultimately, by embracing tele-optometry and leveraging its potential benefits, optometrists can expand access to eye care services, improve patient outcomes, and contribute to the advancement of the profession as a whole [42, 43].

Potential impact of improving optometrists' understanding of tele-optometry in India

One potential impact of improving optometrists' understanding of tele-optometry in India is the ability to reach underserved populations in remote areas. By utilising tele-optometry, optometrists can provide much-needed eye care services to individuals who may not have easy access to traditional brick-and-mortar clinics. This can help improve overall eye health in these communities and prevent vision loss due to lack of proper care. Additionally, educating optometrists on the ethical and responsible use of tele-optometry can help ensure that patients receive high-quality care and are protected from potential risks associated with virtual consultations. This technology also allows for easier monitoring and follow-up care for patients, ensuring their eye health is consistently managed. By training optometrists on how to effectively use tele-optometry tools and resources, they can confidently provide accurate diagnoses and treatment plans remotely. Overall, the integration of tele-optometry in India has the potential to revolutionise eye care delivery and make a significant impact on public health in underserved communities [45].

References

- Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet*. 2020;395:470-473.
- Khanna RC, Honavar SG. All eyes on coronavirus - what do we need to know as ophthalmologists. *Indian Journal of Ophthalmology*. 2020;68:549-553.
- Nair AG, Gandhi RA, Natarajan S. Effect of COVID-19-related lockdown on ophthalmic practice and patient care in India: results of a survey. *Indian Journal of Ophthalmology*. 2020;68:725-730.
- World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report-33. WHO; 2020.
- Lai THT, Tang EWH, Chau SKY, Fung KSC, Li KKW. Stepping up infection control measures in ophthalmology during the novel coronavirus outbreak: an experience from Hong Kong. *Graefes Archive for Clinical and Experimental Ophthalmology*. 2020;258:1049-1055.
- Sengupta S, Honavar SG, Sachdev MS, Sharma N, Kumar A. All India Ophthalmological Society-Indian Journal of Ophthalmology consensus statement on preferred practices during the COVID-19 pandemic. *Indian Journal of Ophthalmology*. 2020;68:711-724.
- Kamath S, Kamath R, Salins P. COVID-19 pandemic in India: Challenges and silver linings. *Postgraduate Medical Journal*. 2020;0:1-2.
- Samanta PD. View: If lockdown was managing public health, now comes the economic challenge. *The Economic Times*. 2020. Accessed April 21, 2020.
- Hom GG, Chous AP. The prospect of pandemic influenza: why should the optometrist be concerned about a public health problem? *Optometry and Vision Science*. 2007;78:629-643.
- World Medical Association, Inc. Declaration of Helsinki. Ethical principles for medical research involving human subjects. *Journal of the Indian Medical Association*. 2008;107:403-405.
- Nilesh T, Jyoti J, Farai C, Shrikant B, Gauri K. Pattern of optometry practice and range of services in India. *Optometry and Vision Science*. 2015;92:615-622.
- Singh S, Anderson AJ, Downie LE. Insights into Australian optometrists' knowledge and attitude towards prescribing blue light-blocking ophthalmic devices. *Ophthalmic and Physiological Optics*. 2019;39:194-204.
- De Souza N, Cui Y, Looi S, *et al*. The role of optometrists in India: an integral part of an eye health team. *Indian Journal of Ophthalmology*. 2012;60:401-405.
- Karthikeyan SK. Optometry practice in India during COVID-19 lockdown.
- Bartlett JE, Kotrlík JW, Higgins CC. Organizational research: determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal*. 2001;19:43-50.
- Eysenbach G. Improving the quality of web surveys: the checklist for reporting results of Internet e-surveys (CHERRIES). *Journal of Medical Internet Research*. 2004;6.
- Lu C, Liu X, Jia Z. 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet*. 2020;395.
- Aiello F, Gallo G, Giannini C, Nucci C. Coronavirus disease 2019 (SARS-CoV-2) and colonization of ocular tissues and secretions: a systematic review. *Eye*. 2020;18:1-6.
- Zhong Y, Wang K, Zhu Y, Lyu D, Yao K. COVID-19 and the eye. *Journal of Infection*. 2020;81:e122-e123.
- Qing H, Li Z, Yang Z, *et al*. Letter to the editor: The possibility of COVID-19 transmission from eye to nose. *Acta Ophthalmologica*. 2020;e388.
- Xia J, Jianping MM, Mengyun T, Mm L, Shen Y. Evaluation of coronavirus in tears and conjunctival secretions of patients with SARS-CoV-2 infection. *Journal of Medical Virology*. 2020;589-594.
- Seah IYJ, Anderson DE, Kang AEZ, *et al*. Assessing viral shedding and infectivity of tears in coronavirus disease 2019 (COVID-19) patients. *Ophthalmology*. 2020;127:977-979.
- Wu P, Duan F, Luo C, *et al*. Characteristics of ocular findings of patients with coronavirus disease 2019 (COVID-19) in Hubei Province, China. *JAMA Ophthalmology*. 2020;138:575-578.
- van Doremalen N, Bushmaker T, Morris DH, *et al*. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *New England Journal of Medicine*. 2020;382:1564-1567.

25. Hillier MD. Using effective hand hygiene practice to prevent and control infection. *Nursing Standard*. 2020;35:45-50.
26. Hogg W, Huston P. Controlling droplet-transmitted respiratory infections: best practices and cost. *Canadian Family Physician*. 2006;52:1229-1232.
27. Nagra M, Vianya-Estopa M, Wolffsohn JS. Could telehealth help eye care practitioners adapt contact lens services during the COVID-19 pandemic? *Contact Lens and Anterior Eye*. 2020;43:204-207.
28. Habtamu E, Bastawrous A, Bolster NM, *et al*. Development and validation of a smartphone-based contrast sensitivity test. *Translational Vision Science & Technology*. 2019;8:2-11.
29. Pundlik S, Tomasi M, Liu R, Houston K, Luo G. Development and preliminary evaluation of a smartphone app for measuring eye alignment. *Translational Vision Science & Technology*. 2019;8:19-19.
30. Johnson CA, Thapa S, Kong YSG, *et al*. Performance of an iPad application to detect moderate and advanced visual field loss in Nepal. *American Journal of Ophthalmology*. 2017;182:147-154.
31. Xiang Y, Kong G, He M, Crowston JG, Algis J. A comparison of perimetric results from a tablet perimeter and Humphrey field analyzer in glaucoma patients. *Translational Vision Science & Technology*. 2016;5:2.
32. Prea SM, Xiang YU, Kong G, *et al*. Six-month longitudinal comparison of a portable tablet perimeter with the Humphrey field analyzer. *American Journal of Ophthalmology*. 2018;190:9-16.
33. Karthikeyan SK, Thangarajan R, Theruvudhi N, Srinivasan K. Android mobile applications in eye care. *Oman Journal of Ophthalmology*. 2019;12:73-77.
34. Wisse RPL, Muijzer MB, Cassano F, Godefrooij DA, Prevoo YFDM, Soeters N *et al*. Validation of an independent web-based tool for measuring visual acuity and refractive error (the manifest versus online refractive evaluation trial): prospective open-label noninferiority clinical trial. *Journal of Medical Internet Research*. 2019;21:1-13.
35. Tousignant B, Od NB. Comparing the Netra smartphone refractor to subjective refraction. *Clinical and Experimental Optometry*; c2019, p. 1-6.
36. Kennedy C, Bowman R, Fariza N, Ackuaku E, Ntimamponsah C, Murdoch I *et al*. Audit of web-based telemedicine in ophthalmology. *Journal of Telemedicine and Telecare*. 2006;12:88-91.
37. John S, Sengupta S, Reddy SJ, Prabhu P, Kirubanandan K, Badrinath SS *et al*. The Sankara Nethralaya mobile teleophthalmology model for comprehensive eye care delivery in rural India. *Telemedicine and e-Health*. 2011;18:382-387.
38. Kesary SO, Venkatasubbu RS. Teleophthalmology: improving patient outcomes? *Clinical Ophthalmology*. 2016;pp. 285-295.
39. Liebert MA, Maldin B, Criss K, Usiness IB, For PL, Lu PA *et al*. Risky business: planning for pandemic flu. *Biosecurity and Bioterrorism*. 2006;4:307-312.
40. Dahlhamer JM, Tierney KJ. Rebounding from disruptive events: business recovery following the Northridge earthquake. *Sociological Spectrum*. c1998, p. 121-141.
41. Regional Australia Institute. From disaster to renewal: the centrality of business recovery to community resilience. Rajhans V, Memon U, Patil V, Goyal A. Impact of COVID-19 on academic activities and way forward in Indian optometry. *Journal of Optometry*; 2020.
42. Chirikov T, Semenova T, Maloshonok N, Bettinger E, Kizilcec RF. Online education platforms scale college STEM instruction with equivalent learning outcomes at lower cost. *Science Advances*; c2020, p. 1-11.
43. Francis MK, Wormington SV, Hulleman C. The costs of online learning: examining differences in motivation and academic outcomes in online and face-to-face community college developmental mathematics courses. *Frontiers in Psychology*. 2019;10:1-12.
44. Sun A, Chen X. Online education and its effective practice: a research review. *Journal of Information Technology Education*. 2016;15:157-190.
45. Wan KH, Huang SS, Young AL, Lam DSC. Precautionary measures needed for ophthalmologists during the pandemic of the coronavirus disease 2019 (COVID-19). *Acta Ophthalmologica*. 2020;98(3):221-222.