Expanding the scope of tele-ophthalmology from vision centers to home

Dear Editor,

Several articles published in IJO this year have unveiled a broad spectrum of telemedicine topics beginning from challenges posed by the COVID-19 pandemic to reformations at primary, secondary, and tertiary eye care levels. Although the COVID-19 scenario may fade away in a few months to years, it cannot be denied that the new norm set forth by it is likely to raise the standards of eye care delivery. Tele-ophthalmology via Vision Centers (VC) has emerged as the central focus of remedy in assuring safe and continuous delivery of eye care without compromising on the quality of treatment. Several eye care systems have tried different technological solutions and practice algorithms to combat current hurdles. Yet, the uncertainty about the prevailing COVID-19 eradication or similar pandemics in the future mandates healthcare systems to further expand from VC to home-telemedicine.

Home-Telemedicine (HTM) [Fig. 1] or home-based healthcare delivery is the use of information, communication, and monitoring technologies that allow healthcare providers to remotely evaluate health status, give educational intervention, or deliver health and social care to patients in their homes. Several terms have been used in literature to describe the provision of healthcare at home such as home-based-healthcare, tele-home care, remote health care, home-telecare, etc. All of them describe similar concepts of HTM with a blurred distinction. Fig. 1 provides a comprehensive overview of various concepts involved in HTM in ophthalmic practice, in short, Home-teleophthalmology.
Table 1: Comparison of Vision Centers vs Home telemedicine

| Modes of communication | Both synchronous and asynchronous |
|------------------------|----------------------------------|
| Legislatures[8]         | 1. Patient doctor identity must be established  
2. The patient gets the same standard of care as face-face consult  
3. Consent obtained and recorded (Implied or explicit)  
4. Maintenance of medical records  
5. Patient confidentiality and identity must be protected (IMC professional conduct etiquette and Ethics-regulation 2002 and IT)  
6. Fee taken as face to face consult |

| Type of Tele consultation[9] | Telemedicine via Vision Centers | Home-Teleophthalmology |
|-------------------------------|--------------------------------|------------------------|
| Set up and location           | Satellite connection registered to a particular institution | At home using a broadband connection |
| Technical Equipment           | 1. A computer/mobile device  
2. An integrated/external microphone | 1. A computer/mobile device  
2. laptop, tablet, and smartphone or even telephone |
| Ophthalmic Equipment          | Slit lamp, tonometer, refraction units, An integrated/external camera, Fundus camera | Home screening tools such as vision screening[9]  
Amsler chart for ARMD[10]  
I-care[11] |
| Prescriptions                 | Limited restrictions in prescribing a drug | Over the counter (OTC) and certain antibiotic eye drops[12] |
| Personnel                    | Vision Technician (VT) mediates the consultation | Can be patient or any layman |
| Patient records and confidentiality | Can be easily maintained | Might not be always possible |

Advantages

- Data more reliable
- Cost for infrastructure and manpower training
- Comfort of home
- Prone to errors

Disadvantages

- Cost for infrastructure and manpower training
- Prone to errors

Moreover, several concepts of vision centers are intermixed with HTM. A comparison of HTM vs VC is depicted in Table 1.

Mhealth (mobile Health) has the potential to expand eye care in the comfort of home. WHO defines mHealth as the “use of mobile and wireless technologies to support the achievement of health objectives”. [13] According to the International Telecommunication Union over 85% of the world’s population now is covered by a commercial wireless signal. In developing countries like India, the penetration of mobile phone network has surpassed other infrastructures. With Smartphones evolving as mini computers, the applications of mHealth have extended from home-teleconsultations to health information exchange mediums within one’s home. Smartphones can bridge the gap between patients and ophthalmologists via self-screening of vision, remote patient monitoring of visual field defects in ARMD, scheduling appointments, reminding prescription refills, and educating patients. [14] Therefore mhealth is crucial in the adoption and dissemination of Home-teleophthalmology. Vision screening smartphone applications such as PEEK Acuity, Kay ±Sight, and Amsler’s grid enable remote patient vision screening and monitoring. [15] Web-based refraction systems

Figure 1: Concept Map of Home-Telemedicine in Ophthalmology
Figure 2: Pros and Cons of HTM in Ophthalmology

Figure 3: Management Algorithm for HTM in Ophthalmic Practice
like EyeNetra can unlock the whole new area in telemedicine in community eye health.[9] Paxos Checkup (DigiSight Technologies, Inc, San Francisco, California, USA), currently in clinical studies, is a vision-assessment application that offers patients clinically validated tests such as Snellen visual acuity, dynamic Amsler grid, contrast sensitivity, color discrimination, and low-luminance acuity/contrast.[14] ForeseeHome is a lightweight, portable device that connects to an Independent Diagnostic Testing Facility (IDTF) via a wireless network, cellular modem, or landline. The ForeseeHome device was validated in the AREDS2 HOME (Home Monitoring of the Eye) Study.[17,18] Home-telepthalmology has the potential to solve the inequitable distribution of eye care by reaching remote areas.[10]

Barriers to implement home-telepthalmology include medico-legal issues, deterioration of the doctor–patient relationship,[9] physician and patient readiness to adopt the technology, lack of home-based instrument technology for eye care, and high cost of existing resources. Fig. 2 illustrates the pros and cons of HTM in ophthalmic practice. The guidelines suggested by the Ministry of Health and Family Welfare (MOHFW) on teledermatology could be applied to HTM practice too. There is a concern due to a lack of clear practice guidelines exclusive to Home-telepthalmology. Prescribing in HTM entails the same professional accountability as in the traditional in-person consult. Ophthalmologists must cautiously prescribe Over-The-Counter drugs and prescription refills with low or no abuse potential, especially topical steroids. The prescription must be issued as per the Indian Medical Council Regulations and should abide by the provisions of the Drugs and Cosmetics Act and Rules.[9] This also calls for the need to revise institutional and national policies on healthcare delivery to facilitate home-telepthalmology. An online program will be made available by the Board of Governors in the supersession of the Medical Council of India to enable all clinicians to practice teledermatology and get familiar with teledermatology guidelines.[9] Unlike vision centers, home-telepthalmology has to be implemented by the patient themselves. Therefore it becomes the added responsibility of Eye care professionals to educate and train patients and/or their caretakers to efficiently use technology in the management of eye disorders. high-cost instruments such as I-care HOME tonometer (I-care Finland Oy, Vantaa, Finland)[11] limits its use in household monitoring in Countries like India.

Future prospects for the practice of HTM in ophthalmic practice are promising. Under the Digital India project, internet connectivity has spread to rural areas and has increased in the use of smartphones.[9] These conditions favor virtual consultations and screening of patients through HTM. Further advancements in technological innovations in home screening devices and validation of existing technology could support healthcare systems to incorporate HTM into their workflow. 3D printing is yet another technology that has been encouraging in eye care provision beginning from smartphone adapters for fundus pictures to eye drop self-administration stands.[9] By integrating Medical instrument technology and Information technology, HTM can be more efficiently utilized in ophthalmology compared to other medical specialties which mostly need tactile contact for the diagnosis. This calls for eye care professionals to validate these technologies in their day to day practice.

Fig. 3 depicts a management algorithm for HTM in ophthalmic practice. The algorithm serves as a primer to enable ophthalmologists to incorporate HTM practice into their current workflow. This is not a treatment protocol but a practice guideline to remotely treat patients without compromising the quality of care. Patient data collection and payment gateways should be used appropriately for medico-legal safety and patient information security purposes. To conclude expanding the scope of tele-ophtalmology from vision centers to home-telepthalmology embarks a new era of ophthalmic healthcare delivery that can outreach to households.

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in medicine which were amenable to flexible work hours, this were previously encouraged or tempted to opt for branches also no opportunity for respite and renewal.

COVID‑19 pandemic has curtailed social activities, there is to growing professional and financial frustrations. Since the reports of mental and physical domestic abuse, possibly more complicated. Another disturbing trend is the increase in

Though not feasible for doctors in clinical specialties, work and their unsupervised care, as schools are yet to reopen. Online classes for children, which needs to be streamlined for work‑from‑home employees are drawing full salaries, while doctors who are putting their life at risk are making do with reduced or salary.

doctors who are putting their life at risk are making do with avoided progress. Indian J Ophthalmol 2020;68:367.

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