Commentary: An app a day keeps the eye doctor busy

We are all familiar with smartphones and the power of their apps. Often, we hear the phrase “there’s an app for that”, which makes our old gadgets obsolete. Common objects replaced by apps include flashlight, watch, alarm, stopwatch, reminder, phonebook, camera, calendar, calculator, and many more. Apps are so powerful that recently, we have seen the Indian government ban several apps that risk national security. Properly designed apps have great potential to convert your smartphone into a useful and specialized multi-tool. We, as ophthalmologists, should know the various apps that can help us in our profession. We should also be aware of apps that can be useful to our patients.

Eye Doctors are iDoctors

Ophthalmology is often at the cutting edge of technology. There has always been a steady stream of innovations, from ophthalmic innovators worldwide.[1] Many of the frugal innovations have been helped by easy availability of affordable but powerful smartphones and they are often made by ophthalmologists themselves.[2] The accompanying article[3] quantitatively studies the apps available in the Apple App Store and Google Play Store, to identify the various types of apps designed for ophthalmic care. They also note that most
apps are not clinically validated and many are made without the input of any ophthalmic personnel.

**Smartphones for Everyone**

In a country like India, a large number of people have access to smartphones. By the end of 2019, there were around 500 million smartphones in India. Low-cost, made for India smartphones by some of the big companies have helped fuel this growth. As ophthalmologists, we can assume that most of our patients will have smartphones.

**Apps for Ophthalmologists**

There are several excellent innovative apps for ophthalmologists as described in this cited article.[4] Some of the categories noted include apps for Vision Testing, Ophthalmic Calculations, Ophthalmic Photography,[5] Smartphone Perimetry, Toric Marking, Ophthalmic education and so on. The authors have developed an app for Clinical Grading of ocular conditions (EyeGrader: https://play.google.com/store/apps/details?id=com.fundazone.eyegraded), language helper apps (Eye Know Tamil: https://play.google.com/store/apps/details?id=com.fundazone.eyeknowtamil & Eye Know Bangla: https://play.google.com/store/apps/details?id=com.fundazone.eyeknowbangla) and a 3D Atlas of Ophthalmology (https://play.google.com/store/apps/details?id=com.fundazone.opthalmology_3D_stereo_atlas)

Potentially, by combining various smartphone apps[4] with adapters for imaging such as ASPI (Anterior Segment Photography with Intraocular Lens)[6] and DIYretcam,[7] one can carry all the equipment for an eye clinic in a handbag or maybe even in your pockets.

**Teleophthalmology During COVID-19 Pandemic**

The worldwide COVID-19 pandemic and the lockdown brought out the importance of telemedicine. Typically, teleophthalmology was conducted with the patient in a peripheral vision center examined by specialized ophthalmic equipment such as photo-slitlamp and fundus camera, assisted by an ophthalmic assistant or optometrist. In the current situation, we had to adapt to a teleconsultation where the patient is at home and has only a smartphone as equipment. Various vision testing apps, smartphone perimetry and ophthalmic photography have great potential in this time.

**Apps for Patients**

There are several types of apps which would be specifically useful for patients. Visually impaired patients would benefit from specially made smartphone apps such as those listed and described in this cited article.[9] Medication reminder apps sound an alarm (with photo of the eyelid bottle) according to dosing schedule, and can taper eyedrops as per doctor’s advice.[10] Vision simulator apps demonstrate visual symptoms, vision changes in various eye diseases and the vision through different types of spectacles, contact lenses and intraocular lenses. Disease explanation apps help the patients understand the disease and counsel them regarding the various treatment options suggested by the ophthalmologist. Teleconsultation apps connect the patient to an ophthalmologist and specialized apps can remotely check visual acuity and other parameters. There are also apps for amblyopia therapy and eye exercises.

The Future

Smartphones are getting smarter and more accessible to all. With carefully designed and well-made smartphone apps, we can do a lot of useful ophthalmic work with smartphones. Inexpensive innovative hardware attachments help in slit imaging and fundus photography. Though there are a large number of apps available, very few are validated for use. We should take efforts to conduct validation studies on useful apps so that we can understand their accuracy and limitations. I do feel that such validation studies may be undertaken for several such apps by ophthalmology and optometry students perhaps as part of their dissertation.

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