Smartphone Applications in Clinical Medicine

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INTRODUCTION

The digital industry including computers, smartphones and the world of social media has seen a tremendous upsurge in the recent years especially due to marked internet connectivity.

According to TRAI, India is an upcoming super power in the world telecommunication sector marked by improved mobile connectivity, smartphones and internet use at a reasonable cost. The urban rural divide is getting patched up and the rate of growth is quite significant.[1]

Despite such a large advancement on the technical front, medical practiioners especially physicians have not fully used its potential. Only a small section comprising of residents and students are using them frequently.A cross sectional multicentre study revealed that mobile phone apps use has become almost universal in academic & clinical settings improves point of care decision making .[2] A very good review article by Andrew Bucholz deals with beilefs, benefits & barriers of smartphone use.[3,4,5]

There are currently around 165,000 health-related apps available for either Apple or Android phones and it's been predicted that the global revenue from these products will reach $21.1 billion by 2018. Globally, digital health start ups attracted $5.8 billion in funding in 2015. As on today 190 million smartphones are used in India maximum users is of Android system 60 % & only 7% use Apple IOS, it is expected that we will have 651 million smrt phones in use by 2019,(QUORA).

Two very elaborate text books written by Dr. R.D. Lele [5] envision the scenario which has come true after almost after 28 years & suppoted by stalwarts like Eric Topol recently.[6]

Few review articles published in API Medicine update 2014[7], 2016[18] & RSSDI update 2015[9] add to valuable information on technology in medicine & diabetes in India.

Mobile and internet technology should be seen as the means to address India's deficit of doctors through innovations in technology and telemedicine. A smartphone is a basic tool of communication and with the help of internet connectivity can substantially change the quality and outcome of health care; which has been confirmed by many clinical studies.[10]

MOBILE MEDICAL APPS (MMA)

Mobile apps are software programs that run on smartphones and other mobile communication devices. They can also be accessories that attach to a smartphone or other mobile communication devices, or a combination of both. Points to consider (for doctors)

1. Developer: Rely on known developers who have the experience. Eg. Medical organizations,

2. Content: Type of content- knowledge/resources/tools,

3. Accessibility: Familiarity with use of smartphones is a must and the app features should be explored,

4. Purpose: Primarily being used as reference tool, aid clinical decisions, improving patient-care,

5. Cost: Free vs. paid apps. Does the cost over time confer sustainability?

Points to consider (for recommending to patients)

1. Integration: Patient generated data as a verification tool,

2. Electronic presence: 2nd opinion, symptom checker, use in life-threatening situations including AMI/hypoglycaemia/stroke/poisoning etc.

3. Patient-doctor relationship: Improving team-based and evidence generated medical care,

4. Outcome: basic principle is to improve patient health,

5. Cost and accessibility: Feasibility of use, especially older population and cost are major factors.

OTHER CONSIDERATIONS

The rate at which the physician prescribes an app & the actual uses it, is variable the download rate is about 60 -70 % and retention rate is 20 – 50 %.

Technology access: both in terms of smartphone (costing around Rs.5-50,000) and internet connection around Rs. 500 monthly with capability to platforms and operation systems (IOS and Android) along with technology and language literacy will determine further use in upcoming years. Some smartphones are now available for senior citizens which pronounce the name of the caller, with a panic button and improve access to counter the issues of

touch and dexterity of a small screen.

Further financial hardships should be avoided since a few apps are free initially but may cost later. Patient motivation is seen adequately with younger age group and educated care givers. But the same may lack in patients staying alone in villages or in an old age home.

Privacy, confidentiality and burden of unnecessary advertisements are going to be major challenges of this digital age. Other issues to consider are app overload, addiction and new terms like 'selfie disorder' and 'trolls'.

1. Advanced bundled apps: These are designed to provide information at the point of care Medscape from WebMD which is supported across all devices. Medscape is the leading medical resource used by healthcare professionals for clinical information, highest rated, fastest growing free mobile app with over 4 million registered users. Initial log is required (free).

   The components include: Medical News: across 30+ specialties, covering FDA announcements, thought leader perspectives, conference news, important journal articles.

   Drug Information and Tools: adult and pediatric drug dosing information in seconds, check drug interactions, access drug dosing calculators.Disease & Condition Information: clinical presentation, workup, and treatment information for 4,400+ diseases and conditions (Authored and reviewed by expert physicians).Medical Calculators: 129 medical calculators covering formulas, scales, and classifications, drugs integrated dosing calculators. Drug Formulary Information.Continuing Medical Education Courses: Complete accredited CME/CE courses for professional development and to fulfil licensure.Offline Access: can be accessed without an internet connection when you select the option to download the clinical reference database.

   Epocrates is used by 1 million health care professionals worldwide. Highlights include: drug prescribing and safety information, drug-drug interactions among up to 30 drugs at a time, medical news and research information, perform hundreds of calculations and coordinate care securely. It also has disease information, clinical practice guidelines, alternative medications, lab guides, coding and more content is available by upgrading to an Epocrates Plus subscription.

   UpToDate is the leading clinical decision support resource with evidence-based clinical information – including drug topics and recommendations that clinicians rely on at the point of care. It has been the subject of over 30 research studies confirming that widespread usage of UpToDate is associated with improved patient care and hospital performance.

   Omnio (formerly Skyscape) has healthcare professional's clinical workflow in mind with Drug Guide, Disease Guide (Free access to The Merck Manual), Newsfeed, Interaction analyzer, Pill identifier, and dosing calculators. One can access essential, free specialty resources from trusted in the app which offers 300+ premium resources in 35+ medical specialties, integrated into a seamless, cross-indexed collection.

2. Other clinical reference tools

   Access Medicine: has eBooks on internal medicine, cardiology, genetics, pharmacy, diagnosis and management, basic sciences, patient care, and a repository of medical knowledge from all specialities ,all databases have latest editions of selected medical titles.

   DynaMed plus clinical reference tool, written by a world-class team of physicians and researchers who synthesize the evidence and provide objective analysis. Based on clinical evidence and the content is updated multiple times each day to ensure information they need to make decisions at the point of care, includes overviews and recommendations, graphics and images, precise search results every time, expert reviewers, specialty content and mobile access. Cost ($395).

3. Apps for Medical students & learning

   Many apps now cater to the medical student population and can give them and can open their worlds to many horizons. Examples: LabGear for Lab Reference, RENOTE for academic note taking and referencing- Clinical Skills: Medical History taking and clinical exam, Cranial Nerves: Functional Mapping of cranial nerves, Physiology Guru, Anatomy apps.

4. Professional enhancements uses .

   These integrated platform apps can smoothen one's clinical practice including appointments, record-keeping and are the future of e-health.

   Lybrate provides an online and app-based doctor consultation platform. Similarly Practo provides healthcare solutions for healthcare providers and consumers. Practo Search lets patients to browse through doctor profiles online and book appointments, while Practo Ray serves as a practice management solution for healthcare providers to manage patient data and digital healthcare records. PlexusMD is professional network for doctors and healthcare organizations Profile, can find and connect with their alumni and colleagues, share and read interesting cases, read the latest news and apply to high quality jobs, courses and fellowships across leading institutions. Regular updates of the latest developments in your specialty from BMJ, Lancet, NEJM and associations like WHO, AHA, ESH, IMA, MCI and all other top sources Find and apply instantly to jobs, courses and fellowships across leading institutions. major conferences and

events across specialties. Share interesting cases, presentations, articles and grow your follower base.

5. For patients & caregivers

   1 mg and Netmeds are licensed online pharmacists offering prescription medicines. MyChart allow you to access your medical records on your phone at any time. You can quickly see which vaccinations you've had and when at a glance, along with the last time you visited the doctor and which prescriptions you're taking. You can even send a non-urgent message to your clinic and receive a response schedule visits from directly within the app, and request prescription refills. Physiotherapy apps, medical procedure explanation apps add value to patient care as a whole.

6. Medical Journals, Organisations in App format.

   The Journal of Association of Physicians of India has free access via myJAPI app and is an important source for consultants and physicians for practice guide-lines and for Indian literature for post-graduate students. Most of other journals are very costly. Website of API is another value addition for the Indian physicans.

7. Indian scenario- Swasthya Slate

   This is a powerful device that allows Android Tablets and Phones to conduct 33 diagnostic tests on the mobile device, includes specialized applications that help users perform a variety of screenings and health analysis protocols, allows users to deliver fast and accurate care at home, in clinics and just about anywhere. Also contains decision support tools to enable users to deliver quality recommendations. Stores electronic medical records both locally on the phone/tablet and also pushes the data onto our cloud. This allows offline/online operations and doctor on call services. CDAC, Chandigarh has developed many Indian health apps.

CONCLUSION

Smartphone apps are going to be the mainstay of health care of next generation.[11] In future How Big Data Will Change Healthcare ? New ways to mine data analytics will enable new avenues of research, identifying new patients prior to acute episodes looking at healthcare data differently, provide new sources of data and research models, in population health it will give decision support for the best outcomes to improve efficiency of management. The ultimate step is to improve population health.

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