

Mobile Medicine in the Developing World

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The wide spread use of mobile applications has improved the way people work. The mobile applications are now useful in the health sector for both the physicians as well as for the patients in developed countries. Physicians use these applications to gain access to useful information at any time. Patients use these applications for a healthy lifestyle. These mobile applications are simply software programs that are used in smartphones or any other mobile communication devices. They can also be small parts that are attached to the existing mobile devices.

Patients can use medical apps to monitor caloric intake, or to check their blood sugar (Goyal, 2013). On the other hand, physicians use these medical apps to improve and facilitate patient care, for diagnosing and treating injuries, or even for diagnosing cancer and other abnormalities in the human body. These mobile applications are also referred to as Mobile Health which conveys the same meaning of using mobile telecommunication devices like mobile phones, tablet computers and PDAs for health services and information. They can also be used for collecting clinical data and delivering this information to physicians, researchers, and patients in real-time. The developing countries have also started using these mobile devices. For example, patients can receive SMS messages as reminders of their appointments (Muessig et al., 2013).

Apart from the mobile devices, there are other applications being researched that will play a major role in the health sector (Ritger, 2013). Though this research is aimed at developed countries, the developing countries will be able to enjoy this technology through free and open-source software as the starting point. Some of these mobile technology applications include patient monitoring devices, mobile telemedicine devices, and microcomputers. Data collection

software and mobile operating system technology play major roles in the implementation of mobile medicine as well.

The Use of Mobile Applications

With social media being a widespread method of communication, people are now free to ask questions and get answers. These tools are suitable for delivering HIV prevention programs in a cost effective way to young people through the media that they are already using (Muessig et al., 2013). This technology is accessible through any smartphone with an internet connection. Since mobile phones are available in any country in the world, mobile health is increasingly recognized as an effective way to develop HIV prevention programs. Research has been done to identify and evaluate mobile phone apps related to prevention and care of HIV. Though these apps failed to attract users' attention and positive views, physicians should continue to work hard with the developers in order to improve these apps so that the results are accurate.

Diabetes comes in different forms and affects people of different age groups. It is affecting people every year. The new trend in technology makes it easier for patients to monitor their diabetes (Goyal, 2013). Mobile health applications are very helpful for self-management by providing accessible ways for the patients to monitor their glucose levels by themselves. This technology will help provide additional information to the physicians, nurses, and pharmacists. Though there are promising results using these apps, there is still more to be learned about the accuracy of these gadgets.

Mobile technology is also used by adults to understand their everyday health issues, including diet and exercise (Muessig et al., 2013). Physicians use text messaging apps to send messages to patients, asking questions about their general state of health. Patients reply to the

physicians through texting. If there is any issue to be addressed, then the physician will make an appointment for the patient

Mobile apps are also used for children with behavior problems. The applications can be used by parents at home or by teachers in schools. It is a great tool, especially for those children with Autism (Muessig et al., 2013). An example of this app, which is also used in hospitals, is My Routine. A photo which is familiar to the child is uploaded in My Routine. The familiarity of the photo helps the child to recognize the photo by clicking it. Sound can also be uploaded to encourage the child while getting treatment in the hospital. The application is very useful in reducing anxiety for these children. For the upcoming appointment of the child, parents can upload the picture of the doctor to familiarize the child with that particular doctor. This application can be downloaded for free from the internet.

My Chart, which is an electronic healthcare record, is easily accessible with a smart phone. It provides access to lab results, appointment information, any medication that a person is currently taking, and immunization history. Other features include viewing patients' records and the ability to request appointments as well as prescription refills any time, night or day. Doctors can also be asked any non-urgent questions. Parents can also view their children's medical information at any time. This application is available with iPhone and Android smart phones by downloading through the app store.

The Use of Mobile Applications in Developing Countries

Developing countries face a huge challenge in the prevalence of chronic diseases. Mobile health technology, specifically the use of mobile phones, provides support in responding to different types of diseases. Without the apps, it used to take ages for illnesses to be detected (Jason, 2013). However, in the present day, diseases can be reported by using a message sent to

the physician. Even though these apps are already in use in developed countries, some of these apps might take time to be available in developing countries on devices such as smart phones. Companies are looking forward to investing in the technology that will help the developing countries. Presently, a company called Ringful is developing these apps for pre-industrialized nations.

Pharmaceutical companies could also benefit from these apps. For example, these apps allow companies to understand the demand of their products by keeping a record of what products are used most. This is done by collecting data on how people in these countries respond to drug treatment. The data is valuable for developers. The drug companies could then use the mobile phones to ensure that drugs reach their desired destinations at the appropriate times. Issues arise, however, if these drugs fall into the wrong hands. The drugs could end up being counterfeit, stolen, or sold illegally. Regardless, companies expect positive results and the software can be beneficial to increasing their profits. The data was gathered via mobile phones and is now used in the health ministries of 20 countries in Africa (Nrooney, 2012). The application has changed the way people report illnesses.

Mobile phones have changed the lives of people in developing countries. They are widely used in Africa for bank transactions. People are able to send and receive money through their mobile devices (Morgan, 2013). Mobile money is widely used by people to pay their bills, make payments to other people and receive remittances from relatives abroad.

In 2011, the uprisings across North Africa were made possible by communicating through mobile devices. Realizing this, the former president of Egypt exerted pressure on Egypt's networks in order to slow down the opposition activity. In the aftermath of the elections

in Kenya, violence was reported via text messages which were then viewed by the rest of the world.

Since the cost of mobile phones is cheaper than that of PCs, it is hoped that mobile phones will be used as tools for delivering teaching materials to students. This will boost the education system in these developing countries, especially for those children who are not receiving any formal education.

In South Africa, a physician worried that his patients did not take their prescribed medicine on time (Dominic, 2013). Elderly people suffering from memory loss often forget to take their medications and for the drugs to be effective, these patients have to take their pills at the appropriate times. Otherwise, the drugs will have little effect. To address this issue, the doctor set up a messaging system for each of his patients. The system sends messages daily to the patients, reminding them to take their medications. This automated system is set up in different languages, including the mother tongue of that particular area.

In Bangladesh, maternal mortality is the biggest killer. To improve patient awareness, doctors launched a piece of software called Mobile4Health. This system provides information on how to take care of expectant mothers during pregnancies. It also informs people about family planning, breast feeding, and early signs of possible infant problems. This software is funded by USAID and is now used in India and South Africa (Dominic, 2013).

eHealth is a system in its pilot study which aims to digitalize health information in Bangladesh. This use of digital resources will broaden the reach of key messages for health, population, and nutrition. Netbooks containing the eHealth software have been distributed to community health workers. The orientation program is ongoing to educate the health workers on how to use the netbook and the software.

Challenges Facing Mobile Health Applications

Developing mobile health applications is not an easy task. Some challenges that health apps have yet to overcome include maintaining consumer privacy and security (Mossop, 2013). Furthermore, the development of these apps is costly and there is a lack of research showing improved health outcomes. Moreover, other challenges include:

- Physicians and patients need to recognize the role apps can play in healthcare.
- Security and privacy must be guaranteed among providers, patients and developers.
- There should be an evaluation of apps to determine their appropriate use.
- The apps must be integrated with other aspects of patient care.

No matter how effective the apps are, they need to fit into patients' routines and need to protect their privacy. More evidence of their effectiveness and their cost has yet to be addressed in the developing countries. Most of the apps are specific to mobile devices and their operating systems. Thus, different versions need to be developed to support the different types of mobile phones. This slows down the development of new apps (Dean, 2009). It is also difficult to develop mobile apps with different languages that align with the developing countries. The default language has always been English. For non-English speakers, the use of these apps is a challenge due to the language barrier. In some areas, some patients do not understand how to use the smartphones and may wonder why a physician is using a smartphone while attending to the patients.

The use of electronic medical records has increased dramatically. In hospitals, physicians and nurses are using the electronic recording of patients' data (Ritger, 2013). One of the biggest drawbacks is the cost. Not only is the price high, but hospitals need to convert all their charts into

an electronic form. Patients' records might not be transferred into the electronic form, due to human error. Therefore, doctors might not be aware of the patients' situations. Training on electronic medical records software also adds additional expenses. Hospitals must pay both trainers and trainees in order to implement these systems.

The Future of Mobile Health

Research shows that no technology has ever been adopted as fast as the smartphone. People have adopted these devices faster than automobiles, personal computers, and even the internet. We are already seeing how technology helps patients monitor their health and interact with their healthcare providers. With smartphones, users can connect with their physicians anywhere in the world and get the required information about their health (Ritger, 2013). Mobile apps are already saving lives. In remote areas, where patient visits to the clinic can be difficult, physicians can be connected to their patients through wireless technology. Doctors are then able to spot the condition of the patient and take necessary action of treatment.

Mobile technology will play an important role in the coming years. The mHealth market will increase significantly. Though there are challenges facing the healthcare industry, mobile technology will be helpful in overcoming these challenges. Mobile devices are predicted to play a greater role in the healthcare industry for both developing and developed countries. By 2017, mobile technology will be delivering healthcare to every corner of the globe (Nrooney, 2012).

In order for the mobile apps to be successful, governments and healthcare providers need to work together with mobile operators to support the trend of mHealth application (Ritger, 2013). This will include the following key factors:

- Government support: Adoption of mHealth in developing countries depends on the governments of these specific countries. They should be willing to take necessary steps in improving access and affordability of healthcare.
- Regulatory support: Regulators should be able to support implementation by emphasizing the growth of mHealth services in developing countries. This can be done by making the process of certification and standardization hassle free.
- Healthcare industry acceptance: In addition to government support, key players such as corporations, researchers, and medical professionals are vital in making the process effective and efficient.
- User adoption: Individual persons will help improve the growth and market of mHealth, simply by using these services. Physicians as well as patients should be able to make the use of mHealth affordably and easily.

In this changing industry, mobile health care is critical because it is beginning to define the future of healthcare. Its use has become a global reality. With the emerging markets, mHealth is moving faster in developing nations. Though patients believe mHealth would improve their health, some doctors think it has interfered with their traditional method of treating patients. However, we have seen how our lives have been transformed in using the apps (Ritger, 2013).

Conclusions

To sum up, we have seen how mobile apps have transformed our lives, from reminding us about appointments to detection of fetal diseases. The HIV prevention programs will surely change the lives of people in Africa. If the apps are efficient, people will be aware of fetal disease and will be more likely to prevent it. As a result, the number of people dying from the

fetal disease would be reduced dramatically. The advance in technology has made this possible. Though there are promising results, there is still more to be learned about the accuracy of these gadgets and their cost.

Adults have been using the gadgets by wearing them like a watch. Whenever they feel uncomfortable with their health, by pressing a button, the ambulance will arrive at their home within minutes. This is remarkable. By saving time, the patient is saved. If a victim of stroke or heart attack is delayed treatment, his/her life will be in danger. Parents can also use the gadget to locate their children when they get lost.

The My Routine application has been successful with autistic children by reducing their anxiety. The drawback in developing countries is that not everyone can afford the software. Internet connection in rural areas has remained a challenge. Electricity is another issue to be considered. People without electricity are less likely to receive the benefits of applications such as these.

My Chart, which provides access to lab results, appointment information, medication schedule that patients are taking and immunization history, is a very helpful tool. Still, patients challenge the privacy and security issues of the application. This shows that privacy is still a concern for users of these applications.

Though there are lots of challenges facing medical health applications, it can be seen how these apps have changed lives. It used to take ages for illnesses to be detected. In present day, diseases are easily reported by using a text message sent to the physician.

Mobile apps have changed the way people do business in Africa. They can now send and receive money through their mobile devices. There is no need to go to the bank. Internet connection is not required for this service since it is done through the text messaging system.

This is an example of how this technology already widely used. These applications not only benefit the health sector, but they have an effect on political issues as well. The uprisings in North Africa and Kenya are some of the examples. Furthermore, education cost in Africa will soon be reduced. Mobile apps for delivering teaching materials to students have been introduced.

Physicians should take extra precaution in using the apps by ensuring that proper medication is delivered to the patient. Physicians using smartphones in their practice must ensure that the apps are updated. Any apps recommended to patients should be carefully vetted for the content. In the end, it is the physician's responsibility to ensure the safety of their patients.

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