International Journal of Engineering Research
Volume No.6, Issue No.10, pp : 450-452
ISSN:2319-6890 (online),2347-5013(print)
1 Oct. 2017

Mobile Health

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Abstract - Mobile health is the creative use of emerging mobile devices to deliver and improve healthcare practices. It integrates mobile technology with the health delivery with the premise of promoting a better health and improving efficiency. Mobile health has become an increasingly important issue in a number of disciplines such as health communication, public health, and health promotion. This paper provides a brief introduction to mobile health.

Keywords: mobile health, mHealth, ehealth, digital health

I. INTRODUCTION

Mobile phones came on the market in the 1980s and only a few other technologies have had a comparable popular success. Advanced mobile phone technologies are enabling mobile healthcare delivery. These technologies along with mobile Internet offer anywhere and anytime connectivity and play key roles in modern healthcare solutions. Doctors, nurses, and other health professionals use mobile devices to access patient information, databases, and resources.

Mobile technologies can facilitate access to healthcare professionals and provide instant access to multiple wireless networks. They can increase the speed of decision making, especially for emergency situations. The rapid and wide-scale introduction of mobile technologies in healthcare is resulting in an emerging area of mobile health [1].

Mobile health (or mHealth) refers to the practice of medicine via mobile devices such as mobile phones, tablet computers, personal digital assistants (PDAs), and wearable devices. It has emerged as a subdiscipline of electronic health (or eHealth). While eHealth can be regarded as technology that supports the delivery of healthcare and provides healthcare services online, mHealth essentially provides access to healthcare [2]. Several factors contribute to this trend, especially the continuous adoption of mobile devices and the need of providing care and support for an aging society. A typical m-Health services architectures is shown in Figure 1 [3].

Worldwide, mobile technologies have demonstrated the power of communication as an agent for social change. As advances in capabilities of mobile devices are made, significant benefits can be achieved in the delivery of health care services. Integrating use of GIS and GPS with mobile technologies adds a useful geographical mapping component. MHealth technologies include health text messaging, mobile phone apps, remote monitoring, and portable sensor devices. There is an increase rise in the usage of mobile health sensors in wearable devices and smartphones. MHealth can be implemented as automated or human-assisted. MHealth technologies, when linked to cloud computing, provide several advantages.

II. APPLICATIONS

Many innovative mHhealth applications exist. Applications can deal with disease prevention and wellness, monitoring and remote care, mobile decision making, and emergency interventions. In 2011, the World Health Organization (WHO) identified several emerging health technologies that present the potential for being solutions for unmet medical needs. Google Android and Apple iOS dominate the OS market.

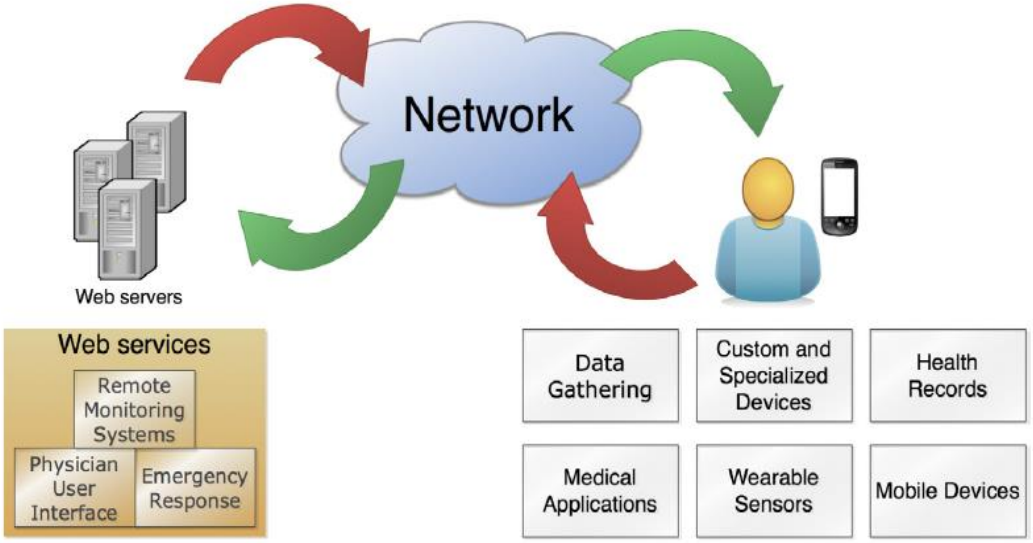

Figure 1. A typical mHealth architecture [3].

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MHealth is particularly beneficial for chronic disease patients who require long-term and regular services. There are presently more than 165,000 mHealth applications (apps) publicly available in major app stores. The top 2 categories are wellness management and disease management apps, whereas other categories include self-diagnosis, disease management, well management, mental heatlh, medication reminder, patient education, and electronic patient portal. These apps can provide low-cost, around-the-clock access to high-quality, evidence-based health information [4].

MHealth has promoted the development of teleconsultation, which is basically cross-regional medical consultation by means of computer and communication technology between medical institutions. This application may change the disease intervention to prevention, keeping healthy people away from disease [5].

MHealth is increasingly utilized to assist in providing mammography screening. Providing these services can be effective in increasing access and decreasing barriers to screening hard-to-reach populations [6].

Mobile diabetes monitoring could be an effective tool to functionally address the clinical needs of rural communities and healthcare centers. This may involve insulin and medication recording, data export and communication, diet recording, and weight managements. Even physicians prefer that their patients be able to monitor their health at home, particularly their weight and blood sugar levels [7].

The rapid growth of mHealth applications has forced many healthcare organizations to treat employees as shared owners of end user technologies such as smartphones, iPads, and tablets. Many mHealth apps promote themselves through advertising on social media channels, thereby increasing their use.

III. BENEFITS AND CHALLENGES

Healthcare systems are increasingly using mHealth to provide better services with less financial and human resources. This technology represents an advantage especially for reaching patients who otherwise would have no access to healthcare. Its benefits include 24/7 availability, equity, immediate support treatment, continuous health monitoring, anonymity, networking, patient's knowledge/education, and low cost [8].

Despite the benefits and widespread use of mobile health technology, health care leaders need to resolve a number of unique challenges for mHealth to significantly contribute to healthcare service delivery. The success and widespread adoption of mHealth depend on meeting the challenges. These challenges include protecting the privacy of patient information shared on mobile devices, concerns about the unregulated status of mHealth, and legal issues especially in developing countries that lack privacy and data protection laws. Concerns about safety revolve around privacy risks. Mobile devices such as smartphones, tablets, and wearable devices that contain healthcare information are targets for thieves.

To address the privacy and security concerns, we now have the Health Insurance Portability and Accountability Act (HIPAA), the Health Information Technology for Economic and Clinical Health (HITECH), and other federal and state laws. In the US, mHealth devices come under the regulatory authority of the Food and Drug Administration (FDA). Healthcare providers that transmit patient information electronically must comply with the rules [9].

Mobile devices have limited computation, storage, and battery powers. It is not economical and feasible for a hospital to equip thousands of healthcare staff with mobile devices. Lack of operating system (OS) neutrality is another challenge in the development and adoption of mHealth applications. There are multiple operating systems for mobile phones such as iOs, Microsoft Windows, Palm OS, Blackberry, Linux, and the Android.

Different mHealth initiatives in different countries do not adopt globally due to lack of accepted standards or interoperable infrastructures, making future integrations difficult if not impossible. The mHealth intervention app market has long been isolated, unregulated, and patient-driven. There is little information on which of mHealth apps are effective, or how well they compare with face-to-face treatments.

The mHealth transformation has been disruptive in the developing countries, where the growth of mHealth has been rather slow. In those nations, healthcare systems are facing major challenges in providing affordable and better quality of care due to the increase in chronic and communicable diseases. There remains hurdles like low literacy, poor infrastructure, shortage of doctors and other skilled healthcare professionals, lack of continuous power supply, and cultural issues hindering the large-scale adoption of mHealth [10].

Other challenges include administrative, architectural, implementation, and balancing the productivity, cost benefits, or scientific value of new information technologies with the security risks [11]. Despite these challenges, mHealth has the potential of improving health outcomes, and it should be given priority by governments and non-governmental organizations (NGOs).

IV. CONCLUSION

Mobile health refers to the use of mobile and wireless communication technologies to provide healthcare delivery and support wellness. It is an innovative means of providing healthcare services and is a promising frontier that can be used to solve health inequality and health coverage. MHealth services propose healthcare delivery anytime and anywhere overcoming geographical barriers with low and affordable costs. Challenges such as privacy concerns have limited the impact of mHealth, but it has enormous potential to reshape healthcare delivery in the future. MHealth continues to climb in popularity and it definitely represents the future trend of health care due to its great potential in improving health care efficiency and accessibility [12].

REFERENCES

i. U. Varshney, "A model for improving quality of decisions in mobile health," Decision Support Systems, vol. 62, 2014, pp. 66–77.

ii. "mHealth," Wikipedia, the free encyclopediahttps://en.wikipedia.org/wiki/MHealth

iii. B. M. C. Silva, "Mobile-health: A review of current state in 2015," Journal of Biomedical Informatics, vol. 56, 2015, pp. 265–272.

iv. C. K. Kao and D. M. Liebovitz, "Consumer mobile health apps: Current state, barriers, and future directions," Physical Medicine and Rehabilitation (PM R), vol. 9, 2017, pp. S106-S115.

v. H. Li et al., "Mobile health in China: Current status and future development,"Asian Journal of Psychiatry, vol. 10, 2014, pp. 101–104,

vi. S. E. Brooks et al., "Mobile mammography in underserved populations: Analysis of outcomes of 3,923 women," Journal of Community Health, vol. 38, 2013, pp. 900–906.

vii. S. Okazaki et al., " Physicians' motivations to use mobile health monitoring: a cross-country comparison," Behaviour & Information Technology, vol. 36, no. 1, 2017, pp. 21-32.

viii. M. Olff, "Mobile mental health: a challenging research agenda," European Journal of Psychotraumatology, vol. 6, no. 1, 2015, pp. 1-8.

ix. B. Liss, "HIPAA and mobile health: Where's the app for that?" The Computer & Internet Lawyer, vol. 34, no. 9, September 2017, pp. 9-12.

x. S. Latif et al., "Mobile health in the developing world: review of literature and lessons from a case study," IEEE Access, vol. 5, 2017, pp. 11540-11556.

xi. M. J. Harvey and M. G. Harvey, "Privacy and security issues for mobile health platforms," Journal of the Association for Information Science and Technology, vol. 65, no. 7, 2014, pp. 1305–1318.

xii. R. Miao et al., "Factors that influence users' adoption intention of mobile health: aStructural equation modeling approach," International Journal of Production Research, vol. 55, no. 19, 2017, pp. 5801-5815.

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