An assessment of the effects of widespread use of mobile applications in the health sector: An exploratory study of its success and failures

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Abstract

Prior to the introduction of mobile technologies, the manual system of checking patients' vital signs after approximately seven hours increased the health risk of the patients. Some of the patients' health was jeopardised, worsening their situation, others re-admitted and others even passing on. The introduction and extensive use of mobile technologies has transformed the delivery of health care. Mobile applications with early warning systems are now dominating the health sector in an attempt to alert medical practitioners to act promptly to the patients' needs. This paper reviews effects of mobile applications in the health sector as well as the success and failures of Mobile health applications. The assimilation of mobile applications in health care is marking an incredible venture in the health care industry.

Keywords: mHealth, mobile applications, success, failures, health sector, mobile technologies, adoption, patients, hospitals.

1. Introduction

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Mobile health (mHealth) refers to mobile technology usage which includes smartphones as well as other modern technologies to facilitate or enhance health care. Statistics on Google Play [1] show that iTriage one of the most popular mobile health applications on Google Play with over 12 million downloads and a 4.5 star rating gives quick access to a huge healthcare and medical database reviewed by Harvard Medical School. A fact such as this makes it difficult to deny the rising popularity of the mobile health industry. Federal and state initiatives, physicians, other healthcare entities and patients have all been part of the health IT transformation. Burdett [4] pointed out that the healthcare industry has shifted into the digital world, resulting in the adoption of Electronic Health Records (EHRs), Health Information Exchange (HIE) and mHealth applications.

Chouffani [2] stated that healthcare applications are playing a crucial role in changing the services of mobile devices. Also he explained that smartphones and tablets are being transformed to medical instruments that capture blood test results, glucose readings, medication information, medical images and so on thus enabling patients and physicians to monitor and manage health information conveniently.

2. Effects of mobile health

In the literature many researchers [4, 6, 7, 10, 11] pointed out that the use of mobile health has led to a significant positive impact in the way healthcare services are now delivered. This has been seen as beneficial to different stakeholders in the health sector.

2.1 Advantages to the clinicians

The use of mHealth devices facilitates real time, early detection and warning of patient deterioration. Smith et al. [10] emphasized that the use of such devices allows clinicians to move away from the paper files and have patient details on the move (on wireless devices such as smartphones and tablets). He explained that in the event of a call, the doctor will be able to view client details on the mobile gadgets before even attending to the patient. The application signals clinicians with an alarm when vitals stray outside of safe levels at the same time allowing patients to summon help. Clinicians have immediate access to patient information from anywhere across the world since it is stored on the cloud. The clinician is able to see the patient's medical history despite geographical limitations.

2.2 Advantages to the hospital

In the literature, many researchers [3, 5, 8, 10] stated that several health care providers have noted a reduction in the length of stay for patients and overall reduction in treatment costs. The Centers for Disease Control and Prevention, stated that treating patients with chronic diseases accounts for about 75% of the US$2 trillion spent on medical care in the U.S. every year [3]. They suggested that if patients are educated on the proper usage of mobile health applications this can cut on expenses as patients with terminal sickness make use of the applications to communicate to their physicians directly and be monitored whilst at home.

2.3 Advantages to the patient

Burdett [4] pointed out that most mobile health devices allow the patient to have total freedom of movement in the hospital vicinity during the period they are under the clinicians' supervision. For instance, the Sensium Vitals a wireless, wearable medical device that is put on the patient's chest to continually monitor with greater precision, a patient's vital signs (heart-beat, breathing rate and temperature). Also he explained that the sensor only weighs 15grams therefore it allows the patient to move freely. Telephonic and online scheduling services serve as cost reduction mechanism to patients who will not need to regularly visit the hospital.

3. Success of mobile health

Burdett's [4] research found out that due to the adoption of mobile health applications, patient length of in-hospital stay was reduced by an average of 4 days, and an overall treatment saving of over $5,500 per patient. McGloin et al. [5] pointed out that the UK based hospital, Brighton pioneered in the use of a new wireless vital signs monitoring device (SensiumVitals) as a communication link between the medical staff and the patients in urgent need of attention.

He noted that positive feedback from clinicians at the hospital has and suggested that in order for the medical staff to respond promptly to the patients' weakening, they must be taking vital signs measurements every 120 seconds. McGloin's [5] research found out that 20 out of 38 per month alerts facilitated deterioration detection, and subsequently speedy reaction.

Sproutling baby monitor a wearable device designed to measure a baby's heart beat, temperature, sleep and other activities was one of the award winning healthcare gadgets at the 2015 CES (Consumer Electronics Show) held in Las Vegas as stated by Chouffani [6] in his report. Also, he said that the application has the ability to learn and predict the sleeping habits of a baby and determine optimal sleeping conditions. He further pointed out that another recipient of a Best of Innovation Award was iHealth Align, which earned recognition for its mobile glucometer. This iHealth Align product, lets users perform a blood glucose test and use their smartphones to view and track the results.

Chouffani [7] asserted that the Health-Kit for Apple which was announced in June 2014 and Google Fit platforms are examples of how seriously these device makers want a stake in the mHealth market. He pointed out that the newly launched iphone6 for Apple uses Near Field Communication (NFC), which is radio frequency identification (RFID) technology, which enables smartphones to exchange information embedded in NFC tags is likely to increase the use of this technology in healthcare. In his other report, Chouffani [12] pointed out that Google's NFC Pills reminder an application available on Android devices that helps patients to manage their medication by tapping, speaking and listening to their medications and dosages has had a significant impact in the market.

In his research, Githinji et al. [8] explained that SMS for Life, another mHealth program which was conducted in Kenya in 2013, facilitated SMS communication between health workers and district health managers about stock levels to improve supply-chain management of malaria commodities. He pointed out that the program reported a 24% and 38% decline in stock-outs of rapid diagnostic tests for artemether and lumefantrine respectively.

4. Failures/ limitations of mobile health

Bayonon [9] argues that technology cannot replace human initiative. She also pointed out that the well-designed mobile applications can become useless if patients are not willing to interact with them and learn what they do. Also his argument rested on the fact that if someone is not eager to go through the steps or enquire from others the proper usage of the device(s) then mobile health applications lose their benefits.

Smith et al. [10] pointed out that most mHealth application developers are not complying with the Health Insurance Portability and Accountability Act (HIPAA) as far as data privacy and security issues are concerned. He underlined that half of mHealth applications do not have clear privacy policies. Most of them are not using encryption technology to secure patient's information during data transmission.

Burdett [4] in his research articulated that 11% of patient deaths reported were as a result of deterioration not detected by mobile devices to alert clinicians of a fall in vital strays. He stated that observations must be recognized as a fundamental rather than basic task.

Ganapathy and Ravindra [13] stated that limited and fluctuant bandwidth is a major issue as far as mHealth is concerned. They pointed out that critical data must be delivered efficiently, reliably, and with high quality. However they concluded that the main limitation in extending the benefits of wireless technology to cover wide areas is the fact that a number of cellular operators may not speak the same language hence it limits the advancement of mHealth.

5. Conclusion

The preliminary experience of mHealth services at health care centers across the world has demonstrated that mobile applications and devices are essential resources for the medical professional in enhancing their activities especially on monitoring the progress of patients who may need urgent attention anytime.

Literature has shown that a lot of success stories on mHealth have been noted in the past years. However we can easily say that the success of mHealth is dependant on the trust the health staff have in it as well as its costs. If measurements cannot be taken correctly or devices not used properly then the benefits seize to exist. Inasmuch as mHealth is dominating, Health care centers should bear in mind that not everyone has a Smartphone hence others will still continue to visit health care centers despite the possibility of viewing their medical results on the cloud.

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