mHEALTH SOLUTIONS EMPOWER MASSES WITH AFFORDABILITY, ACCESSIBILITY AND QUALITY HEALTHCARE
Table of Contents

03 ............................................................................................................... Abstract

03 ............................................................................................................... Overview of Health industry

04 ............................................................................................................... Need for mHealth solution

04 ............................................................................................................... Benefits of mHealth solutions

05 ............................................................................................................... Opportunities and Challenges

06 ............................................................................................................... Way forward for industry players

07 ............................................................................................................... About the Authors

07 ............................................................................................................... About Wipro Ltd.
Abstract

mHealth or mobile health is one of the fastest growing sectors in the health IT space with the incredible increase in the use of mobile technologies to address accessibility, quality and safety in delivering patient care. This paper looks at why mHealth is important. It extensively covers how affordable, accessible health care, through the use of advanced mobile medical devices and remotely monitored cloud based solutions, is enabling disruptive business opportunities in healthcare industry. It also examines the changes required in current system to tap the full potential of mHealth.

Overview of Health industry

It is believed that the healthcare industry will grow at a compound adjusted growth rate (CAGR) of 4%—from $520 billion in 2010 to $740 billion in 2020¹. At a broad level, traditional healthcare is mostly delivered through hospital care however, in the last decade, the trends are moving towards home health monitoring and remote health checkups. The connected health ecosystem, whose important stakeholders include care providers, payers, medical device manufacturers (wearable health parameter monitoring devices, surgical equipment, therapeutic devices and diagnostic devices), IT solution vendors with hospital information management, pharmaceutical manufacturers, has a great potential and is expanding at a great speed. Technology and services around connected healthcare alone shall play a major role in shaping the mHealth industry.

Need for mHealth solution

Over the past decade, increase in life expectancy, changing lifestyles in low-middle-income countries, ageing population in most developed countries coupled with Affordable Care Act, increasing costs and visits for in-hospital care are bearing a huge impact on global economy. Most of the lifestyle changes are resulting in cardiovascular diseases leading up to almost 31% of global deaths\(^2\). Prevention & regular follow up hold the key to curtailing chronic diseases. However low doctor & paramedical staff to patient ratio, lack of adequate hospital beds, increasing patient population and high cost of delivery in conventional healthcare models limit a long term & scalable impact\(^2\).

A holistic non-invasive patient centric health monitoring platform that enables remote health monitoring solutions for chronic disease management is the need of the hour. mHealth platform with a unified patient centric health database that contains patient health data that is device agnostic, solution agnostic or healthcare provider agnostic can be developed to address this situation. It should provide guidelines for device manufacturers, and enable dashboards to registered and licensed users to extract relevant patient information. While the platform itself forms the backbone of remote monitoring, various individual mHealth solutions like remote maternity care, remote cardiac care, remote diabetic care can be developed on top of the platform to address the increasing demand of low-cost patient centric health care. Refer to figure 1.

A typical mHealth solution combines non-invasive connected wearable medical devices with inbuilt algorithms to monitor real time patient vitals ensuring mobility, ubiquitous connectivity, cloud based clinical decision support system and innovative business model to deliver affordable healthcare with timely detection and diagnosis anytime, anywhere. While robust analytics and algorithms run at remote locations, they are trained to trigger alarms in any unusual condition. Alert condition along with annotated data is immediately reported to the physician on his/her mobile device. Doctors can see the patient’s data using their smart phones or tablets and can provide advice in a timely manner.

Each component in the flexible end-to-end platform is both scalable as well as modular to suit different business needs.

Benefits of mHealth solutions:

1. Health Assurance, to wider range of patients: It enables the care providers to continuously monitor patient vital parameters & take timely action. This gives an assurance to patients that they are receiving post-operative hospital care even at home. This also empowers the patient to be proactive in monitoring themselves and taking good care.

2. Convenience of home health: The solutions consists of wearable form factors that ensure patient mobility which improves the healing process.

3. Enhanced & Optimized Care: For hospitals the solution enables them to provide enhanced care to the patients as part of step-down care as well as after they are discharged from the hospital for a period of time. This minimizes potential re-admissions.

Disruptive mHealth solutions like Assure HealthTM platform are an intersection of existing healthcare operational technologies to the information technology, providing platforms that enables physicians, paramedical staff and healthcare providers to monitor and take timely action for high risk patients both in the hospital and at home. Such solutions are affordable and enable Smarter Care – Personalized, Mobile, Real-time, Accessible, Affordable and Preventive.

Opportunities and Challenges

A robust mobile platform solution referred above, along with innovative business models shall deliver affordable patient centric healthcare and in the process open up many new disruptive businesses. It should be capable of delivering safe and secured in-patient (step-down care) and remote health monitoring solutions for chronic disease management.

Benefits for mHealth enablement:

1. Continuous Remote monitoring for:
   a. Chronic diseases like CVDs, diabetes need to be monitored continuously to prevent any unfortunate situations. With advances in medical wearables, a wearable ECG device can monitor conditions like arrhythmia and alert the back end systems to take timely actions in case of any unfortunate event.
   
   b. Elderly care: There is a need to monitor the health of elderly patients at regular intervals. This is currently met by frequent visits to the hospitals. With the advent of mHealth solutions, easy to use devices, remote health monitoring can be available for elderly care at their doorstep.
   
   c. Post-operative care: Patients can be discharged early, but at the same time, the health parameters are remotely monitored by the care providers. This reduces the recovery time.
   
   d. High risk pregnancy care: During the final trimester, the health conditions of the mother and fetus need to be monitored at regular intervals. mHealth solutions like Assure HealthTM enable fetal heart rate, mother heart rate and uterine movements to be continuously monitored from the comfort of the home, avoiding frequent hospital visits.

2. Point care solutions can be delivered with health kiosks. Each of these connected health kiosks shall be equipped with patient friendly medical devices that are suitable for basic vital screening. The results shall be analyzed in real time at a back end cloud system. This will avoid the long waiting queues and also can be a substitute for the basic first level screening by the practitioner. Priority can be given to patients results. Such kiosks can find their way in
   a. Primary Health Centers
   b. Pharmacies
   c. First respondent units and in ambulances
   d. Work places as employee health and safety kits

3. mHealth solutions can be effectively used over a fixed duration of clinical study to monitor prescribed drug adherence and medical device usage. Along with the data from wearable medical devices, data from advanced devices like E-pills, smart pill dispensers and biometric authentication devices can be used by care provider and payers to ensure drug adherence. These results can be effectively used across
   a. Clinical trials
   b. Insurance Claim processing
   c. Risk based premiums where, patients’ past records are available to the undertakers during the risk assessment and premium calculation.

4. mHealth platforms can be coupled with new technologies like Video based vital monitoring3, advanced mobile accessories to reduce regular visits to physicians. With the advent of new technologies and potential opportunities, it is becoming increasingly difficult to maintain the safety, privacy and interconnectivity standards. Hence, many organizations are revising the healthcare standards with stringent certification processes, ensuring medical grade products, secured patient data transactions over clinical decision support system and data privacy. Other potential challenges observed in mHealth domain include a lack of central patient data that could be accessed across various hospitals and clinics as well as to shift the traditional physical examination of the doctors towards digital examination.

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3 “Motion microscope,” a video-processing tool by Video researcher Michael Rubinstein http://www.ted.com/talks/michael_rubinstein_see_invisible_motion_hear_silent_sounds_cool_creepy_we_can_t_decide?language=en
Way forward for industry players

The business impact of mHealth platforms is multi-fold and can be categorized as Accessibility, Affordability and Availability to wider set of growing population. However, to exploit the full potential of disruptive mHealth solutions, there are a set changes that are required in the current system. Some of them are listed here for a quick reference.

1. For the healthcare provider and payers:
   a. Clinical staff, doctors and other care providers should be sufficiently trained on the new technologies to make the best use of the mHealth transformation.
   b. Payers like insurance companies and government bodies should leverage the data for policy administration, offer incentives for patients who adhere to a healthy life style.

2. For ecosystem enablers:
   a. A strong need for a common health body [similar to NHS in UK] is felt in most of the countries. This body should be equipped to collect and relate all the medical device data of each and every patient in the region. This data should be mashed properly before storing and have common protocols across devices, should hospital or clinic agnostic be accessed by registered care providers across the region.
   b. A global standards committee, should be formed for ensuring medical grade device manufacturers to arrive at a common standard and protocols (like continua) for devices, across regions and across all health parameters.
   c. Solution architects and integrators should design solutions based on new evolving technologies without compromising on safety and security of patient data.

Health care delivery is very different in different regions of the globe. Although the required changes are different based on existing regional systems, the potential of mHealth remains very vast and untapped as of today.
About the Authors

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