M-Health Application- New Area of Research

Minimol V K
Research Scholar
Norul Islam University

Abstract :- **M-health is a novel application of information technology in which health services are provided to the people through mobile devices. This application provide variety of services in various countries. As in every application the m-Health also has to face lots of threats in the area of security, confidentiality, privacy etc. The technology has its own advantages and disadvantages. As the technology advances, the physicians and patients are more forced to use this new facility of health application .And this services got acceptance in remote areas of different countries. The cost of devices ,lack of trained people etc. determines the range of this application in different places. M-Health includes the use and capitalization on a mobile phone's core utility of voice and short messaging service (SMS) as well as more complex functionalities and applications including general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), global positioning system (GPS), and Bluetooth technology. This paper tries to reveal some applications of m-health, the expectations of patients and doctors involved in this field and also some anxieties of the people related with this application.**

Key words:- M-Health, Decision support system, patient monitoring, telemedicine.

I. INTRODUCTION

M-health is the present and popular application that helps the people to access health services through their mobile phones. This application provide variety of services such as health call centres, emergency toll-free telephone service, mobile telemedicine, appointment reminders, community mobilization and health promotion, mobile patients records, information access, patient monitoring, health surveys and data collection , surveillance and decision supporting system. Among this applications only simple services are widely applicable, where as mobile telemedicine like applications has complex architecture and it is difficult to implement. The major advantages of m-health applications are

1. Increase patient-physician interaction
2. Promote self-management of chronic diseases using health application
3. Physicians can reduce rush in their home by relying on home test results to prescribe medication
4. Help for time management of both patient and physician
5. The health services can access from anywhere any time

Because of the above mentioned benefits the expectations of the people on this technology has increased more. At the same time the physicians have some worries about these services.

II. EXISTING APPLICATIONS AND THEIR RATE OF ACCESS

A. Health call centers

Health call centers/Health care telephone help lines are service formed to convey health care advice services by trained health professionals on the telephone. This method of communication is established to manage national emergencies, and was regularly made available during the H1N1 influenza outbreak in 2009.Health call centers in developing countries are more often for-profit operations than non profit-making; The people are charged for using the m-health application.[2,3]

B. Emergency toll-free telephone services.

Emergency toll-free telephone services are often used for rapid access to health professionals or staff trained to provide instruction during a medical emergency. Access to telephony services is required to connect with a health call centre and/or emergency toll-free number (e.g. 911 in the United States)[3,4].
The South-East Asia Region reported the highest percentage of emergency toll-free telephone services (80%).The African Region reported the least activity in this category (30%). Countries from the lower-middle income (60%) and high-income (55%) groups reported the highest level of service.

C. Treatment Compliance

This application includes sending reminder messages, by voice or SMS, to patients with the aim of achieve treatment compliance, disease eradiation, and overcoming challenges such as drug resistance. It has been applied to support patients with conditions such as diabetes, HIV/AIDS, and TB. Approximately one third of responding Member States across all WHO regions reported conducting treatment compliance initiatives. Almost 58%of countries in the high-income group have treatment compliance initiatives, compared to approximately 40% in other income groups.[4,6]
A large number of treatment compliance initiatives in Member States in the high- and low income groups are in the informal stage.

D. Appointment reminders

Appointment reminders are voice or SMS messages sent to patients to schedule or attend an appointment. It includes immunization reminders, treatment results, and post-appointment follow-up calls. In low and lower middle income countries, where access to fixed-line telephony is minimal and in high-income

Special Issue - 2015

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
RTPPTDM-2015 Conference Proceedings

countries where fixed line telephony is being replaced with mobile phones, the mobile phone is rapidly becoming the primary means of receiving appointment reminders.[3,6]

E. Community mobilization & health promotion.

Mobile phones provide a new communication channel for health promotion and community mobilization. Community mobilization is defined as the use of text messaging for health promotion or to alert target groups of health campaigns. This can be used, for example, to increase participation in immunization campaigns or to promote voluntary counselling and HIV screening. Cooperation with a local telecommunications provider, Get the Msg! has now become an established information service[2,5]. The service offers free health and safety information about common legal and illegal drugs and direct referrals to web sites and help lines by texting the name of a substance to the short code DRUG. A short code is a special telephone number, often shorter than conventional numbers, used to address SMS or MMS (multimedia messaging service) from a mobile phone[7,8]

The Americas, Eastern Mediterranean, and South-East Asia Regions reported the highest-adoption for community mobilization and health promotion. High-income countries had the highest percentage of community mobilization initiatives (55%), of which 32% were established initiatives.[6,8]

Community mobilization and health promotion initiatives addressed general health information or specific public health issues such as H1N1, HIV/AIDS, immunization and vaccination, reproductive health, chronic illness, and blood donation.SMS was the primary method of communication used in the initiatives.

F. Mobile telemedicine

Mobile telemedicine was defined as the communication or consultation between health Professionals about patients using the voice, text, data, imaging, or video functions of a mobile device. But it can be applied to other situations; the management of chronic diseases of patients living at home is one example. In developing countries, as well as underserved areas of developed countries, human resource shortages in the health sector pose a major barrier to a patient's access to treatment and/or specialized care. Mobile technologies present an opportunity to circumvent this challenge by connecting patients, community health workers and physicians in urban and rural areas to improve quality of care at the point of care and reduce unnecessary referrals. The Americas (75%), European (64%) and South-East Asia (62%) Regions reported high rates of adoption of mobile telemedicine initiatives, though a large proportion of these initiatives were informal or in the pilot phase.

Countries in the high-income group reported the highest percentage of mobile initiatives (64%) followed by lower-middle income countries (53%). Mobile telemedicine initiatives included consultations between health-care providers and transmission of a patient's health-related data using mobile devices

G. Health surveys and surveillance

Health surveys, in the context of m-Health, are defined as the use of mobile devices for health-related data collection and reporting. Similarly, surveillance is defined as the use of mobile devices to input and transmit data that will be used to track diseases for examination programs. Given the overlap between the two types of m-Health initiatives, they have been presented tog .The use of mobile devices for health surveys was low across all WHO regions, with the exception of the Region of the Americas (42%). Responding countries in the low-income group reported the highest activity of health initiatives (37%). M-Health surveillance activity is more prevalent in countries in the low-income (40%) and lower-middle income groups (27%) than those in the higher-income groups.The African and South-East Asia Regions had the highest percentages for surveillance initiatives (41% and 38%, respectively).

H. Patient monitoring

This application , patient monitoring is defined as using technology to manage, monitor, and treat a patient's illness from a distance (e.g. diabetes and cardiac patients). Remote sensors installed in -house holds or imaging devices linked to mobile phones are often used to facilitate data transmission to the health service provider. This can reduce the need for visits to a health centre for check-ups.

I. Decision support systems.

Decision support systems are defined as software algorithms that advise health providers on clinical diagnoses of patients based on the interaction of patient data and medical information, such as prescribed drugs. Mobile devices are used to input patient data and receive targeted health information. Here is low global uptake of mobile decision support systems within WHO regions; no region reported adoption of over 25%. Countries in the high-income group reported the highest percentage of uptake (42%).

The stage of various m-health application in different countries are shown in the graph 1.
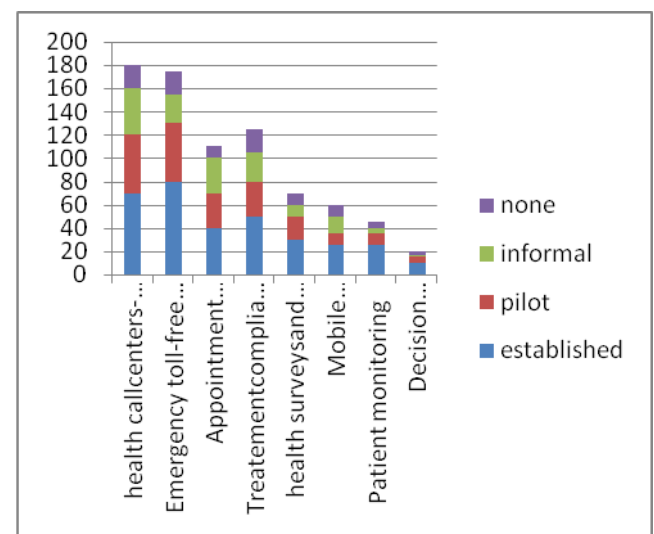

Fig 1

III. HUDDLES IN THE IMPLEMENTATION OF M-HEALTH APPLICATION[10,11]

The application of m-health various in wide range still the popularity of the application in various countries sometimes very least due to some economical, social, professional, technological reasons. This session point outs some issues in this area.

1. Priority of health data transferring
Most health systems are severely overburdened. This means they are constantly challenged by the need to make difficult decisions about competing priorities. Since m-Health currently lacks a strong evidence base to verify its impact on health outcomes and health systems, it is understandable that about half of the responding Member States reported competing priorities as their main barrier.

2. Conflicting priorities
generally indicates that funding is allocated to other programs ahead of m-Health, or can reflect a lack of general interest or understanding of the field.[5,7,10]

3. Lack of knowledge
The lack of knowledge concerning the possible applications of m-Health and public health outcomes was the next highest rated barrier (47%). This highlights the need for evaluation studies of mHealth.

4.Ploicies related with m-health
One of the most important barrier identified was that of country or regional e-Health policy not recognizing m-Health as an approach to health-related issues. This finding is not surprising given that m-Health is still in a relatively early stage of adoption and development. Recent studies indicate that health information security, patient confidentiality, standardized metrics, and interoperable systems were identified as pertinent policy challenges to overcome before the consideration of m-Health as a tactical initiative can occur .Addressing such points within a health policy that includes electronic and mobile health will promote and validate m-Health, systematizing it. This is a multi-step process, of course, which includes public awareness campaigns(highlighting the need and potential solution/benefit), research and development (innovation), trials and their Evaluation to prove effectiveness, and guidelines for use (part of policy). The policy-making process
rarely keeps up with technological development or public's demand; this is especially true of the field of m-Health – where technology evolves so quickly and there are multiple sectors involved (e.g. health, communications, and technology).
effectiveness of m-Health solutions was the final of the top four barriers cited. Most responding countries at the time of the survey did not know the cost-effectiveness of available m-health solutions. This is not surprising; few data exist on the evaluation of m-Health programs. It should be noted that cost-effectiveness is just one element of the health system that requires resources alongside operating costs, infrastructure, knowledge, and technical expertise. Most

mHealth solutions to date are independent, local initiatives. Such solutions are unlikely to be the most cost-effective; indeed the opposite is true. And integrated, interoperable systems are more likely to be the cheapest to deploy and operate, as well as having the most significant impact. That is, integrated regional (and even global) solutions are likely to provide the most benefits.

5. Expectations of the patients and anxieties of the physicians and patients about this technology.

The health care models of yesterday are in adequate to satisfy growing industry and consumer expectation. So the physicians are feeling pressure to meet these expectations. Tomorrows successful health care application models are expected to be

1. Consider patient as a consumer.
The coming health models will use customer relationship management technology to generate and manage demand. The models will concentrate on patients experience and understanding them in their everyday lives.

2. Diagnosing from the home itself-
The m-health technology provide facility to diagnose health problems from the home itself. The patient sends the data through the mobile device to the physician ,and he can analyze the details send by the patient and give proper instruction. With the help of a smart phone the pictures of body parts can be sent to the doctor.

3. Access to the physician will be more easy-
The patients feel that a communication with the doctor will be more comfortable through the mobile devices .they can call the doctor from anywhere any time for consultation.

4. Doctors feel more free from the rush of patients-
It is easy to the doctor to comfortably answers the queries from the patient by avoiding rush in to home .the doctor can store detail of patients for further reference.

5. Digitalization of the health care system-
in the coming years the tendency of patients to visit doctors will get reduced and each one will be comfortable to use the mobile health care system. The application of m-health like decision supporting system and mobile telemedicine etc are some of the novel area of m-health application that make the diagnosing of body part with the tiny body sensors.

6. Anxieties of the physicians about this technology
Even though the patients feel more comfort while using this technology, the physicians have some worries.

1. Quality of diagnosis-The physicians are not sure about the quality of diagnosis through the m-health. It is because the symptoms and images sends through the mobile are may not proper or

Special Issue - 2015

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
RTPPTDM-2015 Conference Proceedings

incomplete due to some technical errors .so a perfect diagnosis is not possible [4,5].

2. Payment of the physicians-with this mobile health technology the payment of the doctors may through e-banking or net banking ,but the doctors are not satisfied with this.

3. Authorization of m-health service-Even though the m-health service is becoming popular ,there is no strict authorization by the public or private agencies .In most countries it is done by some private agencies.[2,8,9]

4. Security and confidentiality of the data-The physicians are also fear about the security of data received through the mobile phones. There may be dropping of data or revealing of identity of the parties etc may occur.[6,9,10]

5. Lack of skilled clinicians for using this technology-It is one another drawback of the mhealth technology. The people in the clinics are not trained enough to capture the sensed data and for sending replies.[11,12]

6. Social concern of m-health care system

The health care application becoming a business. More the usage of this application, the technology has to develop new devices that cope with the coming trends in health application. So the business people will try to produce the best mobile devices with network accessing and having more efficient applications. In this scenario the common people will be get troubled to get this devices. The business people will decide doctors and they treat the patient as their consumers.

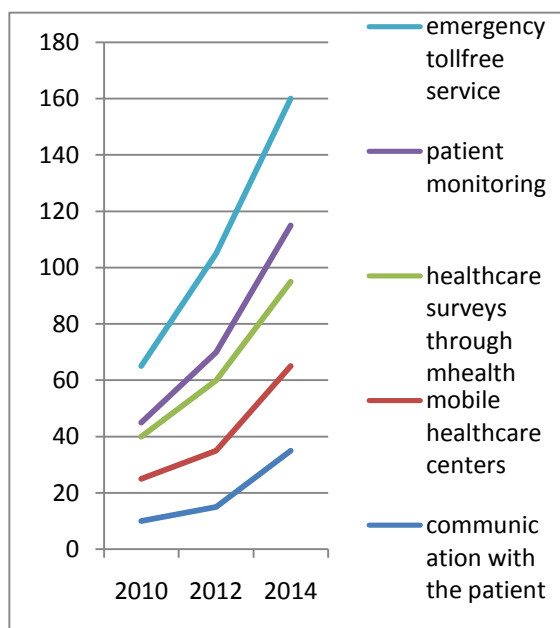The following figure shows the rate of mobile health application in the last 4 years.

fig.2 shows the rate of mobile health application in recent years.

IV. CONCLUSION

The application of mobile health going on increases from countries to countries. Now the rural areas got the benefits from this application more. In India Bangladesh shows highest use of this mobile health application. The application now widens its area with the use of body area networks and helps to diagnose complex body signals. So patient monitoring with decision making will be the most significant application of M-health. As in the case of any technology the m-health also has the disadvantages due to the misuse of technology. The signals passed through mobile devices are highly personal related to the patient. So the fact of mutual belief between the doctor and patient is more important. As in any communication network system the problem of eves dropping, steeling of information, lack of authenticity etc should consider as a major issues related with this technology. The lack of knowledge about the technology and lack of trained people in this area are one of the major problems in our area. Especially in Kerala even the physicians are unknown about the application. Only the toll free telephone system , Patient booking system like normal telephone services are existing in kerala. Based on this survey the paper would like to put forward some suggestion for the health care system in kerala and some rural areas of some other states like Karnataka, Thamilnadu etc.

1. Make provision for the students of MBBS or other doctor professionals to handle with the m-health application in rural area especially for patient monitoring ,keeping record of the patients in rural area, the environmental conditions of the locality chance of epidemic in that area ,give the importance of personal and social hygiene etc.

2. The government has to take initiative to implement the m-health in the current health care system.

3. Make setup to give training to physicians and clinicians about this application

The health care system in Kerala even all over India is not in a better position. Even though the technology grows rapidly, its application is very less in the area of health care system .So the proper and efficient use of m-health application can change the society a lot in its health concern.

V. REFERENCES

[1] Centers for Medicare &Medicaid Services Data and progress reports:2014(http://www.cms.gov/regulations)EHRIncentiveprograms/Dataand Reports.html(accessed, oct. 13 2014)

[2] MedicareEHRIncentive programme.http://dashboard.healthit .gov/quickstarts/pages/FIG-MedicareProfessionals-stageone meaningfulUseAttestation.html(accessed Oct.13-2014)

[3] PwC Health Research Institute, "Top Health Industry Issues of 2013." January

Special Issue - 2015

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
RTPPTDM-2015 Conference Proceedings

[4] PwC, "Making care mobile,Introducing the apps pharmacy." April 2014. http://read.ca.pwc.com/i/298503 (accessed Oct. 13, 2014).

[5] Corker J. "Ligne Verte" Toll-Free Hotline: using cell phones to increase access to family planning (www.casesjournal.org/volume4, accessed(May 2011).

[6] Rahman, M. Health-Line Medical Call Center Using Cellular Phone Technology in Bangladesh: Lessons Learned n Breaking Economic and Social Barriers in Accessing Healthcare. *The 135th APHA Annual eeting & Exposition of APHA,* November 3–7, 007, Washington, DC.

[7] STOMP_TELUS'Smoking Cessation Programme:helping smokers to quit the habit by using the mobile phone.Telus Health Solutions(http://telushealth.com/en/solutions/consumer_health/docs/ STOMP_Overvie.pdf)Accessed 18 May 2011

[8] Mechael PN. Exploring health-related uses of mobile phones: an Egyptian case study. *Journal of Public Health & Policy*, 2006, 264. London: London School of Hygiene and Tropical Medicine.

[9] PWC health research institute,"Datadriven progress as informatics evolves, clinicians find way to stay ahead of illness and revarno care delivery"-may 2014

[10] Dr.SMSamobile health information system for kerala. http://www.endpoverty2015.org/goals

[11] Top health industry issues of 2015 PWC health research institute

[12] Atun RA, Mohan A. *Uses and benefits of SMS in health care delivery*.London,Imperial College,London, 2005.

[13] The world in2010: ICT facts and figures Geneva, International Telecommunication-union,2010((http://www.itu.int/ITU-D/ict/material/FactsFigures2010.pdf