mHealth, IOTand Healthcare

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Abstract-Health model refers to the model designed to suggest health related process particularly used to improve health services in a region. They are used to suggest various methods and medical policies in relation to the complex health problems. Internet of Things is a rapidly growing technology which if implemented properly can help in improving and taking the health system of the country a step ahead. Similarly mHealth is also an emerging technology for boosting health models. Country's growth rate can increase effectively if the development of technology can help the people in improving their standards and health conditions.The paper represents the advanced health model and various methods which if adopted will proof to be beneficial for the people of India. It describes patient centred services with alternative low cost economic model. By using low cost economic model,all the healthcare systems and organisations will be deliver improved health facilities to the people in need.

Key words: IOT, mHealth

I. INTRODUCTION

A country progresses in any domain only when the population or the people in it are healthy. A very common phrase we hear every now and then states "health is wealth" what it means actually is that if a person or a group of people are healthy and mentally fit then they automatically work more effectively, making the country's success rate very high. The countries nowadays practice various kinds of health models which indicate the behaviour of the government in making and maintaining the health of the people. Before addressing the health model we must define what health is and what do we mean by the term healthy.

HEALTH-health defines the condition of complete physical and mental well-being and not only free from any physical diseases.

HEALTHY- a person is said to be healthy if he is free from any mental and physical condition.

HEALTH BEHAVIOUR MODEL-defined as the psychological health change model designed and drafted to predict health related behaviours particularly used to improve health services.

The presented paper uses an in-depth approach to improve the healthcare system for the world's largest democratic country in the world [1-3].

II. METHODOLOGIES

A. mHealth

mHealth can be written as mobile health is the use of handheld devices like PDA, Tablets PC, Laptops, mobile phones etc. for the providing medical and public health, supported by mobile devices. The mhealth mechanism comprises of PBI (portable biomedical instruments) which are based on low power based microcontroller that can help in wireless communication of the medical staff with the device. Some of mHealth applications are given below.

M-HOSPITALS- Applications could be devised to connect to doctors in the OPD'S of the hospitals wirelessly through webcams and other social platforms for any minor medical assistances so that people who are actually in deep needs only reach the hospital.

WEBSITES-The concept of e-hospitals or "hospital on the web" could be designed to provide medical assistance on the web on one tap. Interfaces could be designed to seek the symptoms and provide assistance on just one click and these websites or web interfaces could be run by private organisations.

Doctor on call- concept introduced by the government named *"kisan call centre"* could be used to setup a similar mechanism namely, "*dost doctor*" in which people of the rural areas specially could dial toll free government numbers to talk to specialised doctors free of cost to get immediate medical assistance.

To donate for the noble cause of providing funds to the government for health betterment of poor people"*missed call*" concept could be used where in, if a person gives a missed call then a certain amount could be donated by him immediately to the nearest hospital directly from his mobile balance. This will act as a helping hand to those people who can't afford to pay the charges of the hospital.

Government Banks could provide instant medical help financially be paying the bills of the patientsif he is uninsured and later the government could return the money to the bank directly so that no patient at any point of time faces any sort of shortage of money.

MEDI-SCANNER: We can devise an object which could be used to identify whether the medicine is real or fake. The companies those produce medicines can put a barcode on their medicines and this scanner will scan the medicine and tell whether it is fake or real. The scanner will contain two LEDs (one of red colour and other of green colour). If the medicine is real then green LED will blink and if the medicine is fake then red LED will blink. Reduction of fake medicines will help the government as a huge amount of revenue will saved and this revenue can be used for betterment of medical facilities.

M-LOOKER: A national health repository of all the citizens can be created and linked to their Aadhar Card Number. This will enable getting all the required medical history of the person on the fly.Whenever a person consults a doctor; the doctor will upload the prescription or

report. (This will be in line with government's initiative towards Digital India, Smart Cities and a sustainable healthy environment.)

If a patient wants to consult another doctor then the doctor can view the entire patient's medical history through this system and can check whether the previous doctor has prescribed correct medicines to the patient. Through this, the doctors will not prescribe wrong medicines to the patient as a legal action will be taken if they do so. Another advantage of this system is that the people will no longer need to carry their documents to the doctor as they will be saved in repository [4-6].

B.Internet of things (IOT)

IOT is an acronym of Information of Things. IOT is the network of things or objects which are embedded having sensors, electronics and topological networks which allows the devices to collect, store and communicate data. It is developed from the convergence of multiple technologies. It is rapidly growing technology which if used effectively, can help in advancement of medical sector. It is estimated that IOT in medical devices will potentially add billion dollar worth of economic value to medical healthcare providers by 2020.

IOT provides a technical platform which helps in increasing the efficiency and improving the patient care. The information can be accessed, stored and processed from IOT to make important decisions.A number of factors such as growing adoption of cloud-based and health care technologies and expansion of healthcare infrastructure across emerging countries are offering opportunities for people in healthcare IOT market.IOT is cheap, reliable technology and can give good results in health sectors. It can reduce scope of human error and it can provide real time disease management.

IOT basically comprises of a RFID (radio frequency identification) system whose main purpose is to trace still or moving objects track their tags.

Benefits of IOT in medical industry are:

- Improving devices and their maintenance:
  Remote monitoring of all the medical devicescan be done which can help in reducing the downtime and increasing the availability of devices.
- Help during emergency :
  During emergency or in a complicated case, the doctor who is operating the patient can remotely share his procedure with global experts and can have their guidance during the procedure.
- Enhancement of medical device:
  The device manufacturer can further add and improve the features of the device by the data generated by IOT.
- Maintain records:
  IOT can be used for updating the patient's information online in an orderly manner. The doctor can easily access the medical data of the patient.

- Improved medicine management:
  A large amount of expense is spent in creating and managing medicines. IOT process can help in managing the medicines. This can be done by adding tags to medication containers. Through this the producers, suppliers and consumers will have confidence in the medical supply chain.
- Analysis of proteins:
  IOT provides a standardised and quantitative analysis of protein content in the research sample as it provides researchers an easy access to computing power for testing.
- Monitoring patients:
  Patients can be monitored at home by using live video and audio streaming.
- IOT can be used to monitor vital health indicators collected by portable devices such as smart phones and tablets
- Emergency alerts can be triggered by the data collected from patient monitoring devices using IOT.
- Monitoring devices can be integrated with the analytics software throughout the hospital to provide the physicians with greater visibility into patient's vitals.
- Patient flow management:
  Hospitals can implement patient flow management using RFID technology as it will help in tracking down the status, location and treatment schedule of the patients. This will ultimately help in effective working of hospitals and better services provided to the patients [7-8].
- Work management:
  IOT can provide information to the caregivers in hospitals that a procedure room is available or a patient has spent too much time in the emergency department or that a therapist is needed to staff a particular room.

III. CONCLUSION AND FUTURE SCOPE

IOT and M-HEALTH can be the best method to enhance health infrastructure. IOT provides a technical platform which helps in increasing the efficiency and improving the patient care. The information can be accessed, stored and processed from IOT to make important decisions. Similarly mHealth is the use of handheld devices for providing health services using all wireless and wire line technologies. These systems can be used to make the country free from diseases. These techniques can further leads to virtual hospitals.

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Ethical statement: The authors declare that they have followed ethical responsibilities

IV. REFERENCES

[1] WHOQOL group. (1995). The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. Social science & medicine, 41(10), 1403-1409.
[2] Van de Ven, W. P., & Van Praag, B. M. (1981). The demand for deductibles in private health insurance: A probit model with sample selection. Journal of econometrics, 17(2), 229-252.

[3] Heller, P. S. (1982). A model of the demand for medical and health services in Peninsular Malaysia. Social science & medicine, 16(3), 267-284.
[4] Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. Health Education & Behavior, 11(1), 1-47.
[5] Frenk, J., BOBADILLA, J. L., SEPUúLVEDA, J. A. I. M. E., & CERVANTES, M. L. (1989). Health transition in middle-income countries: new challenges for health care. Health policy and planning, 4(1), 29-39.
[6] Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of Things (IoT): A vision, architectural elements, and future directions. Future Generation Computer Systems, 29(7), 1645-1660.
[7] Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. Computer networks, 54(15), 2787-2805.
[8] Yu, P., Wu, M. X., Yu, H., & Xiao, G. Q. (2006). The challenges for the adoption of M-health. In Service Operations and Logistics, and Informatics, 2006. SOLI'06. IEEE International Conference on (pp. 181-186). IEEE.
[9] Pindter Medina, J., Villarruel, G., & Tovar Corona, B. (2009). Proposal of M-HEALTH. JE," Technology de Monterrey, Campus Estado de Mexico