NATIONAL INSTITUTE OF TECHNOLOGY
RAIPUR

ASSIGNMENT

Evolution of Modern Health Care System

Submitted By:
Name : Smriti Priya
Roll No. : 21111060
Semester : First
Branch - Biomedical Engineering

Under The Supervision Of:
Dr. Saurabh Gupta
Department Of Biomedical Engineering
NIT Raipur

MODERN HEALTH CARE SYSTEM

Modern healthcare has evolved and become more focused on prevention. Preventative efforts are in place to reduce and eradicate disease, support overall physical and mental health, and educate patients and families to promote safety.

Evolution in Medical Devices

First medical device was invented in 1816 by French physician René Laennec , who had invented stethoscope. With changing times and need of healthcare the devices got upgraded or invented. Better devices got best and new devices got invented with better technology and precisions.

Some devices:

- Stethoscope : Since the 19th century, the stethoscope's design has evolved to become the lighter, more flexible, and binaural version we are familiar with today. An advantage of the electronic stethoscope is its ability to amplify quiet components of sounds from a patient's body.

Figure 1: Electronic Stethoscope

- X-ray machines : First-generation medical X-ray machines produced blurred images and required a 90-minute skin exposure time to the radiations. In contrast, modern X-ray machines take high-resolution images after a skin exposure time of merely 21 milliseconds, with the radiation dose to the skin being 1,500 times lower. Nowadays, it is possible to even attain three-dimensional, coloured images of soft tissues and other body parts.

Figure 2: xray(1896) VS modern xray

- Artificial cardiac pacemaker : The first "artificial pacemaker",consisted of a spring-wound, hand-cranked motor which produced and directed electrical impulses to the patient's heart through a needle electrode. Since then, the artificial cardiac

  pacemaker evolved into an external, table-top electronic device tethered to an extension cord; a battery-operated wearable device; and totally implantable device.

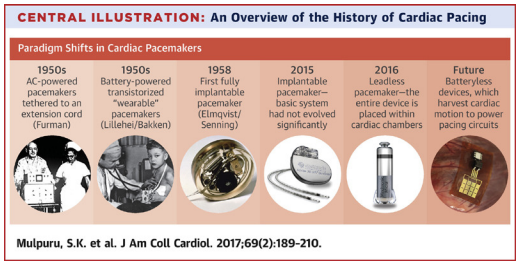

Figure 3: Artificial cardiac pacemaker

- Electrocardiogram (ECG) devices : The first portable ECG machine in the late 1920s was battery-powered and weighed around 20 kilograms. Modern transistor- and microchip-related technologies were leveraged to produce the modern 12-lead ECG devices we know today.

  ⇒And nowadays, bluetooth ECG devices have electrodes that weigh merely 18 grams.

⇒ Devices like AliveCor's Kardia Mobile capture medical-grade ECGs in seconds from the comfort of your home and with minimal effort. These readings can then be viewed on a smartphone and easily shared with doctors.

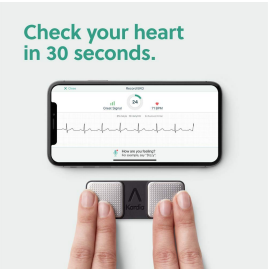

Figure 4: AliveCor's Kardia Mobile capture medical-grade ECG

Evolution In Healthcare Technology

- Cloud Adoption : Healthcare organizations are shifting from data centers to cloud based computing. The goal is to lower the cost of data storage and enhance the ability to share healthcare data within departments and among other entities.
- Internet of Things (IoT) Healthcare Devices : Connected devices are improving real-time data availability and information sharing. But IoT devices are targeted by hackers and the technology still has some maturing to do.
- Customer Satisfaction : While HIT departments see themselves as responsible for serving internal staff members, they are realizing how their work influences the customer experience and satisfaction with the healthcare organization.

Looking to the Future

- Patients are using consumer medical devices that collects health data.
- Clinicians want access on any device, anywhere, and at any time.