IMPACT of INFORMATION TECHNOLOGY in INDIAN HEALTHCARE SYSTEM

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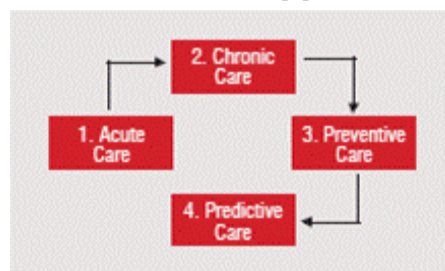kavitha.g@vit.ac.in

Abstract— **The development of economic and social aspects of a country are said to be complimentary to each other. The fields such as education and healthcare are affected by social poverty which finally depicts the economic growth and ultimately the quality of life. Impact of information technology in Indian healthcare services has been transforming into a managed care services. The present paper aims to examine the factors driving the influence of information technology in Indian healthcare, maintenance of computerized patient records in urban and rural areas of india.**

Keywords— healthcare, economic growth, information technology, Indian healthcare system, computerized patient record, urban, rural .

I.INTRODUCTION

India is the leading country which tends to provide quality healthcare service in which it spends 5.2% of the GDP every year and it has estimated to grow 17%(compounded annual growth rate- CAGR) for at least the next 7-10 years[1].Accessing information by providers and patients can be done with safety and effectively through the use of information technology. Certain Characteristics such as cost and complexity which posses barriers of information technology adoption in healthcare industry but the majors aspects are quality and efficiency gains are retained by the use of information communication and technology. But delivering quality health care relay on acute care, chronic care, Preventive Care, Predictive care [2]

It can be achieved by the use of information technology in healthcare. The paper has been divided into 3 parts. Part 2 of the paper mentions the factors that are convergence and influence of information technology in Indian healthcare services, influence of Information technology in patient record management system of rural and urban areas in part 3. Finally in part 4 providing future directions of adoption technology in hospital environment.

II. FACTORS DRIVING THE ATTRIBUTES OF IT IN INDIAN HEALTHCARE INDUSTRY

The expenditure of healthcare services was about 80% is provided by the patients, 12% by the states and 3% by insurance claims. The national expenditure report has been estimate their expenditure rate by 2016 is $12,782 from the national expenditure report which is shown below
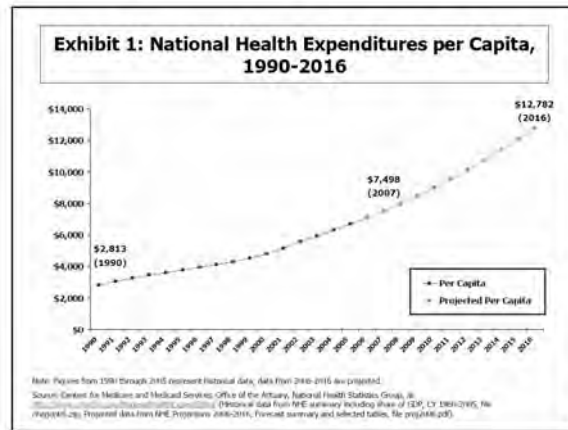
Fig1: National Health Expenditure per Captia 1990-2016
Source: Center for Medicare and Medicaid Services

To reduce such kind of expenditure the Indian healthcare industry expands his services by using Information, Communication and Technology (ICT) in his 3-tier structure services such as primary care, secondary care and tertiary care. Upon survey of the innumerous existing factors that impacts the Indian healthcare industry; four primary and vital factors are found to play major roles and are hierarchically arranged as

    – Financial outcomes

    – Workflow efficiency

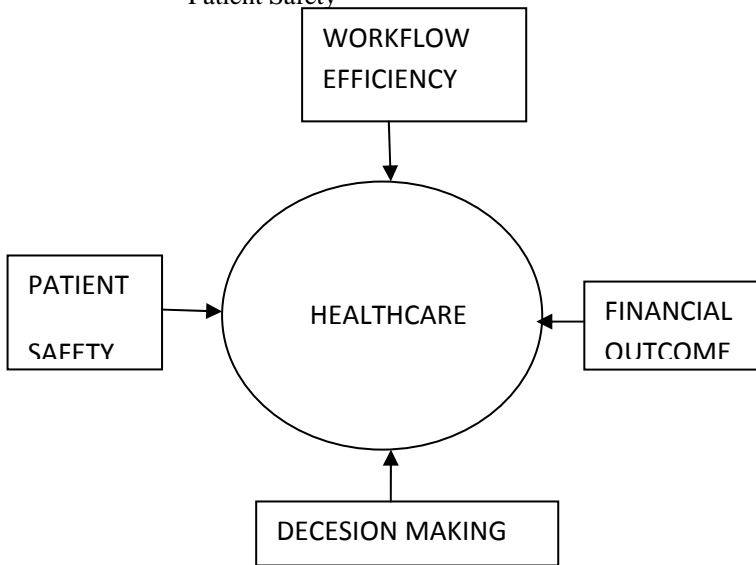   – Decision making

    – Patient Safety

Fig2: Four major factors impact on Indian healthcare industry

A. Financial outcomes

More variability and uncertainty at the point of service exists in healthcare than in any other service in our country[4]. The IT investments can improves reporting, Increases revenues and improves the quality of service.

B. Decesion Making

Providing medical services and accessing the medical information at any point of care will be one of the critical aspect of decision making process in healthcare services. To reduce the uncertainty of decision makers and improving the decision making process we tend to use the information technology to supply information and to support the decision making process. The physicians have more responsibility in decision making he needs to access the information for such as [5]

    – Providing medical service

    – Making the correct diagnosis

    – Prescribing the best treatment

– Ensuing patient safety

C. Workflow efficiency

More effective and efficient healthcare services are been demand by patients, providers and Government. Such kind of revolution can be done by automating the core process of healthcare industry. The cognitive workflow[6] combined with novel technologies like RFID, wireless technologies, automated business process which improves the efficiency of the work. Many hospitals are implementing the intelligent automated system with computerized feedback loop systems which provide higher adaptability, capability, extensibility and maintainability of the information.

D. Patient safety

The information technology can be applied to facilitate the positive change desired in health sector but it will not ensure the patient safety. Rather the safety can be in build within the system will address both long term and short term issues. Patient safety predicts on the reducing the medication errors and insures providing the right information without having to leave a patient unattended[7]. We use information technology for ensuring patient safety like bar coding technologies which can reduce the medication errors.

III. INFLUENCE OF IT ON INDIAN PATIENT RECORD MANAGEMENT SYSTEM

Many Indian metro hospitals as well as small physician's clinics use the information technology for administrative purpose14.Rather accessing the medical records (birth to death) at any point of care by both patients and physicians is said to be critical aspect in healthcare. Computerizing the patient medical records can improve the quality of the services. In India 80% of population lives in rural areas and remaining 20% are in urban[7]. The primary health care center are main source of healthcare service in rural areas other than secondary care and tertiary care services provided in urban areas where information technology is broadly used in urban hospitals. The supply and demand of healthcare services in urban and rural area are varies such as due to the influence of information technology[9]. To enhance the features of healthcare IT in rural areas we use the public-private partnership (PPP) model which can interconnect the metro public and private hospitals with public hospitals (primary health care) in rural areas by using the information technology as a tool for interconnecting them. An integrated and computerized of medical records can reduce all kind of medical errors it is widely accepted by physicians as well as patients8. In this part we focused on how medical records are computerized in rural and urban India.

A. COMPUTERIZED PATIENT RECORD MANAGEMENT SYSTEM IN RURAL AREAS

Indian healthcare services have been globally accepted and according to UNDP it has ranked 128/177 countries for its best health care service (Human Development Index 2007/2008). But the major issue is the IT enabled healthcare services are widely explored in urban area while in rural areas they are in growing stage. The primary health care centers in rural places are focused on preventive type of health care services. Rural people have to travel towards the urban area for curative kind of healthcare services which predict on the cost of treatment that is highly expensive. Use of information technology has reduced all kind of barriers of rural people. If all kind patient records are computerized and it is interconnected with the physicians of urban hospitals through video conferencing technology they instruct the staff to provide services at any point of care. Now let we look upon an open source based EMR software which is widely used for prenatal care and child health of rural india. In general the healthcare system of rural area will be look as given below Rural people are serviced only in sub centers by paramedics of one female worker and one male worker (ANM) which every patient records nearly upto 5000-7000 records he has to be maintained in centralized database community center by the impact of information technology it reduced all kind of paper works which was done in sub center. The adoption of handheld technology for EMR system[10] has been widely accepted by public. The current technology we are using is handheld device which interconnect the larger databases from different community centers to form a virtual database it can be accessed in physicians for patient records. The above software was designed for prenatal and child care in rural areas since most of the sub centers are focused on servicing for woman and child cares in India. The above software designed with 4 modules

MODULES	DESCRIPTION
REGISTRATION	Newly registered patient and unique ID has been provided
DEMOGRAPHIC	Modification in patient data can be done
ANTENATAL CASE	–registration consist of historical patient record –encounter Alerts about current health status
CHILD UNDER 5 CASE	Provide immunization and child care status

Table 1: Modules in the EMR system

The above modules are been used and women prenatal and child healthcare data are stored. In some critical cases the sub center staff would not be able to tackle the health problem attained to the patient thus the information technology will act as major tool in such situations. Rural sub centers are all connected to community health center in turn it is connected to the urban hospitals where expert physicians can give guidance to the staff in sub centers for providing services to the patient. The simple flow of information has show in below diagram
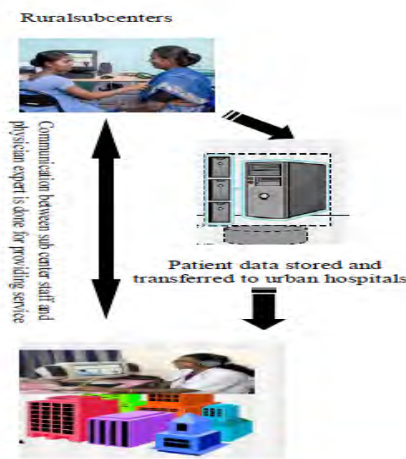

Fig3:Flow of information from rural sub centers connected to urban hospitals

B.COMPUTERIZED PATIENT RECORD MANAGEMENT SYSTEM IN URBAN AREA

Technology innovations are been widely accepted and implemented in urban healthcare sector.Various types of technology are been used Computerization Of health information as[11]
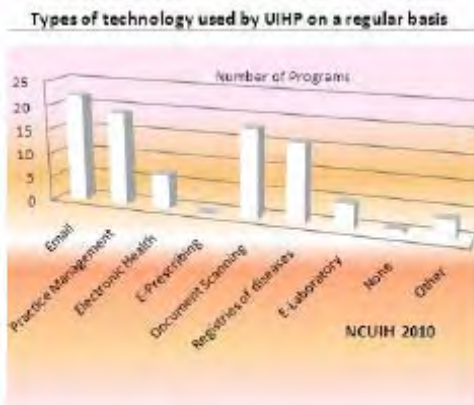

Fig4:Source-Survey conducted by UIHP(Urban Indian Health Program)

According to the survey conducted by UIHP(Urban Indian Health Program) the influence of IT in each program are as

– 92% reported Email

- 79% practice management system
- 29% reported EHR
- No-one for E-prescribing
- 75% reported Document Scanning
- 67% reported Registries of patient with specific
  diseases
- 21% reported E-Laboratory

Electronic Patient Health Record (EPHR) which is said to be digitizing all kind of patient records to do away with the maintaining the paper based record and also it is used for accessing those data at any point of care. The use of Information technology in EPHR system model has been depicted with the scenario of Apollo hospital Bangalore who has implemented this system in 2006 developed by Akhil System. The basic components that are used by this system is about different kind of patient records are been computerized and it is used by the physician for further treatment to the patient where all kind of historic patient data are stored in EPHR system and later it can be by using the unique ID for each patient. The adoption of this kind of system is high that compared to rural health centers.

IV. CONCLUSION

The adoption of information technology in healthcare services is been extensively accepted and implemented in urban areas rather rural areas of Indian scenario. Due to facts such as

- Lack of resources.
- Lack of technical (computer) skills among staff.
- Deployment of quality   service using upcoming
  technologies.
- Embracing standard policy framework

Use of information technology in healthcare services can eradicate all the above facts.

ACKNOWLEDGMENT

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