

The Study on Role of Information Technology in the Management of Govt. Hospital with Special Reference to Nagpur District for the Year 2001-2010

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Abstract: Information Technology has tremendous potential in the field of hospital management. Health information technology describe the comprehensive management of health information across computerized system and its secure exchange between consumers, providers organized hospitals ensuring quality entities. HIT is viewed as the most promising tool to support in improving overall quality of day-to-day working safely and efficiently within the hospital. The consistent utilization of HIT will prevent the medical & administrative errors, help not only to reducing the cost but increase the efficiencies and reduce paper work. Hence help to solve health problems and improve quality lives. . N numbers of IT services are available and utilized by pharmaceutical companies, corporate hospitals and other private health sector. But in our country public health sector run under the management of government are far behind in its utilization of this technology. In past decades health insurance has grown very rapidly which uses this electronic technology in collecting, analysis, and transferring information when needed. The combination of data, knowledge and processes along with effective monitoring and mentoring by the professional community would ensure the availability of high-end medical services, to the lower tiers. This could only be possible with effective computerization by implementing HIT at all levels in govt. hospitals.

Keywords: Hospital information system, Decision support system, Data consistency.

1. RESEARCH STUDY

Information technology (IT) has the potential to improve the quality, safety, and efficiency of health care. Delivering quality health care requires providers and patients to integrate complex information from many different sources. Thus, increasing the ability of physicians, nurses, clinical technicians, and others to readily access and use the right information about their patients should improve care. The ability for patients to obtain information to better manage their condition and to communicate with the health system could also improve the efficiency and quality of care. This potential to improve care makes broader diffusion of IT desirable. However, further research is needed to better understand what types of IT applications are most useful for improving care in different settings and what circumstances are necessary to ensure successful implementation. Current studies show that some technologies lead to better care. However, the evidence base is narrow, coming primarily from select institutions that developed their own systems, and may not represent the average facility.

The health care system generally uses less IT than other industries, but surveys indicate that providers are increasing their investments. The extent of IT and the types of IT deployed vary by setting and institution. The prevalence of IT in any setting largely reflects the strength of the drivers and barriers to investment. For many organizations, quality and process

improvements are primary drivers. For others, gains in efficiency motivate investment. Yet, the cost and the complexity of IT implementation, including necessary organizational and workflow redesign, pose considerable barriers, as does uncertainty regarding the stability of the IT industry.

Health information technology not only prevents medical errors but reduces the health care cost leads to expansion accessible medical information which improves the health care delivery through better diagnoses. Having advantage for mapping of public health threats Mainly useful in sharing knowledge among the medical experts, staff and public The knowledge of health promotion is accessible for overall improvement and development for services of people. India is hub of IT and IT enabled service industry. N numbers of IT services are available and utilized by pharmaceutical companies, corporate hospitals and other private health sector. **But in our country public health sector run under the management of government are far behind in its utilization of this technology.** In past decades health insurance has grown very rapidly which uses this electronic technology in collecting, analysis, and transferring information when needed. Currently electronic health record (EHR), telemedicine, digital health knowledge resource (digital medical library), and hospital management system, e-learning technologies, health sciences, health informatics are under the network of information technology. Even today - hospital and healthcare information systems are noticed controversial in our country specially government hospitals in urban and rural parts. The manual working is steel to be replaced by Information Technology which deficiently affects the quality of health delivery and reduce manpower to the huge extend.

At present the major software application for information system in this modern fast world has made significant impact on health care sector has witnessed the foray of numerous information systems and their resultant output in hospital scenario. This is because of paper medical records are cumbersome, (bulky) to use and difficult to manage. On the other hand digital records are much easier to handle and improve workflow efficiently by integrating various tasks.

A hospital Information system (HIS) can be defined as a computerized system that is designed to meet all the information need within a hospital. Broadly this includes diverse data types such as patient information, billing, finance and account ting, staffing and scheduling, pharmacy ordering, prescription handling, supplies, inventory, maintenance, diagnostic report related to laboratory, radiology and patient monitoring as well as providing decision support. IT application system can be used for communicating medical information, administrative support, legal requirement, image processing and other research developments. A health or medical digital library is designed to assist physicians, health professionals, students, patients, in finding health and scientific information to improve, upgrade, assess or evaluate health care for the benefit of people.

Information Technology is playing valuable role not just to reduce cost and manpower but it's a need of scenario in order to meet patient care and satisfaction. The practice of information technology is most flexible & useful technique of engineering in medical industry.

2. IMPORTANT FEATURES OF HOSPITAL MANAGEMENT & INFORMATION SYSTEM (HMIS)

1. HMIS is a revolutionary solution with end-to-end features for simplifying hospital management – all at a cost which provides the fastest ROI
2. Access to the right information and the automation of complex tasks & workflow is the key focus of the HMIS, enabling freeing the staff to spend more time on caring for patients and extending the reach of services
3. The HMIS is designed to cover a wide range of hospital administration and management processes believes that every hospital is unique in terms of its requirements and priorities. Hence, flexibility has been built into the HMIS to allow easy customization.
4. The HMIS features unparalleled flexibility & scalability, comprehensive report types, easy customization, intuitive visuals and interactive graphics that simplify complex data, dashboards supported quality initiatives and comprehensive drill-down capabilities
5. The HMIS has been conceived by a blend of seasoned professionals with rich and relevant experience healthcare industry

6. The system incorporates the best healthcare practices and is designed to deliver key tangible benefits to clients across the globe
7. With technology expertise garnered for over a decade and specialists drawn from diverse fields of medicine, we help hospitals provide better managed care through the state-of-the-art HMIS solution

Information Technology has made its presence felt in various verticals and the benefits derived from computerization have now been well established. Healthcare sector is no exception to this. The advent of HIMS solutions dates back to almost two decades. However, the advancements in this technological area have not been fully utilized by the government hospitals in India, where its adoption has been slow. Appropriate use of Information technology in health care would have a significant positive influence in creating a healthy society. The combination of data, knowledge and processes along with effective monitoring and mentoring by the professional community would ensure the availability of high-end medical services, to the lower tiers. This could only be possible with effective computerization at all levels that ensures the availability of electronic health records for tele-medicine, medical data ware housing and decision support systems. The first step is an effective HIMS implementation at all tiers of hospitals, leading to the availability of data in a consolidated manner at the decision making points. The government and the health industry are realizing the benefits of such computerization. However, due to various reasons, their adoption at lower tiers is very low. HIMS Systems had its share of failures during their initial introduction in mid nine ties and early twenties, in many countries. They provide valuable lessons on pit falls that one should look for during implementation. Meanwhile, ICT has progressed during the past decade and many of the hardware and bandwidth related problems of yester years have vanished ushering in new possibilities in implementation. Cloud Computing is one such technology.

Cloud computing can fundamentally revolutionize the way technology is used in Government Hospitals. The ability to more effectively communicate and collaborate is the biggest benefit of adopting the cloud model. It permits uniform coverage of the solution over the whole country. It also cuts the cost of ownership considerably. It will bring in standards of interoperability for services being offered.

3. EXAMPLES OF HEALTH INFORMATION TECHNOLOGY FOR HOSPITALS AND PHYSICIANS

- **Electronic health record (EHR):** EHRs were originally envisioned as an electronic file cabinet for patient data from various sources.
- **Computerized provider order entry (CPOE):** CPOE in its basic form is typically a medication ordering and fulfillment system.
- **Clinical decision support system (CDSS):** CDSS provides physicians and nurses with real-time diagnostic and treatment recommendations.
- **Picture archiving and communications system (PACS):** This technology captures and integrates diagnostic and radiological images from various devices
- **Bar coding:** Bar coding in a health care environment is similar to bar-code scanning in other environments:
- **Radio frequency identification (RFID):** This technology tracks patients throughout the hospital
- **Automated dispensing machines (ADMs):** This technology distributes medication doses.
- **Electronic materials management (EMM):** Health care organizations use EMM to track and manage inventory of medical supplies, pharmaceuticals, and other materials
- **Quality and health information technology**

One of the primary motivators for adopting many clinical health IT applications is the belief that they improve the quality of patient care.

The in-depth study was conducted to understand the MIS system application and its existent in government hospitals in Nagpur and Public Health Centers of Nagpur dist for assessing the MIS status.

4. INFRASTRUCTURE OF GOVERNMENT HOSPITAL IN NAGPUR & PHC'S IN RURAL AREAS

The study conducted at following government hospitals in Nagpur and Public Health Centers of Nagpur dist for assessing the MIS implementation with present status.

4.1 List of Major Government Medical College & Hospitals of Nagpur City:

- Government Medical College & Hospital, Nagpur
- Daga Hospital, Nagpur
- Indira Gandhi Medical College & Hospital, Nagpur
- Mental Hospital, Nagpur

4.2 List of the Govt. Public Health Centers at Rural Areas in Nagpur District:

- Hingna
- Saoner
- Kamthee
- Umrer
- Dhapewada
- Narkhed
- Kanolibara
- Mohapa
- Kondhali
- Gondkhairi

In the study while assessing the Hospital Information System at above hospitals & health centers Descriptive research approach adopted to understand about MIS technology. Descriptive statistics have been used to find out the deficiencies, if any, in the existing Hospital Information System. The target consisted of Administrative Officer, doctors HOD and patients in the hospital. The data were collected from a sample of Admin & managerial head / Center in charge, doctors and patients selected by the uneven stream sampling technique. The inclusive criteria for selecting the sample were the Dean, Administrative Head, Hospital Superintendents who involved in decision making process, doctors with experience of more than one year, and the computer literate staff & patients, who supported in the study.

The tool used to collect the data was a prepared, close attention questionnaire. The questionnaire was constructed with emphasis on the content, clarity and simple language based on health care facility and Information Technology. The questionnaire was circulated during personal interviews with Heads, Doctors and Patients in OPD also in sections of the hospitals. Well thought-out questionnaires were used to find out the deficiencies in the existing system. The various studies conducted, shows the importance of Management Information System (MIS) in hospital management. It lays emphasis on the nature of the modern hospital management system, the current legal and social environment; advancing technology and the expanding role of management that have created information needs which cannot be satisfied by traditional resources. A closer examination of these four areas will make known the demand for more advanced management information technology in health care sector.

The objective to find out the benefit for patients of lower levels in study, and check the validity and feasibility of healthcare The tool was administered to understand the current system and difficulties for ascertaining the reliability and quality health care with & without MIS which was important and satisfactory.

The purpose of the Hospital Information System is to raise “managing” from the level of gradually patterned information, perceptive staff at work and isolated problem solving to the level of systems insight, systems information and systems problem solving. It is, thus, a powerful method for aiding administrators in solving and making decisions. The heads of hospital agree that the Hospital Information System does help as a tool in the various utilization processes.

The various studies conducted earlier regarding information system reveals the benefits for doctors and nurses and includes, qualitatively better data, more available data on patients, direct consultations of colleagues and experts, use of decision based systems, reduced work load, the gain of time, and the availability of administrative support. Majority of the doctors do believe that the existing Hospital Information System can help to reduce the cost of patient care or shorten the stay of the patient in the hospital

The present scenario in India is that most of the Medical Records Department is partially computerized. This system exists in some Health Care facilities, where entries are made by different Health care providers, such as Physicians, Nurses and therapists, into the computer in different nodes in a local area network. The survey conducted in the hospital reveals the importance of information networking between the departments. Majority of the beneficiaries of Hospital Information System, are aware about the advantages of computerization in the HIS in providing better health care. All of them agree that only in an efficient system the information can be readily available. The exciting possibility of a modern and computerized information system is a need for quality healthcare. In the coming years we can visualize the patient record existing in electronic medium, where a patient can have a single record from birth to death that can be assessed from any where in the world.

Infrastructure of Govt. Medical College and Hospital, Nagpur:

About GMC & HOSPITAL:

It is known to be the biggest medical college campus in asia, when the total accumulative area of the campus was 190 acres. But now because of encroachments by the neighboring colonies and slums the area is reduced to not more than 35 acres.

The hospital was built in 1947 and the college became functioning in 1952. Currently having the capacity to accommodate aprox 1750 patients, this majestic hospital drains patient load from hoshangabad in the north, to up to secundrabad in the south, from far western districts of Maharashtra to Raipur in the east.

Academically the college boasts the finest departments of anatomy, microbiology, pathology, preventive medicine (being the regional centre for WHO), general medicine, general surgery,

Information Technology has made its presence felt in various verticals and the benefits derived from computerization have now been well established.

The combination of data, knowledge and processes along with effective monitoring and anesthesia, are just to name a few. the adjoining superspeciality hospital come under the administration of the same dean as the college although has the totally different identity altogether. The hospital has a peak inflow of a few thousand of patients daily, managed competently by the well versed and responsible residents. The intake capacity of the college is 200 medical students yearly.

The massive infrastructure of this hospital is supported with computerization and MIS technology connected to most department & section for fast and efficient working. Mentoring by the professional community ensures the availability of high-end medical services, to the lower tiers.

This could only be possible with effective computerization at all levels that ensures the availability of electronic health records for tele-medicine, medical data, and ware housing and decision support systems. The first step is an effective MIS implementation at all tiers of hospitals, leading to the availability of data in a consolidated manner at the decision making points.

The government and the health industry are realizing the benefits of such computerization. However, due to various reasons, their adoption at every section is yet to installed and utilized completely.

The computerization can fundamentally revolutionize the way technology is used in Government Hospitals. The ability to more effectively communicate and MIS Systems of Computing is one such technology can fundamentally revolutionize the way technology is used in. It also cuts the cost investment of ownership considerably. It will bring in standards of interoperability for services being offered to all levels of patients

5. RESEARCH METHODOLOGY

Rationale for Selection of the Research Problem:

The objective of the research study as stated earlier the existences of Information Technology in Health Care specifically in Nagpur District is still left behind particularly in PHC & RH centers of rural areas since 2000-to-2014. Though Govt. has taken the problem seriously in the early twenties the HIMS system proved the importance of technology support & its efficiency mainly in Govt. Hospitals of Nagpur. Information Technology has made its presence felt in various verticals and the benefits derived from computerization have now been well established in Govt. Medical College & Hospital, Daga Hospital & Indira Gandhi Medical College. However, the advancements in this technological area have not been fully utilized by the government hospitals in rural health centers.

Appropriate use of Information technology in health care would have significant posit influence in creating a healthy society. The combination of data, knowledge and processes along with effective monitoring and mentoring by the professional community would ensure the availability of high-end medical services, to the lower tiers patients in rural and urban parts. This could only be possible with effective computerization at all levels that ensures the availability of electronic health records for tele-medicine, medical data warehousing and decision support systems. The first step is an effective HIMS implementation at all tiers of hospitals, PHC & RH, leading to the availability of data in a consolidated manner at the decision-making points. The government and the health industry are realizing the benefits of such computerization. However, due to various reasons, their adoption at lower tiers in rural PHC & RH not taken care off as yet. Thus the health information systems are very inadequate and this is perhaps the missing link in the state being unable to gain pre-eminence in the social sector.

To provide health information infrastructure, this would help in daily operations, clinical practice and ensuring quality of service to be provided to the needy patients. To improve the utilization of available resources and sharing common patient information by makings of information technology and by adhering to standard Healthcare Management Information System (HMIS) from the data processing over information gathering to knowledge management, to facilitate decision taking by providing the information and communication infrastructure.

To create Unique Health ID for the Patients visiting State Government run Hospitals which will be used as permanent MRD number for the patient. Reduction in the waiting time at registration and consultation for Patients by making all patient data including X-ray, CT, MRI images available to the Clinician Make Patient data available in Electronic format so that Management of Hospital / MED Department /Health Ministry can take quick decisions and action institutions of emergency /shoot up of any communicable disease /Disaster Management.

Statement of Problem:

As stated before how the role of Information Technology is important and efficient in hospital management mainly in government hospitals. Despite the fact that the state of Maharashtra is growing with industrialization and technological development in other sectors Importantly the Health Care Facility is still not equipped with information technology infrastructure and computerization for welfare and healthcare in rural part of Nagpur Dist.. However Govt. Hospitals like **GMCH, DAGA HOSPITAL** and **IGMCH** in Nagpur City has the Medical Information System (MIS) functioning efficiently since 2009 according to my assessment in study. There are various reasons which may not being focused by govt. authority possibly due to lack of manpower and financial constrain of the government to make PHC RH well equipped with HIS. The poor villagers cannot effort and rush for treatment at hospitals in Nagpur Consequently the Computerization with MIS system is a need to install at PHC & RH to protect the health of poor patients. MIS in PHC will support Doctors in clinical laboratory and treating patients more efficiently and quickly. This will avoid people rushing to Nagpur in emergencies form nearby villages to save their lives.

Objectives of the study:

1. To study the existing Hospital Information System in the Government medical hospitals in Nagpur city and Rural PHC in the district.
2. To study the satisfaction level of doctors, administrators and patients with respect to Hospital Information System.

3. To Study the year wise developments and acceptance during the period 2000-2014 with Medical Information System & computerization to provide quality healthcare in Govt. Medical College & Hospital specifically in Nagpur District
4. To identify the presence and uses, of the existing Hospital Information System in health care facility at govt. hospitals.
5. To understand the problems in not implementing Medical Information System (MIS) in the govt. hospitals.

Hypothesis 1

H₀ - The doctors and administrators are not satisfied with the Hospital Information System.

H_a - The doctors and administrators are satisfied with the Hospital Information System and find it as a useful resource.

The doctors and administrators of the hospitals where HIS has been implemented were asked about their satisfaction with working on the system. Out of 57 respondents 49 said that they were satisfied whereas 8 respondents said that they were not satisfied.

The responses indicated overall satisfaction with HIS. However, the data was subjected to chi-square analysis for the purpose of statistically testing the hypothesis.

The results of the chi-square test were as below:

SRN

Sr. No.	Observed N	Expected N	Residual
1	49	28.5	20.5
2	8	28.5	-20.5
Total	57		

Test Statistics

	SRN
Chi-Square	29.491 ^a
df	1
Asymp. Sig.	.000

a. 0 cells (___%) have expected frequencies less than 5. The minimum expected cell frequency is 28.5.

Above test results show that chi-square value for 1 degrees of freedom is 29.491 which is higher than the table value of 7.879. Furthermore, significance value (.000) is below the usual threshold value of .05. Therefore, we reject the null hypothesis (H₀) and accept the alternate hypothesis (H_a).

Hypothesis 2

H₀ - There is no difference in the satisfaction level of patients in hospitals where HIS has been implemented as compared to that of the patients in hospitals where HIS has not been implemented.

H_a - There is a significant difference in the satisfaction level of patients in hospitals where HIS has been implemented as compared to that of the patients in hospitals where HIS has not been implemented.

To check and compare the satisfaction level of patients in urban areas where HIS has been implemented with satisfaction level of patients in rural areas where HIS has not been implemented a total 120 patients were contacted (60 from urban areas and 60 from rural areas). The patients were asked their opinion on 11 variables which contribute to satisfaction level. The results obtained are shown below. Student's t-test was used to compare the mean satisfaction of the two categories.

Descriptive statistics for urban category patients

Table No. 1

	N	Minimum	Maximum	Mean	Std. Deviaion
Proper Guidance	60	3	5	3.77	.563
Registration Time	60	3	5	3.80	.576

Past Record	60	3	5	4.45	.675
Payment Receipt	60	3	5	3.75	.654
Time to Meet Doctor	60	3	4	3.48	.504
Pathology Reports	60	2	5	3.75	.728
Discharge Card	60	3	5	4.57	.593
Detailed Bill	60	3	5	4.57	.593
Cleanliness	60	2	5	3.87	.724
Caring Staff	60	2	5	3.70	.788
Medicines Available	60	2	5	3.62	.640
Valid N (list wise)	60				

From the above descriptive it can be observed that the highest satisfaction of patients in urban areas is with respect to accessibility of past history and receiving proper, timely and detailed bills. HIS plays an important role in these parameters.

Descriptive statistics for rural category patients

Table No. 2

	N	Minimum	Maximum	Mean	Std. Deviaion
Proper Guidance	60	3	4	3.07	.252
Registration Time	60	3	4	3.08	.279
Past Record	60	3	4	3.55	.502
Payment Receipt	60	3	4	3.12	.324
Time to Meet Doctor	60	3	3	3.00	.000
Pathology Reports	60	2	4	3.03	.410
Discharge Card	60	3	4	3.62	.490
Detailed Bill	60	3	4	3.62	.490
Cleanliness	60	2	4	3.17	.418
Caring Staff	60	2	4	3.07	.446
Medicines Available	60	2	4	3.05	.287
Valid N (listwise)	60				

From the above descriptive it can be observed that the highest satisfaction of patients in rural areas is with respect to discharge card and receiving proper, timely and detailed bills.

T-test for comparison of the satisfaction level of urban & rural patients:

To compare the satisfaction levels of urban and rural patient's student's t-test was employed. First the total score of each respondent was computed by adding up their responses to the 11 parameters. This was done for both urban as well as rural patients. The total score thus obtained was inputted in the SPSS software and t-test was conducted. The results obtained were as below.

6. CONCLUSIONS

It is therefore considered that, the Information technology has made a significant impact on the healthcare sector. The past decade has witnessed the foray of plentiful information systems and their resultant products into the hospital scenario. The number of investments in computers and types of hospital Information Systems plays an important role in govt hospital management. This is because paper medical records are cumbersome, bulky to use and difficult to manage. On the other hand digital records are much easier to handle and improve the workflow efficiency by integrating various tasks to provide faster, safe and quality health care services in Government Hospital.

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