Computerized Patient Management System (CPMS) at AIIMS Jodhpur: An Outcome Based Paperless Hospital Management

Rajesh Sharma[1], Anish Singhal[2], Yogendra Raj Singh[3], Rahul Dhoot[4]

Abstract

A hospital information system (HIS) is an element of health informatics that focuses mainly on the administrational needs of hospitals. HIS is a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services. With the help of HIS, dealing with patient records has become very easy and manageable. The reliability, integrity, transparency and reproducibility of the records are best maintained accordingly. HIS provides a common source of information about a patient's health history. We, at our Institute have learnt that proper HIS can indeed mitigate many pitfalls encountered in the traditional paper based patient information system and strongly advocate the use of computerized patient management system (CPMS).

Keywords: Hospital Information System; Computerized Patient Management System.

[1]Professor, Department of Physiology [2,3]Senior Resident, Department of Physiology [4]Office Assistant, IT Cell, All India Institute of Medical Sciences, Jodhpur, Rajasthan 342005, India.

Correspondence and Reprint Requests:
Anish Singhal, Senior Resident, Department of Physiology, All India Institute of Medical Sciences, Jodhpur, Rajasthan 342005, India.
E-mail: asksinghal@gmail.com

Introduction

A hospital information system (HIS) is an element of health informatics that focuses mainly on the administrational needs of hospitals. HIS is a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services.All India Institute of Medical Sciences (AIIMS), Jodhpur is one of the six new AIIMS established by the Ministry of Health & Family Welfare, Government of India under the Pradhan Mantri Swasthya Suraksha Yojna (PMSSY). AIIMS, Jodhpur is one of the finest hospitals in India, providing quality patient care from 27th July 2013. Around 576,670 patients have already been served by the hospital. The mission of the organization is to establish a centre of excellence in medical education, training, health care and research imbued with scientific culture, compassion for the sick and commitment to serve the underserved.

AIIMS Jodhpur has a very robust IT infrastructure for patient management, teaching and research purposes. The improvements of our organization are best designed with the help of our Hospital Information System (HIS). With the help of HIS, dealing with patient records has become very easy and manageable. The reliability, integrity, transparency and reproducibility of the records are best maintained accordingly. HIS provides a common source of information about a patient's health history. These systems enhance the ability of health care professionals to coordinate care by providing a patient's health information and visit history at the place and time that it is needed. HIS provide internal and external communication among health care providers.

Patient servicesinclude Computerised Patient Management System (CPMS) which is a single window software for managing all patient related activities at AIIMS, Jodhpur. Online patient

registration, out patient management, admissions and in patient management, investigation ordering and retrieval of reports, patient referral, personnel management, store distribution, equipment management, blood bank, medico legal aspects, health statistics, family planning reproductive health and maternal and child health activities can be easily managed using CPMS. In addition the system also caters to ancillary hospital services such as ambulance administration, Central Sterile Services Department (CSSD), Biomedical Waste Management (BMW), operation theatre services, ICU, wards and peripheral healthcarecentres of the institution (rural and urban). It also assesses real time monitoring of patient movement, inter-hospital transfer of patient and related health information.

Design and Implementation

The process for the patients to get the service at All India Institute of Medical Sciences, Jodhpur is very quick and easy as demonstrated in the figure 1. The Patient has to first register by sharing the demographics at the Registration Counter.
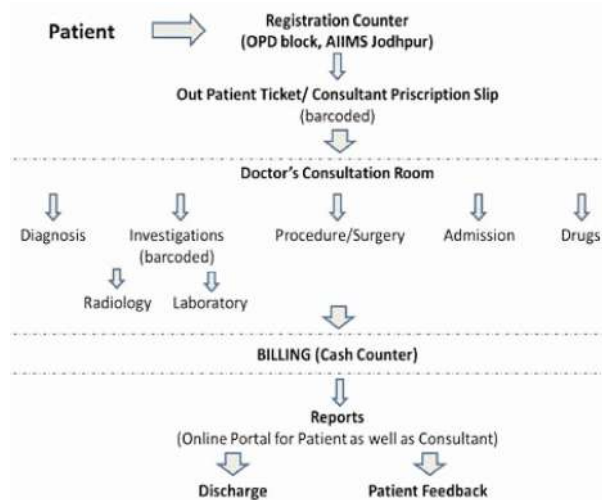
After registration, the OPD ticket or the prescription slip of the respective consultant is issued from the OPD ticket counter. Then the patient has to go to the consulting doctor. The doctor through Consultants portal then fills the diagnosis, orders investigations, prescribes medications etc. in the Hospital Information System. Billing for admission, investigation and procedures is also completed with the help of HIS. The sample for the investigation is well differentiated and managed with the help of barcode. The reporting of the investigations is also done using HIS.

There are many other layers in HIS which is well distributed under user panels so that different categories of staff and departments can work co-ordinately. There are many user panels for the users like *central ward admin panel* which manages the bed allotment and bed occupancy, *nurse panel* which deals with patients at ward regarding their vital sign, intake/output, drug delivery, notes, indenting any item from store, *Store panels* which is also divided into 3 layers i.e Central Store Admin, Store Admin, Distribution Store Admin and their work is distributed accordingly and there are also user panels like *OT Admin* which manages operation theatre, *CMS Panel* which manages approval or disapproval for Free of Cost Patients. There is one master panel named as *Developer* in the HIS. That master panel has the power to manage all the user panels. This panel has control over the HIS. This is one of the unique panels in the HIS. Another unique feature is that patient can see all the activities related to him/her like investigation reports, payment receipts, diagnosis etc. on Patient Portal.

Value Derived/Outcomes

All outpatient department (OPD) activity, patient registration- one time, bar coded, consultation, prescription, investigation, vaccination, drugs, injection, physiotherapy etc. All are done online. All inpatient activity admission, patient record, medical treatment, surgical treatment and procedures, investigation, medico legal and police formalities, discharge, death certificates, scheduling for OT, allotment / reservation of hospital beds and patient referral, all are done online.Pharmacy and stores - online procurement and distribution of drugs and pharmacy without the need to maintain registers at every point, automatic debit of indent from pharmacy stock indent can be generated in any, OPD, ward, theatres, stock keeping, online tracking of pharmacy stick with warning on low levels and expiry dates. Equipment's tracking of all hospitals equipment from bedpans to Lasers with one time online data entry. Linen and laundry stores- tracking of all linen with one time data entry, issue, condemnations, and repairs all are tracked online.Blood Bank Management is completely online from blood donation, its storage and the issue of blood bank and all steps are monitored. The system tracks each cash deposit of any kind and cash exit from the hospital at all cash counters. It keeps track of refunds and generates a detailed daily cash record.

Hospital kitchen, all dietary prescriptions and tracking is done online. Diets can be prescribed only to bona-fide patient. Therefore, misuse is avoided.Biomedical waste generation, its transport and disposal are tracked from each collection site to the incineration site, with warning if a bag is missed. The total amount of waste generated in any hospital system is recorded category (as per safety guidelines) for monitoring purpose.

All health statistics currently being collected by the department of health and family welfare such as admission, morality, infant mortality, vaccination, family planning procedures etc are catered to by the CPMS. All works and records related to maternal and child health services can be done online and all records can be retrieved intently.

We have also started one dedicated SMS portal for all the patients who require a follow up visit and the reminder for the same is sent automatically to those patients 48 hours prior to their scheduled visit at AIIMS Jodhpur for follow up. This service was started this year and we have already sent >100000 messages to the patients concerned. In order to join this initiative one and foremost requirement is that we should have the infrastructure in place, which comprises of a user database server, where our users' ID and password are stored along with a RADIUS server for authentication and logging.

The country already has the advantage of a strong IT fibre backbone and indigenous satellite communication technology with trained human resources. With enhanced efforts, telemedicine could help bring specialized healthcare to the remotest corners of the country. Telemedicine is likely to provide the advantages of tele-diagnosis, especially in the areas of cardiology, pathology, dermatology, and radiology besides effectively operationalizing Continuing Medical Education (CME) programmes. AIIMS Jodhpur takes pride that most of the vision of MOHFW and MeITY has been implemented such as Telemedicine.

Telemedicine can be defined as the use of electronic communication technology to exchange patient information and provision of health care services at remote locations. Global Telemedicine has gone far beyond providing health care services alone. It is now being extensively used also for education, research and management of data. It is, however, paradoxical that despite India's strength in information technology, the use of telemedicine is still at a fairly nascent stage especially in the public health sector. AIIMS Jodhpur has already started Telemedicine setup and acts as the Nodal

Center of referral and consultation of patients of Pali District Hospital.

Apart from patient management services IT Cell at AIIMS Jodhpur also caters for many other services including e-library, video conferencing room with ability to perform 3 simultaneous conferences at a single time, not only we are publicize our public lectures live on YouTube, but OT Procedure also broadcasts to the lecture theatres here in AIIMS Jodhpur, through our in house development we creates a robust user interfaced websites and Recruitment portal.We are providing Eduroam services at AIIMS Jodhpur, Edurom is a global service that enables students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop or activating their smartphone or other portable device through Wi-Fi. With Eduroam, we get Internet access not only via your institution's wireless network, but also when visiting other participating universities, colleges, research centres and libraries. This facility enables users visiting other Eduroam enabled institutions globally to get authenticated and connected to the visiting institutions network using their home institution ID and password and use it for free internet access.

Use of Information and Communication Technology (ICT) in health can be divided broadly in four areas viz. Education, Research, Referral, and Management of Data.

- Health and Education: When ICT is applied to medical education, it is possible to make high quality education available pan India seamlessly.

- Health Research: ICT can potentially transform the medical scene in India, by bringing about a sea-change in medical research. From traditional clinical research to the modern synthetic biology-based research, the opportunity is immense. Work on problems such as Cancer prevention, screening, diagnosis, and therapy can benefit from inter-disciplinary cooperation. Medical fraternity has availed such benefits when MRI and Nuclear Imaging were integrated into medicine a few decades ago.

- Hospital Management System: It is common experience that work places in the health systems are not adequately governed especially in remote areas. The management of medical colleges and district hospitals can be strengthened significantly with the application of Hospital Management System.

- Health and Management of Data: Electronic Medical Records (EMR), is a fundamental prerequisite in using ICT seamlessly in healthcare. While EMR is available in several forms, size, shape, and format, Indian medical community with a specific mandate should standardize EMR, create and establish ICT platforms for using EMR based systems, for universal benefits.

The vision of Digital India is included in our endeavours to achieve a paperless hospital management and Date Storage system.

Concluding Remarks and Future Direction

The hallmark of any information system, whether it is on paper or computerized (paperless) lies on three tenets:

a. patient identification and starting of the workflow of those patients

b. Recording and maintenance of the patient's data by the primary consultants as well as diagnostic consultants

c. Retrieval of the data for patient management or research purposes

We all are well aware that the all these three parameters are cumbersome and tedious if the patient care provider centre still caters to the need with a filing system on paper. In our country health care providers are under tremendous pressure to treat the patients, the numbers of which are growing exponentially and shortage of the medical staff. The need of the hour therefore is to digitalize our patient care system in an efficient way which meets the needs of the day.

We, at our Institute have learnt that proper HIS can indeed mitigate many pitfalls encountered in the traditional paper based patient information system and strongly advocate the use of computerized patient management system (CPMS).

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