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CHAPTER I

INTRODUCTION

This chapter briefly discusses on the overview of this project. It consists of five sections, which are introduction as the first section and followed by problem statements. Next are the objectives where the project's goal is determined. Then is continued by the scopes of the system, and lastly is the thesis organization which briefly describes the structure of this thesis.

1.1 Introduction

A hospital is a healthcare institute providing patient treatment through specialized staff and equipment, which are funded by public sector, health care organizations or health care charities. Healthcare in Malaysia is divided into public and private sectors.

A mainframe is a huge computer that is used for commercial databases, transactions and applications that required high degree of security and availability compared to other small-scale computers. There are certain companies that regard

mainframe as the largest server within their organization. For instance, IBM has named its mainframe as zSeries server [7].

Malaysia contains 15 states in total which includes both *Wilayah Persekutuan*. There are several public hospitals in each state. For example, in Pahang, there have Bentong Hospital, Jerantut Hospital, Raub Hospital, Pekan Hospital, Mentakab Hospital and Kuala Lipis Hospital. Excluding the hospitals in Kuantan and Termerloh Hospital, other rural public hospitals especially Bentong Hospital are still using traditional paper-based registration system.

Hospital management system on mainframe is a combination of general health care system and System-Z on mainframe. At present, Malaysia health care system is still a matter of inconvenience to its people with problems such as long waiting time and lengthy registration time [20]. In addition, environmental problems like pollutions and unhealthy lifestyle and diets that are greatly impacting Malaysians in the present society. These have caused many people to succumb to various diseases and this alarming situation increases the populations visit to hospital for treatment or consultation. What is a hassle is that, when people seek medical help or consultation in the hospital, they still need to go through the lengthy procedures to register themselves especially in certain general hospitals that are still using manual registration. Such hand-written registration is not only time-consuming [8] for both the administration and patients it is also prone to data redundancy [14]. Thus, the hospital management system that will be developed is to transact the paper works of the manual written system into a computing system to reduce the excessive waiting time and redundancy.

Other than the time consuming problem, there is also not enough storage for the hospital to store increasing piles of documentations. Most of the general hospitals in Malaysia especially within the rural areas are still using the paper works that requires a lot of places to store. For instance, there is doubled increment of birth rate every day. All the newborn babies are needed to register as Malaysian, yet the information of newborns are still written on paper and stored as filing documentation. This show the staffs took double time to update their records in a manual system as compared to a computerized one [14]. It is troublesome for the hospital to keep all the documentations about nativity and various types of information with hospital requiring a lot of extra places to keep all

those documentation. Therefore, a computing system is preferred for usage so that staffs can manage and refer to the patient records easily and save storage place [18]. Mainframe especially is highly suggested to be implemented on the system because it provides massive volume of storage [25] that can store terabytes of information in database [7] compared to the normal computing system. There is a webpage about the history of computing project [16] that stated mainframe has tons of disk space and other storage facilities in large size and quantities that are not normally found with other small computers.

From the scenario above, there is a consideration that it is quite impossible for the current manual data management system of hospitals in Malaysia, to have a secure backup for important information. If for example, any unwanted circumstances happen to the hospital such as fire or flashfloods, all the documentations are doomed. Not to mention, those information are easily breached by anyone with ill intentions and thus putting the patients' privacy in high risk. Hence, the mainframe is highly recommended to be implemented within the data system because Database Management System (DBMS) in a mainframe provides the utilities to control and implement backup and recovery of the data, preventing loss of vital information [7]. Besides that, the tape systems are still much widely used for the mainframe computers to store data and as backup. It is not possible for the government to store a mainframe in the hospital. However, government can subscribe to the services of mainframe from companies that provide them such as HeiTech Padu Berhad. [17] IBM announced that HeiTech Padu Berhad (HeiTech), Malaysia's leading information and communications technology company, is the first in the ASEAN region to use IBM's new zEnterprise mainframe server.

1.2 Problem Statements

There are several weaknesses in the general hospital manual management system, which are:

- i. All data that required in the Hospital Management System are entered manually into database which causing inconvenient to operators.
- ii. Every data is entered one-by-one at a time causing much time consuming.
- iii. All data that inserted are in unformatted form which causing operator and system admin facing the problem of reading them.

1.3 Objectives of Project

The objectives of this project are:

- i. To create an automated data entry into database via COBOL.
- ii. To create a batch type input and output system.
- iii. To generate a formatted report as stored in an independent flat file as output.

1.4 Scope

This project is mainly built for the operators and system admin in the Malaysian healthcare industries.

The scope of this system includes:

- a. patient registration,
- b. consultation record and
- c. dispensary record.

By using the computing system for registration, people will need not to register manually. This eliminates as many time-consuming tasks as possible, with features such as patient information management, printing the patient information and prescription department. Operator can key in the patient information such as name, ID number/passport number, contact number and address on the registration terminal. For the consultation, operator can entry the patient record like noting down the problem of patient and the medicine prescription on the patient's file. The dispensary department

can distribute remedy to patient according to the consultation result through the synchronization of the system.

1.5 Thesis Organization

This thesis consists of four chapters. Chapter 1 is introduction which briefly describes and introduces the system that will be developed. The basic concept of the system, problem statements of the system, objectives, scope and the ways to organize this report are included in this chapter. Chapter 2 is literature review which describes the existing systems as the case studies of the project. This chapter also reviews the technique, methods, equipment and technology used in the case studies. Chapter 3 is methodology which discusses the overall workflow in the development of the project. It also discusses the method or approach used while designing and implementing the project. Lastly, chapter 4 is conclusion which briefly summarizes the overall of the project.

CHAPTER II

LITERATURE REVIEW

This chapter is briefly to describe the review of “Hospital Management System on Mainframe”. This chapter comprises two major parts which are review on present system and review on the method, technique and equipment used in previously.

2.1 Existing System Review

This section is reviewing the existing and current Hospital Management System (HMS) either in Malaysia or other countries or both.

2.1.1 MediNous Hospital Management System

MediNous Hospital Management System provides the benefits of streamlined operations, enhanced administration & control, superior patient care, strict cost control and improved profitability.



Figure 2.1: Homepage view of MediNous HMS [19].

Company Name: DEMO HOSPITAL
Module Name: REGISTRATION
Logged in as: ADMIN
Collector Name: 301 Family Medicine

Register Patients

Patient ID: 121
Title: MR
* First Name: JONATHAN
Middle Name1: BROWN
Middle Name2:
Last Name:
Alternate No:
Status: Active
Sponsor Name:
Payment Type:
*Registration Date: 09/12/2009
Primary Doctor:

Address
PO Box: No. 256
Flat Number:
12A
Town: New York city
Zipcode: 10001

Personal Details
Blood Group: O +ve
Gender: Male
Marital Status: Single
*Date of Birth: 09/12/1979 *Years: 30 *Months: 0 *Days: 0

Other Contact Information
Telephone: 1204699151
Fax: 1204699151
Mobile No.: 6204699151
E mail: jonathan@nous.com

General Information
Nationality: USA
Employer: Nous Corporation
Occupation: Director
Passport No.: A436799 Valid Upto: 01/01/2020
Sponsorship Entry: SELF PAYEE

Other Information
Emergency Contact Person: Martha
Relation: Wife
Contact Number: 1204699152
Patient Classification: GENERAL
MRD collection point: COUNTER-1
Hear About: REFERRED BY A DOCTOR

Notes: Referred by Dr. John
Family History: None, Initial visit
Occupational History: Director of a leading firm in the city.
Past History: None, Initial visit

Buttons: Add, Remove, Print Labels, Print Registration Card, Home, Modify, Cancel, Save

Figure 2.2: Patients Registration view of MediNous HMS [19].

2.1.2 Normah Medical Specialist Centre Hospital Management System

Normah Medical Specialist Centre (NMSC) is owned by Sarawak Medical Centre Sdn Bhd, which is a subsidiary company of the State Financial Secretary (SFS) Incorporation. The Centre was officially opened on 11 August 1988. Apart from primary and family medicine and general specialties like internal medicine, general surgery, obstetrics and gynaecology and paediatrics, it also offers tertiary services such as cardiology and cardiac surgery, endoscopic surgery, neurosurgery, urology and nephrology, haematology, psychiatry and medical oncology. NMSC was the first hospital in the island of Borneo to offer open heart surgery in December 1994.




about us	facilities	services	patient info	newsletter	milestones	programs	opportunities	glossary
home	events	contact						
 <p>Normah Medical Specialist Centre Kuching, Malaysia</p>								
<h2>about us</h2> <p>Overview</p>  <p>Normah Medical Specialist Centre (NMSC) is a private 130-bed acute care hospital and medical specialist centre located at Jalan Tun Abdul Rahman Yakub, Petra Jaya Kuching, Sarawak, Malaysia. It is 16 km north of the Kuching International Airport and 7 km from downtown Kuching City.</p>			  <ul style="list-style-type: none">OverviewGeneral InfoCar ParkingSmoking FreeGeneral EnvironmentLocationMission & VisionOur ValuesContact UsFloor Plan					

Figure 2.3: Homepage view of NMSC HMS [21].

SARAWAK MEDICAL CENTRE SDN BHD (119669-3)
Normah Medical Specialist Centre
 Jalan Tun Damsak Patinggi Haji Abdul Rahman Yikob
 Petra Jaya, 93050 Kuching, Sarawak, Malaysia
 (P. O. Box 3296, 93766 Kuching, Sarawak, Malaysia.)
 Tel: (082) 660055 Fax: (082) 662600

CLINIC REGISTRATION FORM	
A. For THIS Visit:	Date:/...../.....
Patient	Title: <input type="checkbox"/> Mr. <input type="checkbox"/> Mrs. <input type="checkbox"/> Ms. <input type="checkbox"/> Miss. Other: Name: NRIC /Passport No.: Old IC No.:
Visit	First Visit: <input type="checkbox"/> Yes <input type="checkbox"/> No Payment Arrangement: <input type="checkbox"/> Self Paying <input type="checkbox"/> Corporate Patient Primary Doctor:
B. For FIRST Visit or CHANGES:	
Patient's Demographics	Date of Birth:/...../..... Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female Marital Status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Widowed Race: Religion: Nationality: Occupation: Address: Tel. (Home): Tel. (Office): Hand phone:
Next of Kin	Name: NRIC No./Passport: Relationship: Address: Tel. (Home): Tel. (Office): Hand phone:
Guarantor (if applicable)	Name: NRIC No./Passport: Relationship: Address (Home): Address (Office): Tel. (Home): Tel. (Office): Hand phone:
Office Use	<u>For Office Use Only</u> Registration Clerk: Time: a.m./p.m.

NMSC Clinic Registration Form/Version
Revision 00 Dec 2009
NMSC/MS/0017

Figure 2.4: Outpatient registration form view of NMSC HMS [21].

2.1.3 Hospital Kuala Lumpur Hospital Management System

Hospital Kuala Lumpur (HKL) is a main government hospital located in the state of Kuala Lumpur, Malaysia. It has 38 different departments and units, which include the administration & finance department, the pharmaceutical department, training and research, 23 clinical departments and 11 clinical support services [30].

The screenshot shows the homepage of the Hospital Kuala Lumpur (HKL) official website. The header includes the HKL logo and the text "HOSPITAL KUALA LUMPUR MINISTRY OF HEALTH MALAYSIA". The date is "Sunday, 30 October, 2011". The navigation menu includes "HOME", "FEEDBACK", and "SITE MAP". The main content area is divided into several sections:

- PROFILE:** Introduction, HKL Map, Management, HKL Board of Visitor, Client Charter, INTRANET (HKL Project, e-Aduan, Portal Intranet, ICT Complaint, NGCS Directory, Doctor On-Call List, 2011's Monthly Assembly Schedule, List of Medical Masters Student and Supervisors, Persatuan Kebajikan HKL), HKL INFO (Online Hospital Bills Payment, Library Information Sources, Application Process For Locum/Sessional From).
- ATTENTION:** Terdapat gangguan aplikasi MOHCUBE (email KKM) buat sementara waktu. Sebarang pertanyaan sila hubungi Helpdesk CTM di talian 5111. Penutupan Tempat Letak Kereta di Tapak Pembinaan Hospital Wanita dan Kanak-kanak Bermula 5 Nov 2011 Bagi Pelaksanaan Projek Pembangunan HKL. Perhatian: Hanya SATU tuntutan perjalanan boleh dibuat setiap bulan. Maklumat Lanjut KLIK DI SINI. Kanak-kanak Di Bawah Umur 12 Tahun Tidak Digalakkan Memasuki Wad Hospital Kuala Lumpur.
- FOR ENQUIRIES:** INFORMATION COUNTER: 03-26156391, Monday - Friday, 8.00 am - 5.00 pm.
- EVENTS:**
 - 1) SAMBUTAN HARI KESIHATAN MENTAL PERINGKAT HKL 2011 & PERHIMPUNAN BULANAN BULANAN BIL. 10 2011. Date: 28 OKTOBER 2011, Time: 7.30 PAGI, Venue: AUDITORIUM UTAMA, HKL.
 - 2) CERAMAH AGAMA: PENDIDIKAN AL-QURAN DAN PENGHAYATAN DALAM KELUARGA. Date: 28 OKTOBER 2011.
- NEWS:**
 - 1) Sambutan Hari Anestesia Sedunia 2011 Peringkat Kebangsaan - Your Safety Is Our Priority pada 9 Oktober 2011.
 - 2) Majlis Anugerah Perkhidmatan Cemerlang Tahun 2010 pada 29 September 2011.
 - 3) Majlis Mesra Merdeka Raya Bersama Pesakit HKL Anjuran Biro Sosial Dan Kebudayaan Kelab Sukan HKL pada 20 Seotember 2011.
- HKL VIDEO:** HKL Corporate Video.
- HKL GALLERY:** A photo of a man speaking at a podium.
- Search:** A Google search bar with the URL "www.hkl.gov.my".

Figure 2.5: Homepage view of HKL [9].

HOSPITAL KUALA LUMPUR
MINISTRY OF HEALTH MALAYSIA

Sunday, 30 October, 2011

HOME FEEDBACK SITE MAP

Admission Guide Medical Report Visiting Hours Student Elective Posting Hospital Charges Medical Examination Outpatient Clinic Hospital Facilities

PROFILE
Introduction
HKL Map
Management
HKL Board of Visitor
Client Charter

INTRANET
HKL Project
e-Aduan
Portal Intranet
ICT Complaint
NGCS Directory
Doctor On-Call List
2011's Monthly Assembly Schedule
List of Medical Masters Student and Supervisors
Persatuan Kebajikan HKL

HKL INFO
Online Hospital Bills Payment
Library Information Sources
Application Process For Locum/Sessional From Medical Practitioner To HKL
Influenza A (H1N1) Issues
Dengue Issues
Circular Letter from

GENERAL INFORMATION

OUT-PATIENT CLINIC

PROCEDURE FOR OUTPATIENT CARE

Out patient Clinic is under the jurisdiction of Out Patient Department, Hospital Kuala Lumpur. It is located on the Ground Floor of Hospital Kuala Lumpur's Main Block.

Operating Hours	
Monday to Friday	8.00 am - 5.00 pm
Saturday/Sunday	Close

Steps to get treatment

1. Patients wishing to see doctor, goes to Registration Counter at the Out Patient Department where he/she needs to take a number from Counter 11A.

Caring Society Programme ♦ Senior Citizen (65 years and above) given priority without following turn@s number.

2. Calling System number given is a Computer generated numbers. Press button A then wait for a number to come out of the machine. Take 1 number for each patients to be seen. (i.e. 1 number for 1 patient, 2 numbers for 2 patients and so forth.
3. Wait until your number appears in any digital boxes located over each Registration Counter.
4. When your number appear in the digital box, you must be ready with the following documents for registration.
 - Identification card
 - Birth certificate (for children below 12 years old)
 - Passport for foreigner
 - Latest complete address
 - Appointment card (If you have one stamped with Out Patient Department Chop)
 - The number you have taken earlier.

We Wish You A Speedy Recovery

SPECIALIST SERVICE
There are 70 Specialize Care Clinic in HKL. To get services from a specific specialist clinic a patient

Figure 2.6: General information of Outpatient Clinic view of HKL [9].

<ul style="list-style-type: none"> Management HKL Board of Visitor Client Charter INTRANET HKL Project e-Aduan Portal Intranet ICT Complaint NGCS Directory Doctor On-Call List 2011's Monthly Assembly Schedule List of Medical Masters Student and Supervisors Persatuan Kebajikan HKL HKL INFO Online Hospital Bills Payment Library Information Sources Application Process For Locum/Sessional From Medical Practitioner To HKL Influenza A (H1N1) Issues Dengue Issues Circular Letter from MOH's Policy & International Relations Division Tender Statistics 	<p style="text-align: center;">MEDICAL EXAMINATION</p> <p>Medical examination clinic is located at Wisma Rekod, next to Medical Record Department. It is opened during office hour MONDAY - FRIDAY from 8.00 am - 12.00 noon and 2.00 p.m. to 3.30 pm.</p> <p>MEDICAL EXAMINATION IS GIVEN TO</p> <ul style="list-style-type: none"> Candidate who has been offered job with the Public sector. School students who has accept the offer to go to a Fully Residential School and to the Higher Institution of Learning. Government Officer who received the offer for Intensive Course or postgraduate Degree abroad. Government Officer aged 40 years or above (For category A Officer) Government Officer / Saturated Body's Officer who are exposed to radioactive / Chemical / poisonous / hazardous materials. Handicap person who will receive aids from as a resident of Charity Home (Home for the handicaps) Certain cases as require by the Head of Out patient Department. <p>HOW TO DO MEDICAL EXAMINATION</p> <p>To do medical examination you are require to bring along your offer letter with the medical examination forms, then follow the following procedure:-</p> <div style="border: 2px solid red; padding: 5px;"> <ol style="list-style-type: none"> 1. Give the form to the counter. 2. Clinic staff will determine the types of investigations require as per the requisition of the form. 3. You will be asked to fill up the registration form and some investigation forms. 4. You will be given a bill and you need to make payment prior to the examination. 5. Basic examination such as weight, height, visual and so forth will be made. 6. You will be instructed to do further investigation at other various department. 7. Before leaving the clinic, you will be given an appointment to come again for a physical examination. </div> <p>If there is any problems with your health, a further investigation will be done, where you will be referred to a specific department for further follow-up.</p>	<p>FORM REGISTRATION</p>
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Figure 2.7: General information of Medical Examination view of HKL [9].

2.1.4 Comparison within MediNous HMS, Normah Medical Specialist Centre HMS and Hospital Kuala Lumpur HMS

MediNous Hospital, Normah Medical Specialist Centre (NMSC) and Hospital Kuala Lumpur (HKL) are having a webpage respectively. Users can access and search the information of them via Internet. In MediNous HMS, there comprises all the information of all modules that serviced in the hospital via Internet. From the webpage, we can see that the hospital is using computerized HMS for its management for example patient registration module. However, the there is a lack of doctor consultant module and dispensary module in their system.

NMSC is also a private healthcare hospital same as MediNous Hospital. It is located in Kuching, Malaysia. In its hospital management system, there is not much information as provided in MediNous Hospital webpage. From the website, we know

that the registration of patient is based on paper work and computerized. This means patients have to download the registration form as shown at Figure 2.4 (one of the example outpatient registration form), then fill it and submit to the registration counter to computerize the information.

Hospital Kuala Lumpur (HKL) is a general government healthcare center in Malaysia. There is still using paper work registration in HKL as shown in Figure 2.7 Medical examination: “get the form and fill in the forms”. The patient registration like what has been shown at Figure 2.6 on outpatient clinic in HKL might probably in paper work because the procedure to get medical examination in Figure 2.7 shows in filling form. However, there is a possible of combination of paper work form-filling registration and computerized in certain department, just like what NMSC does. However, for sure is the consultant and prescription modules are still in paper works.

Table 2.1: The Comparison within MediNous HMS, Normah Medical Specialist Centre HMS and Hospital Kuala Lumpur HMS.

Parameters	MediNous Hospital	NMSC	HKL
Accessible via Internet	Yes, it can be accessed through Internet, but it just a webpage to ease users to get all the information about the hospital.	Yes, it can be accessed through Internet, but it just a webpage for users to search some information about the hospital. It enables users to download some forms and let them fill in before they register in the hospital.	Yes, it can be accessed through Internet for the basic general information such as the operating hours of HKL, or certain departments.

Created with

Management system	The hospital management system is being computerized.	The hospital management system is based on paper works and computerized system.	The hospital management system in paper-based and computer-based, but more on paper works compared to computerized system.
Patient Registration module	The patient registration module in this hospital is computerized.	Patients need to download the form from website and filling in before get for the consultant. Then the staff will key in the detail according to the submitted form into computer.	Patients need to get the forms from registration counter and filling in before consultant. Then the staff will computerized the data according to the submitted forms.
Consultant module	Unknown.	Unknown.	All the historical of patient for previous consultation are still keeping in paper-based. Doctors have to write patients' diseases on patients' record - cards.
Dispensary module	Unknown.	Unknown.	Doctors still have to write the medicine that to be dispensary on paper.

A hospital is a place where patients come up for general diseases. Hospitals provide facilities like consultation by doctors on diseases, diagnosis for diseases, providing

treatment facilities and provide immunization for patients especially children. There are various jobs that need to be done in hospital by the operational staffs. For instance, record information about the patients that come, record information related to diagnosis given to patients, and keep information about various diseases and medicines available to cure them. All these works are mostly done on papers [4]. There is a similar view between Park, Y. T. [24] and Chitkara, M., Khandelwal, N., and Chaporkar, A. [4] where medical care generated an extraordinary amount of data, almost all of which has been in paper-based medical records. Park, Y. T. [24] also claimed in traditionally, paper-based medical records (PMR) have incorporated vast amount of patient information and have had a dominant role in medical care. One of the major trends recently evolving in South Korean hospitals is replacing the PMR with electronic health record (EHR) systems, yet most of the hospitals in Malaysia especially hospitals in rural area are still in paper-based system.

A report about hospital management system has done by Chitkara, M., Khandelwal, N., and Chaporkar, A. [4], stated that all the works done manually by the operational staff and lot of papers are needed to be handled and taken care of. Information about patients is done by just writing the patients name, age and gender. Whenever the patient comes up his information is stored freshly. Also, the diagnosis information to patients is generally on the document, which contains patient information. It is destroyed after sometime period to decrease the paper load in the office. Manual system is causing the lack of immediate retrievals, lack of prompt updating, and impact to the preparation of accurate and prompt reports. Staff is very difficult to retrieve and to find particular information, for instance to find out about the patient's history, the staff has to go through various registers. This results in inconvenience and wastage of time. Various changes to information like patient details or immunization details of child are difficult to make as paper work is involved. This consequence a troublesome as information is difficult to collect from various registrations.

On top of that, Krishnan, A., Nongkynrih, B., Yadav, K., Singh, S., and Gupta, V. [14] found that there was currently lacking in the health system in India. The staffs generated a lot of data and the data are redundant or never utilized adequately consequences inefficiency management of data in a manual system, and often causing

duplication of efforts and wastage of time. Moreover, paper medical record system is the high occurrence of human error possible at virtually every step of the process [13]. Thus, Chitkara, M., Khandelwal, N., and Chaporkar, A. [4] suggested one of the alternative solutions is the improvement of the manual system or using computer-based batch system for maintaining the information regarding customers and staffs details. A batch system refers to a system in which data is processed in a periodical basis. For example, staff keys in the data such as patient's name, identification card number, address and contact numbers as the computer-based registration when the patients come in to the hospital. While, Helton, J. R. [8] found that electronic clinical documentation was expected to address the significant problem of nursing staff completing paper documentation. This study cited a statistic that nurses completing paper documentation takes can occupy two to three hours per eight hour work shift. As a result, the manual documentation process appears remarkably time-consuming.

Therefore, a computerized health management information system (HMIS) was implemented because it provides easy and effective storage of information related to patients that come up to the hospital, and helps the staffs in maintaining their records properly [4]. According to Krishnan, A., Nongkynrih, B., Yadav, K., Singh, S., and Gupta, V. [14], the major advantage of computerization has been in saving of time of the health workers in record keeping and report generation. One of the workers also mentioned that by using computer, they can get the information from register immediately if any officer comes and asks for records. In addition, Helton, J. R. [8] has a same statement as the research done by Krishnan, A., Nongkynrih, B., Yadav, K., Singh, S., and Gupta, V. [14] that electronic capture of this documentation would make the monitoring of patient care outcomes accurate and less time-consuming.

Throughout a research article, there was a study that conducted to evaluate the effectiveness of a computerized HMIS in rural health system in India. HMIS is a process whereby health data are recorded, stored, retrieved and processed for decision-making [14]. Decision making broadly includes managerial aspects such as planning, organizing and control of health care facilities at the national, state and institution levels. Maintaining a good HMIS is an essential part of running a health system. This can be done in manually as it is being done in mostly of India, or it can be maintained in a

computerized system. In this study, health workers from All India Institute of Medical Sciences (AIIMS) and non-AIIMS primary health centers were interviewed to compare the manual with computerized HMIS. From the study, there has been no major hardware problem since computerized. The staffs have been acknowledged in use of computerized HMIS, and at the same time manual training has also been prepared. As a result, there were more than 95% of data found to be accurate and timely by using computer-based system. One of the staffs claimed that computerized HMIS also helps them in maintaining their records properly.

Furthermore, a study done by Helton, J. R. [8] discussed information technology (IT) in a hospital organization contributes to greater efficiency in hospitals. It is fast becoming an asset of significance, particularly in light of recent reform legislation in the United States that calls for expending the role of IT in our care delivery system. Hence, he was seeking to determine the extent to which implementation of Electronic Health Record (EHR) technology translates into improved operational efficiency. Park, Y. T. [24] also stated that hospital administrations using IT and replacing the paper medical record systems with electronic record systems not only simplify their work process, they also save time and space in healthcare organizations. The increasing complexity of diagnostic testing, medication administration and oversight of resources in an era of fixed or reduced revenues places a premium on information in the efficient delivery of hospital services, making IT investments - EHR technology in particular - a preferred strategic option. An EHR is a computer-based document that is used by the health workers or staffs [2]. It is similar to the old paper medical chart which contains health information of patients. EHR technology represents the latest state of a transformational process that has occurred in hospital IT over a period of nearly fifty years. Barack Obama had releasing a report titled The Cost of Inaction: the Urgent Need for Health Reform on the newly created HealthReform.gov and stating in a February 2009 address to Congress that "health care reform cannot wait, it must not wait, and it will not wait another year" [23]. Besides that, announced his goal to "ensure that within five years, all of America's medical records are computerized" [22].

Kilgore, A. [13] has proven that the use of a change management model to assist with the implementation process is the key to a successful transition from a paper