ORTHOPEDIC INFORMATION MANAGEMENT SYSTEM (OIMS)

NURUL RASHEEDAH FATEEN BINTI RAMLI

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ABSTRACT

Hospital management system has been developed over the past decades with the objective of streamlining the treatment flow of their patient while optimizing the doctors and staff performance ability. However, previous research on hospital management system shows a lacking in providing information especially to the public society. The need for strengthening this system is crucial as public have their own right to know and be included in the management. Therefore, hospital management has added an element of information in the system to include not only the doctors and hospital staff, but also the patients as the visitors of the hospital itself to access the system. This paper was made to specify the hospital management information system to a specific department that is Orthopedic Department to visualize the effectiveness of the system. Information on the latest news, promotion package offered by the hospital as well as direct line contact number of department of interest can be easily attained

ABSTRAK

Sistem pengurusan hospital telah dibangunkan sejak berdekad-dekad lagi bagi tujuan untuk memudahkan aliran rawatan pesakit dan seterusnya kakitangan hospital dan doktor. Ianya dapat dicapai melalui kaedah mengoptimumkan kemampuan prestasi kakitangan. Namun, kajian terdahulu mendapati ada kekurangan dalam proses menyebarkan dan menyimpan maklumat khususnya kepada masyarakat umum. Keperluan untuk menguatkan sistem ini adalah sangat penting kerana masyarakat mempunyai hak tersendiri untuk mengetahui dan melibatkan diri dalam pengurusan. Oleh kerana itu, pengurusan hospital telah menambah unsur maklumat dalam sistem di mana pesakit juga dapat melibatkan diri dalam mengakses sistem selain dari doktor dan kakitangan hospital. Projek ini dibuat untuk menentukan sistem maklumat pengurusan hospital untuk sebuah jabatan khas iaitu Jabatan Ortopedik untuk memvisualisasikan keberkesanan sistem. Maklumat tentang berita terkini, pakej promosi yang ditawarkan oleh jabatan tersebut serta nombor untuk dihubungi turut diisi di dalam aplikasi ini untuk kemudahan semua.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	TITLE PAGE	**i**
	SUPERVISOR DECLARATION	**ii**
	DECLARATION	**iii**
	DEDICATION	**iv**
	ACKNOWLEDGEMENT	**v**
	ABSTRACT	**vi**
	ABSTRAK	**vii**
	TABLE OF CONTENTS	**viii**
	LIST OF TABLES	**xii**
	LIST OF FIGURES	**xiii**
	LIST OF APPENDICES	**xv**
1	**INTRODUCTION**	**1-4**
	1.1 Introduction	1
	1.2 Problem Statement	2
	1.3 Project Overview	2
	1.4 Project Scope	3
	1.5 Thesis Organization	4
2	**LITERATURE REVIEW**	**5-20**
	2.1 Introduction	5

	2.2 Domain	7
	2.3 Recent Works	9
	2.3.1 MediNous Fusion	10
	2.3.2 Cybermate Infotek ™	13
	2.3.3 Kuantan Specialist	15
	2.4 Comparison and Discussion	16
	2.4.1 Comparison of Overall Aspects	16
	2.4.2 Discussion on Tools for Development	18
	2.4.2.1 Database (MySQL)	19
	2.4.2.2 Hosting Server Software (Xampp)	20
	2.5 Conclusion	20
3	**METHODOLOGY**	**21-50**
	3.1 Rapid Application Development (RAD)	22
	3.2 Requirement Planning	24
	3.3 User Design	27
	3.3.1 Unified Modelling Language (UML)	28
	3.3.2 System Modules	30
	3.3.2.1 Login module	30
	3.3.2.2 Registration module	31
	3.3.2.3 Patient Transaction module	33
	3.3.2.4 Appoinment module	35
	3.3.2.5 Surgery Payment module	37
	3.3.2.6 Orthopedic Information Module	39
	3.3.3 Database Design	41

	3.3.3.1 OIMS Database Design	41
	3.4 Construction	45
	3.5 Cutover	47
	3.6 Development Tools	47
	3.6.1 Hardware Tools	48
	3.6.2 Software Tools	48
	3.7 Conclusion	50
4	**IMPLEMENTATION**	**50-75**
	4.1 Introduction	51
	4.2 Interface Development	52
	4.2.1 The Main Interface	52
	4.2.2 Login Form	53
	4.2.3 Registration Form	55
	4.2.4 Patient Transaction Form	57
	4.2.5 Appoinment Form	60
	4.2.6 Surgery Payment Form	61
	4.2.7 Orthopedic Information Form	62
	4.3 Database Development	63
	4.4 SQL Statement and PHP Command Development	64
	4.4.1 Insert the Data/Information	64
	4.4.2 Update the data in the database	65
	4.4.3 View or Retrieve the data in the Database	67
	4.4.4 Delete Data form Database	69
	4.5 Database Design	70
	4.6 Conclusion	75
5	**RESULT AND DISUCSSION**	**76-88**
	5.1 Result of OIMS	76
	5.1.1 Result in login process	77
	5.1.2 Result in registration process	79

	5.1.3 Result in patient transaction process	80
	5.1.4 Result in appoinment process	81
	5.1.5 Result in surgery payment process	82
	5.1.6 Result in orthopedic information latest news process	83
	5.1.7 Result in orthopedic information promotion process	84
	5.2 Result Analysis	84
	5.2.1 Objective 1	86
	5.2.2 Objective 2	86
	5.3 Result Testing Analysis	86
	5.4 Project Limitation	86
	5.4.1 Development Constraints	87
	5.4.2 System Constraints	87
	5.5 Suggestion and Project Enhancement	88
	5.6 Conclusion	88
6	**CONCLUSION**	**89-90**
REFERENCES		**91**
APPENDICES		**93**
	Appendix A	93
	Appendix B	96
	Appendix C	294
	Appendix D	342

LIST OF TABLES

TABLE NO	TITLE	P
2.1	Overall Aspects	
3.1	login Table Data Dictionary	4
3.2	login_dr Table Data Dictionary	4
3.3	patient Table Data Dictionary	4
3.4	medicine Table Data Dictionary	4
3.5	appointment Table Data Dictionary	4
3.6	payment Table Data Dictionary	4
3.7	news Table Data Dictionary	4
3.8	promotion Table Data Dictionary	4
3.9	contact Table Data Dictionary	4
4.1	login Table	7
4.2	login_dr Table	7
4.3	patient Table	7
4.4	medicine Table	7
4.5	appointment Table	7
4.6	payment Table	7
4.7	news Table	74
4.8	promotion Table	74
4.9	contact Table	74

LIST OF FIGURES

FIGURE NO	TITLE	PAGE
2.1	Patient Registration	11
2.2	Patient Billing	12
2.3	HMS Medical Records	14
2.4	HMS Room Transfer Information	15
3.1	Rapid Application Development (RAD) Model	23
3.2	OIMS Context Diagram	25
3.3	OIMS Use-Case Diagram	26
3.4	UML Diagram	29
3.5	Login Use Case Diagram	30
3.6	Sequence Diagram for Basic Flow of Use case Login	31
3.7	Registration Use Case Diagram	31
3.8	Sequence Diagram for Basic Flow of Use case Registration	33
3.9	Patient Transaction Use Case Diagram	33
3.10	Sequence Diagram Basic Flow of Use case Patient Transaction	34
3.11	Appointment Use Case Diagram	35
3.12	Sequence Diagram for Basic Flow of Use case Appointment	36
3.13	Surgery Payment Use Case Diagram	37
3.14	Sequence Diagram for Basic Flow of Use case Surgery Payment	38
3.15	Orthopedic Information Use Case Diagram	39
3.16	Sequence Diagram Basic Flow Use case Orthopedic Information	40
4.1	The Main Interface of OIMS	53
4.2	OIMS Staff Login Form	54
4.3	OIMS Doctor Login Form	55
4.4	OIMS Registration Form	56

4.5	Pseudo code for Registration	57
4.6	OIMS Patient Treatment Form	58
4.7	OIMS Medicine Form	59
4.8	Pseudo code for Patient Transaction Form	60
4.9	OIMS Appointment Form	61
4.10	OIMS Surgery Payment Form	62
4.11	OIMS Orthopedic Information Form	63
4.12	PHP command and combination SQL statement to insert data	65
4.13	PHP command and combination SQL statement to update data	67
4.14	PHP command and combination SQL statement to retrieve data	69
4.15	PHP command and combination SQL statement to delete data	70
5.1	OIMS Staff Login Result	77
5.2	OIMS Doctor Login Process Result	78
5.3	OIMS Registration New Patient Result	79
5.4	OIMS Patient Transaction Process Result	80
5.5	OIMS Set Up Appointment Process Result	81
5.6	OIMS Surgery Payment Process Result	82
5.7	OIMS Latest News Process Result	83
5.8	OIMS Promotion Packages Process Result	84

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Gantt Chart	93
B	Software Development Plan (SDP)	96
C	Software Requirement Specification (SRS)	294
D	Software Design Document (SDD)	342

CHAPTER 1

INTRODUCTION

1.1 Background

In recent times, health care concept of the people have undergone a incredible change which has lead to higher expectations and an increased demand for high quality medical care and facilities. Here comes the importance of Hospital Management. It is a difficult, challenging, responsible and more over, a demanding job.

Based on traditional method of managing the hospital activities, staffs kept the data in forms and gathered them into one file for each patient. Logically, it takes too much time in order a staff to complete a bunch of works. Apart from that, it will become more difficult to retrieve or remember all the data when amount of the patients become larger and crowded.

Kuantan Specialist Hospital expects to give a high quality of medical care and facilities to its patients. Therefore, in achieving these requirements, manual method needs to convert to the computerized method. Hospital management information system and website about the hospital be developed by the management department as well. Nevertheless, Orthopedic Information Management System (OIMS) will be developed

where it capable to manage several core functions and business processes that take place in Orthopedic Department within a Kuantan Specialist Hospital.

1.2 Problem Statements

Normally, staffs use forms in order to keep the data of the patients. No doubt that the staffs need a long period to complete their certain tasks. For example, staff needs to find one by one file of patient's information to make sure get the right one which is wasting time just for complete only one task.

Furthermore, staffs and patients make mistake in case of inserting the information in the form. As a human being, sometimes they prone of doing mistakes where they wrongly insert their identity card number and phone number. Besides, bad handwriting also influenced staffs in making mistake while inserting the information.

On the other hand, 'fill in the form' method is not an efficient way to keep the data safely. Even though filing system had been used, there is still not efficient because of a piece of paper can be easily frayed, misplaced, and being stolen.

Last but not least, staffs difficult to retrieve all the data because of number of patients become larger and crowded. Therefore, arrangement of files in alphabetically is really needed to make the staffs easier retrieving the data but it is still need a plenty of works and time to do it so.

1.3 Objectives

There are two objectives that this project must achieve that are:

i. To computerize the manual process of managing several core functions and business processes that take place in Orthopedic

Department within a private hospital which are login, register new user, patient transaction specifically for outpatient, set up appointment, surgery payment as well as orthopedic information.

ii. To make web-based application of orthopedic hospital management information system so that all the data can be saved easily and efficiently.

1.4 Scopes

The following scopes have been identified in order to achieve the objectives stated earlier:

i. The users of this application are staffs, doctors and visitors which are related to Orthopedic Department.

ii. This application referred on data inserted only by staffs and doctors.

iii. Registration of new user can be made by staffs.

iv. Staffs can add, edit, delete, and view the patient information.

v. Doctors set and view the appointment of patients while staffs can only view it.

vi. Appointment is only for orthopedic cases.

vii. Payment of orthopedic surgery can be added, edited, deleted, and viewed only by doctors.

viii. Orthopedic information data only be inserted by staff and the rest only can view them all.

ix. All documentations are referring to Software Engineering Process such as Software Development Plan (SDP), Software Requirements Specification (SRS), Software Design Documentation (SDD), Software Test Plan (STP), and Software Test Report (STR).

1.5 Thesis Organization

This thesis consists of four chapters. Chapter 1: Introduction; This chapter is all about the introduction about the project that will be developed. It contains the introduction, problem statement, objective, scope, and thesis organization. Chapter 2: Literature Review; This chapter will explain in detail the case study of the project. There are two general structure of this study which are the technique that has been used and the former system that are already created. While Chapter 3: Methodology; This chapter discuss more details on the overall work flow in the development of the project. It contains justification on the technique together with the equipment and the software. Finally, Chapter 4: Conclusion; As the last part of this thesis, this chapter will summarize the project that will be developed. There are four main subtopics in this chapter. Those are summarization of the project, data, methodology, and the alternative way to improve the research on the chosen topic.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

According to Haux, Winter, Ammenwerth, & Brigl (2003), they stated that almost all healthcare professionals need a vast amount of information. It is essential for the quality of patient care and for the quality of hospital management to fulfill these information needs. Hospital management also has an enormous information need. Up-to-date information about costs and proceeds are necessary as a basis for controlling the enterprise. If this information is not accurate, not on time, or incomplete, the hospital's work cannot be controlled adequately, increasing the risks of management errors.

In addition, patient transaction or more specific known as epidemiological transaction which is referred to the definition by Neil James Alexander Sloane that is the epidemiological transaction record illustratively includes various medical, personal and epidemiological data relevant to the patient and his/her present symptoms, including test results, as well as the diagnosis, if one has already been arrived at by the e-doc. The epidemiological database computer facility can correlate this information with the other epidemiological transaction records that it receives over time in order to help physicians make and/or confirm diagnoses as well as to identify and track epidemiological events and/or trends.

In fact, the computer science discipline concerned with developing large applications. Software engineering covers not only the technical aspects of building software systems, but also management issues, such as directing programming teams, scheduling, and budgeting. Software engineering has several documentation that must done with the development of the system. There are Software Development Plan (SDP), Software Test Plan (STP), Software Requirements Specification (SRS) and Software Design Development (SDD).

Kuantan Specialist Hospital is set to be a client for this research. Basically, it already has its own hospital management information system in order to manage activities that involve in the hospital. Therefore, Orthopedic Information Management System (OIMS) is developed by the guide from Kuantan Specialist Hospital management information itself in order to create the better quality, efficient and suitable to the concept of designing in software development model. Hospital management system is needed in every hospital because of intention to computerize the manual process of manage all core functions and business processes that take place within a hospital and increase the hospital's performance.

OIMS has three target users that are staffs, doctors and visitors. For the staffs, they need to register to the system in order to get their own username and password based on their ID as a staff. In addition, they are in charge on registration of new patient, update the details of patients' information, and view patients' information as well as patients' appointment. In fact, they are also need to view and key in the data of payment that already being done by the patients after they had their certain surgery. As mentioned in previous chapter, OIMS only focused on Orthopedic Department. Subsequently, staffs also in charge on key in the information about the promotion packages and latest news in orthopedic field. Meanwhile, doctors are in charge in update the details of patients' information and set up the appointment for the particular patients. Apart from that, doctors can view the patients' information and also no need to register to the system because they had their username and password through their own ID. Visitors and

patients can view the promotion packages, latest news in orthopedic field as well as about the system and contact details modules.

The overall flow for OIMS manages the patients is like in description below:

Staff

Login⟶Homepage⟶Register Patient⟶Update/View Patients' Info⟶View Appointment⟶Key in data on Surgery Payment⟶Update/View Orthopedic Information⟶Logout

Doctor

Login⟶Homepage⟶Update/View Patient Transaction⟶Set Appointment⟶ View Orthopedic Information⟶Logout

Visitor

Homepage⟶View Orthopedic Latest News⟶View Orthopedic Promotion Packages⟶View Contact Details

Through this OIMS, staff can avoid wasting time in order to complete certain tasks about the hospital management activities and can also keep data easily and safely. By computerize the manual process of manage all core functions and business processes that take place within a private hospital, performance for staff, doctor as well as hospital itself will be increased.

2.2 Domain

According to Winter, Ammenwerth , Bott , Brigl , Büchauer , Graber ,... Winter (2001), they stated that " The expenses associated with information processing have been subjected to cost analysis and already in 1993 it was estimated that within the European Union about 3.5 billion Euro were spent on the computer supported parts of hospital information systems, with a projected 15 billion Euro in 2000. A more recent investigation states, that 'the current European market size for hospital information systems is 2.4billion $US compared to 2.7 billion $US in US'."

"Hospital management plays an important -intermediate- role in the national health care management network [Van der Zwan,1993; CMCZ, 1994].". This statement is stated by Smits & Pijl(1999). It is more clear when Sridhar, Rao, Muraleedharan, Jaya Kumar, & Yarabati(2008) declared that, " The HIS has traditionally included a broad sweep: in-patient administration, out-patient administration, patient care, tests and results, pharmacy control, purchase department, patient billing, financial accounting, human resources management and medical insurance policies. The online activities include the entering patient profile into database for subsequent retrieval/analysis, reservation for in-patients, transfer of patients from one bed to another, pending discharges, displaying specified physicians patients, displaying patient details by name inquiry and displaying bed availability by nursing station. In addition, offline activities can also be performed such as reservation list, daily in-patient report, list of patients admitted, transferred or discharged, bed census report indicating bed availability, and monthly maternity and death report."

Based on Coyle (2002), "the endemic problems of health system management are reviewed, as is the difficulty of taking a systems viewpoint. It is argued, and demonstrated, that, by using some very simple ideas of system structure it is remarkably easy to draw up a diagram of system influences. Such a diagram is drawn for the case of psychiatric patients who recycle in the system. The diagram is analyzed from the point of view of its properties as a feedback control system, and it is shown that there are alternative, and probably more satisfactory, management practices."

There are many ways of managing the hospital systems since the past fifty years. According to Pouvourville & Renaud(1985), " Since the mid-1960s, France and Canada have developed different ways of managing their hospital systems. In Canada, each provincial government has gradually imposed technocratic control with the aim of planning the allocation of health-care resources. In spite of attempts to do the same in France, the hospital system has grown with few restrictions other than those set by the medical profession itself. Consequently, health expenditures have risen at one of the

fastest paces in Europe. The provincial monopoly over hospital care in Canada contrasts with the juxtaposition of local 'cartels' throughout France resulting, for the latter, in a much more uncoordinated system.

After a description of each country's hospital system and its historical origins, the advantages and disadvantages of each system are assessed so as to understand current public debate in each country."

Through the statement proposed by Supic, Bjegovic, Marinkovic, Milicevic & Vasic(2010), " Hospital are constantly adapting to the challenges of both the external and internal environments such as demographic and epidemiological transitions, application of new and expensive technologies, changes in health market, and changes in economic conditions as well as constant reforms of the health care systems. Managers react to these challenges by modifying and improving hospital management structures and upgrading managerial skills. Recent analyses indicate that, above all, hospital management teams have to deal with strategic management tools. The common characteristic of these studies is the application of research evidence to improve the state of strategic management, to develop managerial knowledge and to promote managerial skills.

2.3 Recent Works

In this section, current systems of hospital management information system will be compared and analyzed in order to get the detail dáta that relevant and used commonly in hospital management. Technically, there are three current or recent systems had been compared that are MediNous Fusion Management System (Medinous FUSION), Cybermate Infotek™ Hospital Management System (HMS) and Kuantan Specialist Hospital Management System.

2.3.1 MediNous Fusion Hospital Management System (Medinous FUSION)

MediNous is a fully integrated online system. It is designed for mid-size of multispecialty hospitals, to cover a wide range of hospital administration and management processes. It is an integrated end–to-end Hospital Management System that provides relevant information across the hospital to support the hospital's activities such as patient care, hospital administration and critical financial accounting, in a seamless flow.

As information, Medinous already had its clients such as Pusat Perubatan Naluri Medical Center, Malaysia and Clinique de Lorette, Mauritius. Based on Medinous FUSION, it consists of six major modules that are Registration, Inpatient Management, Billing, Laboratory, Radiology, and Pharmacy which is fully integrated.

The solution has been designed and developed using Visual Basic and runs on Microsoft SQL Server (MSDE) as well on Oracle Server, too. Reports are built using Crystal Reports. All of these are the technologies being used in this Medinous FUSION.

There are several advantages of this system that are it used latest and high technologies and also the management cover up not only about the patient side. It had covered the financial, laboratory, radiology, and pharmacy departments. In fact, it is fully scalable and secure.

Unfortunately, it still had the disadvantages. The first point is the system is too complex for apply which means the hospital that used this system need to train the staff in order to be efficient in handling and operating the new system because of not all staff good in computer. Next, the cost is too expensive and only for administrator and staff used. Its Graphical User Interfaces (GUIs) is also not too friendly where it is complicated and had a lot of buttons and so thus its module not covered for outpatient activities.

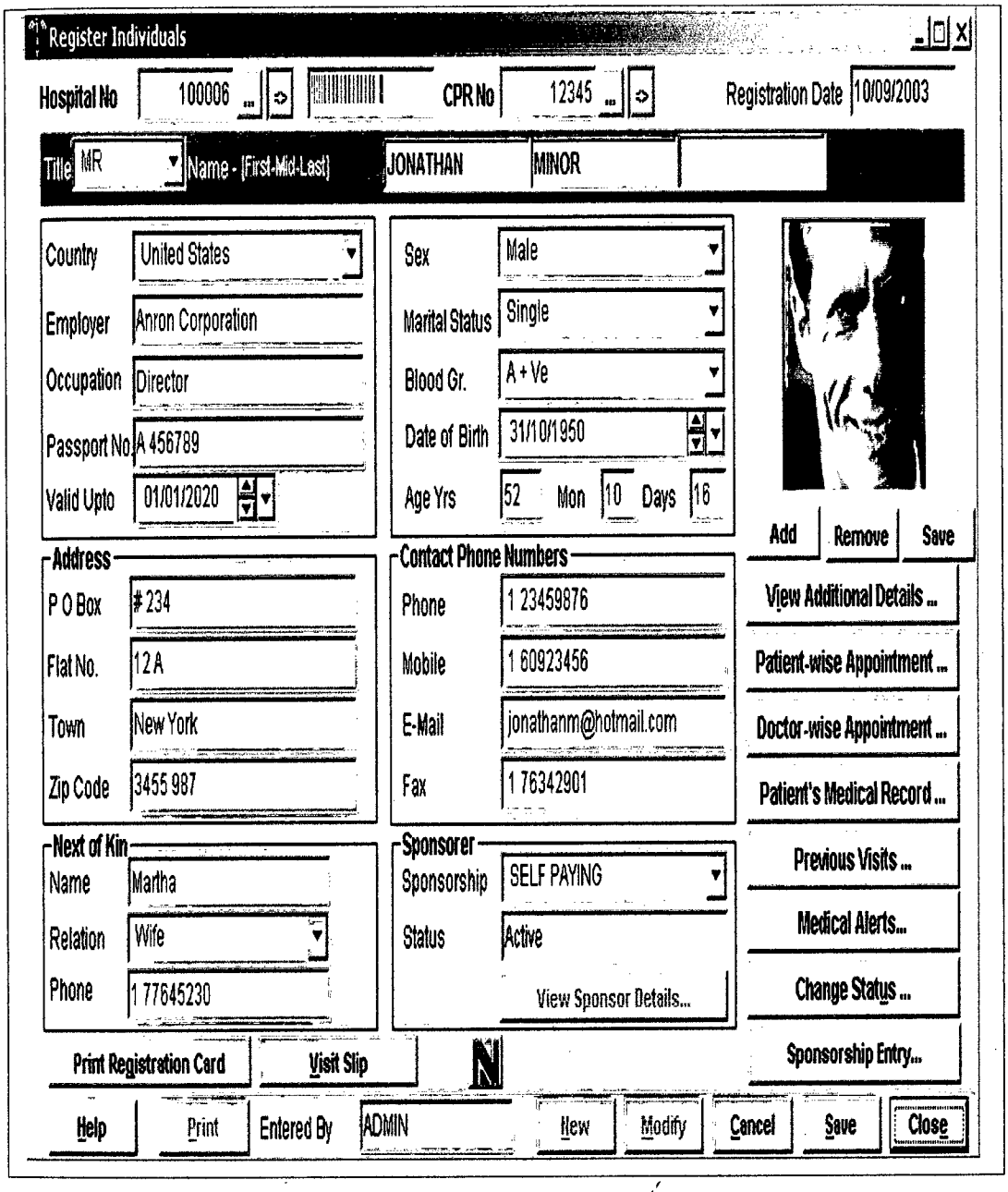

Figure 2.1: Patient Registration

2.3.2 Cybermate Infotek™ Hospital Management System (HMS)

HMS is a comprehensive software package, which dealing with all the major functional areas of hospitals. HMS by Cybermate Infotek™ acute care settings are required to provide prompt service to the patients. This fact calls for formalized and predetermined sets of methods to be followed in the hospital. This step will make the hospital more efficiently and effectively by extending the services to more number of patients.

This Web Based Application has been developed in Java as Frontend & Oracle as Backend. Subsequently, it has been segregated into fifteen modules namely Help Desk, Registration, Medical Records, Out Patient management, In Patient management, Ward management, Room management, Radiology, Laboratory, Billing, Central Store, Pharmacy, Financial Accounting, User manager, and MIS reports.

Some advantages had been discovered from this application. One of them is HMS enhanced administrator and control of hospital activities. In addition, HMS enables the customer to achieve greater productivity as well as improve profitability.

Anyhow, HMS does not well-structured and arranged of its every operation taken. Somehow, the interfaces are not interesting for user view.

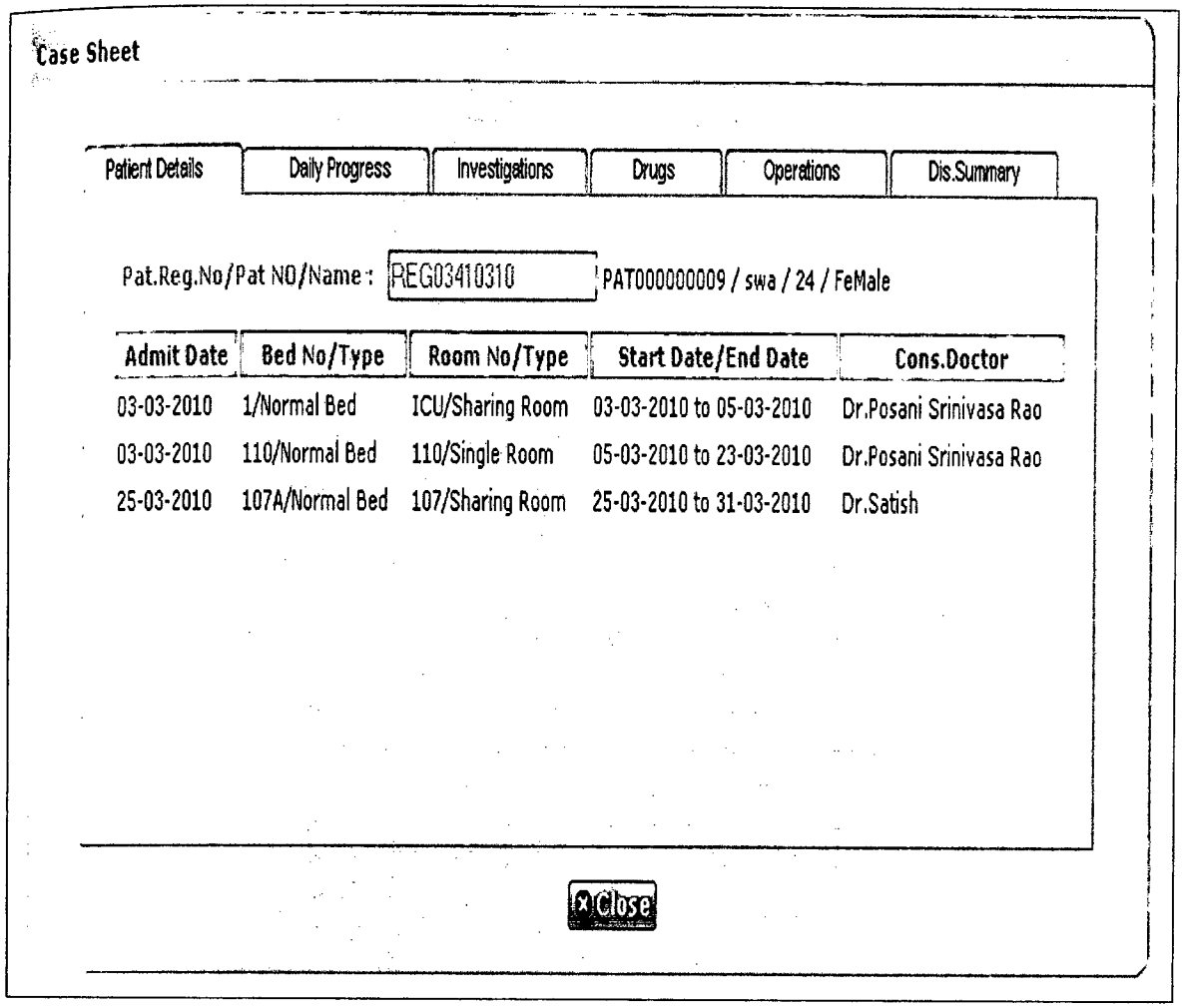

Figure 2.3: HMS Medical Records