CLINIC MANAGEMENT SYSTEM: WARD MANAGEMENT SYSTEM

NORAINI BINTI DESA

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ABSTRACT

A web based Ward Management System is a computerized system designed to meet the information needs of ward in hospital. Ward management system gives solution for nurses and doctors to complex and sensitive ward procedure. A research and analysis on the current system was done to get better understanding of the system. There is still some problem facing ward management which requires numerous paper forms to store patient record and document. All this problem and manual task will be computerize and make data management easier. Expected result for the systems are provides easy operation and management for ward in hospital. Patient Medical Record also will be well manage and this system will automatically generate the vital sign and lab test graph, so this is make the nurse and doctor alert the changes for vital sign and lab test such as blood pressure. The Java Server Pages (JSP) being used as the programming language to develop the system and Oracle 9i as suitable database storage for ward management system. Rapid Application Development (RAD) is used as system development methodology.

ABSTRAK

Sistem Pengurusan Wad berasaskan web adalah sistem berkomputer yang bertujuan untuk memenuhi keperluan pengurusan wad di hospital. Sistem Pengurusan Wad memberi penyelesaian kepada jururawat dan doktor untuk melengkapkan prosedur dalam pengurusan wad. Kajian dan analisis tentang sistem yang sedia ada berkenaan pengurusan wad telah dijalankan untuk mendapatkan pemahaman yang lebih untuk menjalankan projek ini. Masih ada beberapa masalah yang dihadapi dalam pengurusan wad dimana memerlukan jumlah kertas dan borang yang banyak untuk menyimpan rekod pesakit. Semua masalah dan tugas akan dikomputerkan untuk menjadikan pengurusan data lebih mudah. Hasil yang dijangkakan dari sistem ini adalah untuk menyediakan operasi dan pengurusan wad yang lebih mudah di hospital.. Rekod perubatan pesakit juga akan lebih mudah diuruskan dan sistem akan menghasilkan graph vital sign and ujian makmal secara automatik, oleh itu menjadikan doktor dan jururawat berjaga-jaga kepada perubahan vital sign dan ujian makmal seperti tekanan darah. Java Server Pages (JSP) digunakan untuk membangunkan sistem dan Oracle 9i sebagai stor penyimpanan pangkalan data untuk sistem pengurusan wad. Pembangunan aplikasi Rapid digunakan sebagai metodologi pembangunan sistem.

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LIST OF ABBREVIATIONS

CASE	-	Centre for Advanced Software Engineering
EMR	-	Electronic Medical Record
GA		Genetic Algorithm
HTAA	-	Hospital Tengku Ampuan Afzan
IT	-	Information Technology
IIUM	-	International Islamic University Malaysia.
JSP	-	Java Server Pages
LIS	-	Laboratory Information System
OPD	-	Out Patient Department
PACS	-	Picture Archiving and Communication System
PIS	-	Pharmacy Information System
RAD	-	Rapid Application Development
RAM	-	Random Access Memory
RIS	-	Radiology Information System
SDLC	-	Software Development Life Cycle
THIS	-	Total Hospital Information System
WMS		Ward Management System

LIST OF SYMBOLS

GHz	-	Giga Hertz
MB	-	Mega Byte
MHz	-	Mega Hertz

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CHAPTER I

INTRODUCTION

1.1 Introduction

Clinic Management System: Ward Management System (WMS) is a computerized system designed to meet the information needs of ward in hospital. Ward Management System is solution for the healthcare industry, addressing large government and private hospitals. It is a one-point solution to complex and manages ward procedure. It provides a simplistic and user- friendly interface towards multi dimensional and intricate healthcare operations. It helps health care managers handle administrative duties better and facilitates easy interaction between the ward and others department. Ward Management System enables better patient care, patient safety, and efficiency and reduced costs. It provides easy access to critical information there by enabling the management to take better decisions on time. This system provides the benefits of streamlining of operations, enhanced administration and control, improved response, cost control and improved profitability. Ward Management takes care of the inpatient. It starts with room admissions and ends with patient discharge. Ward functions provide options for both routing and reporting medical and administrative needs of a patient. It records patient's daily events such as Lab Test, Investigation, Output, Medication, Vital Signs, Primary and Secondary diagnosis and high-risk details of the patient. Ward management system gives solution for clinicians, nurses and doctors to complex and sensitive ward procedure. It helps health care managers handle administrative duties better and facilitates easy interaction between the ward, nurses and doctor.

1.2 Problem Statement

Ward management at Hospital Tengku Ampuan Afzan (HTAA), Kuantan, are use a manual system for the management and maintenance of critical information which there are no linked between medical records of patients to other medical sections of the hospital such as laboratories or pathology departments. Patient records from Out Patient Department (OPD), emergency room or appointment are sent manually using paper to related ward and doctor. Doctor need to get patient record before examines the patient and nurses need to take patient's medical documents to the doctor. Nurse also needs to manage Patient Medical Record which needs a lot of forms to handle. Allocations of wards and beds are doing by nurses, which needs nurses identify the empty beds and locate the patient by their medical record and critical phase.

Current ward management systems are not running into network connection which can avoid from system down or problem to retrieve or get patient information or medical record. Nurse sent patient medical record manually to doctor before examine patient. Nurses can fill all patient information and progress on paper or form without need to fill all information and data again in the computer. There are no additional work for nurses to keep in again patient record and data into computer. Unfortunately, there is still some problem facing ward management which requires numerous paper forms, with data stores spread throughout the hospital management infrastructure, where at certain time, some document or form needed is late or difficult or sometimes cannot be tracked anymore because too many manual documents or forms were stored in ward. So that is why, one document or form tracking system is needed by ward unit to solve this problem. Nurses also have difficulties for patient location and movements which need to take times to locating and moving patients. Automatic patient location systems are needed to make sure patient location and movement can be easier and faster.

1.3 Objective

In developing the system, there are certain objectives to fulfill. The objectives to be achieved are:

(i) To develop and design a prototype for ward management system.

(ii) To computerize manual procedure of ward into web based ward system.

(iii) To implement the rule based technique for the bed arrangement in the hospital ward.

1.4 Scope

The scopes of the system are:

(i) Ward Management System will be used by doctor and nurses in gynaecology and obstetric ward operation.

(ii) Doctor can manage every patient record, patient vital sign, lab test result and prescription medication.

(a) Vital Sign

Doctor can insert patient vital sign based on their blood pressure, pulse, temperature and respiratory.

(b) Lab Test

Doctor can insert patient lab test according to their blood test, urine, blood sugar, blood urea and doctor can give comment or suggestion.

(c) Prescription Medication

Doctor can insert patient prescription medication by insert medication name, dosage, reason and comment.

(iii)   Nurses also can manage patient registration and patient checkout, manage every patient record, patient vital sign, test result and prescription medication.

    (a)   Patient Registration

        Nurse need to register new patient and get bed number for particular patient according to their age, work status (government or private), citizenship, level of disease (chronic or not chronic) and bed type (first class or second class).

    (b)   Vital Sign

        Nurse can insert patient vital sign according to their blood pressure, pulse, temperature and respiratory.

    (c)   Lab Test

        Nurse can insert patient lab test according to their blood test, urine, blood sugar, blood urea and doctor can give comment or suggestion.

    (d)   Prescription Medication

        Nurse can insert patient prescription medication by insert medication name, dosage, reason and comment.

CHAPTER II

LITERATURE REVIEW

The Clinic Management System: Ward Management System is a web base application system and Information system. This system will be developed for ward to manage their daily operation and used to record all the details and the treatment in each patient in the hospital. Ward Management System gives solution for nurses and doctors to complex and sensitive ward procedure. This system is very important to know the history health of each patient, what types of medicines that he takes what type of sickness and many more. In Malaysia this system is still new, but in the overseas this system has been used in some healthy care centre.

2.1   Ward Management at Hospital Tengku Ampuan Afzan (HTAA)

Ward management at HTAA, Kuantan , are use a manual system for the management which there are no linked between medical records of patients to other medical sections of the hospital such as laboratories or pathology departments. According to patient medical documents, nurses need to make bed location for the patient based on their critical phase patient records from OPD, emergency room or appointment which are sent manually using paper to related ward and doctor. Doctor need to get patient record before examines the patient and nurses need to take patient's medical documents to the doctor. After examining the patient, the doctor makes a prescription or patient history.
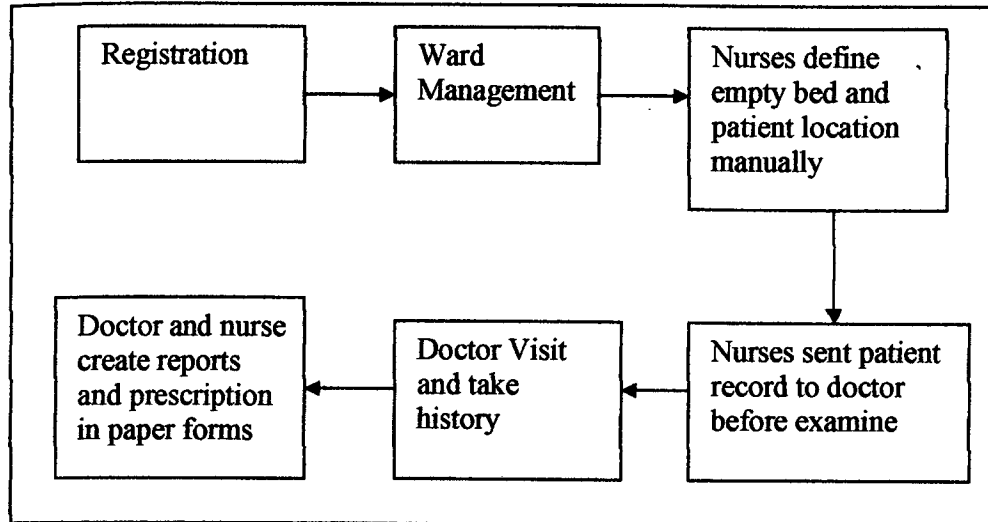
Figure 2.1: Flow of Ward Management at HTAA

Table 2.1: Pros and Cons in current ward management at HTAA, Kuantan.

Pros		Cons	
(i)	There are no additional work for nurses to keep in again patient record and data into computer.	(i)	Hard for patient location and movements which need to take times to locating and moving patents.
(ii)	Current systems are not running into network connection which can avoid from system down or problem to retrieve or get patient information or medical record. Nurse sent patient medical record manually to doctor before examine patient.	(ii)	Hard to accessing all patient information which doctors or nurses needed to find numerous paper forms and it takes time to read history of the bed or ward, which patient had been on that bed or wards.
		(iii)	Hard to records patient's daily events such as Intakes, Investigation, Output, Medication, Vital Signs, Primary and Secondary diagnosis and high-risk details of the patient.
		(iv)	Problem in Clinical observation/profile details such as Surgery, Blood Transfusion and baseline parameters.
		(v)	Problem in recorded Visiting Doctor's note

	along with prescription for pathology tests, x-ray procedures and administration of drugs at wards

2.2   Selayang Total Hospital Information System (THIS)

Total Hospital Information System (THIS) at the Selayang Hospital is a trailblazer for future electronic hospitals in Malaysia. A special feature of the Selayang Hospital is the T.H.I.S. concept. This Total Hospital Information System means fully integrated clinical, financial and administrative information system centered on the patient care process and includes. [8].

(i)   Electronic Medical Record (EMR)

(ii)   Scheduling

(iii)   Order Management

(iv)   Patient/Person Management

(v)   Document Management

(vi)   RIS – Radiology Information System

(vii)   PIS – Pharmacy Information System

(viii)   LIS – Laboratory Information System

(ix)   PACS – Picture Archiving and Communication System

Using information technology, the system enables easy access to patient data and records, reduces paperwork and improves hospital staff productivity. The system is expected to improve the quality of services in government hospitals as it reduces paper and duplication of work and enables easy access to patient data and records. It is also expected to reduce waiting time at government hospitals and improve bill collection. [8]

Under T.H.I.S., three major aspects of hospital operation, that is, clinical, images, and administration and finance have gone "electronic", and are networked to each other. At the core is the clinical service where all medical records are electronic. Electronic Medical Record (EMR) provides storage of patient data. This data is available to authorized medical personnel at any location, at any time using a single, integrated clinical workstation. The archived data will reduce the likelihood of lost records. Upon registration and throughout the hospital stay, a patient's name and personal particulars are keyed into a computer only once. This single entry is considered a major efficiency tool for Government hospitals as it reduces time and paperwork. There are slim chances of mistaken identity as the barcode at the back of a patient's identity card is scanned and the information stored in the computer. This barcode will be used for life long identification at the hospital. [8]

Under the Hospital Information System (HIS), doctors enters their information and place their orders for laboratory tests, drugs or further examination through the computers. The Pharmacy Information System (PIS) is a drug ordering system which keeps an inventory of all drugs and also alerts medical personnel on contra indications (when conflicting drugs are prescribed). The Radiology Information System (RIS) allows doctors to order for X-rays and view the results.

The Laboratory Information System (LIS) records all lab tests, results and verifications done at the hospital for analysis and record purposes. The Critical Care System is geared towards the intensive care unit where patients can be monitored remotely and information accessed via computer monitors. Currently the PIS and the Critical Care systems are not fully operational. The Picture Archive & Communications System (PACS) scans and stores all X-ray images in a huge Sienet

server. This removes the need for X-rays films and passing of films from one section of the hospital to another. Doctors and radiologists can view the X-rays in special monitors located at various parts of the hospital. In addition, they can send the X-ray images to the Kuala Lumpur General Hospital electronically for referrals and second opinions for neurosurgical cases. Teleradiology and teleconsultation are thus made possible. Although it is the first electronic hospital, the finance and administration systems at the Selayang Hospital currently run on both paper and non-paper systems. As a Government hospital, it has to continue using paper forms to comply with Government rules and regulations on reporting and documentation to various ministries and Government agencies [8].

The benefits of T.H.I.S. have yet to manifest themselves clearly. For health care providers, the easy access to information and reduction in paper work should bring productivity improvements. Workload is expected to be more manageable as work lists are generated automatically in the information system. For example, once an order is issued for drugs or an X-ray, the information will be collected in a work list which is routed to the respective sections of the hospital. The staff on duty will know exactly their workload for the day. Perhaps the most pleasant change is the shorter waiting time for services.

In the collection of prescribed drugs, for example, a patient can get his medicine as soon as he reaches the drug counter as the list of drugs would have been relayed electronically from the clinic to the pharmacy section.

2.2.1 Problem and Constraint

According to Selayang Hospital's IT Project Manager, Dr. Syed Amin Husaini, there were many problems and challenges in implementing T.H.I.S [3]. For one, there is no single software package that can provide a hospital wide solution. Multiple software packages from different vendors had to be interfaced to achieve a total hospital information system. Managing the complexity of integrating multiple systems was a great challenge. Currently, he reveals that not all IT systems are in full operation, and the hospital is experiencing some teething problems. Another big challenge of going "paperless" is the human resistance to change "We have to manage change and change management process has to be in place", he notes. All hospital staff underwent an intensive two-week training programmed on how to use the various computers in the respective departments. Still, the lack of confidence in using the system has yet to be overcome in some sections of the hospital. However, a recent visit to the hospital showed that the waiting time was just as long as in other public hospitals. Coincidentally, the computer system was down. Patients said it was a quite common occurrence. Currently, nurses still have to write down patients' temperatures and other particulars and key them into the computer at the counter, which mean additional work [3].

THIS is good as it stores the data well, the network could not cope when the number of patients increased by leaps and bounds. "Doctors run into intermittent network problems. It is difficult for doctors to get into the system after 9am each day when most people are using the computers," he said. When the system is down, doctor would examine the patient and write down the information on a piece of paper and key in the information later in the evening when the system is up. They could not place prescriptions online because they could not read the blood test results or other laboratory results. There is concern that the inefficient computer system could put patients' lives at risk when information retrieval is delayed for patients whose conditions need urgent treatment or when information is left to memory. The THIS at the hospital runs on a single server. It is not broadband connected and computers are run on outdated computers [3].

Table 2.2: Pros and Cons at Selayang Total Hospital Information System

Pros	Cons
(i) System enables easy access to patient data and records, reduces paperwork and improves hospital staff productivity.	(i) All nurses underwent an intensive two-week training programmed on how to use the various computers in the respective departments.
(ii) Reduces paper and duplication of work and enables easy access to patient data and records.	(ii) Lack of confidence in using the system has yet to be overcome in some sections of the hospital
	(iii) Computer system was down
	(iv) Currently, nurses still have to write down patients' temperatures and other particulars and key them into the computer at the counter, which mean additional work.
	(v) When the system is down, doctor would examine the patient and write down the information on a piece of paper and key in the information later in the evening when the system is up.
	(vi) The inefficient computer