MEDICAL RECORD APPLICATION WITH MOBILE WEB-BASED BARCODE SYSTEM

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Abstract

Medical record is a file containing notes and documents regarding patient identity, examination, treatment, actions and other services to patients at health care facilities. According to the Regulation of the Minister of Health of the Republic of Indonesia in 2008 in Article 1, medical records are files containing notes and documents regarding patient identity, examination, treatment, actions and other services which have been provided to patients. In the development of the medical record system, the waterfall method is used which is a method which takes a systematic approach from the level of system requirements to the analysis, design, coding, testing and maintenance stages. Many methods are used in system development such as the prototyping method, waterfall and others. In this study only the waterfall development method is used because each stage will be carried out sequentially from System Design, System Analysis, Coding, System Implementation, and System Maintenance. Based on the results of the study of research progress, analysis, design and implementation of the design of a mobile web-based barcode medical record system at Bhakti Keluarga Husada Clinic, it can be concluded that the system design was carried out using the PHP programming language, MySQL database processing, and the application of a webmobile-based barcode medical record system at Bhakti Keluarga Husada Clinic.

I.   INTRODUCTION

The development of science today has changed the world where in the times various things have been replaced by technological sophistication. The utilization stage in various aspects is not only humans who are now starting to be replaced by robots, but also several management systems, one of which is the Health Management System. This starts from the application of registration to hospitals which already use an online system to medical records and switch to electronic. Medical records, which were originally in the process of providing medical services in a conventional way, using paper and requiring human services for storage and retrieval, have turned into electronic systems using information technology systems based on clinical or hospital needs.

The application of electronic medical records has become a trend in Indonesia where the application of electronic medical records is an effort to improve the quality of health services, increase cost efficiency, support medical personnel and have an important role in the safety of medical services for patients. This electronic medical record is also expected to reduce clinical errors and reduce errors in archiving. One of the things which has caused electronic medical records to boom is the ease of access between hospitals, administration and doctors, and even pharmacists for prescribing drugs in viewing the patient's medical history.

Medical Record/ Health Record is a record in written form or a description of service activities provided by a health medical service provider to a patient. In this case, it can be interpreted that medical records are an obligation in terms of medical services both in clinics and hospitals. The regulation on medical records has been explicitly regulated by the Indonesian government through the Ministry of Health which has issued Regulation of the Minister of Health Number 749a/MENKES/Per/XII/1989 concerning Medical Record. Then came the government's awareness of the development of technological sophistication so that the government issued Minister of Health Regulation no. 269 of 2008 concerning Medical Record.

According to the Minister of Health (1989) regarding Medical Records, it is explained that medical records are files containing notes and documents about patient identity, examination,

treatment, actions and other services to patients at health care facilities. According to the PERMENKES RI (2008) regarding Medical Records in Article 1, medical records are files containing notes and documents about patient identity, examination, treatment, actions and other services which have been provided to patients. In health services, it can be found arrangements related to medical records which explain that making medical records is one of the obligations of doctors as stated in (LAW OF THE REPUBLIC OF INDONESIA NUMBER 29, 2004) concerning Medical Practice. In article 46 paragraph (1) to paragraph (3) and article 47 paragraph (1) to paragraph (3) says "if this obligation is violated, the doctor will be subject to criminal sanctions based on the provisions in article 79 letter b of the Medical Practice Law."

Recording of medical records then becomes mandatory, because the contents in medical records are social data, health demographic data and the results of post-examination doctor diagnoses and complaints faced by patients. Accuracy, thoroughness and confidentiality are the basis for storing patient data where the responsibility for medical records is very large. When conventional medical records turn into electronic medical records, there are various pros and cons. Not a few experts are worried about the disclosure of patient secrets because electronic systems which use advanced information technology have a level of security which cannot be guaranteed safe according to the program planned by the government. Programs planned by the government are based on the basis of Health Development. To realize the Healthy Indonesia Vision 2025, a Health Development mission has been established which is to increase and utilize Health Resources which includes health human resources, health financing, as well as pharmaceutical supplies and medical devices. Health resources include mastery of health/ medical science and technology, as well as data and information whose role is increasingly important. One of the data and information (information technology) about health in accordance with the current of globalization is the Electronic Medical Record (RME) (Sudjana, 2017).

According to Aditya Nanda Putra (2019), the research explains that the information system used is a web-based system using the waterfall method, with the stages of needs analysis, program code design and writing, program implementation and program testing. The software which will be used in building this information system is HTML, Bootstrap and PHP as programming languages, Apache as a web server, and MySql as a database server. The service information system and patient medical records are systems which will generate information and provide convenience to patients when registering, treatment, and provide convenience for the clinic in

processing patient data and drug data, so that it will produce complete data for Al-Barra Maternal and Child Hospital.

In the second research conducted by Ayurindra S.Kom (2018), the research explains that medical record data processing is an important component in the Hospital Information System to facilitate medical personnel in the recording process, entering patient personal data, data storage, retrieval of stored data, history of illness, medications -drugs which have been consumed by the patient, symptoms of the disease experienced by the patient and the diagnosis of medical personnel. This application is built using the PHP programming language and uses the MySql database so that it is expected to support capabilities in client server-based applications. The method in this research is object-oriented. The design of the developed system uses a prototype development model. This method is suitable for developing a device which will be redeveloped.

In the third research conducted by Al Faruq (2015), the research explains that the information management system applied is still done manually. To improve performance and ease in managing medical record services, an application which can improve and facilitate services is proposed. The system development method used to build this Medical Record Application is the waterfall method and modeling tools with UML (Unified Modeling Language) as well as supporting software to support the development of this system using the Dephi 7 programming language and MySql database tools. The medical record application at the polyclinic is built to facilitate the processing of patient administrative data, manage medical record data, manage drug data, manage doctor's practice schedules, search patient data, and generate reports.

The fourth research conducted by Putranto, Adi Putra and Hakim (2017), the research explains that the problems which occur at Klinik Utama Meditama, Semarang are the management of medical data which is less effective and efficient. This information system aims to make medical data management run quickly and precisely. This system development method uses SDLC by making UML diagrams such as use case diagrams, class diagrams, activity diagrams, entity relationship diagrams as the stages of system design. This information system is made on a WEB-based basis using the PHP programming language supported by the MySQL database. The results of this system design are expected to be one solution to the problems which have occurred so far.

The fifth research was conducted by Kurniawan and Utomo (2018), the research explains that the system used is a QR Code (Quick Response Code). QR Code is an extension of barcode. The difference is in the process of hiding information if

the barcode is stored vertically. In the QR code, information is stored both vertically and horizontally. Based on the prototping stage used to solve problems related to the completeness and tracing of medical record files, QR code can be integrated with web based and able to overcome file tracing. Patients can use this system in their smartphone to access their examination history. The test results also show that on average the respondents stated that the proposed medical record system was good and feasible to be applied to hospitals. The proposed QR code provides accuracy, speed, and security in medical records. However in its use, it still requires adjustment with the right system, also real time synchronization with the system backend. the use of a QR code which is capable of automatic synchronization and integration with other applications is the right solution for documenting medical record files to medical personnel and patients.

The first research still uses a web-based information system using the waterfall method. The second research uses a client server-based application system using the PHP programming language and using the MySql database. The third research uses the waterfall method and modeling tools with UML (Unified Modeling Language). In the fourth research, this system uses a WEB-based SDLC and uses the PHP programming language supported by the MySQL database. The fifth research uses a QR Code (Quick Response Code) which is then integrated with a web based. From the research above, it can be concluded that on average the research still uses the web with PHP and MYSQL programming languages only. Therefore researchers want to develop research on barcode-based medical records using a mobile web application at Bhakti Keluarga Husada Clinic so that information can be obtained quickly, effectively and efficiently.

Bhakti Keluarga Husada Clinic is the only health clinic in Podorejo Village, Pringsewu, which already has many patients with various ailments. Currently the number of patients has reached more than hundreds, with dozens of patients who are still active and routinely carry out control so that a system is needed to record the treatment history (medical record) of each patient. So far, patient medical records at Bhakti Keluarga Husada Clinic still use records which are then archived manually and patient data storage is still using Microsoft Excel. When the system is damaged and lost, it will be very difficult to present data such as data on the number of patients or data on patient care.

The medical record system is a system which aims to document patient medical data. This system will record, manage and then present data related to medical matters such as patient data, patient medical history, to the amount of fees to be paid and others.

Judging from the background of the problem, a medical record information system is needed to make it easier to get information about the clinic, search for patient data, process data, and monitor the progress of each patient's care. By considering the existing problems, the researcher provides a solution by building a mobile web-based barcode medical record application system at Bhakti Keluarga Husada Clinic. To improve service professionally, the author is interested and intends to compile a research About Mobile Web Based Barcode Medical Record System at Bhakti Keluarga Husada Clinic.

II.   LITERATURE REVIEW
2.1. Previous Research

Research conducted by Yuyun Puspitasari, et al (2013) which describes a system which is applied to the Pringkuku Public Health Center, Pacitan Regency is the Outpatient Medical Record Information System which was created using the PHP programming language and MySQL database. This information system is in the form of a web page and can be opened using a web browser. It is hoped that the outpatient medical record information system can be used to search data more easily, report generation is also faster and produce accurate data.

Research conducted by Johni S Pasaribu and Johnson Sihombing (2017) describes the Design of an Outpatient Information System with the YII Framework at the Margasari Health Clinic, Bandung. In his research, the author makes an application for designing an outpatient information system which then can be useful in the application of information media as a form of technology and information development. The design of an outpatient information system is expected to make it easier for officers to handle and manage outpatient data on the computer so that it can provide an alternative problem solving at the Margasari Health Clinic in Bandung.

Research conducted by Indarti and Dewi Laraswati (2018) explains the problems which exist at the Galur Medika General Clinic. The right way to solve problems which occur in the administrative service information system is to use a computerized system. A computerized system can make it easy for clinic to store and manage data completely and accurately. A computerized system can prevent duplication of data. Patients can see in detail the results of their medical records and make it easier for officers to find medical records of old patients. The system used is the waterfall model and the software design is focused on making interface designs and database designs.

The three previous studies were website-based and used PHP and MySQL databases. The three studies discussed the medical records used to solve existing problems. The research which will be conducted is a development of previous research

which still uses a website-based system to become a mobile web-based system, which is expected to be able to help solve problems in Bhakti Keluarga Husada Clinic and make it easier to find participant data and medical record history quickly, easily and efficiently which can be accessed via smartphones and Tablet PCs.

2.2. Information System Concept

An information system is a system within an organization which brings together the daily transaction processing needs which support the managerial operational functions of an organization with the strategic activities of an organization to provide the information needed for decision making. This definition can be further detailed regarding the understanding of information systems in general. An information system is an organized combination of people, hardware, software, communication networks and data resources which collects, transforms, and disseminates information within an organization (Elisabet Yunaeti Anggraeni, 2017:1). An information system is a system within an organization which brings together the needs of daily transaction processing which supports managerial organizational operation functions with strategic activities of an organization to be able to provide certain outside parties with the necessary reports (Tata Sutabri, 2019:1). An information system is an organized combination of people, hardware, software, communication networks and data sources by collecting, converting, and disseminating information on a system within an organization which meets the daily transaction processing needs which support the managerial operations of the organization with strategic activities of an organization to be able to provide certain outside parties with the necessary reports so that they can support the company or organization in achieving its goals.

2.3. Medical Record Concept

Medical records have a very broad understanding, not only recording activities but also organizing medical records. Medical Record begins with recording as long as the patient receives medical services followed by handling of medical record files which includes storage and release of files from storage areas to serve requests/ borrows from patients or for other purposes. Medical Record is a file containing records and documents regarding identity, examination, diagnosis of treatment, actions and other services provided to patients during hospitalization, whether carried out in outpatient units, inpatients and emergency units [12]. Medical record is a file containing records and documents regarding patient identity, examination, treatment, actions and other services which have been provided to patients [13]. Medical record is a file which contains records and documents about the patient's identity, examination, treatment, actions and other services which have been provided to patients, about how services are obtained by someone who is treated.

2.4. Uses and Benefits of Medical Records

Sitanggang (2019:6) explained about the uses and benefits of medical records:

1. As a means of communication between doctors and other experts who take part in providing services, treatment and care to patients.
2. As a basis for planning treatment or care to be given to a patient.
3. As written evidence for all service actions, disease progression and treatment while the patient is hospitalized.
4. As a useful material for analysis, research and evaluation of the quality of services provided to patients.
5. Protecting the legal interests of patients, hospitals as well as doctors and other health workers.
6. Providing special data for research and education purposes.
7. As a basis for calculating the cost of paying for patient medical services.
8. Becoming a memory which must be documented as well as material for accountability and reports.

2.5. Barcode

A barcode is a machine-readable collection of optical data. Barcodes collect data from line widths and parallel line spacing and may be referred to as linear or 1D (1 dimension) barcodes or symbology [15]. A barcode or bar code is a set of optical data which is read by a machine. In fact, these barcodes collect data in widths (lines) and distances of parallel lines and may be referred to as barcodes or linear symbology or ID (1 dimension) [16]. A barcode or bar code is a set of optical data which is read by a machine. Actually, these barcodes collect data in widths (lines) and distances of parallel lines and may be referred to as linear or 1D (1 dimension) barcodes or symbology [17]. A barcode is a machine-readable collection of optical data. These barcodes collect data in widths (lines) and distances of parallel lines and may be referred to as linear or 1D (1 dimension) barcodes or symbology. According to Wahyono (2019), barcode scanners have a variety of different forms. There are:

1. Pen-shaped scanner
    This barcode scanner model is shaped like a pen connected by a cable and has a direct connector on the computer, either USB, PS2 or serial connector on older models.
2. Slot reader

This type of barcode reader is used to read barcode labels which are attached to certain cards, for example student cards.

3. Scanner handheld (handheld)
This barcode scanner model has a handle for holding hands. Usually this is used by the operator who will read the barcode label which is then directed to the barcode on the product in question.

4. Fixed position scanner
This type of barcode is fixed in certain positions so that it can read barcodes permanently. Usually this is used for industry, because the scanner will identify the product during the manufacturing process.

5. Mobile barcode scanner
This barcode scanner model is a scanner which is built-in on mobile devices (originally for PDAs). However in its development, this scanner model is also installed for several brands of cellphones.

6. Automatic reader
This barcode scanner is a back office equipment to read barcode documents at high speed (up to 50,000 per hour).

2.6. Website

According to (Wahana Komputer, 2010:2), Website is an information system which is growing rapidly and can display information which can be enjoyed throughout the world. According to (Rohi Abdulloh, 2016:1), Website or abbreviated as WEB is a page consisting of several pages which contain data information in the form of digital data. The website above is a page which can be used to display information or data which can be enjoyed throughout the world and also to earn an income.

According to Muhammad Irsan (2015), Mobile application is software which runs on a mobile device such as a smartphone or tablet PC. According to Hasan, Kahfi and Alamsyah (2019), mobile application is a software application which can only be used on smartphones and tablet PCs. Mobile Web is a web or internet website page which can be used or accessed on mobile devices. The website created can be accessed on various devices, both general computer devices (such as PCs/ laptops) or mobile devices (smartphones). [22]. Mobile web is a web or internet website page which can be used or accessed on mobile devices. The Mobile Web is the easiest platform to learn, least expensive to produce, standardized, most readily available, and easiest to distribute according to Ubiquity principles. Mobile web is a web or web page which can be used or accessed on mobile devices and is easy to learn, cheapest, and easiest to distribute [22]. Mobile web is software which runs on mobile devices such as smartphones or tablet PCs in the form of web or internet website pages which

can be used to be accessed on mobile devices. The mobile web application is also the easiest platform to learn, least expensive to produce, standardized, most available, and easiest to distribute according to Ubiquity principles.

III. RESEARCH METHODS
3.1. System Development Method

System development methods are needed to build a complex system in a systematic and integrated manner in order to guide system makers to produce a system which is able to meet user needs. The following will explain the understanding and stages of system development using the waterfall method. According to Yurindra (2017:43), The Waterfall Method is one of the methods in the SDLC which has a characteristic process. Each phase in the waterfall must be completed first. Waterfall is a method which takes a systematic approach from the level of system requirements and then goes to the analysis, design, coding, testing and maintenance stages (Muharto, 2016:105). Many methods are used in system development such as the prototyping method, waterfall and others. This study only uses the waterfall development method. Each stage will be carried out sequentially from System Design, System Analysis, System Design, Coding, System Implementation, and System Maintenance. The following is an overview of the Waterfall Method.
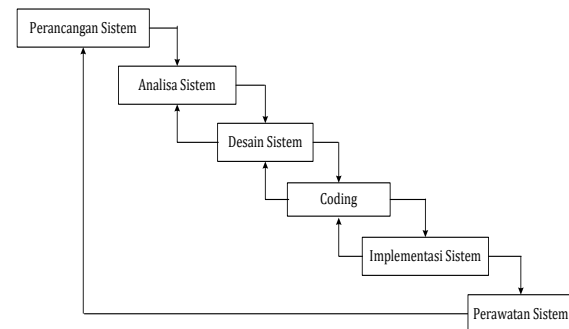

Figure 1. Waterfall Method

The description according to the Waterfall picture above is as follows:

a. System Design (Planning)
This stage aims to identify and prioritize what systems will be developed, what goals are to be achieved, the implementation period and consider the available funds and who will implement them. The following are some of the advantages of computer-based system planning:
1. Improve communication between researchers and users.
2. Increase the effectiveness of the use of natural resources.

3. Support communication for accountability for activities carried out by individuals and in general.
4. Support the evaluation process.
5. Enables researchers to cultivate long-term system development.

At this stage, it is explained that in designing, the steps which must be taken are to collect all information about the object you want to research both from books and journals as a source of information for a mobile web-based system, to think about how this system can run as much as possible so that it can be managed in the long term.

b. System Analysis
System analysis is the second stage of problem identification, problem solving proposals and system requirements analysis focused on software development. System analysis is used to answer the question **what?** At this stage, the authors describe a complete information system into its component parts which aims to identify and evaluate the data and the expected needs.

c. System Design
System design is used to answer the question **how?** Design concentrates on how the system is built to meet the requirements in the analysis phase. The benefit of system design is that it provides a complete blue print, as a guideline for programmers in creating applications. Some of the things which are done in system design are:
1. System modeling
2. Database design
3. App design
4. Hardware/ network design
5. Job design/ user description

At the design stage in making the system, programmers must create an attractive system model so that it can be easily used by users and enter the information which has been collected at the planning stage into a database which is then processed into a mobile web-based system so that it becomes very important information.

d. Coding
At this stage, the authors apply the results of the design into a form which can be read by a computer. At this stage the results of the design begin to be translated into machine language through a programming language.

e. System Implementation
System implementation is to implement a system which has been created. Before implementation, make careful preparations regarding hardware, software and other supporting facilities. Some things which are important to note in the implementation of the system are:
1. Convection
Usually it is required from the old system to the new system, especially if you have previously used computerized applications.
2. Training
Conduct thorough training for each party which uses it. Don't forget to socialize to parties involved in the system directly.
3. Acceptance testing
Do testing during a certain period as a learning process.

f. System Maintenance (Maintenance)
The system maintenance stage includes all processes needed to ensure the continuity, smoothness, and refinement of the system which has been operated. A few things to do:
1. Operation monitoring
2. Involving the development team to monitor directly at certain times on how the user parties operate the system made.
3. Anticipation of minor disturbances (bugs). Usually there are minor disturbances in a newly developed application.
4. Make improvements
5. Anticipate external factors, including viruses, data damage/ data loss or the system being accessed by outside parties.

3.2. Mapping Chart
Mapping chart is a mixture of maps and flow charts which show the movement or a research process from one process to another. Mapping charts help researchers to analyze the research process in solving problems, analyze smaller segments or parts and help in analyzing alternatives in research. The function of the mapping chart is to describe, simplify a series of processes or procedures so that they are easy to understand and easy to see based on the sequence of steps of a process.
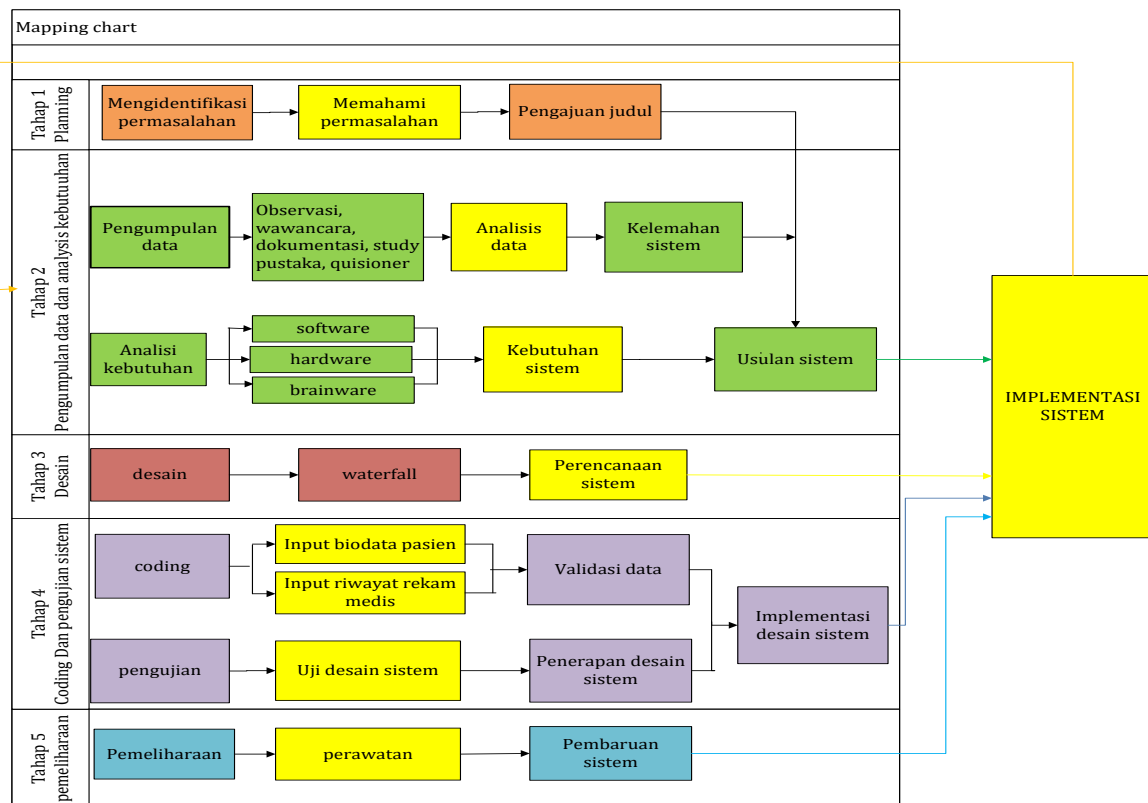
Figure 2. Mapping Chart of the Medical Record System Development Process

Mapping Chart
1.   Stage 1
     The first stage is planning, where at that stage the researcher conducts research and identifies problems which occur in an ongoing system, then the problem is understood so that a solution will be obtained from the problem.
2.   Stage 2
     The second stage is analyzing the needs of software, hardware, brainware and collecting data using the methods of observation, interviews, documentation, literature studies and questionnaires to find deficiencies in the current system. After analyzing and collecting data and knowing the weaknesses of the current system, a new system is proposed.
3.   Stage 3
     The third stage is the system design using the waterfall method and structured diagrams then the system design process is to build DAD, DFD, to cover the weaknesses of the old system, and specify the appearance. In the design process, the proposed new system design drawings can cover the weaknesses of the current system.
4.   Stage 4
     The fourth stage is writing coding and testing. At this stage, biodata and medical record history are inputted into the new system by translating the description of the system which has been designed in the third stage. After the input is complete and data validation is complete, the system is tested whether the system which has been designed is in accordance with the design and there are still errors or not, and whether the system can be used by stakeholders.
5.   Stage 5
     In the fifth stage, maintenance is carried out on a system which has been run. Maintenance also includes fixing errors not found in the previous step. Once an error is found, the update process will be carried out until the system can meet user needs.

IV.   RESULTS AND DISCUSSION
4.1. Design Stage
     System design is a stage in the form of drawing, planning and manufacturing by uniting several separate elements into a unified whole to clarify the form of a system. The following are the design stages contained in the Mobile Web-based Medical Record System.

a.   Context Diagram

The context diagram is the highest level in the data flow diagram and contains only one process, showing the system as a whole. The following is an overview of the mobile web-based medical record.
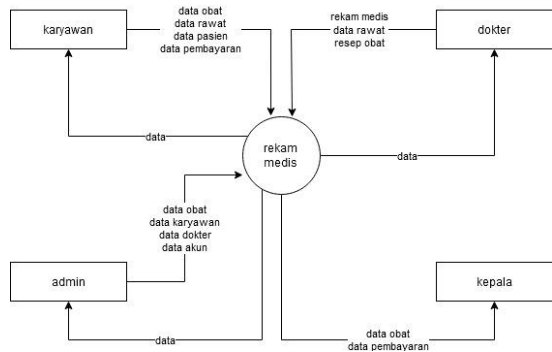

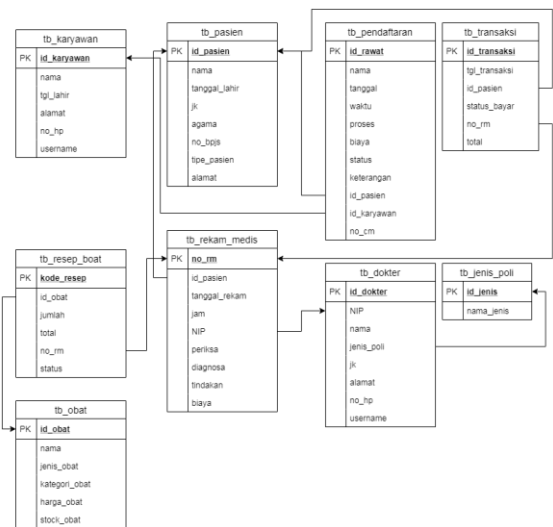Figure 3. Context Diagram of a Mobile Web-Based Medical Record

b. **Data Flow Diagrams**

Data Flow Diagram Level 0 describes the process more clearly and in detail from the context diagram which can be seen in the image below:
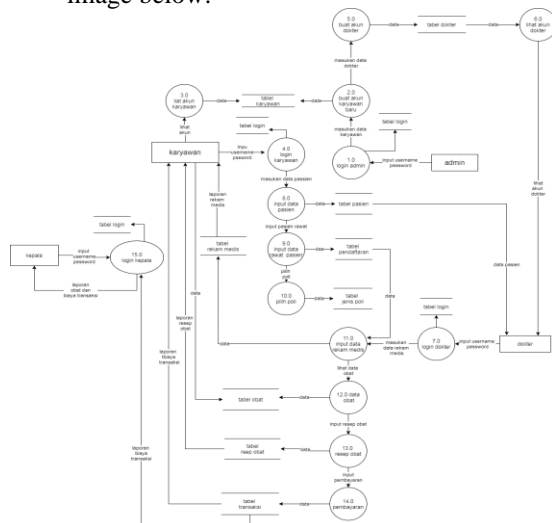

Figure 4. Data Flow Diagram Level 0 Medical Record Mobile web-based

c. **Entity Relationship Diagram**

Entity Relationship Diagram (ERD) is a model to explain the relationship between data in the database based on basic data objects which have relationships between relationships. The relations between tables from the Mobile Web-based Medical Record are as follows:

Figure 5. Entity Relationship Diagram (ERD) Mobile Web-Based Medical Records

4.2. **Designing Master Files**
a. **System Login Design**

The system login design is enabled by the user to access and process data on the system. Before the user enters the system, the administrator must first input the username and password for validation.
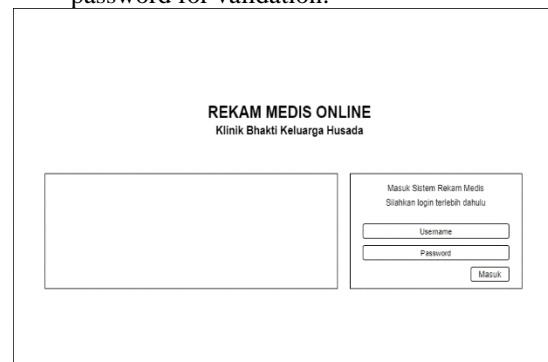

Figure 6. Mobile Web-based Medical Record System Login Design

b. **Design Administrator**

The admin process page needs to be designed in such a way with the hope that it can provide comfort and convenience to the admin during the process of inputting data into the application. The admin page design is as follows:
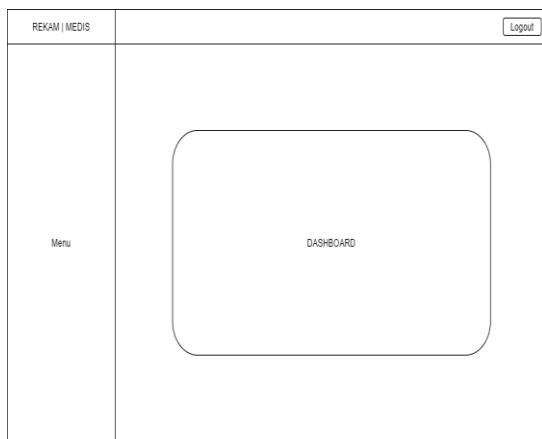
Figure 7. Mobile Web-based Medical Record
Administrator Design

c.   Input Dialog Design

This input display design will later be used to input data into the Mobile Web-based Medical Record System. The following are some input display designs which will be implemented. The patient input display is a form which functions to add or edit patient data. The following is a draft of patient input.

Figure 8. Patient Input Design of Mobile Web-based
Medical Records

d.   Doctor Input Display

Doctor input display is a form which functions to add or edit doctor data. The following is a draft of the doctor's input.

Figure 9. Design of mobile web-based Doctor Input
of Medical Records

e.   Treatment Input Display

The treatment input display is a form which functions to add or edit treatment data. Here is the design of the input treatment.

Figure 10. Design of mobile web-based Medical
Record Input

f.   Drug Input Display

Drug input display is a form which functions to add or edit drug data. The following is a design of drug input.

Figure 11. Design of mobile web-based Drug Input of Medical Records

g.   Employee Input Display
   Employee input display is a form which functions to add or edit employee data. The following is a draft of employee input.

Figure 12. Employee input design of mobile web-based medical records

h.   Output Dialog Design
   The output display design is used as an illustration of the system data interface design which will be used by the output design of the Mobile Web-Based Medical Record System. Master data is a collection of grouped data. The Design of Patient Data of Master is a display design to display all data from patient data. The following is the design of the Patient Master Data.

Figure 13. Patient Master Data of Mobile Web-based Medical Records

i.   Master of Medical Records
   Master data is a collection of grouped data. Master of Medical Record Data Design is a display design to display all data from medical record data. The following is the design of the Master of Medical Record Data.

Figure 14. Mobile web-based Master of Medical Record data

j.   Drug Master Data
   Master data is a collection of grouped data. Drug Master Data Design is a display design to display all data from drug data. The following is the design of the Drug Master Data.

Figure 15. Drug Master Data of Mobile Web-based Medical Records

4.3. Program Implementation
   This page is a user interface page, a system which aims to make it easier to get information.
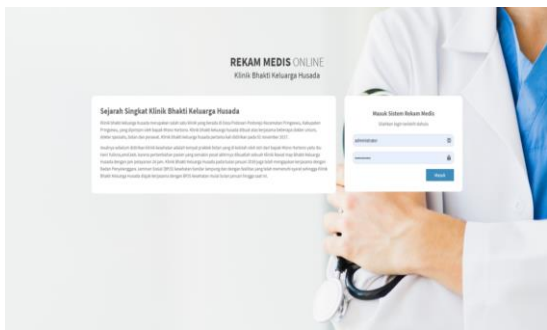**a.   Login Page Implementation**

Figure 16. Mobile web-based login of medical
record display

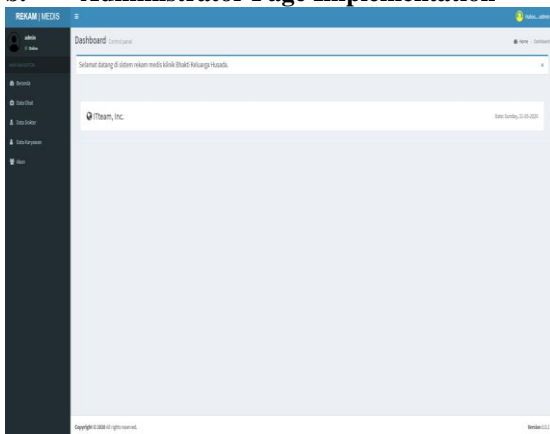### b.   Administrator Page Implementation

Figure 17. Display of the web-based Administrator
of Medical Record page

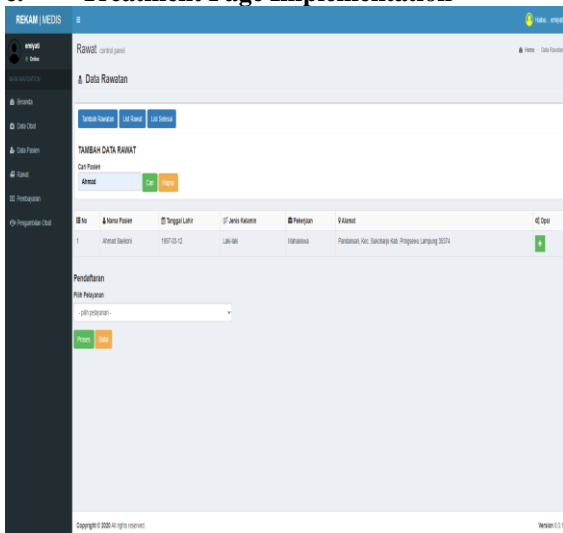### c.   Treatment Page Implementation

Figure 18. Display of the Mobile Web-based
Medical Record Treatment Page

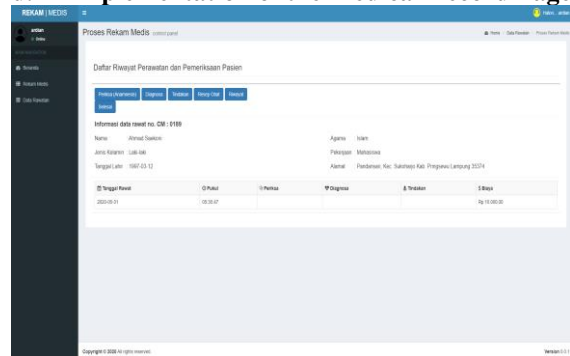### d.   Implementation of the Medical Record Page

Figure 19. Page display of mobile web-based
Medical Records
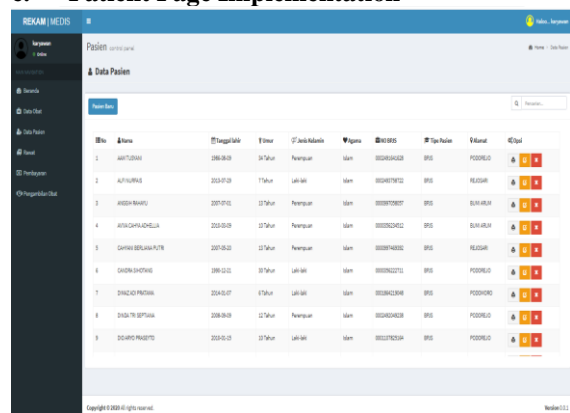
e.   Patient Page Implementation

Figure 20. Display of a mobile web-based Patient of
Medical Record page

4.4.   Analysis of Research Result

Based on the research which has been done and the system which has been created for this mobile web-based Medical Record System, there are several advantages which this system has. The advantages are that it is faster, more precise and efficient in inputting data, and can easily obtain more accurate medical record data. With this medical record, it is easier to record patient data and medical records which have been equipped with systems which can perform payment management. In this study, several trials were carried out to see how efficient this system was and to find out some errors in the system which still existed. In the process of this medical record system, the time used is quite short, while in the manual system, of course it takes longer.

4.6.   Black Box Test

Testing is an important part of the software development cycle. Testing is done to ensure the quality and also find out the weaknesses of the software. The purpose of this test is to ensure that the software built is as expected. Testing this software uses the black box testing method. Black box testing does not need to know what

is really happening in the system or software being tested regarding its inputs and outputs. With the various inputs given, the system or software has given the expected output or not.

Table 1. Black Box Application Test

No	Test Application Menu	System Running	System Error	Information
1	Admin Login	✓		Displaying the admin dashboard page
	Drug data page	✓		➢ Displays all drug list data
	➢ Added feature			➢ Displays the display of added drug list
	➢ Modified feature			➢ Displays drug data to be changed
	➢ Deleted feature			➢ Displays drug data to be deleted
	Doctor data page	✓		➢ Displays all doctor data
	➢ Added feature			➢ Displays the view of added doctor data
	➢ Modified feature			➢ Displays doctor data to be changed
	➢ Deleted feature			➢ Displays doctor data to be deleted
	Employee data page	✓		➢ Display all employee data
	➢ Added feature			➢ Displays the display of added employees
	➢ Modified feature			➢ Displaying employee data to be changed
	➢ Deleted feature			➢ Displaying employee data to be deleted
	Account page	✓		➢ Display all account data
	➢ Added feature			➢ Displays the view of add account
	➢ Modified feature			➢ Displays the account data to be changed
	➢ Deleted feature			➢ Displays the account data to be deleted
2	Employee login	✓		Displaying the employee dashboard page
	Drug data page	✓		➢ Displays all drug list data
	➢ Added feature			➢ Displays the display of added drug list
	➢ Modified feature			➢ Displays drug data to be changed
	➢ Deleted feature			➢ Displays drug data to be deleted
	Patient data page	✓		➢ Display all patient data
	➢ Added feature			➢ Displays the display to add new patients
	➢ Printed feature			➢ Display patient data to be printed
	➢ Modified feature			➢ Displays patient data to be changed
	➢ Deleted feature			➢ Displays patient data to be deleted
	Treatment page	✓		➢ Display maintenance page
	➢ Added feature			➢ Displays the view added maintenance
	➢ Maintenance list feature			➢ Displays all care list data
	➢ Complete list feature			➢ Display data list of treatments to be completed
	➢ Modified feature			➢ Displays treatment data to be changed
	➢ Deleted feature			➢ Displays treatment data to be deleted
	Payment page	✓		➢ Display payment page
	➢ Printed feature			➢ Display all data payment data
	➢ Receipt printing feature			➢ Display payment receipts
	➢ Pay feature			➢ Displays the data to be paid
	Medication pick up page	✓		➢ Displays the drug retrieval page
	➢ Take medicine feature			➢ Displays all drug taking data
	➢ Recipe info feature			➢ Displays prescription drugs to be taken
2	Doctor login	✓		Display the doctor dashboard page doctor
	Medical records page	✓		➢ Displays the medical record page
	➢ Appear features			➢ Displays all medical record data
	Maintenance data page	✓		➢ Displays the maintenance data page
	➢ Maintenance list feature			➢ Displays a list of care data
	➢ Complete list feature			➢ Displays a list of completed patient care
	➢ Maintenance process feature			➢ Displays the patient care process
	Head login	✓		➢ Displays dashboard head
	Drug data page	✓		➢ Displays all drug list data

➤ Added feature		➤ Displays the view add a list of drugs
➤ Modified feature		➤ Displays drug data to be changed
➤ Deleted feature		➤ Displays drug data to be deleted
Transaction data page	✓	➤ Displays transaction page
➤ Printing feature		➤ Displays all transaction data
➤ Receipt printing feature		➤ Displays payment receipts

V. CONCLUSION

Based on the results of research, analysis, design and implementation of a mobile web-based barcode medical record system design at Bhakti Keluarga Husada Clinic, it can be concluded that the system design was carried out using the PHP programming language and MySQL database processing. The application of a webmobile-based barcode medical record system at Bhakti Keluarga Husada Clinic began with the installation of a barcode medical record system support device, which was then carried out training on the use of the new system for employees at Bhakti Keluarga Husada Clinic. With the existence of a webmobile-based barcode medical record system at Bhakti Keluarga Husada Clinic, this can make it easier for prospective polyclinic patients to register and seek treatment.

REFERENCES

[1] Menteri Kesehatan, "Peraturan Menteri Kesehatan Republik Indonesia Nomor : 749a | MENKES / PER / XII / 1989 Tentang Rekam Medis / Medical Records Menteri Kesehatan Republik Indonesia," hal. 2, 1989.

[2] P. RI, "permenkes ri 269/MENKES/PER/III/2008," Permenkes Ri No 269/Menkes/Per/Iii/2008, vol. 2008. hal. 7, 2008.

[3] UNDANG-UNDANG RI, Undang-Undang Republik Indonesia Nomor 29 Tahun 2004 Tentang Praktik Kedokteran. 2004.

[4] S. Sudjana, "Aspek Hukum Rekam Medis atau Rekam Medis Elektronik sebagai Alat Bukti Dalam Transaksi Teurapetik," Verit. Justitia, vol. 3, no. 2, hal. 359–383, 2017.

[5] A. N. Putra, "Membangun Sistem Informasi Pelayanan Dan Rekam Medis Pasien Rumah Sakit Ibu Dan Anak Berbasis Web (Studi Kasus: Rsia Al-Barra Muko Muko Bengkulu)," Universitas Teknologi Yogyakarta, 2019.

[6] A. N. Putra, "Membangun Sistem Informasi Pelayanan Dan Rekam Medis Pasien Rumah Sakit Ibu Dan Anak Berbasis Web (Studi Kasus: RSIA Al-Barra Muko Muko Bengkulu)," in KNSI 2018, 2018, hal. 8–9.

[7] U. Al Faruq, "Rancang Bangun Aplikasi Rekam Medis Poliklinik Universitas Trilogi," J. Inform., vol. 9, no. 1, hal. 1017–1027, 2015.

[8] Y. Y. Putranto, T. W. Adi Putra, dan F. N. Hakim, "Rancang Bangun Sistem Informasi Rekam Medis Klinik Berbasis Web (Studi Kasus: Klinik Utama Meditama Semarang)," J. Inform. Upgris, vol. 3, no. 2, hal. 105–115, 2017.

[9] A. A. Kurniawan dan D. W. Utomo, "QR Code Mobile sebagai Pendukung Rekam Medik Berkas Rawat Jalan RS. St. Elisabeth Semarang," J. Inform. J. Pengemb. IT, vol. 03, no. 01, hal. 86–95, 2018.

[10] E. Y. Anggraeni dan R. Irviani, Pengantar Sistem Informasi. Yogyakarta: Penerbit Andi, 2017.

[11] D. N. Tata Sutabri, Sistem Informasi Bisnis, 1 ed. Yogyakarta: CV. Andi Offset, 2019.

[12] M. Firdayanti, "Perancangan Dan Implementasi Rekam Medis Pasien Poli Umum Dirumah Sakit Aisyiyah Muhammadiyah Padang Menggunakan PHP dAN MySQL," Progr. Stud. Sist. Komput. Fak. Teknol. Inf. Univ. Andalas, hal. 1–8, 2015.

[13] I. M. Hanif dan L. Fitriani, "Perancangan Perangkat Lunak Sistem Informasi Rekam Medis Berbasis Client-Server Studi Kasus Klinik Cipanas," J. Algoritm. Sekol. Tinggi Teknol. Garut, vol. 13, no. 1, hal. 41–49, 2016.

[14] T. Sitanggang, Aspek Hukum Kepemilikan Rekam Medis Terhadap Perlindungan Hak Pasien. Yayasan Kita Menulis, 2019.

[15] M. A. Asep Saepulloh, "Aplikasi Scaner Berbasis Android Untuk Menampilkan Data Id Card Menggunakan Barcode," J. Manaj. Dan Tek. Inform., vol. 03, no. 01, hal. 181–190, 2019.

[16] T. Purwanto, "Rancang Bangun Aplikasi Penjualan Barang Pada Toko Versus Footwear Berbasis Web Menggunkan

Barcode," J. Transform. (Informasi Pengemb. IPTEK)" (STMIK Bina Patria) Online, vol. 14, no. 2, hal. 186–193, 2018.

[17] Sri Yuningsih, Akik Hidayat, "Jurnal manajemen dan teknik informatika," Ranc. Bangun Sist. Inf. Pengolah. Bank Sampah Puspasari Kec. Purbaratu Kota Tasikmalaya, vol. 02, no. 01, hal. 181–190, 2018.

[18] T. Wahyono, Membuat Sendiri Aplikasi Dengan Memanfaatkan Bercode. Alex Media Komputindo, 2019.

[19] Wahana Komputer, Mendesain Website Dinamis Dan Menarik Dengan Adobe Dreamweaver. 2010.

[20] Rohi Abdulloh, Easy & Simple Web Programing. 2016.

[21] D. P. A. S. Muhamad Hasan, Ahmad Hafidzul Kahfi, "Analisis Pengaruh Mobile Application Dalam Menunjang Keberhasilan Wirausaha di Kota Bekasi," vol. 6, no. 1, hal. 47–52, 2019.

[22] N. Vinandari, K. A. Hafizd, dan M. Noor, "Sistem Informasi Geografis Wisata Religi Berbasis Web Mobile," J. Sains dan Inform., vol. 5, no. 1, hal. 41, 2019.