DESIGN OF INFORMATION SYSTEM FOR LABORATORY MEDICAL SUPPORT SERVICES AT PUSKESMAS KOPO BANDUNG

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Abstract

The aimed of research result was purpose to design and build implementation of services information system for laboratory medical support at UPT Puskesmas Kopo Bandung. The main problem that happened at UPT Puskesmas Kopo bandung is not yet computerized medical laboratory process of service of medical support laboratory as data processing still found difficulty. Data collection technique is with observation interview and literature review. Software developing method using waterfall method with Data Flow Diagram (DFD) as software design. Implementation using Microsoft visual studio 2010 programming language, database using acces and software test using blackbox method. The suggestion given to overcome the problems in system of medical support service laboratory are : Need better way developing system , Need training for human resources that manage this related application system.

Keywords: Information System, Laboratory Service, Waterfall, Microsoft Visual Studio 2010

Introduction

Over time in the field of technology and communication has progressed very rapidly so that it has an impact on the world of health which has progressed in health services provided to the community. One of the advances in information technology penetrated the field of health such as medicine. Progress in the health sector is growing so rapidly, so many findings are obtained with the help of information technology both in the field of organizing hospitals, health centers, treatment and research development of health science itself. The combination of information technology with the activities of people who use the technology, to support operations and management is an information system. In a very broad sense, the term information systems is often used to refer to interactions between people, algorithmic processes, data and technology. Health factors are one of the important factors in people's lives. According to Permenkes NO.269/MENKES/PER/III/2008 states that every health service facility is required to hold medical records. Medical records are files that contain records and documents about the patient's identity, examination results, treatment, actions and services that have been provided to patients. Puskesmas according to (Effendi, 2009) is the Technical Implementation Unit of the Health Office responsible for organizing health development in its work area. As an organizer of health development, puskesmas is responsible for organizing individual health efforts and public health efforts, which in terms of the National Health System is a first-level service in addition to medical services, puskesmas also has types of medical support services. Medical support is a service that supports medical servants who function so that the treatment and care provided are more optimal. The role of the laboratory in the puskesmas has now become a part that is quite necessary, because it is needed to determine a diagnosis of disease. The management of health laboratories is based on the regulation of the Minister of Health of the Republic of Indonesia number 37 of 2012. According to the regulation of the minister of health, what is meant by puskesmas laboratory is a puskesmas health service facility that carries out measurement, determination, and testing of materials derived from humans to determine the type of disease, cause of disease, health conditions, or factors that can affect individual and community health. The system that runs at UPT Puskesmas Kopo Kota Bandung regarding laboratory medical support services is still carried out manually, laboratory officers still record patient data and laboratory results in the register book, making laboratory test results is very long and making laboratory reports is still done manually.

Literature Review

1. *Public health center*

According to the Decree of the Minister of Health / SK / II / 1981, the Integrated Recording and Reporting System of Puskesmas is an activity to record and report general data, facilities, personnel and health service efforts in puskesmas which aims to improve the quality of Puskesmas management more successfully and effectively through optimal utilization of SP2TP data and other supporting information.

2. *Electronic Health Record (EHR)*

According to Permenkes No. 269/Menkes/Per/III/2008 Medical Records must be made in writing, complete and clear or electronically. The implementation of medical records using electronic information technology is further regulated with separate regulations. Electronic Health Record can Support: Data Recording, Data Storage, Data Processing, Data Security , Information Presentation

Electronic Health Record can Support:

1. Data Recording
2. Data Storage
3. Data Processing
4. Data Security
5. Presentation of Information

1. *Laboratory*

According to the ministerial regulation, what is meant by puskesmas laboratory is a puskesmas health service facility that carries out measurement, determination, and testing of materials derived from humans to determine the type of disease, cause of disease, health conditions, or factors that can affect individual and community health.

2. *Planning*

According to Ladjamudin (2005: 51) Design is an activity that has the aim of designing a new system that can solve the problems faced by the company obtained from the selection of good system alternatives

3. *Information System*

An information system is "a set of interconnected components that function to collect, process, store and distribute information to support decision making in an organization". (Sutanta, 2003: 6).

Laboratory Patient Service Flow
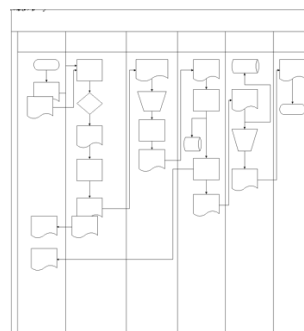
Sumber : Puskesmas (2018)

A patient's EHR can be viewed as a repository of information regarding a medical laboratory in a computer-readable form. When connected to the healthcare system, it generates different types of patient-related data. Patient data is stored in a database and can be viewed in a format that suits the needs and authority of a particular group of users. The term Electronic Health Record (EHR), or Electronic Health Record, refers to the collection of patient health information in digital format. EHRs can be categorized in terms of functionality: (i) basic EHRs without clinical records, (ii) basic EHRs with clinical records and (iii) comprehensive systems. EHRs, even in their simplest form, provide researchers with rich data collections. Data can be shared across networks and can include, as described earlier, a wide variety of information. EHRs are primarily designed for internal hospital administrative tasks and many different schemes exist in different structures (Poongodi et al, 2021).

State-of-the-Art

Feature selection has a direct effect on classification results. The main goal is to select the best features and shrink the high dimensions so as to improve the performance of the classification method .One method for feature selection is backward elimination. Backward elimination is a method for selecting features by testing all features first, then gradually reducing insignificant features based on a comparison of the evaluation of test results obtained . Eliminating one regressor model at a time based on deterioration in a good model is a conventional backward elimination process . The first step taken when performing backward elimination is to determine the significance level of 5% which generally means the p-value to be 0.05, Second, include all features in the model. Step three, find the largest p-value feature value and compare it with the significant value. The fourth step, if the largest p-value present in the model > 0.05 then the feature will be removed. The next step goes back to the second step until the highest p-value in the model < 0.05.

There are four steps taken in feature selection (Dash, 1997), namely:

1. The generation procedure, to produce candidates for the next subset can be done in several ways, namely: complete, heuristic and random.
2. Function evaluation, to evaluate subsets, by measuring distance, information, consistency, dependability, and measuring the degree of classification error. 3. Termination criteria, to decide when to stop, by looking at threshold values, beginning with a number of iterations and a measure of the best subset of features. 4. Validation procedure, to check if a subset is valid. (optional). The process in the selection feature can be outlined in the following scheme:
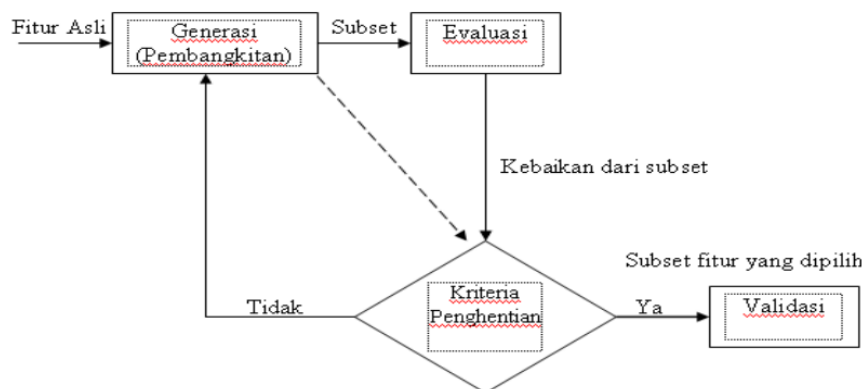

Figure 1. Feature Selection Process with validation (Dash and Lui 1997)

The generation procedure is a search procedure that basically produces a subset of features to evaluate. If the original feature set contains N number of features, then the number of candidates competing to be the resulting subset is 2N. This represents a large number even for half of the number N. There are various approaches to solving this problem, namely: complete, heuristic, and random.

Research Method

According to Notoatmojo (2008: 138) "descriptive research method is a research method carried out with the main purpose of making a picture or description of a situation objectively. The description research method is used to break down or answer problems that are being faced in the present.

Data Collection Techniques

Data collection techniques in completing this thesis are: Field Work Practice (PKL)

Field Work Practice (PKL) is a data collection technique carried out by means of direct work practice in the field in fact and real so that the data obtained is definitely not an estimate or fabrication.

- Interview
  Interview is one of the data collection techniques by asking direct questions that the interviewer does to respondents, the results of which the respondents' answers are recorded or recorded. Interviews are used if researchers want to conduct preliminary studies to find the problem to be studied.
- Literature Study
  Literature study is a data collection technique that is not directly aimed at research subjects, but through documents or scientific book references used by the author to support the research being carried out.
- By Using the Internet
  Data collection is also obtained from sources on the internet by visiting sites related to problems and data needed in research.

Result and Discussion

For system design tools, the author uses DFD (*Data Flow Diagram*) as a design drawing tool, *Microsoft Access 2010* as a *Database* or data store and *Blackbox* as a system test

Information System Design

This designed Certificate of Health and Not Color Blindness uses *Data Flow Diagrams.* The design system used, namely Microsoft Visual 2010, with *database Microsoft Access 2007*.

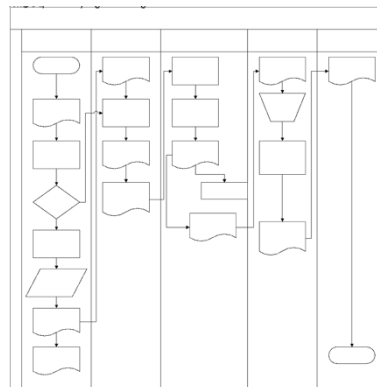1. *Designed* **System Flowmap**

Database Specifications

Figure 1. Designed System Flowmap

2.   **DFD Designed Systems**
3.

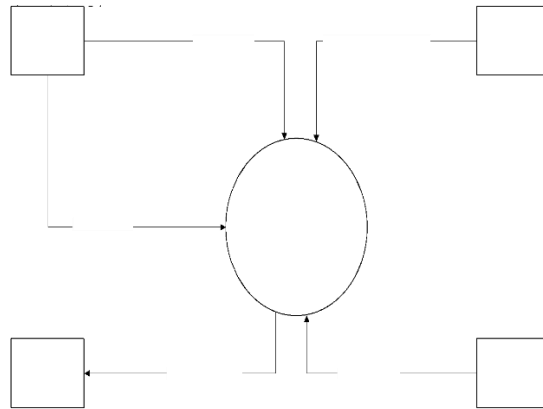   1.   ***The context of*** **the designed** system diagram

Figure 2. Context diagram of the designed system

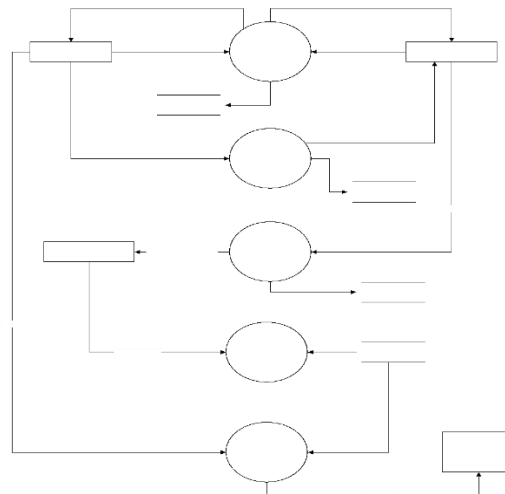   2.   ***Data Flow Diagram*** **(DFD) Level 0 System Designed**

Figure 3. *Designed Level 0 Data Flow Diagram* **(DFD)**

   3.   ***Data Flow Diagram*** **(DFD) Level 1 Process 1**
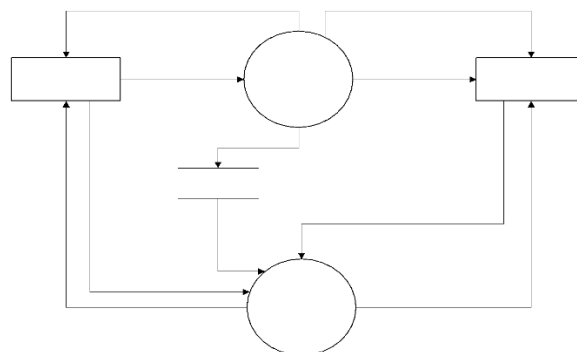

Figure 4. Level 1 *Data Flow Diagram* **(DFD)** Design

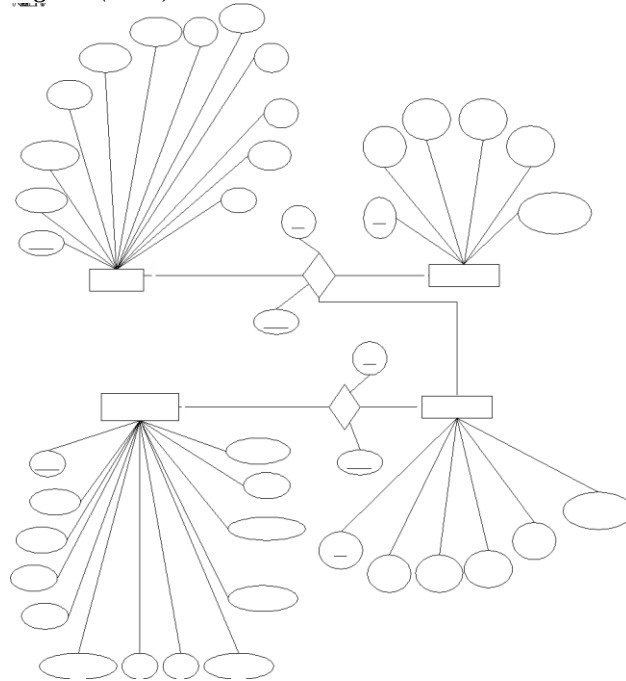***4.   Entity Relationsip Diagram (ERD)***

Figure 9. Design *of Entity Relationsip Diagram*
Source : Author (Rendra R, 2018)

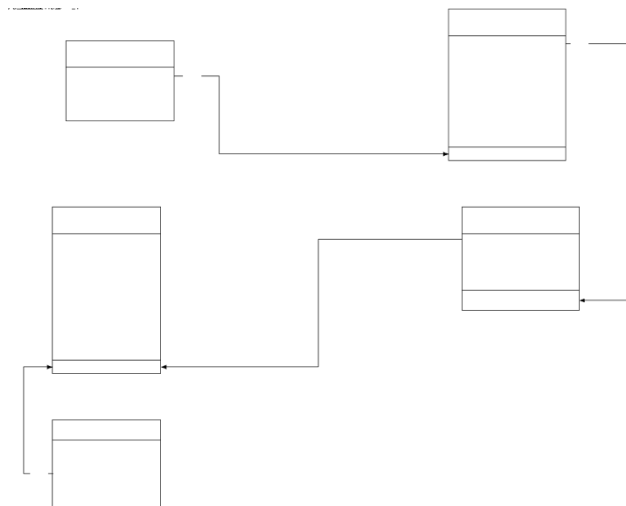***5.   Database Relationships***

Figure 9. Database Relationship Design
Source : Author (Rendra R, 2018)

Input Design

The input design in the design of this information system begins with displaying the *user login form*, which is the user's initial step to access and input patient medical record data into the system which will later be processed and produce report output.

Output Design

The output plan contains an overview of the output produced by the designed system. In this case, the author designed a Prolanis patient service information system at UPT Puskesmas Kopo Bandung. The output produced by the information system design that the author makes is a report on paper media (*print out*) derived from processed *databases*.
dataset.

1. ***Display of Officer Data Input*** Form

Figure 19. *Display of Patient Registration Form*
Source: Author Author (Rendra R, 2018)

2. ***Display of Patient*** Registration Form

Figure 20. *Service Form Display*
Author (Rendra R, 2018)

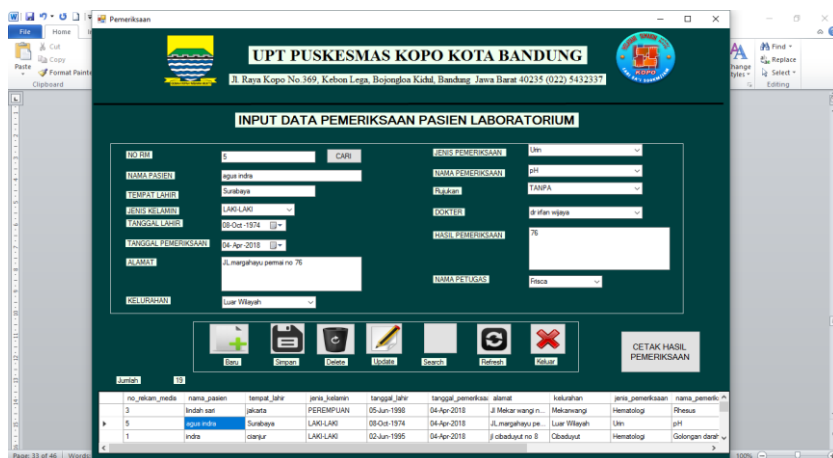*3.* **Display Laboratory Examination Form**

Figure 21. *Display of Laboratory Examination Form*
Source: Author (Rendra R, 2018)

8.Display of Laboratory Report Form

Figure 22. *Display of Laboratory Report* Form
Source: Author (Rendra R, 2018)

Conclusion

Based on the results of the analysis of the laboratory medical support service information system at UPT Puskesmas Kopo Bandung, the author concludes the problems found at UPT Puskesmas Kopo Bandung regarding the laboratory medical support service system The procedure for laboratory medical support services that runs at UPT Puskesmas Kopo, namely patient registration services, is in the registration section to check validation regarding recording and validation that has been checked by officers The laboratory is still recorded by laboratory officers in the register book and the preparation of laboratory test results and the making of examination reports are still written manually following what is in the register book. The problem of medical support services is that services are still not in accordance with Standard Operating Procedures (SOP), there are still laboratory tests that are not written completely and are not recorded in the register book, making laboratory test results are still written manually, causing the length of writing test results and still manual patient data to be examined in the laboratory into the register book and making laboratory reports is still done manually By recapping patient examination data from the register book, resulting in the duration

of laboratory report generation. Efforts are made to overcome problems that already exist in the laboratory medical support information system at UPT Puskesmas Kopo, so there must be a computerized information system. Based on the results of the analysis of the laboratory medical support service information system at UPT Puskesmas Kopo Bandung, the author concludes the problems found at UPT Puskesmas Kopo Bandung regarding the laboratory medical support service system The procedure for laboratory medical support services that runs at UPT Puskesmas Kopo, namely patient registration services, is in the registration section to check validation regarding recording and validation that has been checked by officers The laboratory is still recorded by laboratory officers in the register book and the preparation of laboratory test results and the making of examination reports are still written manually following what is in the register book. The problem of medical support services is that services are still not in accordance with Standard Operating Procedures (SOP), there are still laboratory tests that are not written completely and are not recorded in the register book, making laboratory test results are still written manually, causing the length of writing test results and still manual patient data to be examined in the laboratory into the register book and making laboratory reports is still done manually By recapping patient examination data from the register book, resulting in the duration of laboratory report generation. Efforts are made to overcome problems that already exist in the laboratory medical support information system at UPT Puskesmas Kopo, so there must be a computerized information system.

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OPTIMIZING HEALTHCARE SERVICES THROUGH AN INNOVATIVE CLINIC RESERVATION SYSTEM

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Abstract

This research aims to design and build a web-based reservation information system at Adiandra Medika Clinic. This system allows patients to make reservations or registrations online through the web applications. The research method used is the waterfall method, which consists of five stages: analysis, design, implementation, testing, and maintenance. The data collection techniques used were literature study, observation, and interviews. The results showed that the reservation information system designed and built can increase the effectiveness and efficiency of the reservation or registration process at Adiandra Medika Clinic. This system has features such as patient data, doctor data, reservation data, queue data, patient history, patient recap data, and doctor recap data. Suggestions for further development are to introduce the application to patients and doctors, replace manual information systems with web-based information systems, conduct direct trials of applications, develop patient recap report features, and develop reservation process features.

Keywords: Information System Design, Attendance, Queuing.

Introduction

Nowadays, various systems have been created to simplify life. A database will form part of the system to record all data. The private clinic currently employs a digital system to record patient and clinic-related information. Despite there being many management systems for clinics, the electronic systems that are still new to local users do not meet their requirements (Ariff Bin Anuar, 2006). Beside that, we often encounter the problem of accumulation of registration queues at health facilities in Indonesia (Irihm, 2016; Meiliana Sari & Dian Pratiwi, 2016), including clinics, even though they are supported by an information system.

One of the solutions to overcome the problem of the reservation system is to create a web application that can be connected to the WAG system. Web applications have many benefits, including with a website, companies can save costs and increase customer convenience in making promotions and ordering. Websites are also better for the environment because they reduce the use of paper for advertising, marketing (Dr. May Paing Paing Zaw, 2019) and the record-keeping process at the institution itself. In addition, the challenges of finding public transport stations to their destinations and time-consuming reservation procedures can be minimized (Saleh Al Badrani & Suleiman Al-Shammari, 2020).

Literature Review

A.   Web Application Technology

A web server stores web content and is primarily used for hosting websites, although it can also facilitate games, storage, FTP and email, among others. Client requests for the server can be responded to in one of two ways: by sending the client a requested URL-associated file or by generating responses via script execution and database communication (tutorialspoint, n.d.).