Design of Management Information Systems in A Hospital in The Physiotherapy Section Based on Software Applications

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Abstract

A computer-based management information system, a system based on software applications that can be run by a computer. Software applications are built on the basis of analysis and design of a system. The system is made by collecting information that is integrated with one another. Information in this case, can be in the form of data related to the organization that will build an application system that can store data or information in a database. The design of this hospital information system is carried out, in order to facilitate the storage, recording and creation of data that can be filled in by hospital staff in an integrated manner. The results of the system design, a hospital management information system (MIS) application made in the form of a software application. Software application to facilitate the need for filling in data related to physiotherapy ranging from drugs and equipment, stock management, examination to a list of physiotherapy patients in a hospital.

Introduction

Companies engaged in technology, especially in the Information Technology section. One of the services provided by the company is usually the development of information system applications. In addition, the company has various products related to the manufacture of information systems, one of which is hospital information system software applications. The project being carried out is related to the Hospital Information System, namely the Making of a Hospital Information System. Management information system is a system created to collect information that is integrated with each other. Information in this case can be in the form of data related to the organization which will be stored in the database. So that later, the data or information can be used to meet the needs of the organization. This hospital information system is made to facilitate the storage, recording and integration of data filled in by hospital staff. Previously, hospital staff recorded and input data in a conventional way. From these problems, a company engaged in the field of information systems carried out a project to create a hospital information system, one of which was in the physiotherapy section. The system that runs based on the data that has been entered in the system will be recorded and stored in a database which then the data can be used for hospital records/archives and can be accessed for the past five years. Based on the background that has been presented above, it can be concluded that several problems are as follows: (1) The software application can plan an information system that is easy to use for hospital staff, (2) The software application can perform data management related to the physiotherapy section, (3) Software applications may share user access rights to information system applications. Based on the three problem formulations that have been mentioned, the objectives to build this software application are: (1) Building a system that will help hospital staff in terms of data recording, data input and data management in the physiotherapy section, (2) Building a data management system so that it can be accessed up to several years ago and integrated, and (3) Build a system that will be able to provide access rights according to user data. The main problems studied provide the following scope: (1) Development of this application is a client server, (2) Data information on the system is patient data, drugs and information about physiotherapy stored in the database.

Literature

System

The system is a set of elements that are combined with each other for a common goal. The system can also be said as something abstract and tangible. Another understanding according to McLeod in the book Management Information Systems explains that the system is a group of elements that are integrated with the same intent to achieve a goal (McLeod & Schell, 2007). Meanwhile, according to the Big Indonesian Dictionary, the system is a set of elements that are regularly interrelated to form a totality.

Information

Information is data that has been processed which is intended for a person, organization or anyone who needs it. Information will be useful if the object that receives the information needs

that information (Ma, Zhao, You, & Ge, 2018). According to Jogiyanto HM information is the result of processing data into a form that is more useful for the recipient which describes real events for use in decision making. Meanwhile, according to the Big Indonesian Dictionary, information is notification, news or news about something.

Website (OoCities.org)

Management information system is an information system that has been computerized and works because of human and computer interaction. According to some experts, a management information system is an information-generating tool or a tool to assist in decision making, as well as some add to the function of an information system to perform supervision/control, analysis and visualization (McLeod & Schell, 2007).

Physiotherapy

Physiotherapy is one of the health workers who play a role in the development process in the health sector. The role and function of physiotherapy in health development is to know the current public health problems so that they can play a role and function in public health and must have the ability in accordance with their profession as a physiotherapist (SoftVelocity).

Clarion

Clarion is a 4GL (Fourth-Generation Programming Language) programming language from SoftVelocity which is used to program database applications. This Clarion can be compatible with several database formats including SQL, ADO, and XML, and can generate HTML, XML, plaintext, and PDF. At the time this report was written (2020), Clarion was at version 11 (OoCities.org). This programming language is like a mix of Basic, Pascal, and Cobol. However, unlike Pascal, every block must have a begin-end block (El-Hindi, Binnig, Arasu, Kossmann, & Ramamurthy, 2019).

Database

Database is a collection of interrelated data that is used to support the activities of an organization. The database can be viewed as a kind of data repository which is defined once but can be used many times by various parties with different needs (Bowman et al., 2007). Meanwhile, according to Chaturvedi, Singh, Tiwari, and Thacker (2020), a database is a collection of logically interconnected data and is designed to obtain the data needed by an organization.

SQL Anywhere

SQL Anywhere is one type of database technology that can be used for data management and data exchange, application development using databases for servers, desktops, mobile or remotely. This technology has been used by many companies around the world. Usually SQL Anywhere is used for client server applications, desktops, remote offices and wireless mobile applications (SAP SQL Anywhere).

Data Flow Diagram

According to Muhamad Muslihudin and Oktafianto, Data Flow Diagram (DFD) is a data logic model or process created to describe where the data comes from and where the data goes out of the system, where the data is stored, what processes produce the data, and interactions. between the stored data and the processes applied to that data (Tini & Eko Hadiyanto, 2002). On the DFD there are symbols that will indicate the process current on the system. The following symbols are found on the DFD (SAP Business Process Architecture 16.7 SP4):
External Entity, an external entity is an entity that is outside the system that is directly related to the system (SAP Business Process Architecture 16.7 SP4). There are two types of external entities, namely, sources outside the source and external entities. In addition, outside entities can be people, groups of people, organizations, companies that are outside the system and use nouns. Here's a symbol of an external entity. See figure 1 below.
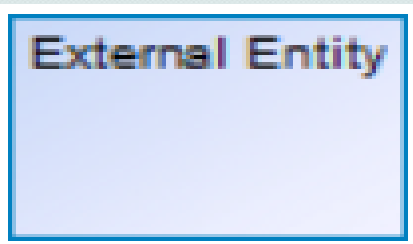
Figure 1: External Entity

Process, the process describes the transformation or change of input into output. This naming is adjusted to the process that occurs. Processes must have inputs and outputs, can be connected to external entities, data stores or through data flow processes. According to Gane & Sarson the process symbol is as follows (SAP Business Process Architecture 16.7 SP4). See figure 2 below.
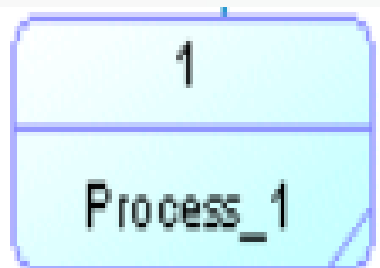

Figure 2: Process

Data flow, data flow is used to provide information about data transfer from one part to another. The data flow can be in the form of messages, words or information. The data flow must not have the same name between other data flows and the name must be in accordance with its contents. The following is the symbol of the data flow, see Figure 3 below.
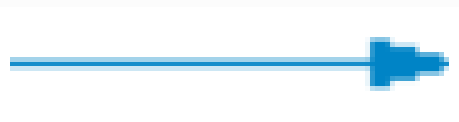

Figure 3: Data Flow

Data Store, the data store serves to create a model from a set of data packets named with plural nouns. Data stores can be in the form of databases/files stored on the hard disk or manually such as books, files and others. According to Gane & Sarson, the data store symbol is as follows (SAP Business Process Architecture 16.7 SP4). See figure 4 below.

Figure 4: *Data Store*

System Analysis

System Analysis

A hospital is a place for health services served by professional experts such as doctors, nurses and other experts who provide inpatient, outpatient and emergency services. One of the services is physiotherapy. In this case, the need for recording patient data and drug data is very necessary to meet the needs of patient care and data information for doctors. To facilitate data input, data recording and data reporting, a hospital management information system was created in the physiotherapy service section. So that later all the data needed for the type of action for the patient and the medication needed will be easier to check and monitor for the medical staff there. From the analysis of the system above, the functionality of the system which will consist of the main menu to be made can be seen in table 1.

Table 1
System Functionality

No.	Description of Needs	Information
1.	Login	This requirement serves as an entrance for the officer concerned to enter the application and use the features in it.
2.	File	This requirement serves to provide a choice of features for printing data, setting the installation (programmer) and exiting the application.
3.	Data	This function aims to provide a menu to input data or view data information regarding drugs/devices, types of actions or stock cards.
4.	Tools	This function will provide a feature that contains the stock taking, initial balance and initial balance per month.
5.	Transaction	This function aims to provide information about transactions that occur in the physiotherapy service section.
6.	Report	This function aims to make reports by officers.
7.	Inpatient	This function aims to enter, modify and delete outpatient data.
8	Outpatient	This function aims to enter, modify and delete inpatient data.
9.	Patient List	This function aims to view all patient information on physiotherapy services.

Needs Analysis

The following table will explain the requirements of the system for the required hardware and software. It can be seen in table 2.

Table 2
System Requirements Analysis

No.	System Requirements	Information
1.	Operating System at least Windows XP SP2 32 bits	Operating System Software
2.	Sybase ASA 9.	Database Software
3.	Processor minimal Dual Core	Computer Hardware
4.	RAM minimal 512 MB	Computer Hardware
5.	VGA minimal 128 MB	Computer Hardware
6.	Minimum screen size 1280 x 768px	Computer Hardware

User Analysis

The following is a table that will explain the users of this system with the level of officer users. It can be seen in table 3.

Tabel 3
User Analysis

No.	User Type	Duty	Access Rights
1.	Officer	1. Login.	1. Form login
		2. Open the file menu.	2. Menu display
		3. Input, edit and delete the data menu, tools, transactions, reports, inpatient, outpatient and patient lists.	3. Forms for menu data, tools, transactions, reports, inpatient, outpatient and patient lists.
		4. Doing data printing	4. Data print form

DCD (*Data Context Diagram*)

Figure 5 shows the context diagram for the hospital information system application. Access will be given to officers who have been given username and password access in the physiotherapy section. The officer can only enter the system if the officer correctly enters the username and password and is also in accordance with the schedule on duty (morning or afternoon shift). Here is a context diagram or DFD Level 0.
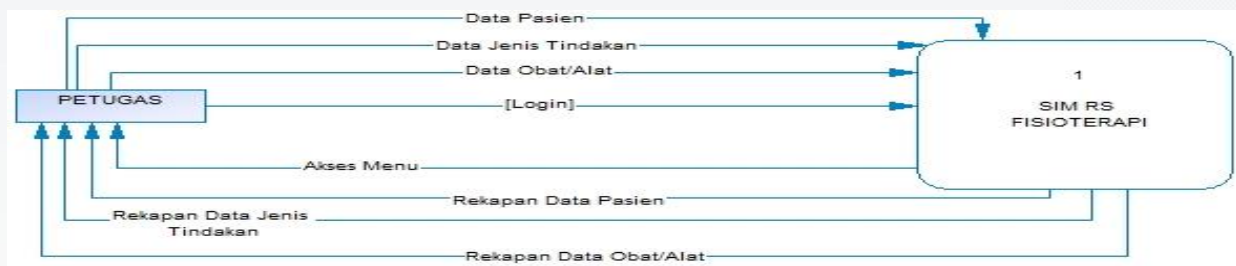

Figure 5: Context Diagram

DFD (*Data Flow Diagram*)

Figure 6 shows DFD level 1 which is a solution to the context diagram. This diagram explains what access can be done by officers to the system.
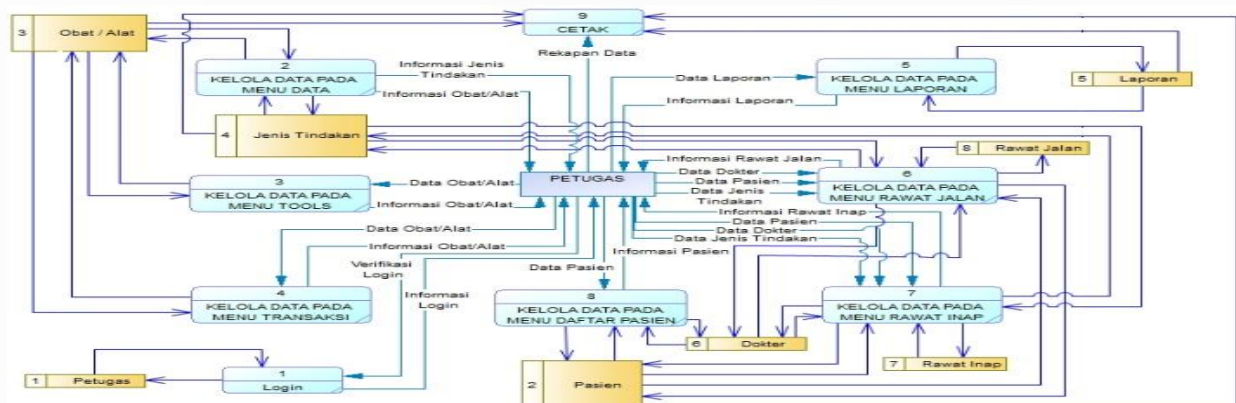
Figure 6: DFD level 1

Application Planning

The design in building a computer-based application is part of the process for an application. The design is carried out after the analysis stage has been passed. The design describes in detail the application made. The design stage is carried out before the implementation and trial stages.

Interface Design

Interface design will explain the design of the display for a system or application to be built. The following is an interface design for a website-based hospital management information system application for the physiotherapy section.

1. Login page, this page will appear when the officer opens the application for the first time. The system will ask the officer to enter the username and password. In Figure 7 is the design of the login interface on the application.
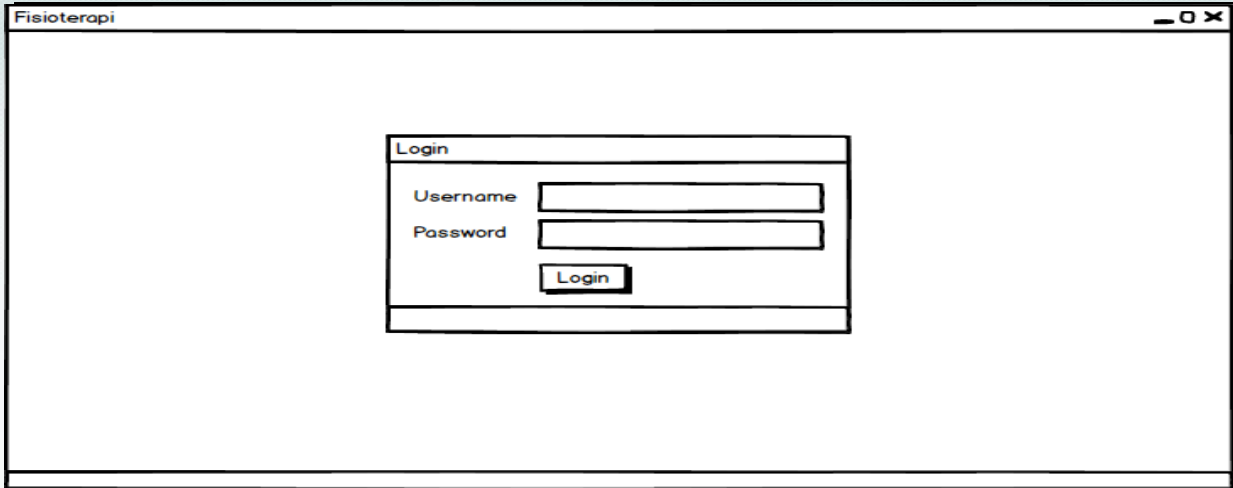
Figure 7: Login Interface

2. The start page, in Figure 8 is the design of the interface for the start page. This page will appear after the officer has successfully entered the application.
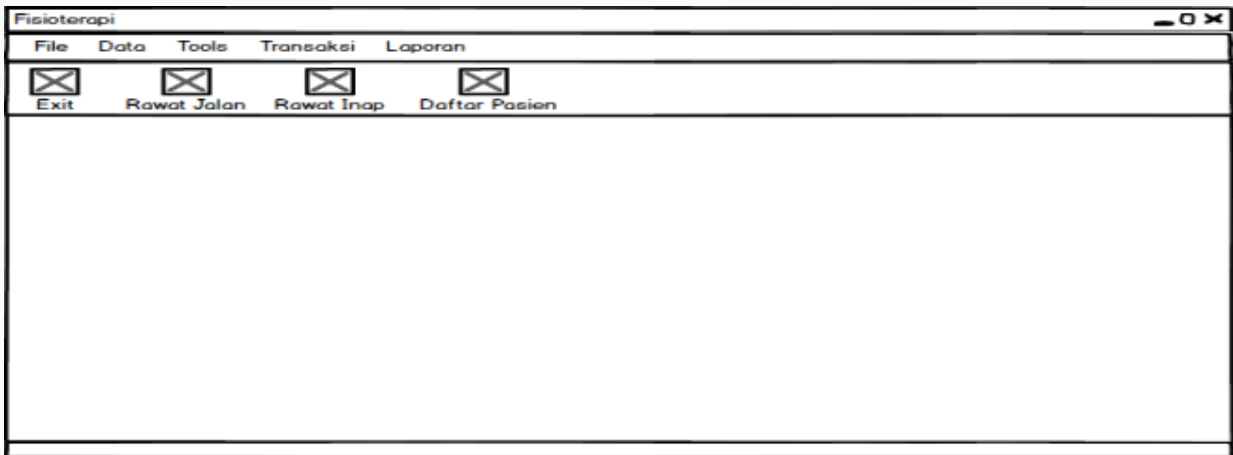

Figure 8: Homepage Interface

3. Drugs/tools page, On this page officers can check the list of drugs and equipment available at the physiotherapy poly. Figure 9 is the design of the drug/device page interface on the application.
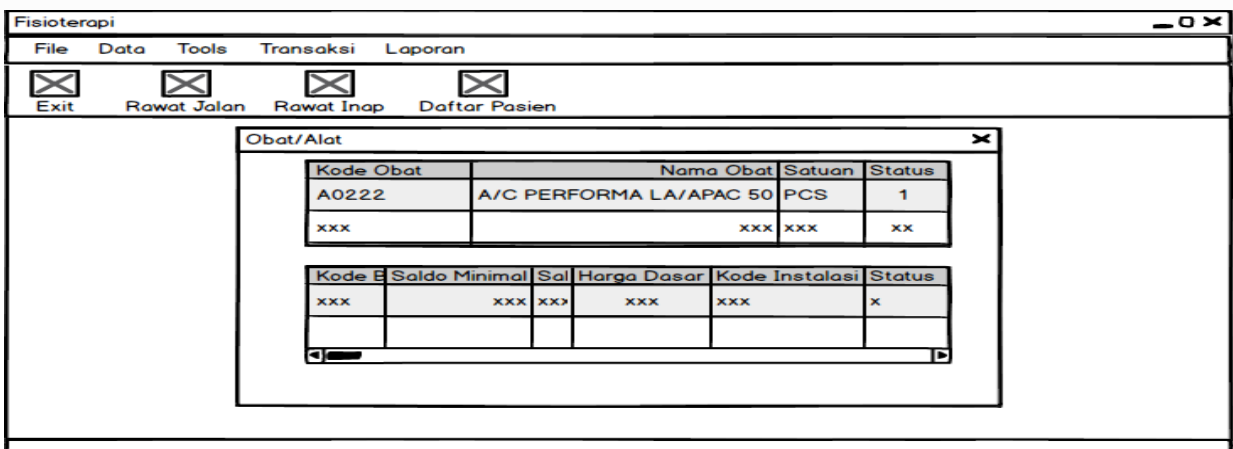

Figure 9: Drug/Device Interface

4. Action Types page, On this page officers can add types of actions, change types of actions, delete types of actions and print types of actions provided by pressing the button on this page. Figure 10 is an action type page interface design.
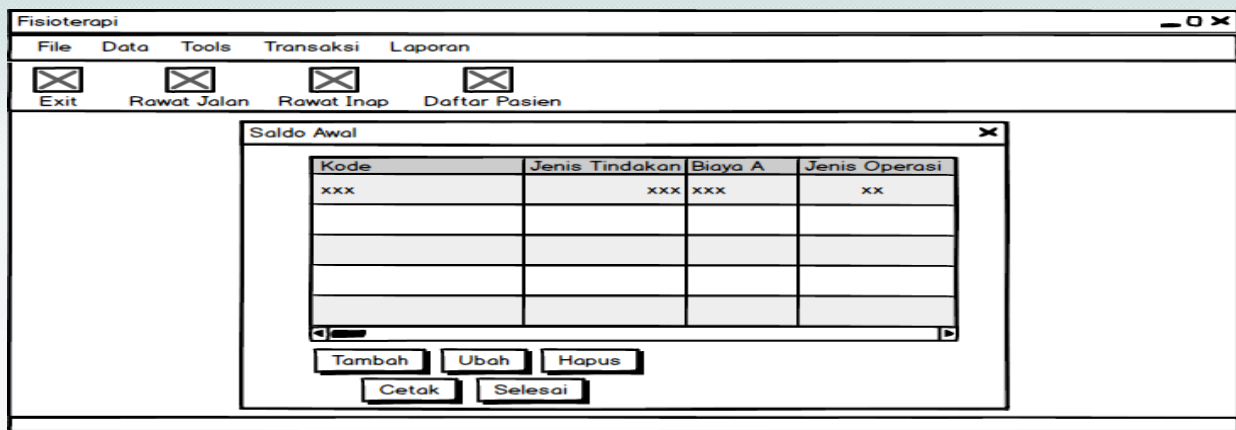
Figure 10: Action Type Interface

5.   Stock Card Page. On this page, officers can see stock related to available drugs and tools. Figure 11 is the design of the stock card page interface.
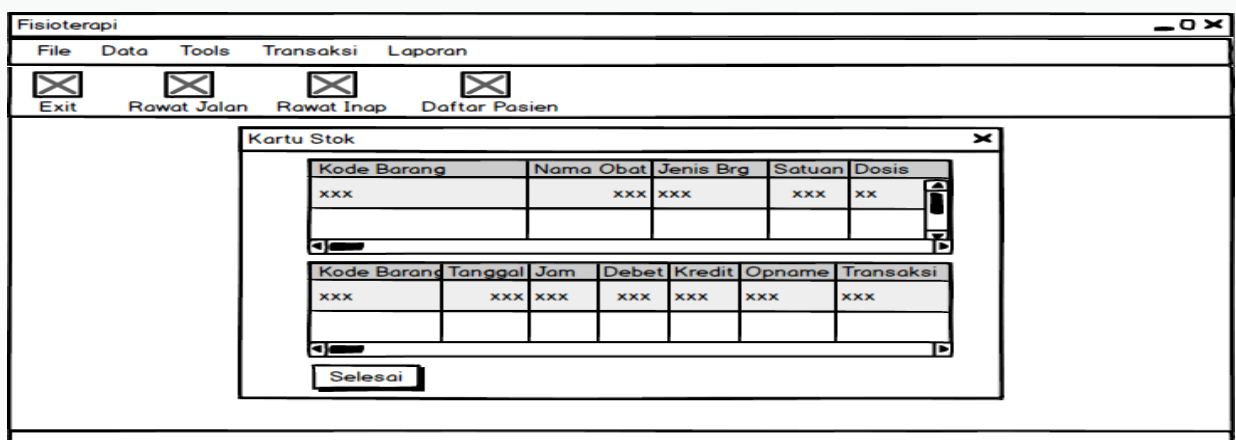

Figure 11: Stock Card Interface

6.   Initial Balance page, on this page the officer can add, change, delete and process the provided initial balance by pressing the button on this page. This page serves to enter new stock items before the stock taking process is carried out. Figure 12 is an initial balance page interface design.
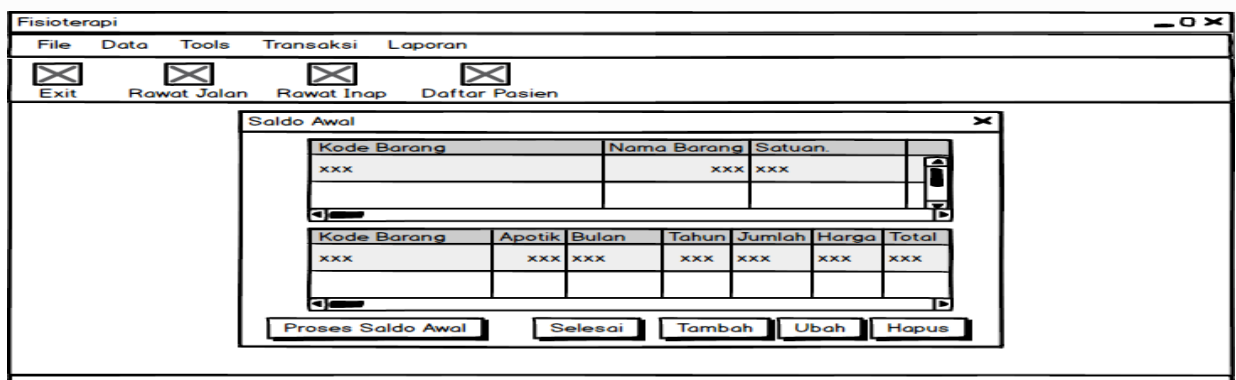

Figure 12: Initial Balance Interface

7.   Stock Taking page, on this page officers can add, change, delete and process the provided stock taking by pressing the button on this page. To access this page, the officer must enter a special password to access the stock taking and then enter the month and year for which the stock taking will be processed. Figure 13 is an action type page interface design.
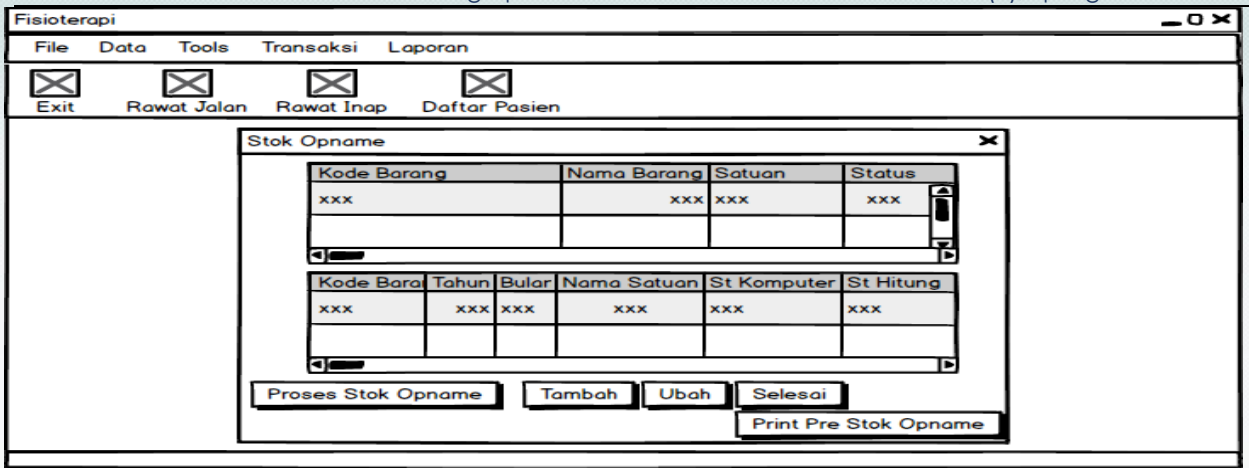
Figure 13: Action Type Interface

8. Adjustment page, on this page officers can add stock corrections manually without having to go through the stock taking process. Stock correction here is done per item, so it is possible to do it at any time. Figure 14 is an adjustment page interface design.
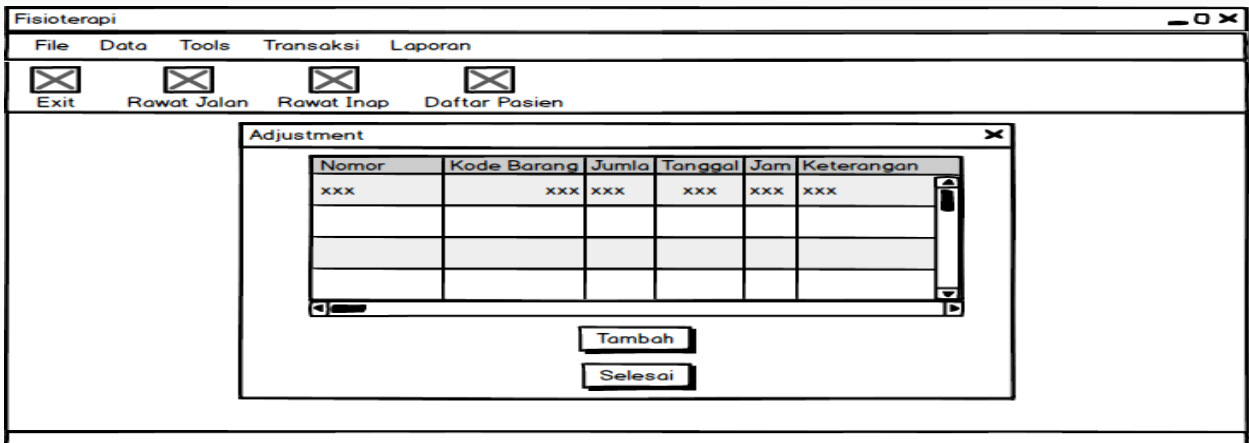

Figure 14: Adjustment Interface

9. Outpatient Inspection page, on this page officers can make additions, changes, deletions, validations and cancellations provided by pressing the button on this page. Figure 15 is the interface design for the outpatient examination page.
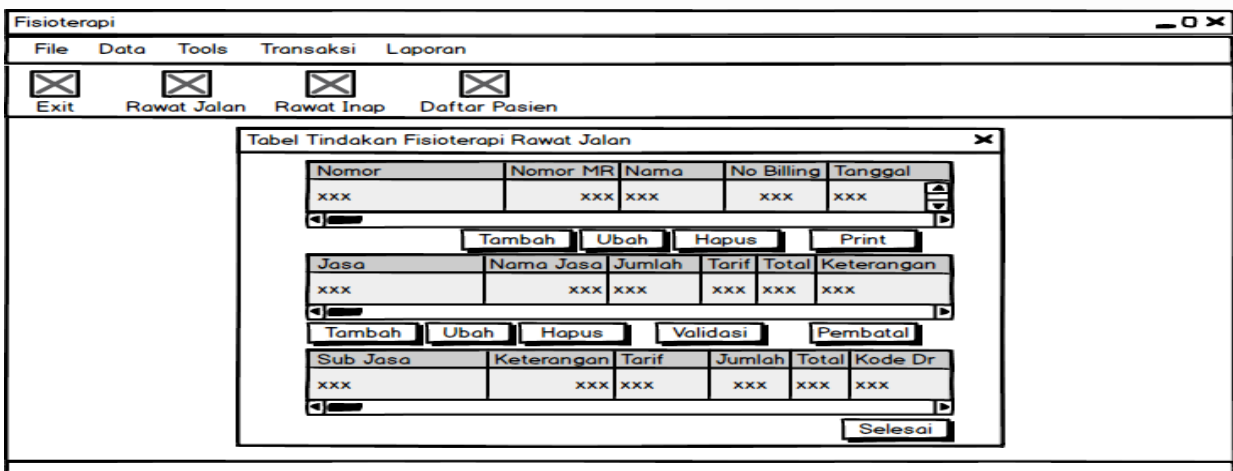

Figure 15: Outpatient Examination Interface

10. Inpatient Examination page, on this page officers can make additions, changes, deletions, validations and cancellations provided by pressing the button on this page. Figure 16 is the design of the interface for the inpatient examination page.
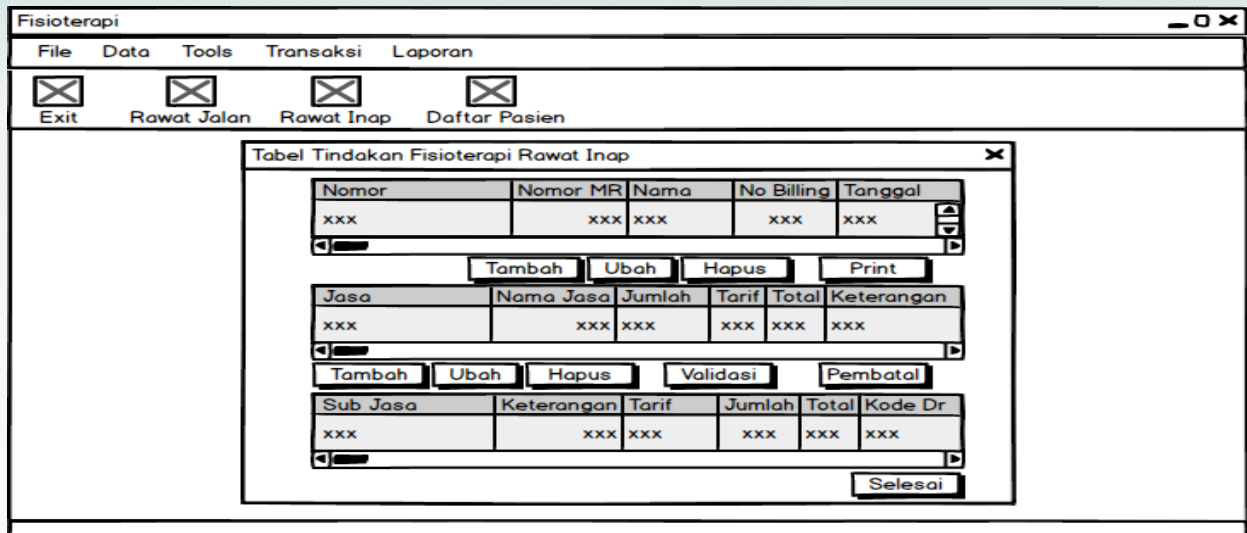
Figure 16: Inpatient Examination Interface Antarmuka

11. Patient List page, On this page the officer can check whether the patient has been called for examination or not. Figure 17 is the design of the patient list page interface.
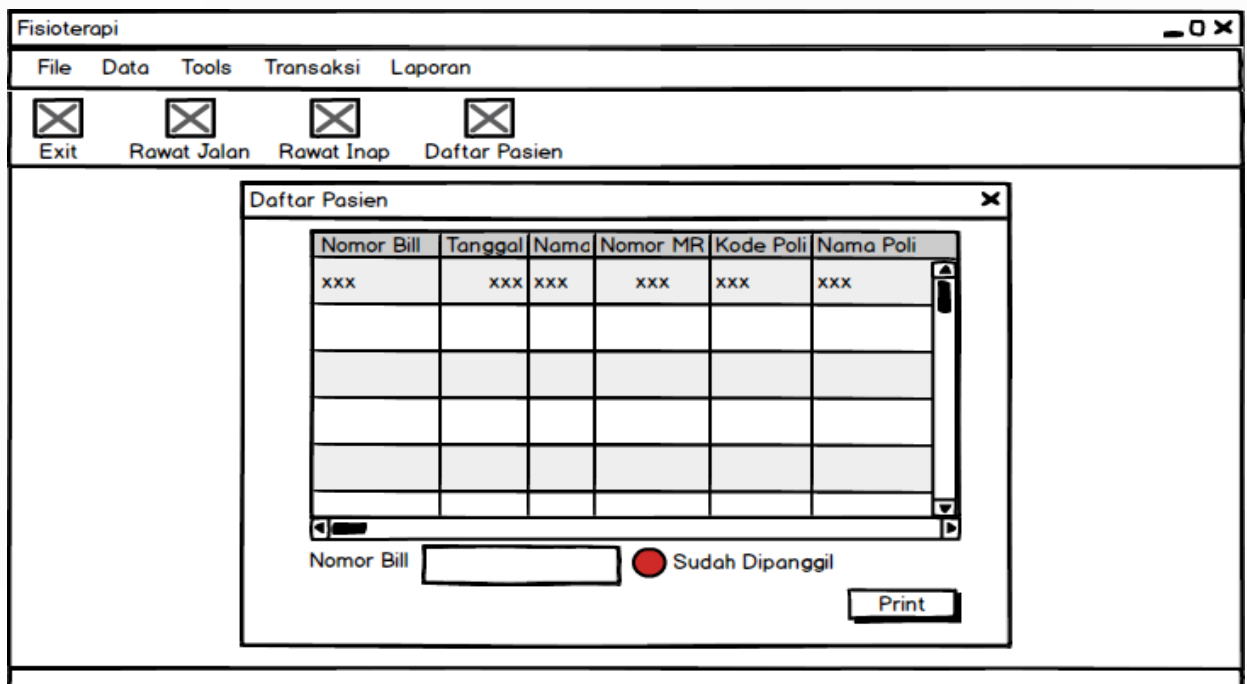

Figure 17: Patient List Examination Interface

Conclusion

Based on the results of the design on an information system-based application regarding hospital management information systems in the physiotherapy section, conclusions can be drawn. The conclusions that can be expressed on the design of information system-based software applications are as follows:

1. The system built as a software application that uses a computer has been successful and is operated in the physiotherapy department bagian.
2. Employees can perform data management by inputting and managing data in the physiotherapy section.
3. The system can only be accessed by officers who have been given access rights by using a username and password.

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