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EVALUATION AND DESIGN OF MANAGEMENT INFORMATION SYSTEM DEVELOPMENT IN COMPLETENESS OF RECIPE SCREENING IN AR-RASYID ISLAMIC HOSPITAL PALEMBANG

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ABSTRACT
Errors in prescribing and administering drugs are things that often occur in medicine, so in an effort to improve pharmaceutical performance, an evaluation and development of a SIM is carried out to support pharmaceutical services in hospitals. The aim of this research is to evaluate the Management Information System needs at RSI Ar-Rasyid Palembang and continue with the development of a design model. This research is descriptive research conducted through direct observation and documentation. The development of this research system uses a prototype method starting from needs analysis, system design and implementation of the EUCS (End User Computing Satisfaction) framework system, creating a system design using context diagrams, Data Flow Diagrams and Entity Relationship Data, the data analysis method used is qualitative analysis. The results of the research from direct observation on the completeness of the IFRS SIM show that the SIM at RSI Ar-Rasyid in pharmaceutical screening has been fulfilled, but in administrative screening and clinical screening it has not been fulfilled and the results of evaluation using a questionnaire distributed to pharmaceutical installation staff show an average the answer to each statement variable is satisfied. In making a draft design, there are suggestions that include clinical screening of prescriptions, it is hoped that this will help pharmacy installation staff in providing services to avoid medication errors. Based on system design, input design and output design, the patient prescription screening management information system design meets the criteria so it is ready to be implemented into the system.

Keywords: Management Information Systems; Pharmacy Installation; Prescription Screening

1. INTRODUCTION

Errors in the treatment process can occur at any time. Errors in prescribing and giving drugs are common in the world of medicine (medication) (Calligaris et al., 2009). The results ofAnwar Makkatutu's research at Bantaeng Hospital reported that there were 18 cases of medication errors in 2010, 16 cases in 2011 and 21 cases in 2012 (Budihardjo, 2017). A good prescription should contain enough information so that the pharmacist can understand what drug to give the patient. However, in reality there are still many obstacles faced with the recipe (Aprilani, 2010). Based on PMK RI No. 129/2008 concerning Minimum Service Standards, 100% there should be no incidence of medication errors that occur in health services (Kemenkes RI, 2008).

Hospitals are a type of healthcare organization that often have difficulty managing data for internal and external needs. Therefore, efforts must be made to make information management more efficient, faster, easier, more accurate, cheaper, more secure, more integrated and more accountable. One form of search is through a service system using information technology using a computer information system (Handiwidjojo, 2015). TheHospital Management Information System (SIMRS) is a communication and information technology system that processes and

integrates all hospital service process flows as a network of coordination, reporting and management activities to obtain accurate and precise information and is part of the health information system (Kemenkes RI, 2013). In order to beable to provide information according to needs, it is necessary to design a good information management system so that it can be used in decision making (Jaelani & Andani, 2015) regarding prescription screening by pharmacists to prevent medication errors (Putri, 2017). Prescription screening includes administration, pharmaceutical suitability and clinical suitability, to ensure the legality of a prescription and minimize the risk of medication errors (Megawati & Santoso, 2017). Medication error is an event that is detrimental to the patient due to drug use (Kemenkes RI, 2004). One form of medication error that occurs at the prescribing stage isan error during prescription writing. The effects range from causing no harm at all to causingdisability or even death (Bilqis, 2015).

Along with the development of this technology, the need for technology is also growingand is needed at all levels of society (Kemenkes RI, 2011). Success in developing management information systems is an investment for organizations, including hospitals (Jaelani & Andani, 2015). According to O'Brien (2005), the development of a prescription screening management information system requires investigation and analysis of the reasons for the emergence of ideas or ideas to build and develop this information system. Analysis isperformed to document information system activities including input, processing, output, storage and control.

Previous research has carried out analysis and design of a management information system specifically for prescription screening manually and requires a long time. This research was conducted in three namely research by (Riswiyanti, 2015) in the hospital, by (Jaelani & Andani, 2015) in health centers and in pharmacies by (Andita et al., 2016). Other research was also conducted by (Advistasari et al., 2015) and (Firdaus, 2019) regarding the evaluation of management information systems in hospitals.

In this study, researchers evaluated the existing Management Information System at RSIAr-Rasyid and continued with the SIM development design. Based on observations, currentlythere are hospitals that have management information system applications in their pharmaceutical installations. Therefore, researchers developed a SIM against prescription screening. In the development of this system, it has been equipped with automatic prescription screening both administratively, pharmaceutically and clinically, which distinguishes it from research by other researchers. The function of this system is expected to be able to support, assist and facilitate pharmaceutical personnel in conducting computerized prescribing screening, so that medication errors do not occur.

The purpose of this study was to find out the results of observations on the need for a driver's license to develop a driver's license in completing prescription screening, to find out the design of the development of a management information system needed to make it easier to carry out prescribing studies at RSI Ar-Rasyid Palembang. To find out the results of evaluating the needs of management information systems in completing prescription screening at RSI Ar-Rasyid Palembang and knowing the needs of systems related to development in completing prescription screening at RSI Ar-Rasyid.

2. METHOD

This research is descriptive research conducted through direct observation and documentation (checklist). Direct observation and documentation are expected to produce complete data related to prescribing screening both administratively, pharmaceutically and clinically, an overview of drugs used in prescribing and the development of a management information system design design for prescription screening needed to facilitate prescribing assessment activities. The development of this research system uses the prototype method starting from needs analysis, system design and system implementation. Data collection of system needs analysis was carried out prospectively (observations, interviews and questionnaires with the

EUCS (End User Computing Satisfaction) framework in September - October 2020. After getting a system needs analysis, then making a system design using context diagrams, Data Flow Diagrams (DFD) and Entity Relationship Data (ERD).

The sample criteria in this study were outpatient and inpatient prescriptions and pharmacy officers responsible for pharmaceutical installations at RSI AR-Rasyid Palembang. This study was analyzed in a quality descriptive manner. The data obtained are analyzed using qualitative analysis methods and presented in forms, tables, figures and narratives.

3. RESULTS AND DISCUSSION

3.1. IFRS Sim Observation Results

The following are the results of observations made on the RSI AR-Rasyid Pelembang IFRS SIM from September-October 2023, which can be seen in **Table 1**. Data collection for this study was carried out from September - October 2020 at the RSI Ar-Rasyid Palembang pharmaceutical installation. Management information systems in pharmaceutical installations have started to be implemented in the last 1 year or so. This management information system itself is connected directly to administration, poly, emergency room, inpatient, operating room and warehouse.

The results of direct observation of SIM in IFRS show that the management information system meets pharmaceutical standards for prescriptions. This can be seen through the completeness of the existing features in the management information system in pharmaceutical installations. It can be seen that the applied SIM contains the name of the drug, dosage form, dosage strength, dosage sauna, amount of drug, rules for use and how to use it. However, related

Table 1. AR-Rasyid RSI SIM Completeness

Screening	Description
Administrative	
1. Patient Name	√
2. Date of Birth	√
3. Medical Record Number	√
4. Gender	√
5. Patient's Weight	√
6. Patient's telephone number	-
7. Patient Address	√
8. Name of Doctor	√
9. SIP Doctor	√
10. Doctor initials	-
11. Date of Writing Recipe	√
Pharmaceuticals	
1. Drug Name	√
2. Dosage Form	√
3. Stock Strength	√
4. Supply Unit	√
5. Amount of Drug	√
6. Drug Use Rules	√
7. How to use the drug	√
Clinical	
1. Drug indications	-
2. Drug Dosage	-
3. Route of Drug Administration	-
4. Time to use the drug	-
5. Drug Duplication	-
6. Allergies	-
7. Drug Interactions	-
8. Drug Contraindications	-
9. Drug side effects	-

Source: Primary Data 2020

to the completeness of the SIM in administrative screening (patient telephone number, doctor's initials) and clinical screening such as drug duplication, interactions and contraindications and side effects of drugs have not been fulfilled, so researchers are developing the existing system.

3.2. Management Information System Evaluation

The following are the results of the questionnaire filled out by 20 pharmaceutical staffat IFRS RSI Ar-Rasyid Palembang regarding content, accuracy, format, timeliness and easeof use of the system which has been used for 1 year, can be seen in **Table 2.** The content variable in this study is used to measure user satisfaction in terms of content or content of a system. This variable also measures whether the system is generating information according to user needs. In the **Table 2**, it can be seen that the average results of respondents' answers in each statement show that the level of satisfaction of staff at pharmaceutical installations from the aspect of content is included in the satisfied category, which means it is in accordance with user expectations. Variable accuracy in this study is useful for measuring user satisfaction in terms of data accuracy when the system receives input and then processes it into information. In the **Table 2**, the average results of respondents' answers in each statement show that the level of satisfaction of staff at pharmaceutical installations in terms of accuracy is included in the satisfied category, which means it is in accordance with user expectations. This can be seen from the officer's satisfaction with the use of the system.

Variable format is useful for measuring user satisfaction in terms of application appearance. Format aims to measure user satisfaction in terms of the appearance and aesthetics of the system design, whether the format of the system is attractive and whether the appearance of the system

Table 2. Questionnaire results for content, accuracy, format, timeliness and ease of use

Content	Very Dissatisfied	Not satisfied	Satisfied	Very satisfied	Total
C1	-	1	16	3	20
C2	-	-	17	3	20
C3	-	-	17	3	20
C4	-	2	17	1	20
C5	-	-	18	2	20
Accuracy	**Very Dissatisfied**	**Not satisfied**	**Satisfied**	**Very satisfied**	**Total**
A1	-	-	16	4	20
A2	-	3	15	2	20
A3	-	1	18	1	20
A4	-	1	18	1	20
A5	-	1	19	-	20
Format	**Very Dissatisfied**	**Not satisfied**	**Satisfied**	**Very satisfied**	**Total**
F1	-	2	16	2	20
F2	-	2	15	3	20
F3	-	1	16	3	20
F4	-	3	13	4	20
F5	-	-	16	4	20
F6	-	1	16	3	20
Timeliness	**Very Dissatisfied**	**Not satisfied**	**Satisfied**	**Very satisfied**	**Total**
T1	-	3	17	-	20
T2	-	1	19	-	20
T3	-	1	18	1	20
T4	-	2	17	1	20
Easy of use	**Very Dissatisfied**	**Not satisfied**	**Satisfied**	**Very satisfied**	**Total**
E1	-	-	18	2	20
E2	-	1	17	2	20
E3	-	1	17	1	20

Source: Primary Data 2020

makes it easier for system users. In the **Table 2**, it can be seen that the average results of respondents' answers in each statement show that the level of satisfaction of staff at pharmaceutical installations from the aspect of format is included in the satisfied category, which means that the existing system format is in accordance with user expectations. Timeliness variables are useful for measuring user satisfaction from the timeliness of the system in presenting or providing data and information needed by users. In the **Table 2**, it can be seen that the average results of respondents' answers in each statement show that the level of satisfaction of staff at pharmaceutical installations in terms of timeliness is included in the satisfied category, which means that the system is sufficient to meet user expectations in terms of timeliness and can be used for decision making.

The Ease-of-use variable is used to measure satisfaction in terms of user ease or user friendliness in using the system such as finding the information needed. In the **Table 2**, it can be seen that the average results of respondents' answers in each statement show that the level of satisfaction of staff in pharmaceutical installations in terms of ease of use (ease of use) is included in the satisfied category which means that the system is in accordance with the expectations of users, namely easy to use. Based on the results of the analysis of the 5 variables namely content, format, accuracy, timeliness and ease of use, it was concluded that the respondents were satisfied with the management information system in prescribing screening at RSI Ar-Rasyid Palembang.

3.3. Management Information System Development Design

The development of a management information system begins with analyzing system requirements, namely evaluating the system using the EUCS framework and making direct observations on existing systems in pharmaceutical installations. After obtaining the results of the system requirements analysis, it is continued with management information system design, system development design. The development of a prescription screening management information system at the Ar-Rasyid Islamic Hospital in Palembang was carried out to simplify and develop the previous system. The hope is that it can help staff in pharmacy installations in providing services and avoid errors in administering medicines. The prototype of the Prescription Screening Management Information System is shown in **Figure 1**.

Assessment Identification of patient prescription screening is carried out in accordance with pharmaceutical service standards at the Ar-Rasyid Islamic Hospital in Palembang, which includes identification of administrative screening, pharmaceutical screening and clinical screening (Kemenkes RI, 2016). The prescription screening service in the previous system still had several shortcomings, for example at the administration stage the patient's telephone number and doctor's initials were not included. This will certainly make it difficult for pharmacy staff to contact patients if an error occurs in administering medication. Meanwhile, at the clinical stage, researchers are still making additions related to drug indications, drug doses, drug administration routes, drug use times, drug duplication, allergies, drug interactions, drug contraindications and drug side effects. These additions are expected to help pharmaceutical staff in providing pharmaceutical services so that no medication errors occurred.

The following is a prototype of the prescription screening management information system, after analyzing the system using the EUCS framework and direct observation as material for analyzing the needs of the system. The results of the system requirements analysis are followed by development design, the design plan that will be created is to add completeness in terms of clinical screening. The system development process, this hospital management information system is assisted by a system development team consisting of a programmer and an IT person. The system design formulated in this research consists of model design, input design and output design. The model design is described with DFD and ERD context diagrams (Silberschatz et al., 2011). The context diagram for the proposed management information system at RSI Ar-Rasyid is shown in **Figure 2**.

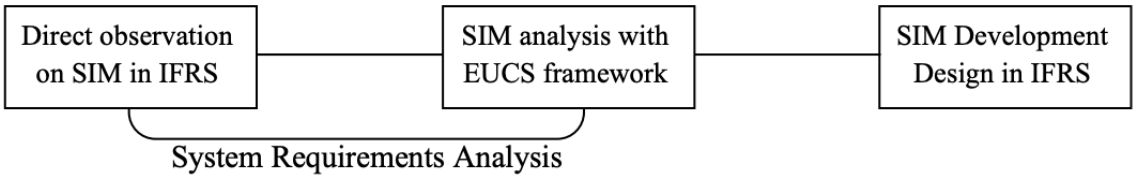

Figure 1. Prescription Screening Management Information System Prototype Method

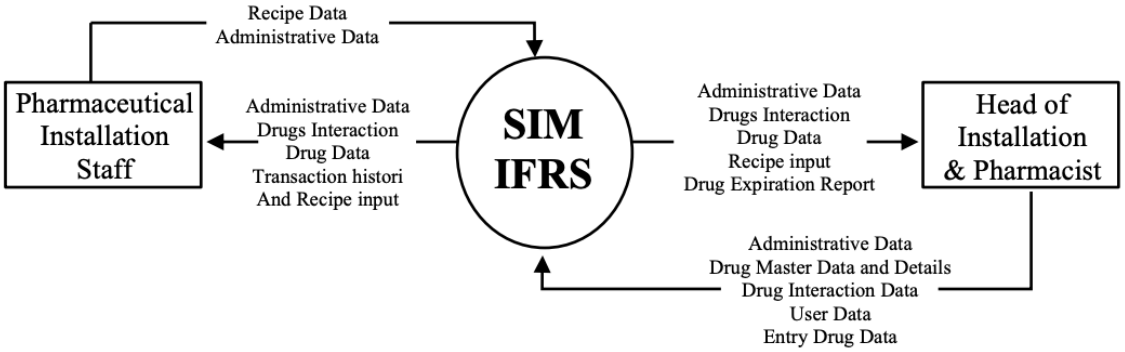

Figure 2. Context diagram of the proposed management information system at RSI Ar-Rasyid

Based on the proposed context diagram, this management information system is operated by 2 users namely, the pharmacy installation staffs (user) and the installation head (Manager). The user here is in charge of inputting all prescription and patient administration data and the output received by the user is administrative data, drug data, drug interactions, transaction history and prescription input, then the manager in charge of inputting administrative data, prescription data, drug master data and details, user data and drug data are entered while the output obtained by the manager is administrative data, drug data, drug interaction data, transaction and prescription history, drug EXP reports.

Based on the proposed flowchart (**Figure 3**), the manager can access most of the system, starting from prescribing, drug data, to drug stock in the IFRS SIM. The manager can monitor the existing drug stock, incoming drugs until the drug is almost approaching its expiry date, adding drug data if there is a new drug, interactions and pregnancy categories of drugs for pregnant women.

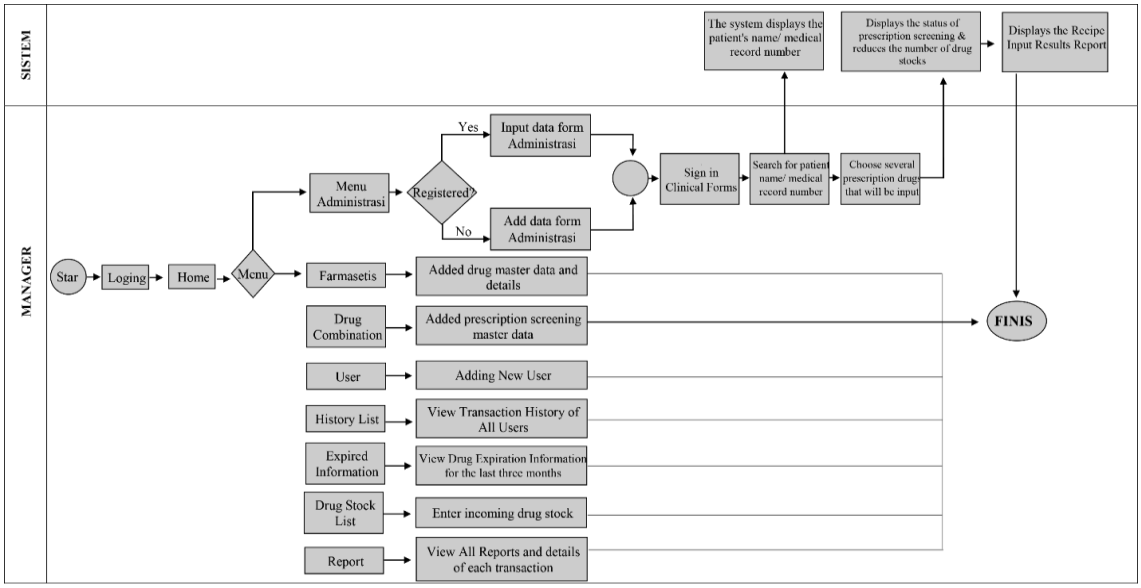

Figure 3. Flowchart of the Proposed Management Information System at RSI Ar-Rasyid

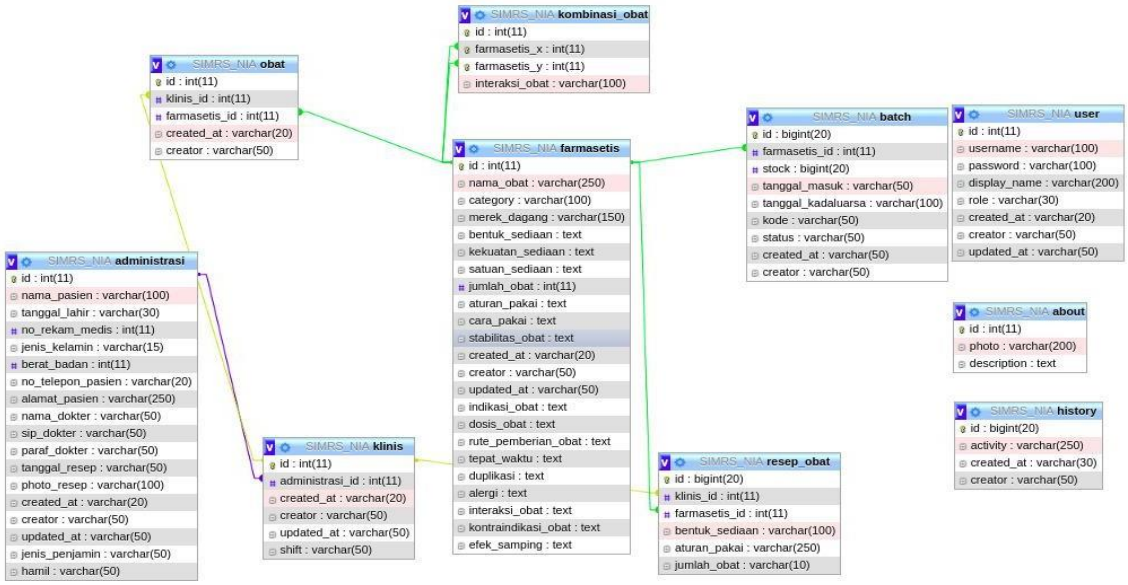

Figure 4. ERD management information system proposed at RSI Ar-Rasyid

Entity Relationship Data (ERD) is one of the models used in database design whichaims to describe related information in a database (Khan & Saber, 2010). The proposedERD management information system at RSI Ar-Rasyid is listed in **Figure 4** Following isthe proposed system development database design, so all information related to druginformation, prescription completeness, interactions will be entered into the designed SIM.The system development design was made based on the results of a needs analysis carried out on the existing management information system at the hospital, in terms ofadministrative and pharmaceutical screening that has been fulfilled in the existing systemat the pharmaceutical installation. Clinical screening which is basically very important inthe prescribing process has not been fulfilled in the system, then a design is made by entering drug information into the system. Drug information can be seen in the search icon besides that with drug information the system will filter data from prescriptions.

3.4. System Implementation

The following is a view of the system developed by researchers using the EUCS (EndUser Computing Satisfaction) framework, creating system designs using context diagrams,Data Flow Diagrams (DFD) and Entity Relationship Data (ERD) (**Figure 5** to **Figure 8**).

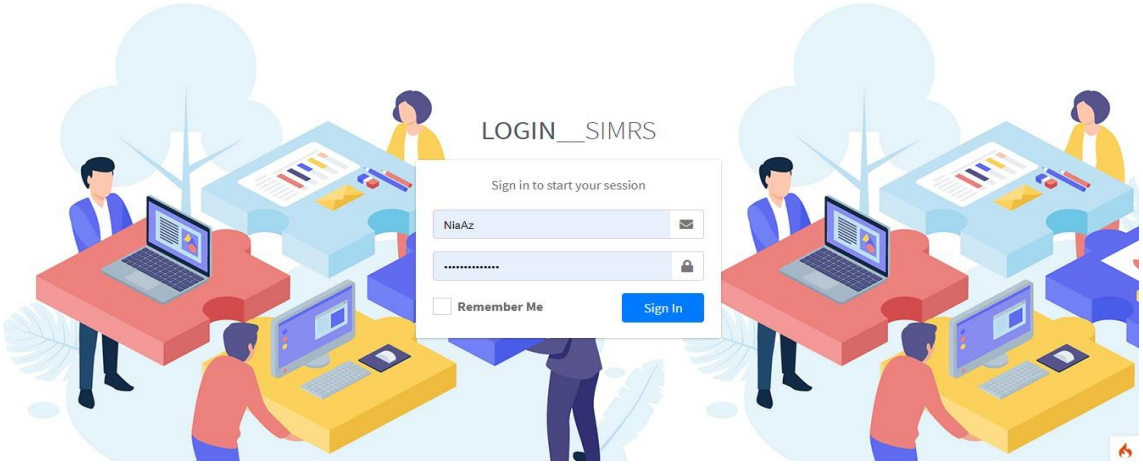

Figure 5. Display of the RS SIM Login Page

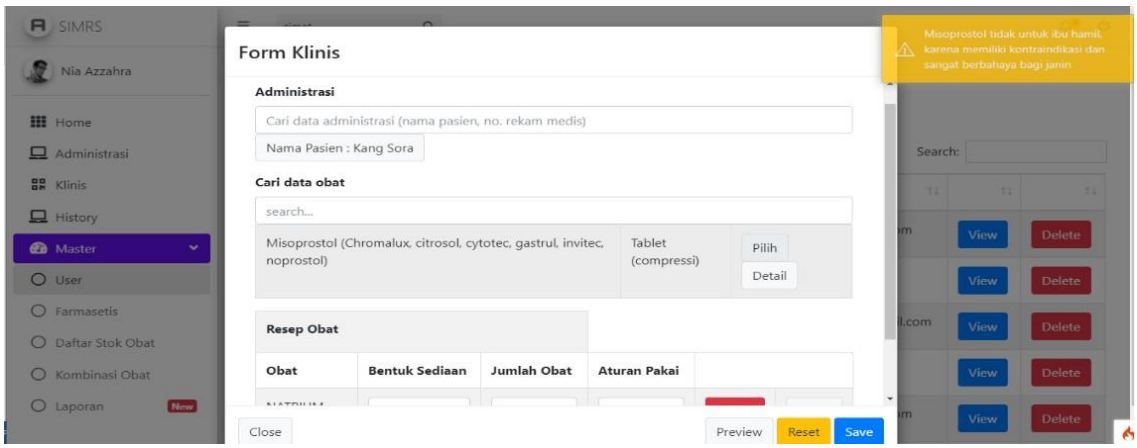

Figure 6. Notification display when there is a drug that belongs to category X when inputting a prescription for pregnant women.

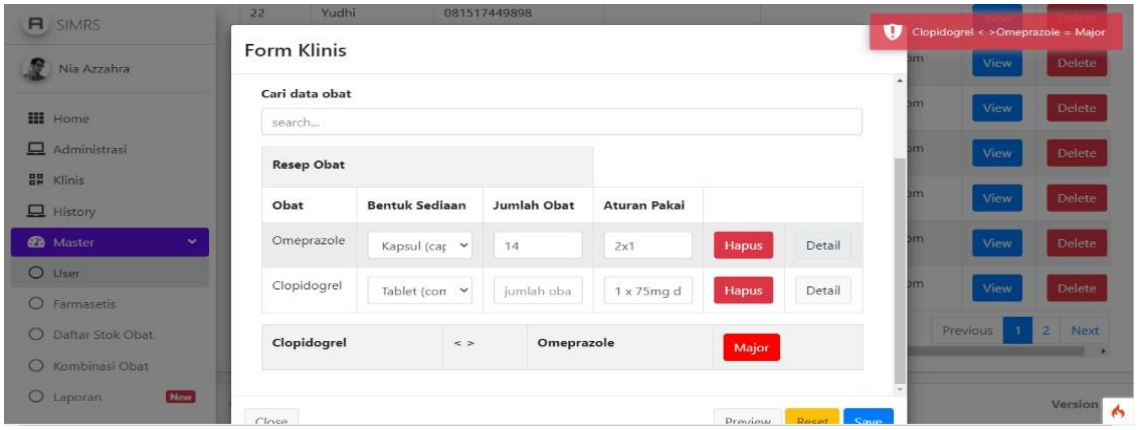

Figure 7. Notification display when there is a drug interaction at the time of input (major interaction)

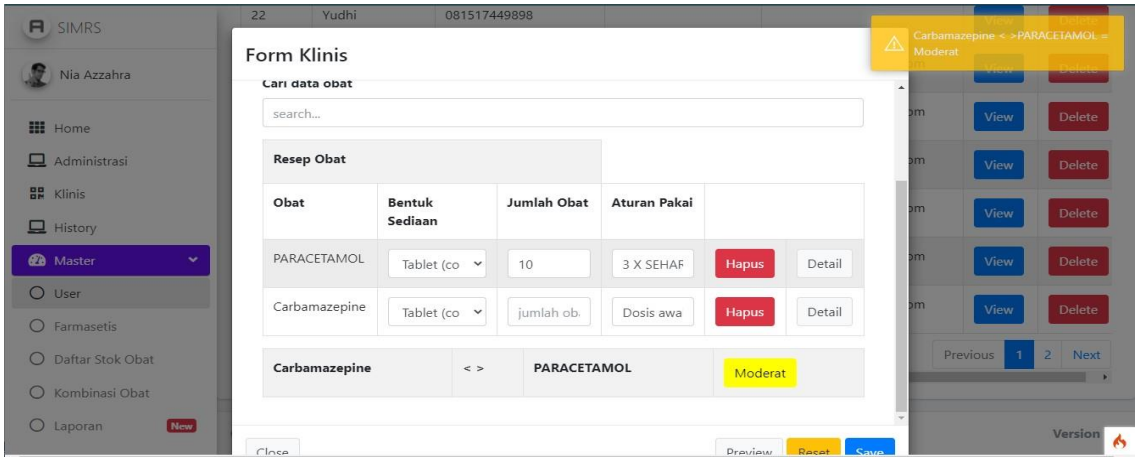

Figure 8. Notification display when there is a drug interaction at the time of input (moderate interaction)

The proposed development design is in the form of additional drug interactions and also the category of drug pregnancy. If there is a prescription that contains interacting drugs,a notification will appear when inputting it. The administration process is equipped with additional information on whether or not the female patient is pregnant, so that the administration of drugs that should be avoided by pregnant women can be identified. Because some drugs have teratogenic effects, which can cause birth defects in the fetus, while other drugs may have side effects that are potentially detrimental to the mother and fetus (Hamidah, Salman, & Gethera, 2022). In addition, the system is equipped with drug notifications on stock date which is expected to assist staff at pharmaceutical installations in monitoring medicines.

It is hoped that this SIM design can be considered by hospitals in the process of developing an existing system, of course it can make it easier for staff at IFRS to screen prescriptions, search data related to drug information and avoid errors in drug administration. The SIM designed by the author is equipped with drug information to make it easier for staff at IFRS to obtain drug information, drug interactions that can be used as a reminder for staff if there are drugs that interact with each other and there is also a warningrelated to the category of drug pregnancy so that if there is a drug that should not be givento pregnant women can be avoided.

It is hoped that this research will be widely useful. As we know, a good prescription must contain enough information to enable the pharmacist concerned to understand what medicine will be given to the patient. The application of this system is believed to be able to minimize the occurrence of Medication Errors which may occur during the prescribing process, reading the prescription (transcribing), preparation and delivery of the drug (dispensing) and in the process of using the drug (administering). So far, errors in prescribing and administering drugs are things that often occur in treatment and will definitely harm patients due to the use of drugs while being treated by health workers.

Meanwhile, the impact if this application does not begin to be implemented is the possibility of errors in the treatment process which can occur at any time starting from theaccuracy of drug indications, suitability of drug doses, route of drug administration, time of drug use, possible duplication of drugs, patient allergies to drugs, as well as the possibility occurrence of drug interactions, drug contraindications and undesirable side effects during treatment. This application can also be applied in other hospital pharmacy installations, it can also be used in clinics and health centers.

According to Agrawal (2009), system design will produce a good product package that can be implemented if it includes seven parts, namely; Fast and easy menu features, input and output displays, easy to print reports, data dictionary containing information on each field including field length, editing in each report.

The limitations in this study are that the researcher did not provide the questionnaire directly and accompanied the respondents in filling out the questionnaire one by one because they used the Google form. fill out the questionnaire properly. Then the evaluationin this study was carried out using a questionnaire on a system that had been implementedin the hospital but was not re-evaluated using a system-related questionnaire made by the researcher.

4. CONCLUSION

The evaluation results of user satisfaction with the SIM that has been implemented at RSI Ar-Rasyid using the EUCS method can be concluded from all statements covering the variable content, accuracy, format, timeliness and ease of use that the average answer from respondents related to satisfaction with the management information system in Prescription screening at the hospital is included in the satisfaction scale, which means that the staff at the pharmacy installation are quite satisfied with the SIM that has been implemented at RSI Ar-Rasyid Palembang. As for the recommendations for RSI Ar-Rasyid Palembang, it is hoped that this will be considered regarding the proposed information system development that has been designed by researchers so that it can assist pharmaceutical officers in carrying out pharmaceutical services and save waiting time and prevent medication errors from occurring. For future researchers, it is hoped that they can continue this research by exploring more needs for existing information systems in pharmaceutical installations with other methods so as to improve performance in pharmaceutical installations and avoid the possibility of medication errors.

5. CONFLICT OF INTEREST

All authors declare no conflict of interest.

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