The Information System Development of Prescription Screening Management in Public Health Center I Kotagede Yogyakarta

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Abstract. Prescription screening is an assessment of the suitability of prescriptions performed by pharmacies in order to minimize the occurrence of medication errors. It is necessary to use information technology so that prescription screening can be carried out quickly, precisely and accurately. The purpose of study was to develop a design model for prescription screening management information systems in Puskesmas Kotagede 1. This study was a descriptive study with a cross sectional design. The research was conducted at the outpatient pharmacy installation at Kotagede 1 Public Health Center in November 2019-April 2020. To determine the system requirements analysis, a descriptive analysis was carried out. The development of a prescription screening information system was carried out using the prototype method. The results of the system requirements analysis indicate that the identification of prescription screening has not been carried out completely by pharmaceutical officers. The development of a prescription screening information system model design at Puskesmas Kotagede 1 uses the waterfall method. The stages start from requirement analysis, system design, implementation, integration & testing, operation & maintenance. With the development of a prescription screening information system model, it can facilitate pharmaceutical work in the prescription screening process to be fast, precise and accurate.

1. Introduction

A medication error is one of the health problems that have the most impact on patient safety. Medication errors consist of prescribing errors, dispensing errors (drug preparation errors), and administration errors [1].

One of the medication errors in the case of pharmaceutical work is not prescription screening by the pharmacy. Prescription screening is a pharmacist's activity in assessing a prescription which includes an assessment of pharmaceutical, clinical, and administrative suitability[2]. Prescription screening is carried out by pharmaceutical personnel to avoid prescribing errors, but prescription screening activities have not been maximally carried out. This happens because the doctor's writing is unclear, the prescription is incomplete, and there is no information system that prevents medication errors.

Several studies have stated that incorrect prescribing, incomplete information about drugs, both given by doctors and pharmacists, and how to use the drugs incorrectly can cause patients to suffer losses [3]. In Yogyakarta, there are 26.63% discrepancies. rules for using drugs in pediatric drug
prescriptions that have the potential for medication errors from 612 drug prescription sheets studied in several pharmacies [4].

Research conducted by Abdul Khodir Jaelani et al regarding the results of a preliminary study in 3 (three) Puskesmas in the city of Yogyakarta regarding prescription screening showed that prescription screening was still carried out manually and this took a long time to carry out screening and the error rate was more. high so there are often medication errors [5]. While the research conducted by Anis in 2019 related to prescription screening carried out on outpatients at the Kotagede 1 Public Health Center stated that most administrative screening (100%) had gone through the screening process, only for the patient's weight, doctor's initials, and SIP numbers were still minimal. performed, clinical screening was performed in only 45%[6].

Based on these studies, it can be concluded that the patient prescription screening activity is still done manually with a high enough error rate so that medication errors can occur. For this reason, it is necessary to develop a prescription screening management information system to overcome this.

Management information system, usually abbreviated as SIM, is the application of an information technology system that can be used by organizations to support decision-making processes at various levels of management, data can be processed into information needed by stakeholders in an organization. In realizing useful information as needed, a good management information system development is needed so that it can be used in making decisions [7].

System development is needed to overcome the error rate in a manual screening of prescriptions. The development of a patient prescription screening management information system was carried out by creating a new system that could benefit and provide convenience for the organization in this study, namely the Kotagede Health Center 1. The development of a prescription screening information system was carried out at the Kotagede 1 Health Center which was still manual. Development of the system began with analysis. Then the process model is visualized using the DFD (Data Flow Diagram) and ERD (Entity Relationship Diagram) design.

2. Methods
The research was conducted at the outpatient pharmacy installation at Kotagede 1 Public Health Center in November 2019-April 2020. The research was descriptive with a cross-sectional design. To determine the system requirements analysis and to design an information system, a descriptive analysis was carried out. The development of a prescription screening information system model design in Kotagede 1 Public Health Center uses the waterfall method. The stages start from requirement analysis, system design, implementation, integration & testing, operation & maintenance.

2.1 Requirement Analysis
This needs analysis was obtained from observations and interviews with resource persons, namely pharmacists at Kotagede 1 Public Health Center, besides that, sample data were obtained in the form of prescription data, drug data, and doctor data.

2.2 System Design
Based on the results of the needs analysis, a prescription screening information system model design was made. Process model design can be described in DFD (Data Flow Diagram) and ERD (Entity Relationship Diagram). The following is a DFD process model from the outpatient prescription screening information system at Kotagede 1 Health Center.

This context diagram illustrates the process of inputting patient data into the system. The doctor gets patient data information. The doctor can examine the patient and determine the diagnosis of the disease along with drug submission. The pharmacy receives prescription data information then performs a prescription screening (administrative, pharmaceutical, and clinical).
Fig 1. Context diagram of the prescription screening management information system

ERD (Entity Relationship Diagram) is made to make it easier to see related objects. Each object has its own complete attributes. Every object always has a primary key attribute. Attributes in each object can later be displayed on the system which is useful for data input. Between one object and another is associated with an activity. Based on this process model, a patient prescription screening management information system interface design can be made. The interface design can be a guide in system implementation. The design of the interface design for the patient prescription screening management information system is as follows:

Fig 2. System login at the health center

2.3 Implementation
This prescription screening management information system is web-based. The software required includes,
- PHP programming language
- Server Local XAMPP
- Internet Browser window
- Text Editor Visual Studio Code
- Hosting

2.4 Integration & Testing
Integration & Testing is a system testing stage. The purpose of Testing is to make the system according to the needs, and the system must be user friendly (make it easier for users). In general, software testing can be divided into three categories, namely: Testing at Input Data, Testing at Processing, and Testing at Output.
- Testing when input data is an action to test edit and control in data entry, for example: patient data input in the administration.
- Testing during Processing aims to ensure that the program has worked as expected. For example: the system can input patient data in the administration section, patient data can be known by doctors and doctors can submit disease diagnoses and medicines, pharmacies can view prescription data.
- While Testing at Output is useful to ensure that the resulting report has been made in the correct format and has valid information. For example: the system can print a recipe data report

2.5 Operation & Maintenance

Operation & Maintenance is intended to determine the life cycle of system development including system maintenance, conditioning hosting services so that users can always access them.

3. Results and Discussion

The research begins with a system requirements analysis by conducting interviews with pharmacists at Kotagede 1 Public Health Center. Based on these observations and interviews, it is found that the writing of prescription data is still manual by handwritten by doctors and prescription screening is still done manually by pharmacists. Pharmacists have difficulty applying manual prescription data because the doctor's handwriting is still difficult to read, the doctor has not included the signature and the patient's weight has not been written. outpatient treatment, namely 200 prescriptions per day. Most of the prescriptions do not go through the prescription screening process because it takes a long time to screen manual prescriptions, plus the queue of patients demanding that they finish quickly. Based on the system requirements analysis conducted on the pharmacist at the Kotagede 1 Public Health Center, an information system is needed so that the prescription screening process can be fast, precise and accurate.

The results of Asri Riswiyanti et al’s research indicate that data on prescription screening and drug use are needed to design a prescription screening information system. Prescription screening data and drug use data are used to design a prescription screening SIM development design in the form of context diagrams, DFD (Data Flow Diagram) level 0, level 1, ERD (Entity Relationship Diagram), patient registration interface display, prescription data entry and examination, process screening in pharmacy and display of screening reports[8]. The interface design was designed in this study to facilitate the implementation of the prescription screening information system. The results of the system design are as follows, the display is presented in sequence.

![Login page](image)

**Fig 3.** Display system login page

This system login page appears first. The login page is valid for the administration section, the medical section (doctor), the pharmacy section. Each of these users can log in to the system by inputting user data and password data then clicking the login button. If you forget your username and password, there will be notification or verification of your email account.
The menu or Home page of this system consists of 3 main menus, namely the administration section, the medical section, and the pharmacy section. In the upper left corner, there is a home link that functions to return to the main page/home and there is a logout link to exit the system.

The add patient data page has 2 buttons, namely a plus button and a search button. The plus button functions to add patient data by inputting patient data. The search button functions to find the patient data needed, making it easier for the administration department to find patient data from the many patient data registered on one day.
The patient data input page will appear when the user presses the add button on the add patient data page. The patient data input page functions to enter patient data into the system. The fields that must be filled in include patient name, patient age, patient weight, patient gender, patient address, and a plus button to submit the patient data.

![System display of patient data input page](image)

**Fig 7.** System display of patient data input page

This medical section display will appear when the user presses the medical section menu button. On this page, there is a search button that functions to search for one of the patient data where the patient's data will be examined by the doctor so that an electronic prescription is obtained. Writing prescriptions in handwriting shows a fairly high error compared to those using a computer so that it can reduce the risk of occurrence medication error [9]. Mistake in prescribing is one of the things that cause errors in medication. Medication errors can damage patient confidence in the health care system [10].

![Patient medical data detail](image)

**Fig 8.** Patient medical data detail
The doctor can input the results of the examination in the form of a diagnosis of the disease and the medicine in the system. In addition, doctors can input the doctor's identity in the form of the doctor's name, then the Doctor's SIP and Doctor's address will be automatically filled in, thereby reducing the error rate of the Doctor in including the wrong identity and / or writing of data.

The doctor has submitted the required drug, so the drug data needs to be considered in prescription screening for pharmaceutical suitability. Doctors are obliged to complete data fields that have not been filled in. 
Prescription screening is also performed on the clinical considerations menu. In clinical considerations, doctors are obliged to fill in the data fields for each drug submitted in the form of drug side effects and drug allergy.

The pharmacy section menu can see the completeness of the prescription data that has been entered by the doctor. Furthermore, the recipe data can be printed if needed. The results of this prescription screening information system are expected to help pharmacies perform prescription screening, thereby reducing the risk of medication errors. The success in developing management information systems is a significant change for organizations, including Kotagede Health Center 1. Like the research conducted by Meilany Nonsi Tentua et al. Shows that developing information systems can make it easier to access information compared to manual methods [11].

**Fig 11.** System display of patient data input page

**Fig 12.** Pharmaceutical parts system view
4. Conclusion
The development of a prescription screening information system model can help North Sumatra staff in conducting prescription screening. The prescription screening model is carried out by analyzing the system requirements and continuing to create a system with the waterfall method so that the system is made according to user needs, namely pharmacy in conducting prescription screening.

Clinical screening is currently not optimal at Kotagede 1 Public Health Center, with the new technology-based system, it is hoped that it can be carried out and well documented so that pharmaceutical work is fast, precise and accurate.

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