Available online on 15.12.2020 at http://ajprd.com

Asian Journal of Pharmaceutical Research and Development

Open Access to Pharmaceutical and Medical Research

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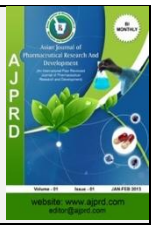

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Research Article

Development of Information Systems Management of Pharmaceutical Preparations and Web-Based Medical Materials at Puskesmas, Medan City

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A B S T R A C T

Objective: To determine the effect of web-based information systems on the management of pharmaceutical preparations and BMHP in Medan City Health Center.

Methods: This research is a descriptive study with comparative study data collection to see the effect of the SIFAMAS application (System Information Puskesmas) which is designed based on indicators of drug management before and after the application. The design of SIFAMAS as a web-based information system based on the waterfall model and evaluated using alpha and beta tests. This research was conducted in February-July 2020.

Results: Before using SIFAMAS, all Puskesmas had not met the standard for accuracy of the number of expired drugs according to the standard, only Puskesmas Mandala, Puskesmas that sent LPLPO on time in February, March, and April respectively 100%; 0%; and 16.67%, and all Puskesmas have not matched the conformity standard for real goods with stock cards. After using SIFAMAS, all Puskesmas did not have expired drugs (0%), delivery of LPLPO was on time (100%), and met the conformity standard for real goods with stock cards (100%). Alpha and beta test results show that SIFAMAS is acceptable and very feasible as a pharmaceutical preparation management information system.

Conclusion: SIFAMAS has a good effect and can solve problems related to the management of pharmaceutical preparations in Puskesmas.

Keywords: Information systems, SIFAMAS, Management, Pharmaceutical Preparations and BMHP, Puskesmas

A R T I C L E I N F O: Received 11 Sept. 2020; Review Completed 09 Oct. 2020; Accepted 02 Nov. 2020; Available online 15 Dec. 2020

Cite this article as:

Novriani E, Harahap U, Wiryanto W Development of Information Systems Management of Pharmaceutical Preparations and Web-Based Medical Materials at Puskesmas, Medan City, Asian Journal of Pharmaceutical Research and Development. 2020; 8(6):28-32. **DOI:** http://dx.doi.org/10.22270/ajprd.v8i6.847

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INTRODUCTION

An information system is a system in an organization that meets the needs of managing daily transactions, supports operations, is managerial in nature, and strategic activities of an organization and provides certain external parties with the required reports[1].

Success in developing an information management system is an investment for organizations, including Puskesmas. The era of national health insurance requires Puskesmas to be able to provide fast, precise, and quality services. In order to achieve these service demands, management information system support is needed [2].Continuity of drug management is closely related to the availability of a drug procurement budget with an efficiency function that includes rational drug use and good record keeping. Good

and thorough recording is the basis for evaluating the work that has been carried out and as material for future planning, because evaluation is a series of procedures to assess a program and obtain information about the success of achieving its goals, activities, results and impacts and costs [3].

METHOD

Types of Research

This research is a descriptive study using comparative study data collection to see the effect of the SIFAMAS application, which is designed based on indicators of drug management before and after the application. The design of SIFAMAS as a web-based information system based on the waterfall model and evaluated using alpha and beta tests. The indicators assessed through the SIFAMAS application are in the form of distribution and administration. Data collection for 3 months before and after using SIFAMAS. The data obtained were analyzed using indicators and compared with literature standards. This research was conducted in February-July 2020.

Research Informants

Pharmacists who have worked as the person in charge of Puskesmas drugs for at least 1 year, and are willing to be research respondents. This research was conducted at 6 Puskesmas in Medan City, North Sumatra, namely Puskesmas Kampung Baru (KB), Puskesmas Kota Matsum (KM), Puskesmas Mandala (PM), Puskesmas Medan Deli (MD), Puskesmas PB Selayang II (PS), and Puskesmas Teladan (PT).

Designing Web-Based Pharmaceutical Preparations Management Information System

The application development method used is the System Depelopment Life Cycle (SDLC) method with the waterfall model because this model uses a systematic and ordered approach. The waterfall model is a simple classic model with a linear system flow [4].

System Design and Software

The system design used is the Unified Modeling Language (UML), which is a language based on graphics or images to visualize, specify, build, and document object-based software systems.

System Development

The system development uses PHP as a programming language and MySQL as a database. This stage is the stage in conducting the coding with the actual conditions according to the needs of an information system for managing pharmaceutical preparations and medical materials [5].

System Testing

This study uses system testing with the blackbox texting method. The purpose of the Black Box method is to find malfunctions in the program [5].

PARAMETER ANALYSIS

Distribution

Number of Expired Drugs

The formula for the percentage of damaged / expired drugs = Total types of damaged / expired drugs divided by the total types of drugs available X 100%

Administration

On Time Report Delivery

The report delivery system is seen from the expedition book of drug report delivery by looking at the date when LPLPO was sent to the Pharmacy Installation of the Health Office of Medan City.

Percentage of Matched for Real Goods with Stock Cards

The match between the number of real goods and the stock card is obtained from the last drug inventory on the stock card, then it is matched with the number of drug supplies on the shelf or pallet.

RESULTS AND DISCUSSION

Assessment Management of Pharmaceutical Preparations of Puskesmas Before and After Using the SIFAMAS Application

Distribution

The indicators used in the distribution stage are the percentage level of the amount and value of expired drugs. The occurrence of expired drugs reflects improper planning or due to poor distribution systems, lack of quality observations in drug storage. Data were collected from documents at the Puskesmas in the form of the number of types of drugs available for health services in one year and the numbr of damaged / expired drugs in one year.

Table: 1 Percentage of Amount and Value of Expired Drugs Before SIFAMAS Application

Puskesmas	Number of Expired Drugs	Number of All Types of Drugs Available	Percentage
KB	5	72	4,94 %
KM	4	94	4,25%
PM	0	63	0%
MD	4	107	3,7%
PS	4	69	5,79%
PT	1	98	1,02%

Based on **Table 1.** The percentage of expired drugs that meet the standards is Mandala Health Center, which is 0%.

The other five Puskesmas do not meet the standard value, namely ≤0.2% in a year [6].

Table: 2. Percentage of Number and Value of Expired Drugs AfterSIFAMAS Application

Puskesmas	Number of Expired Drugs	Number of All Types of Drugs Available	Percentage
KB	0	72	0%
KM	0	94	0%
PM	0	63	0%
MD	0	107	0%
PS	0	69	0%
PT	0	98	0%

Based on **Table 2.**it shows that all Puskesmas do not have expired drugs (0%) after using SIFAMAS. The SIFAMAS application has a drug notification that is approaching its expiration date so that pharmacists can anticipate the amount of these drugs.

Recording and Reporting

Percentage of On Time Delivery of LPLPO

Table: 3. Percentage of On Time LPLPO Delivery Before SIFAMAS Application

Puskesmas	LPLPO Delivery Date			Result			Standard
	Feb 2020	March 2020	April 2020	Feb 2020	March 2020	April 2020	
KB	07	15	19	√	X	X	Not later than the 10th of the following month
KM	05	15	08	√	X	√	
PM	07	15	29	√	X	X	
MD	07	14	11	√	X	X	
PS	05	13	29	√	X	X	
PT	05	14	29	√	X	X	
Amount				6	0	1	
% Accuracy				100%	0%	16,67%	

Information: √ = according to standard, X = not according to standard

The delay in reporting LPLPO is caused by a lack of human resources in completing the tasks and responsibilities of pharmaceutical management with a manual system, as well as a pharmaceutical preparation management system that is not completely one-door so that some of the data to be reported has not entered the pharmacy until the time for report delivery arrives.

Table: 4. Percentage of On Time Delivery of LPLPO After SIFAMAS Application

Puskesmas	LPLPO Delivery Date			Result			Standard
	May 2020	June 2020	July 2020	May 2020	June 2020	July 2020	
KB	04	04	09	√	√	√	Not later than the 10th of the following month
KM	06	05	03	√	√	√	
PM	03	04	06	√	√	√	
MD	05	06	08	√	√	√	
PS	06	04	03	√	√	√	
PT	04	03	06	√	√	√	
Amount				6	6	6	
% Accuracy				100%	100%	100%	

Information: √ = according to the standard

Based on **Table 4.**shows that all Puskesmas send LPLPO according to the standard reporting time and LPLPO delivery can still be done according to the standard even during a pandemic period. This shows that SIFAMAS makes it easy for pharmacists to report using the (Work From Home) WFH work system. This web-based information system makes it easy to produce reports and makes it easy for supervisors and supervisors to obtain information on drug use and supplies [7].

Percentage of Matched for Real Goods with Stock Cards

Table: 5. Percentage of Matched for Real Goods with Stock Cards Before SIFAMAS Application

Puskesmas	The Corresponding Number of Medicinal Items Out of 20 Medicinal Items			Match Between Card Stock and Real Goods (%)			Standard (%)
	Feb 2020	March 2020	April 2020	Feb 2020	March 2020	April 2020	
KB	20	16	10	100%	80%	50%	100%
KM	16	16	16	80%	80%	80%	
PM	6	5	10	30%	25%	50%	
MD	5	5	5	25%	25%	25%	
PS	3	2	4	15%	10%	20%	
PT	6	6	6	30%	30%	30%	

Based on **Table 5.**Puskesmas that meet the standards for matching the number of real items with stock cards are only at the FP Puskesmas in February, but in March and April they do not meet the standard. The magnitude of discrepancies between real goods and stock cards was found for three consecutive months. This means that the mismatch frequency of stock numbers often occurs in Puskesmas. This occurs because officers do not immediately record changes in stock at the time of receipt and dispensing of drugs due to more urgent work demands at that time, for example providing clinical pharmacy services.One of the causes of the discrepancy between the amount of physical medicine and the stock card was the lack of accuracy and discipline of employees in recording the actual amount at the time of drug dispensing and administration. This mismatch causes an error report which will also affect the distribution of drugs in the flow of drug management at the health center. In addition, this mismatch also provides inaccurate information regarding drug availability for patients[8].

Table: 6 Percentage of Matched for Real Goods with Stock Cards AfterSIFAMAS Application

Puskesmas	The corresponding number of medicinal items out of 20 medicinal items			Match between card stock and real goods (%)			Standard (%)
	May 2020	June 2020	July 2020	May 2020	June 2020	July 2020	
KB	20	20	20	100%	100%	100%	100%
KM	20	20	20	100%	100%	100%	
PM	20	20	20	100%	100%	100%	
MD	20	20	20	100%	100%	100%	
PS	20	20	20	100%	100%	100%	
PT	20	20	20	100%	100%	100%	

Based on **Table 6.** It shows that all Puskesmas after using SIFAMAS meet the conformity standard for real goods with stock cards. This can be maximized because SIFAMAS continuously updates the number of stock items at each entry and exit of goods.

Designing Web-Based Pharmaceutical Preparations Management Information System

The alpha test is used to test the feasibility of the software before entering the beta test[9]. Tests assessed by a team of experts include usability, functionality, quality of writing, design and animation, instruction and interaction, and language and communication. The results of the alpha test show that SIFAMAS is acceptable and worthy of being presented as an information system for the management of pharmaceutical preparations.

The beta test is conducted as a trial before the system is officially used by real end users[10]. The results of the beta test by filling out the questionnaire showed that the total score of all respondents was 532 so that the percentage of eligibility obtained was 81.84% or included in the "very feasible" category.

SIFAMAS (System Information Puskesmas) is a web-based information system for managing pharmaceutical preparations at Puskesmas. This system is designed with several features related to the movement of pharmaceutical preparations. The SIFAMAS log in page requires a username and password according to each Puskesmas. The front page consists of a dashboard, expenses, stock, reports, master data, and an exit menu. Dashboard displays general pharmaceutical preparation conditions, namely total receipts, total expenditures, and expired drug notifications.

CONCLUSION

The web-based pharmaceutical preparation management system at Puskesmas Kota Medan is able to solve problems related to distribution, administration and can send LPLPO on time after the existence of SIFAMAS.

ACKNOWLEDGMENT

The researcher gives her gratitude to the Puskesmas and Medan City Health Office, North Sumatra for this study.

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