MEDICAL INFORMATION SYSTEM DEVELOPMENT AT KLINIK PRATAMA KALIMASADHA TENGARAN

This Final Project Compiled as a Condition to Complete Bachelor Degree Program at Department of Informatics Faculty of Communication and Informatics

Submitted:

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DEPARTMENT OF INFORMATICS

FACULTY OF COMMUNICATION AND INFORMATICS

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MEDICAL INFORMATION SYSTEM DEVELOPMENT AT KLINIK PRATAMA KALIMASADHA TENGARAN

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VALIDATION PAGE

MEDICAL INFORMATION SYSTEM DEVELOPMENT
AT KLINIK PRATAMA KALIMASADHA TENGARAN

By :

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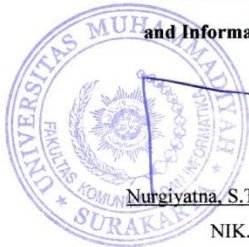
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MEDICAL INFORMATION SYSTEM DEVELOPMENT AT KLINIK PRATAMA KALIMASADHA TENGARAN

Abstract

Klinik Pratama Kalimasadha Tengaran adalah sebuah klinik yang bertempat di Desa Tengaran, Kabupaten Semarang. Klinik ini menyediakan jasa kesehatan untuk semua pasien, namun klinik ini masih menggunakan sistem manajemen manual. Semua aktifitas operasional masih dijalankan dengan kertas dan pulpen. Manajemen inventaris obat juga masih dilakukan secara manual dengan menggunakan buku inventaris. Ini berdampak terhadap operasional yang tidak efektif dan efisien, karena kertas dan pulpen dapat menghasilkan duplikasi data dan kesalahan penulisan. Penelitian ini bertujuan untuk menciptakan sistem informasi berbasis computer untuk Klinik Pratama Kalimasadha Tengaran, agar aktifitas operasional pada klinik ini berjalan lebih mudah dan dapat memberikan data yang lebih akurat dari sebelumnya. Setiap bagian dari klinik akan memiliki bagian dari sistem, seperti staf, dokter, dan apoteker. Pengembangan sistem menggunakan metode waterfall dan metode pendekatan menggunakan orientasi objek dengan diagram use case. Sistem ini akan dikembangkan menggunakan bahasa pemrograman PHP sebagai antarmuka dan MySQL sebagai basis data.

Keywords: *sistem informasi klinik, website*

Abstract

Klinik Pratama Kalimasadha Tengaran is a health service that is located in the sub district of Tengaran, the District of Semarang. This clinic provides medical service for every patient, but this clinic is still utilizing manual administration system. All operational activity is still using paper and pen. Also, medicine inventory management

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MEDICAL INFORMATION SYSTEM DEVELOPMENT AT KLINIK PRATAMA KALIMASADHA TENGARAN

Abstrak

Klinik Pratama Kalimasadha Tengaran adalah sebuah klinik yang bertempat di Desa Tengaran, Kabupaten Semarang. Klinik ini menyediakan jasa kesehatan untuk semua pasien, namun klinik ini masih menggunakan sistem manajemen manual. Semua aktifitas operasional masih dijalankan dengan kertas dan pulpen. Manajemen inventaris obat juga masih dilakukan secara manual dengan menggunakan buku inventaris. Ini berdampak terhadap operasional yang tidak efektif dan efisien, karena kertas dan pulpen dapat menghasilkan duplikasi data dan kesalahan penulisan. Penelitian ini bertujuan untuk menciptakan sistem informasi berbasis computer untuk Klinik Pratama Kalimasadha Tengaran, agar aktifitas operasional pada klinik ini berjalan lebih mudah dan dapat memberikan data yang lebih akurat dari sebelumnya. Setiap bagian dari klinik akan memiliki bagian dari sistem, seperti staf, dokter, dan apoteker. Pengembangan sistem menggunakan metode waterfall dan metode pendekatan menggunakan orientasi objek dengan diagram use case. Sistem ini akan dikembangkan menggunakan bahasa pemrograman PHP sebagai antarmuka dan MySQL sebagai basis data.

Kata Kunci: sistem informasi klinik, website, MySQL, PHP

Abstract

Klinik Pratama Kalimasadha Tengaran is a health service that is located in the sub district of Tengaran, the District of Semarang. This clinic provides medical service for every patient, but this clinic is still utilizing manual administration system. All operational activity is still using paper and pen. Also, medicine inventory management is still done manually, by using inventory book. This affects to operational being not effective and efficient, because pen and paper can result in data duplicity and writing mistake. This research aims to design computerized information system for Klinik Pratama Kalimasadha Tengaran, to make operational activity of this clinic easier and provide more assured data than before. Every section of clinic will be computerized, such as staff, doctor, and pharmacist. System development method using waterfall method and approach method using object oriented with use case diagram. This system will be developed in PHP programming language as the front-end interface and MySQL as the back-end database.

Keywords: clinic information system, website, MySQL, PHP

1. INTRODUCTION

The advancement of information technology has huge impact in every aspect of life as it can facilitate the processes easily and automatically. In the case of health and medical treatment, the usage in information technology can lead to the effectiveness of practice in managing every data related to operational of medical treatment, such as patient data and medicine data management.

Klinik Pratama Kalimasadha Tengaran is a healthcare center that is located at sub district of Tengaran, district of Semarang. This clinic has run for almost 4 years and has hundreds of clients across all sub district. But, since then, all of operational in Klinik Pratama Kalimasadha Tengaran is done by only using pen and paper, because this healthcare doesn't have any computerized system. This proves difficulties in patient data management, because staff has to find patient data one by one through many files. Pharmacist is also having difficulties in managing medicine inventory. Pharmacist has to count every single medicine to update the inventory data. All of this activity is the example why utilizing medical information system can make operational in Klinik Pratama Kalimasadha Tengaran to be more reliable.

Based on aforementioned problem, this study aims to create medical information system to handle all operational in Klinik Pratama Kalimasadha Tengaran, such as patient data management, medicine inventory management, and medical treatment.

2. METHODOLOGY

This research utilizes System Development Life Cycle (SDLC) method with waterfall model to develop this information system. By using waterfall model, this research is performed in linear-sequence which consists of several consecutive stages, starting from analysis, design, development, testing, and maintenance as shown in Figure 1. (Bassil, 2012).
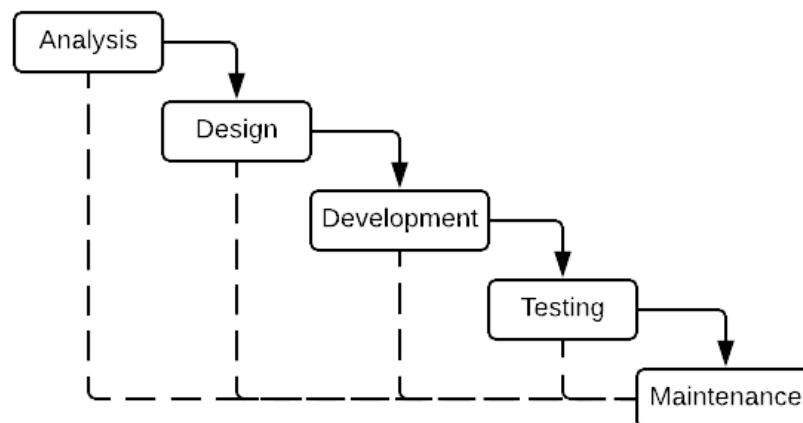
Figure 1. Waterfall Models

The analysis begun by gathering requirement and information about each sections of clinic, which includes staff, doctor, and pharmacist. The requirements for this study include: input and manage patient data, manage inventory of pharmacy, and payment management. From the requirements, researcher specified that there are three actors: staff, doctor and pharmacist. Additional administrator with all features enabled, is available in case of failure in one of actors, administrator can temporarily fill the role in order to keep the system running. All functions of the system are presented as use case diagram in Figure 2.
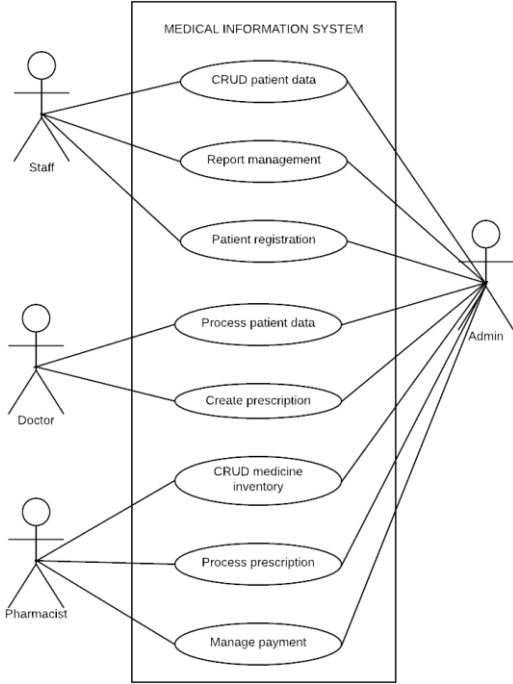
Figure 2. Use Case Diagram

To explain more about how the system works, activity diagram is presented for each actor, shown in Figure 3-6. Activity diagram is a complementary of use case diagram, further explaining the flow of the system in provided scenario.
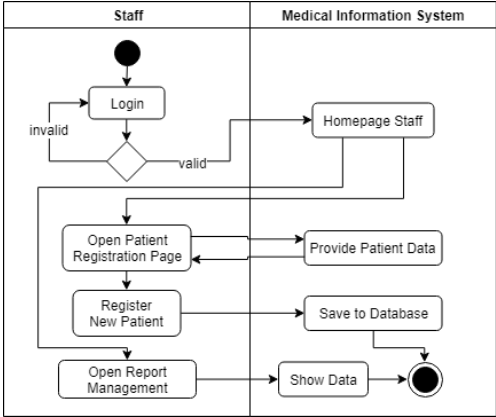
Figure 3. Activity Diagram of Staff

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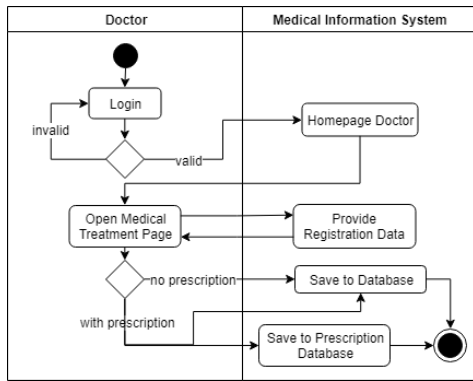
Figure 4. Activity Diagram of Doctor
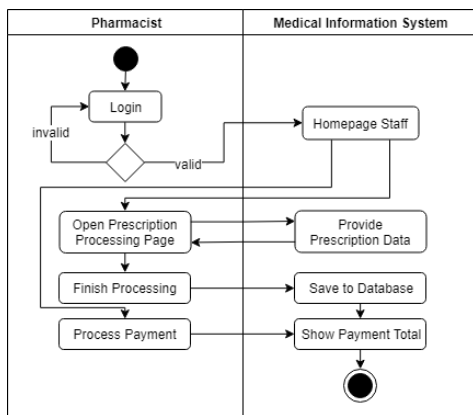
Figure 5. Activity Diagram of Pharmacist
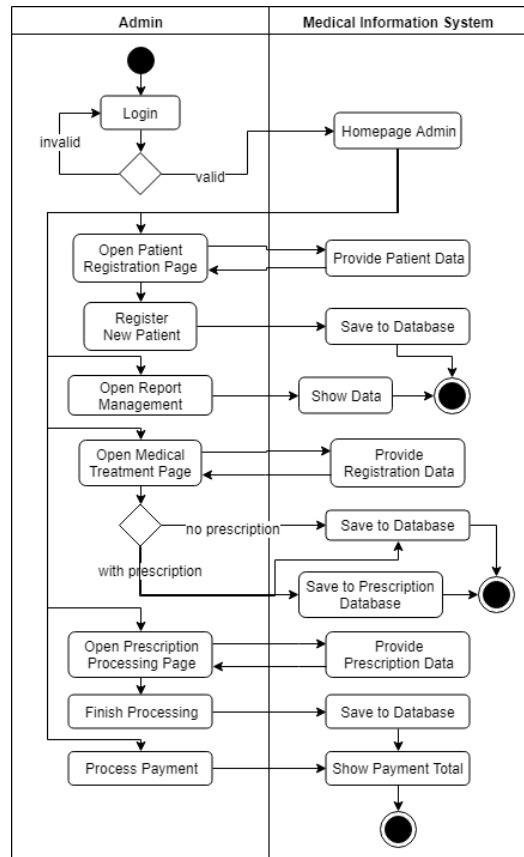
Figure 6. Activity Diagram of Administrator

After determining roles of each actors, the next step is to design database that will be used for the system, as shown in Figure 7. The system will utilize MySQL as database server. The system will use centralized medical record table, with companion table of patient data, medicine transaction history, prescription data, and doctor and staff data. Each transaction of medical treatment will be set as new entry in table medical record, accompanied with data pulled from connected table, such as patient number, acting staff who performs the registration, acting doctor, and prescription number.
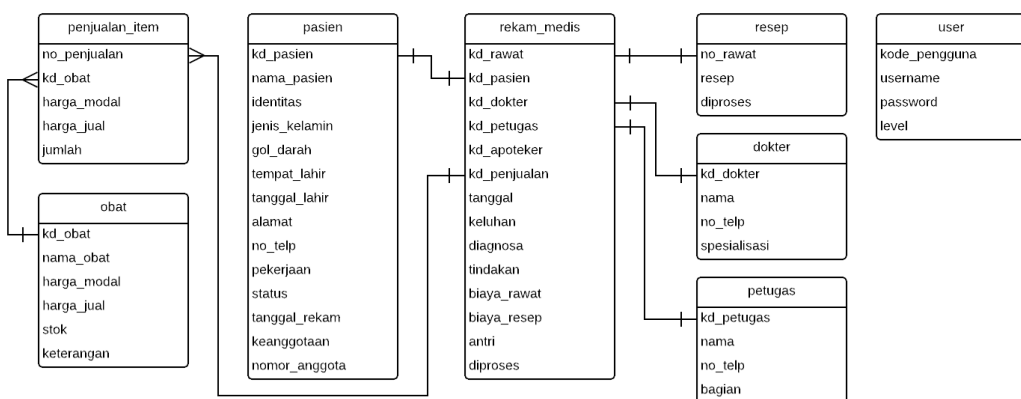
Figure 7. Entity Relationship Diagram

3. RESULT AND DISCUSSION

In this section, there will be explanation about the usage and testing of medical information system for Klinik Pratama Kalimasadha Tengaran. Notable feature available in the system is patient registration, medical treatment, and prescription management.

The system starts with homepage. If there are no user logged in, homepage will show login screen, which prompts user to insert username and password. Login screen is shown in Figure 8.
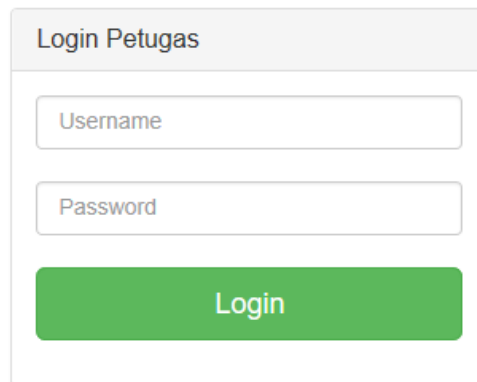
Figure 8. Login Screen

After user is logged into the system, homepage will be presented based on level of the user. Each level has different homepage, and has its own specific task designated to each level. Administrator has full privilege of the system, being able to do all task in the system. Homepage for administrator is shown in Figure 9.
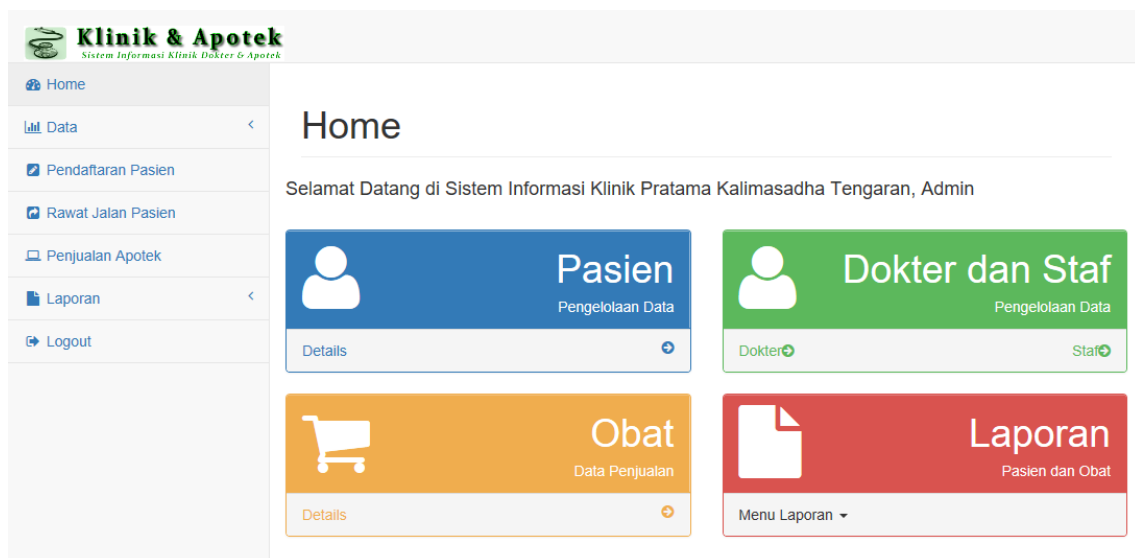
Figure 9. Homepage for Administrator

Homepage for staff, shown in Figure 10, will be limited to its own access, which will be patient data management page, report management page, and patient registration page. Staff can provide report data to doctor, if required, since doctor doesn't have access to any other data.

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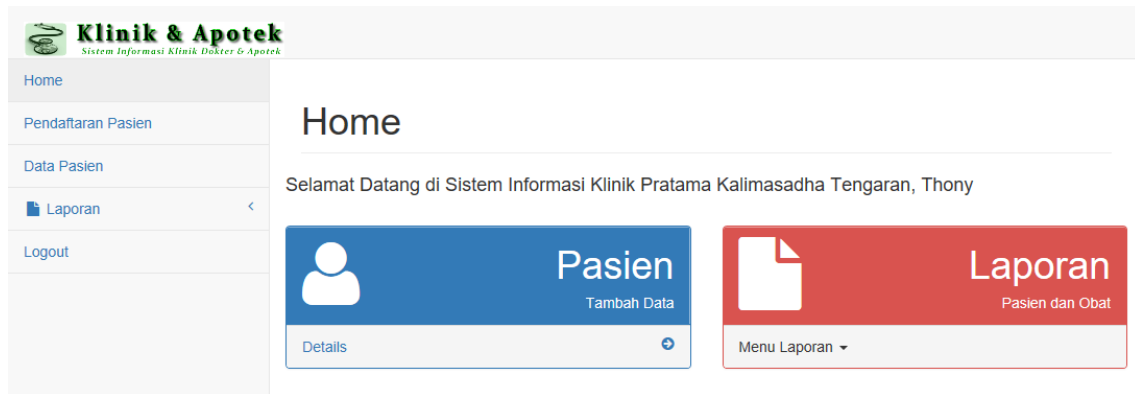
Figure 10. Homepage for Staff

Homepage for pharmacist, shown in Figure 11, will be limited to prescription processing page and medicine management page.
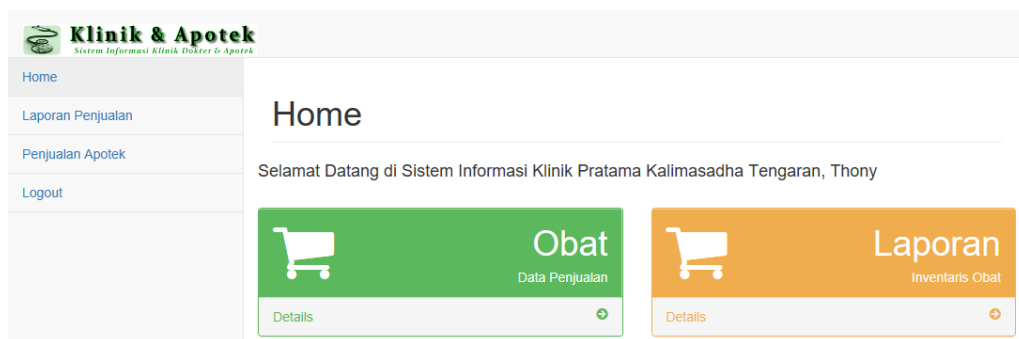
Figure 11. Homepage for Pharmacist

Homepage for doctor, shown in Figure 12, will be limited to only medical treatment page. The role of doctor will only be given access to process of medical treatment. When doctor wants to access other data, for example medicine data, doctor can ask staff to provide the data.
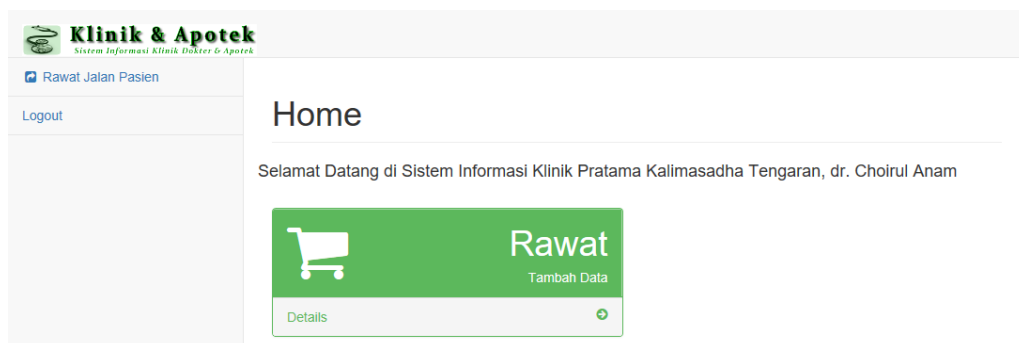

Figure 12. Homepage for Doctor

In patient data page, by Figure 13, staff and/or administrator can manage data regarding to patient. Staff and/or administrator can add new patient, and/or edit or delete existing patient data. Data shown in table are patient number, name, sex, and address. Detailed data is available once staff or administrator click 'Lihat'. If staff or administrator want to edit patient data, staff or administrator have to click 'Edit', which will show edit page.

Figure 13. Patient Data Page

In doctor data page, by Figure 14, administrator can add new doctor, and/or edit or delete existing doctor data. Data shown in table doctor are name, specialist, phone number, and address. If administrator wants to edit doctor data, administrator has to click 'Edit', which will be presented with edit form.

Figure 14. Doctor Data Page

In staff data page, by Figure 15, administrator can add new staff, and/or edit or delete existing staff data. Data shown in table staff are name, address, phone number, and level. Level will determine role and access for each staff. If administrator wants to edit staff data, administrator has to click 'Edit', which will be presented with edit form.

Figure 15. Staff Data Page

In medicine data page, by Figure 16, pharmacist and/or administrator can add new medicine, and/or edit or delete existing medicine data. Data shown in table medicine are medicine code, name, available stock, retail price, and additional information regarding each medicine. If pharmacist or administrator want to make a change to medicine data, pharmacist or administrator have to click 'Edit', which will open edit form.

Figure 16. Medicine Data Page

The process of medical treatment begins at registration, which is done by staff. As shown in Figure 17, staff can find and enter patient data, if the data is already provided, or if there is new

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patient that has yet to be registered into the system, staff can add new patient data. After finding patient data, staff can put data regarding complaint by patient. Following patient registration input, a queue will be made for every patient.

Figure 17. Patient Registration Page

Next step of medical treatment is done by doctor. In this page shown in Figure 18, doctor can see the name of patient and the complaint. After doing medical treatment on patient, doctor can write the diagnosis of the patient, and depending on the requirement of medicine for patient, doctor may or may not write prescription.

Figure 18. Medical Treatment Page

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After being treated by doctor, patient is transferred to pharmacist to process payment and prescription. As shown in Figure 19, pharmacist has a function to read prescription made by doctor, and process the medicine transaction for patient.

Figure 19. Prescription Process Page

After every transaction is done, patient will have to process the payment shown in receipt, as shown in Figure 20. Depends on whether doctor gives prescriptions for patient, the receipt will only show the cost of medical treatment, if doctor doesn't create prescriptions.

Figure 20. Receipt Page

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Furthermore, any transaction, including medical treatment and prescription, are recorded and can be accessed at the report page, in Figure 21-22. Here, staff can pull record from medical treatment in general, and/or filtered based on overall operational time, or per patient data. This also applies to prescription transaction, where data can be shown generally, or filtered periodically.

Figure 21. Medical Treatment History Page

Figure 22. Sales of Prescription Page

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To prove that this system meets its requirement, the next stage of development is testing. The system will be using Black Box Testing (table 1) as a parameter of its usage. By utilizing Black Box Testing, the system will be developed and having right specification based on given requirement. (Nidhra & Dondeti, 2012).

Table 1. Black Box Testing

Function	Description	Actor	Result	Status
CRUD Patient Data	Actor can Create, Read, Update, and Delete patient data	Staff	Patient data can be created, read, updated, and deleted by staff	√
Registration	Actor can manage patient registration for medical treatment	Staff	Registration of new patient can be performed by staff	√
Report Management	Actor can manage report regarding patient, medical treatment, and prescription	Staff	Patient data, medical treatment data, prescription data can be shown by staff	√
Patient Treatment and Prescription	Actor can put patient treatment report and make prescription	Doctor	Patient treatment data and prescription are successfully input by doctor	√
CRUD Medicine Data	Actor can Create, Read, Update, and Delete medicine data	Pharmacist	Medicine data can be created, read, updated, and deleted by pharmacist	√
Processing Prescription	Actor can process prescription	Pharmacist	Prescription can be processed by pharmacist	√
Processing Payment	Actor can process payment	Pharmacist	Payment can be processed by pharmacist	√

By using Technology Acceptance Model, there are two main parameters about how well-received the system is towards user, first is perceived usefulness and second is perceived ease of use. (Momani & Jamous, 2017). This is done by distributing questionnaire to 8 members of Klinik Pratama Kalimasadha Tengaran. The result is shown in table 2.

Table 2. Questionnaire of Satisfaction by Users

No	Question	Surveyors								Result
		A	B	C	D	E	F	G	H	
1	Question A	5	5	5	4	5	5	4	4	37/40
2	Question B	5	5	5	4	5	5	5	4	38/40
3	Question C	4	4	5	5	4	4	4	5	35/40
4	Question D	5	4	4	5	5	4	4	5	36/40
5	Question E	4	4	4	5	5	5	4	4	35/40

Based on table 2, the results show that question B (*Does the system perform well in certain given task?*) has the highest value, because medical information system has all the function that is needed by medical center, therefore this leads to more efficient in data management. Question A (*Does the system have good interface?*) and question D (*Does the system make it easy to show report?*) have average results, meaning that interface, theming and data reporting are well presented. In other word, question C (*Does the system make it easy to manage every available data?*) and question E (*Is the system reliable enough for continuous usage?*) have the lowest value, regarding to ease of usage and reliability of the system, respectively, which is not perfect, but the system can still be considered usable.

4. CONCLUSION

According to the testing, results, and discussions of research conducted in Klinik Pratama Kalimasadha Tengaran, the conclusion can be drawn: a) medical information system can be helpful in the center of process happening in such a medical center; b) the system can manage each kind of data, such as patient, staff, doctor, pharmacist, patient, and medicine; c) by utilizing the system, this brings efficiency and effectiveness in managing data, and also this can speed up any process done in medical center.

This system is still far from perfect, but the author has hope to develop the system to be better. Suggestion received by author for upcoming development are: a) better interface; b) better algorithm; c) feature to export data into external file, such as Excel, for physical report.

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