Development of Information Systems Management of Food Order in Web-Based Patients in Hospital Nutrition Installations

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Abstract—Quality Nutrition services at the hospital will help speed up the patient's healing process, which means also shortening the length of hospitalization days so as to save on medical costs. The Nutrition Installation is in charge of receiving patient order data, recapitulating it, and then making recapitulation results based on the order data. This creates a problem because the use of paper to record patient data in each room is of course too much, not to mention the distance between the room and the nutrition office which is far away and the data recapitulation process takes a long time. Based on these problems, a desktop-based food ordering application was created which can be an alternative for nurses and nutrition workers in ordering patient food every day. The general objective of this research is to develop a web-based information system in the hospital.

The type of research carried out in this research is the Mix Method, which is a research model that is simultaneously practicing and theorizing, or combining theory as well as implementing practice. Qualitative research is used to design SI food ordering inpatients. While quantitative research is used to evaluate SI and quality of information using the waterfall method. The method used in this research is a waterfall. The application is made using the Visual Basic programming language. Net Database and SQL Server. The desktop-based food ordering application at Ken Saras Hospital is tested using the black box method and provides a statement in the form of a questionnaire to the research subject, namely dmin , nurses, and staff as app users.

The results of this study are an application that features food ordering, order recapitulation, changing the application background, and setting database connections. The results of the questionnaire conducted show that the system is feasible to use with an average of 76% Interpretation Percentage. Suggestions for research, monitoring and evaluation of the system can be carried out periodically, so that problems and obstacles in the system can be immediately known and resolved and system testing is needed based on user acceptance of the new information system

Keywords— Information systems, food ordering management, hospitals.

I. INTRODUCTION

The role of nutritional installations as providers in food processing in hospitals must comply with applicable regulations, because food consumed by hospital patients must pay attention to food safety or food safety which includes aspects of hygiene and sanitation in food processing places and sanitation of tableware and cooking utensils, temperature and time of food handling, receipt of foodstuffs, storage of foodstuffs, food preparation, and food distribution (Haghighathoseini et al., 2018).

Nutrition services are an integral part of health services in hospitals that support each other and cannot be

separated from other services. Quality nutritional services at the hospital will help accelerate the patient's healing process, which means shortening the length of hospitalization days so as to save medical costs (Topan et al., 2015). This is in line with the development of science and technology (science and technology) in the health sector, one of which is the development of medical nutrition therapy which is an integral part of medical, nursing and nutritional therapy (R Hatta G, 2017).

A research on the development of computer-based information systems for the efficiency of food administration in the Malang Military Hospital Nutrition Installation concluded that by implementing a computer-based information system in nutrition installations it would increase the efficiency of the nutrition workforce and the need for foodstuffs. One nutrition worker is sufficient for computer operations, previously 2 nutrition workers for manual calculations. The time needed to prepare food before and after implementing computer-based information systems was significantly different with an average of 3.5 hours and 1.6 hours (p <0.05) (Topan et al., 2015).

Another research that has produced a foodstuff management information system that suits your needs, namely the Nutrition Installation of Dr. Wahidin Sudirohusodo Mojokerto (Dyah Ayu Latifahsari, 2016). In other words, reports that are usually inaccurate and handle several existing business processes efficiently and minimize errors can now be resolved with the nutritional installation information system at Dr. Wahidin Sudirohusodo Mojokerto.

The development of information systems carried out in the planning section of the nutrition installation through several stages in its manufacture. Information system development realized with the help of computers (computerized information system) through a stage called the analysis and design system (Tsumoto et al., 2018). Before the system can be designed to obtain data, generate reports, it must be known. Regarding how the nutrition installation planning section handles its operations, the forms used, how to fill them in and what is reported (Carvalho et al., 2019).

Through the identification process, organizational needs, namely the importance of computerization in nutritional installations, especially in the planning section to use computers to speed up the process of calculating food requirements, a software application prototype was developed using the basis of Microsoft Excel 2003 and Visual Basic for Applications (VBA) (Guley HM, 2017).

Henceforth, this application software is called PKBM (calculation of food needs) (Ismail et al., 2015).

Based on the above problems, all hospitals need an application that can handle all food ordering processes from making orders to recapitulating data. The required application can be built by simply adding the food ordering function to the existing SIMRS. However, this is difficult to implement because the SIMRS application was built by a third party. Because of that, a desktop-based inpatient food ordering application was created that can handle the ordering process to print the order summary results. Hospital information systems aim to increase patient satisfaction, reduce hospital costs and make fundamental changes to the old process. It is hoped that this desktop-based patient food ordering application can reduce hospital costs and, carry out existing functions to be faster, more accurate, and efficient.

II. METHOD

The research method used is the development of information systems in nutrition installations. Writing this article uses literature study techniques by collecting data and sources related to the themes and problems being studied.

2.1 METHOD OF COLLECTING DATA

The data source in this study is the subject from which the data was obtained. The data in this study are primary dat

a, namely the food ordering information system at Ken Saras Hospital that is suitable or that supports the problem under study.

2.2 Data Analysis Method

The data analysis technique in this study is a process of grouping, categorizing and giving meaning to each category that has been grouped using hospital information system analysis.

III. RESULTS AND DISCUSSION

This web application was developed into a system capable of ordering inpatient meals, recapitulating and printing order data every day. The application also provides a data warning for incoming orders to the nutrition staff so that patients do not wait long when they arrive at mealtime. In the admin settings itself, a feature is provided to manage database connections such as changing servers or databases if something unwanted happens on the server computer so that the process can continue (Haghighathoseini et al., 2018).

This web-based food ordering application was developed using the waterfall method. The waterfall development method itself has stages in it including needs analysis (analysis), design (design), development (development), testing stages (testing), implementation in the real environment (implementation) and maintenance (maintenance) (Carvalho et al. , 2019). The reason for using the waterfall method is because the requirements are clear at the early stages of development, so the possibility of changing needs is very small and only requires relatively small resources to implement this model.

Requirement Analysis

At the initial stage, namely needs analysis, the authors conducted interviews and observations to collect data and features needed by a nurse and nutrition staff. Observations were made in the hospital environment by collecting sample order forms and existing data recapitulation forms. Meanwhile, interviews were conducted by interviewing nutrition staff and nurses by asking what features were needed in the application to be made (Ismail et al., 2015).

Design Analysis

At the design stage, it is done by designing use case diagrams, activity diagrams, and databases. The next design is a desktop application display for ordering food in the hospital.

1. *Use Case Diagram*

In this use case diagram explains that the food ordering menu is the responsibility of the nurse and the data recapitulation menu is the responsibility of a nutrition staff. Meanwhile, an admin is responsible for managing all users and has access to all application menus.

2. **Activity Diagram**

Activity diagram is a diagram that describes all activities that occur in the system. This diagram illustrates the activities carried out on the system in this application, starting from the process of ordering inpatient food by nurses to the process of printing a recapitulation by a nutrition staff. The first process that is done is click the menu by a nurse, the system will display the patient food order form. Then, the nurse can input the patient's name then perform a search, the system will display patient data based on the name that has been entered. After the patient data appears, the nurse can input the patient's food order and click the send button, the system will save the order data to the database. In the process of printing the recapitulation data starting by clicking the report

menu, the system will display today's recapitulation data, just click print on the display, then the recapitulation will be printed.
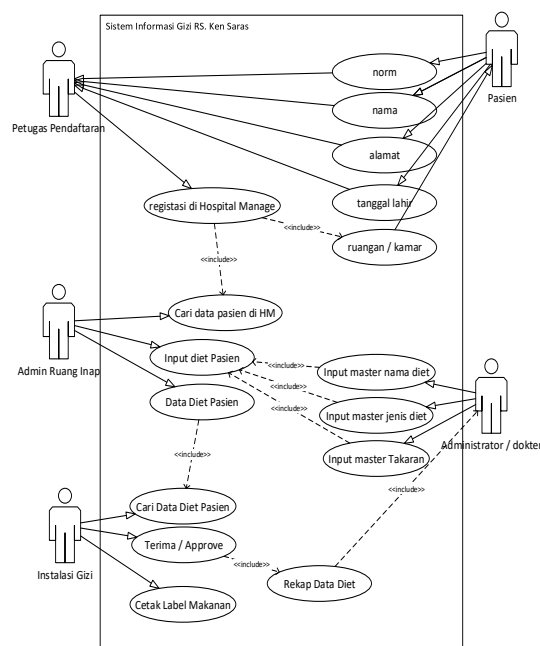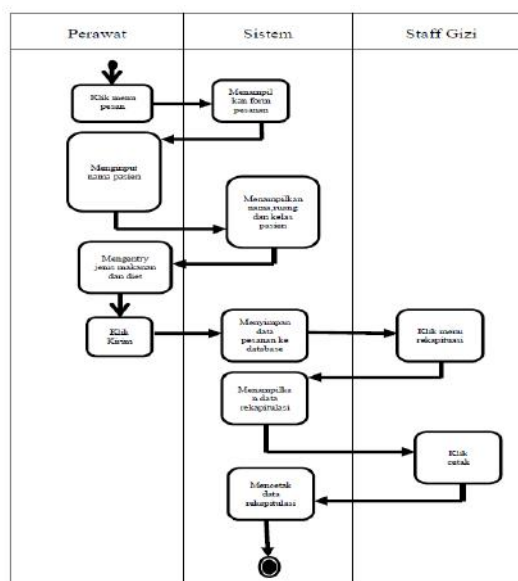

Fig. 1: Use case diagram

Fig. 2: Activity diagram

3. **Database Design**

The database design is described by the ER diagram, the database in this application consists of 6 tables, including table tbl_pasien, tbl_ruangan, tbl_kelas, tbl_p Orders, tbl_food and tbl_diet. The design uses SQL Server Management Studio with a SQL Server database (Guley HM, 2017).
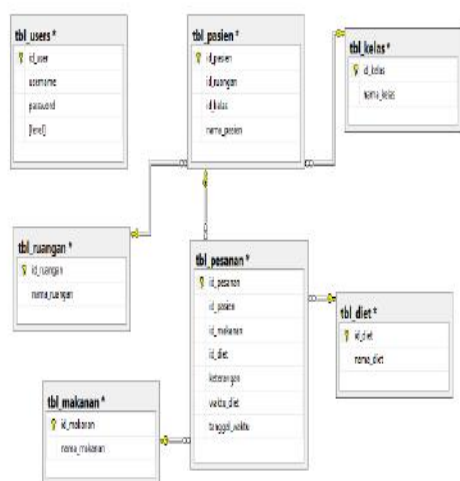
Fig. 3: database design

Interface (dialog interface) is a form of communication between system users and the information system itself through displays in computer applications. A good interface must be close to the original system which is done manually. Interface design is important in order to produce a system that is easy to understand, easy to operate, and familiar to users (C. H. Wu, R. K. Chiu, H. M. Yeh, 2017).

Inpatient food ordering information system interface is designed using bootstrap so that the system can provide the same appearance whether used with computers or other devices such as cellphones. Interface design can be done on the menu display of the information system being built. The menu display used in the food ordering information system includes a binary menu, multiple menu selection, and a pull-down menu. In addition, the menu in the food ordering information system is also equipped with an icon, as well as an image accompanied by a description (V. Palanisamy and R. Thirunavukarasu, 2017).

The menu of the inpatient food ordering information system is adjusted to the tracking form that has been used when running the manual system. Menu system information patient identity and history of illness.

IV. USER MANUAL ADMINISTRATOR

4.1 Access

This application can only be accessed via a PC / Hospital Computer that is connected to the network. To access this application you can access through 192.168.2.21/gizi, using the Google Chrome / Mozilla Firefox browser. Application login access will be given for

each room, each room must be responsible for each Food order sent to the Nutrition Installation via the application.
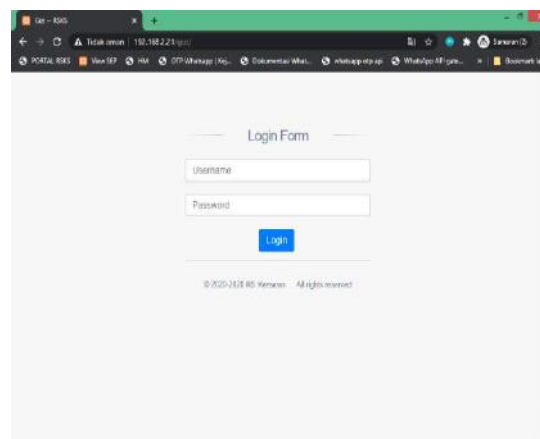

Fig. 4

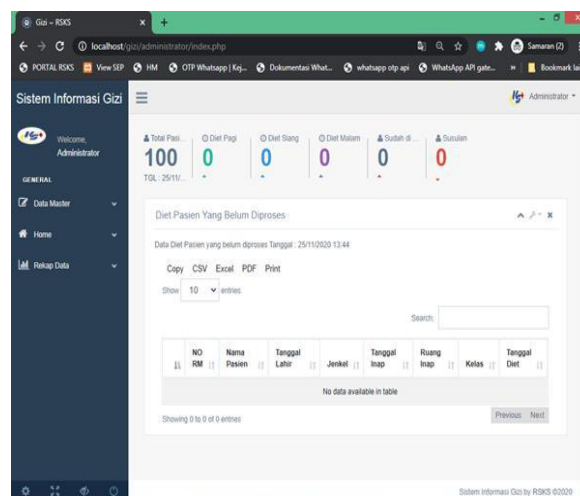After logging in, an image will appear as below:

Fig. 5

4.2 Order Nutritional Installation Food

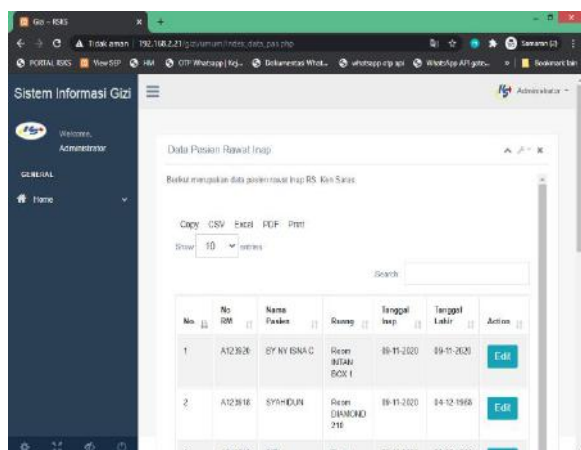After clicking on total inpatients, the following page will appear:

Fig. 6

Then select the patient to order food. You can use the search feature, and click edit to start ordering food. The following will appear after clicking edit:
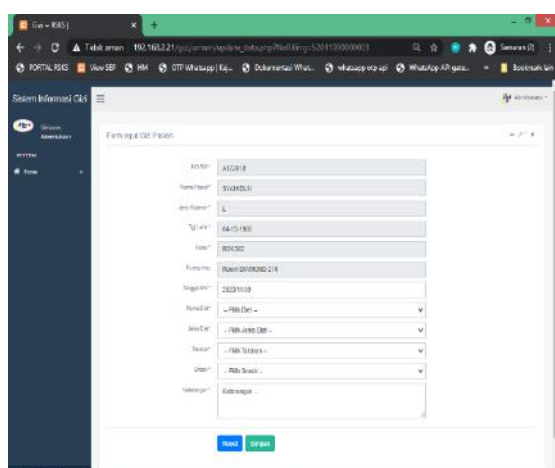

Fig. 7

After that, enter the name of the diet, type of diet, dosage, and snacks based on the recommendations of the Nutritionist. Click save if the data entered is appropriate. After it is successfully saved, it will be redirected to the home page, and the patient's food order data will appear. Wait for the Nutrition Installation to process the order, or you can confirm directly to the Nutrition Installation. The following is an example of a display, after saving the data in the previous image:
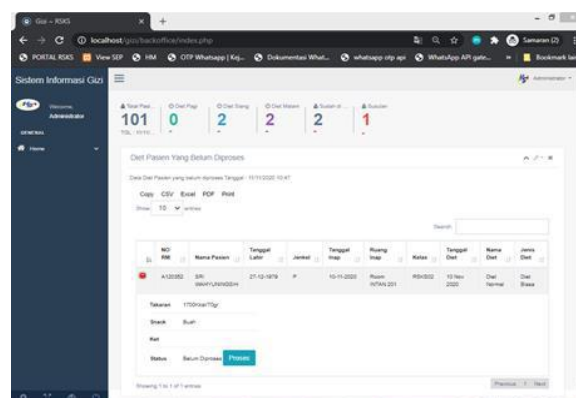

Fig. 8

Button Process feature to confirm that the order from the inpatient room has been received and will be processed by the Nutrition Installation.

4.3 Rakap Order Food According to the Meal Schedule

At each meal schedule, the number will always increase when inputting data. And will be reduced automatically if the inpatient has discharged the bill.
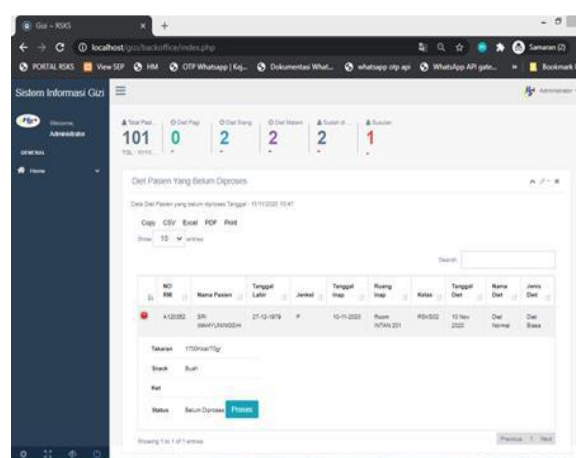

Fig. 9

To see a recap of the patient's food orders, you can click the small arrow logo below the number. Then, an order recap will appear as follows:
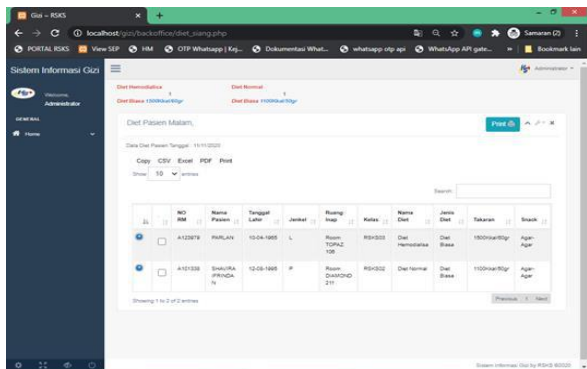
fig. 10

4.4 Features

For administrators there are features in the form of manage diet data and manage user data. This feature is a feature provided by the administrator if there are changes to the list of diet types, snack lists, or administrator access lists. Administrators have full access to this Nutrition application.
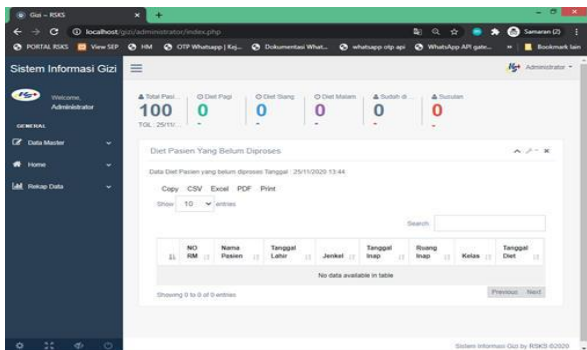

Fig. 11

V. TESTING

Testing food food ordering applications at the hospital using the blackbox method. This test is carried out repeatedly to ensure that the application runs properly according to the desired design and functions. Blackbox testing includes the user interface, create, read, update and delete actions from the application to the database. The purpose of this test is to find weaknesses or bugs that may exist in applications that are made so that they can be immediately handled and fixed so that the quality of the applications to be used is getting better.

Table 1: Testing the Application Login and Form Admin Page Testing

No.	function	testing	Output	result
1	displays the login form application	Open the application for the first time	*show a form login*	good
2	displays *password*	*Click the check mark on the login form*	show *password*	good
3	Displays access rights	*Input username and Password*	Show access rights	good
4	User data	*Create, read, update, delete (CRUD) to form user*	Show CRUD result	good
5	patient food order data	*CRUD order order data*	Show CRUD result order data	good
6	application master data	*CRUD data master*	Show the CRUD data master	good
7	view and print recapitulation data	*Click report and print*	Show result recapitulation and print it out	good
8	Process log out	*Click log out*	Show features log out	good

Table 2: Nursing Page Testing

No	Function	Testing	Output	Result
1.	Patient food order data	CRUD order data	Displays the results of the order data crud	Good
2.	Application master data	CRUD master data	Display the result CRUD master data	Good
3.	Log out process	Click log out	Display log out	Good

Table 3: Testing the Nutrition Staff Page

No	Function	Testing	Output	Result
1.	application master data	CRUD master data	Displays the results of the master data	Good
2.	view and print recapitulation data	Click report and print	Displays the results of the order recapitulation and prints	Good
3.	Log out process	Click log out	Display log out	Good

Based on the test results of the blackbox method that has been carried out, it can be concluded that this food

ordering application has run functionally well after correcting the errors that have been previously found. However, after implementation it is possible that errors or bugs can be found and the application needs to be repaired again.

VI. CONCLUSIONS AND SUGGESTIONS

6.1 Conclusions

Patient food ordering applications are made in the form of food ordering features, order recapitulation, changing the application background, and setting database connections. Applications are managed and used by admins, nurses, and nutrition staff.

Based on the research that has been done, it states that this food ordering application is suitable for use, seen with an average Interpretation Percentage of 76%. The conclusion of this study is that the application that has been built has been completed and in accordance with the original purpose of creating a desktop-based patient food ordering application that facilitates the food ordering process, accelerates the recapitulation of order data, and reduces operational costs in the patient's food ordering process.

6.2 Suggestions

Monitoring and evaluation of the system can be carried out periodically, so that problems and obstacles in the system can be immediately identified and resolved. System testing is required based on user acceptance of the new information system.

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