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Electronic Nutrition (e-Gizi) Application Development on RSUP Dr. Mohammad Hoesin Palembang Using the Rapid Application Development Method

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Abstract

Regional General Hospital Dr Mohammad Hoesin Palembang is one of the types A vertical hospitals in Palembang. Patients who come are not only from South Sumatra but also from outside the region. Dr Mohammad Hoesin Hospital has inpatient services. One of the inpatient facilities is providing food which will be divided into 3 shifts. Currently, data gathering on the patient diet is performed manually, which indicates that many patients have returned home but somehow the food has been made, and the natural ingredients at the nutrition establishment do not match what would be in it. A solution that can facilitate the distribution of food at Dr Mohammad Hoesin Hospital and make it easier to record the patient's diet is to build a website-based Electronic Nutrition (e-Gizi) application.

Keywords: Application, Nutrition, Hospital

1. INTRODUCTION

In the current era of technology and information, it is realized that almost all aspects of activities in all fields are determined by the quality of the technology and information received and produced. The development of information technology changes humans in completing all their work. In the past, humans stored all information and documents using books stored in document cabinets, so now it is changed to use computers to store the data of an agency[1]. This rapid advancement in the field of computers is increasingly felt, it is not even surprising that many agencies, both government and private companies, are utilizing computers to improve their performance. Various activities can be carried out more efficiently and effectively, and data processing can be done to obtain information that is fast, precise, and accurate.

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RSUP Dr. Mohammad Hoesin is one of the vertical type A hospitals in Palembang which is located at Jl Jendral Sudirman KM 3.5 Sekip Jaya Village, Kemuning District. RSUP Dr. Mohammad Hoesin has several services, namely outpatient, inpatient, emergency room, other supporting units such as radiology, laboratory and hemodialysis. For inpatient services, it is divided into 5 classes, namely class III, class II, class I, VIP class, VVIP class. One of the facilities obtained in inpatient services is consumption.

In recording consumption, nutritionists have difficulty in obtaining real-time data of patients who are being treated. The current system of nutritionists asks the nurse or doctor to find out the patient's diet or there is an allergy from the patient and write on the room nutrition book. After that, wait until the waiter delivers the consumption. After distributing the food, recapitulate the patient's diet in the room's nutrition book. Sometimes if there is a nutritionist who pickets in the room, then the nutritionist who recaps the patient's diet is surveyed directly. When it is felt that the nutritionist has an error in determining the diet, the nutritionist can change the diet.

Recap the results of the diet, brought by the waiter to the nutrition installation. The nutritionist also calculated and recapitulated the total number of diets throughout the room and made the patient recap into 2 categories of adult and pediatric patients. Furthermore, the nutritionist also looked at the BM (meal schedule) which had been scheduled according to the date. After that, the nutritionist also recapitulates what foods should be distributed. Sometimes nutritionists find it difficult to recap the menu for allergy patients because it is different from BM (Meal schedule).

The menu that has been recapitulated, is also given to the cook to be cooked. After the food is finished the nutritionist and cook prepare per patient by looking at the results of the recap. The food is ready to be distributed by the waiter and return to the initial process. In this way, the installation of nutrition there are several problems, namely: The difficulty of implementing a supply diet in each room because there can be human error in recording or recording, nutritionists also have difficulty when distributing food because the data is still recorded manually which can be dirty and damaged which makes the data unreadable.

Based on the above problems, creating a website-based application is one of the steps to assist nutritionists in preparing accurate distribution data and helping to recap the diet of inpatients. The feature in this application will have an input form inputted by the room nurse which is immediately sent in real time to a nutritionist so that the waiter does not recap the diet manually. There is also a feature that nutritionists can recap in the system of many perdiet and percategory patients, as well as a recap of the market menu. So this application is very helpful for nutritionists in carrying out services. Therefore, the author took the title

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"Electronic Nutrition (e-Nutrition) at RSUP Dr. Mohammad Hoesin Palembang Using the Rapid Application Development Method (RAD)". RAD is an object-oriented approach to system development that includes a method of development as well as software. RAD aims to shorten the time usually required in the traditional system development life cycle between the design and application of an information system[2] . The reason this research chose the Rapid Application Development (RAD) method is because the stages are more structured, software development can also be done in a faster time by emphasizing on short cycles, more importantly the software developed can be known for the results without having to wait a long time[3].

2. METHODS

There are several methods used in this study. The following is a description of the methods used.

2.1. Research Object

The object of this study is RSUP Dr. Mohammad Hoesin Palembang.

2.2. Data Collection Method

The data collection method used in this study consists of several parts, namely:

1. Interview, Interviews are used as a data collection technique if the researcher wants to carry out a preliminary study to find the problem to be studied, and if the researcher also wants to know things from respondents that are more in-depth, and the number of respondents is small[4]. Interviews were conducted with nutritionists who were conducting the process of calculating nutrition and calculating foodstuffs for inpatients at Dr. Mohammad Hoesin Hospital. The interview technique was carried out to dig up information from the speakers about nutritional calculations and the distribution of food for inpatients at RSUP Dr. Mohammad Hoesin directly
2. Observation, Observation as a data collection technique that has specific characteristics when developed with other techniques. This observation stage is carried out by seeing firsthand how the process of nursing records the diet of all patients per room and the process of taking groceries. This technique is carried out to be able to directly know the process that occurs in the nutrition installation.[5]
3. Literature Studies, in addition to conducting interviews and observations, this study also used literature study techniques through journal references on the internet, library and so on. Library Studies is a series of activities related to

the method of collecting library data, reading, and recording and processing research materials[6].

2.3. Application Development Method

Rapid Application Development (RAD) is a linear sequential software development process model that emphasizes short development cycles[7]. The RAD method emphasizes the scope of business modeling (business modelling), data modeling (data modelling), process modeling (process modeling), application generation and testing (testing). This method can be worked on in a short time only takes 30-90 days to complete the software system.

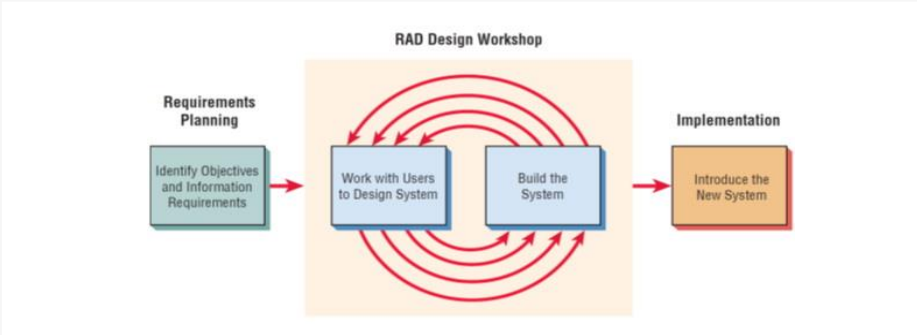

Figure 1. Illustration of Rapid Application Development (RAD) Method[8]

The RAD model has 3 stages as follows:

1. Requirement Planning, in this phase, the user and the analyzer meet to identify the objectives of the application or system as well as to identify the terms of information arising from those goals [9].
2. Design System, this phase is the phase to design and repair that can described as a workshop. Analyzers and programmers can work on building and demonstrating visual representations of designs and work patterns to users. This design workshop can be done for several days depending on the size of the application to be developed. During the RAD design workshop, the user responded to the existing prototype and the analyzer improved the module designed based on the user's response. If the developer is an experienced developer or user, Kendall considers that this creative effort can push development to an accelerated level[10] .
3. Implementation, in this implementation phase, the analyzer works with users intensely during workshops and designing business and nontechnical aspects of the company. As soon as these aspects are approved and the systems are built and filtered, new systems or parts of the system are piloted and then introduced to the organization[11].

3. RESULTS AND DISCUSSION

3.1 Planing

This stage is a stage to obtain information that at RSUP Dr. Mohammad Hoesin Palembang there are several services, namely outpatient, inpatient, laboratory, supporting and IGD. In inpatient services, there are several facilities, one of which is consumption. In the division of consumption, it is divided into 3 division shifts, namely morning, afternoon, and night. The division of the morning shift is carried out from 07.00 to 07.45, the division for the day shift is carried out at 12.00 to 12.45, and for dinner it is carried out from 18.00 to 18.45. The food menu is distinguished according to class I, II, III, VIP, VVIP, and PSUITE. The food menu is also distinguished by class: adult, infant and child. Then the food menu is distinguished based on the patient's diet, currently there are more than 80 types of patient diets. Patients can also request additional menus and request food as recommended by the doctor.

In ordering food that is currently running at RSUP Dr. Mohammad Hoesin is still done manually. The doctor determines the patient's initial diet and then, the doctor also tells the nurse or room admin. The room admin or nurse records the type of diet of each patient in the room by filling out the form that has been provided by the nutritionist. During the food distribution hour, the order form filled out by the admin or nurse is given to the waiter. After the waiter distributes the entire food, he returns to the nutrition installation to provide the diet form that has been filled in by the admin or room nurse, the nutritionist receives the form from the waiter and recaps the total number of patients who are being treated by category, class, diet manually. Then the nutritionist recaps any menu based on the menu schedule on the day, so that the nutritionist can determine what menus will be distributed to patients. The nutritionist also gave a recap of the menu to be cooked to the cook. After the cook finishes the cooking, the nutritionist assisted by the waiter serves the food to the patient and the nutritionist also gives a recap of the distribution of food to the waiter and the waiter distributes the food and returns to take the diet form per room.

In making an Electronic Nutrition (e-Gizi) application, it takes approximately 4 months. With the details of activities as follows: Collecting Data by interviewing users and seeing directly the current business processes for 3 weeks, Requirement Planning by looking at the conditions of the place and environment in the nutrition installation and identifying the needs needed in making this application for 2 weeks, Design System by compiling a Use Case Diagram, Design database, and Design Wireframe for 3 weeks, Implementation by creating an application using programming language based on the Design System which has been carried out for 3 weeks, and finally Testing by testing the application if there are bugs, it will be corrected and tested again for 1 week.

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3.2 Design

The designs used in this study were some of which were first to create a scenario. The resulting scenario consists of user management, role management, patient diet input, sub diet management, diet management, menu management, whereas specifically patient, allergy management, patient diet control, view menu recap, and see distribution recap. The second design is to make a use case diagram. Use case diagrams are generated based on the scenario. In this design, it looks like the actors and what the actors do inside using the application. The use case diagram presents the interaction between the use case and the actor. Use cases are a technique of capturing the functional needs of a new system or a modified system. Each use case can consist of one or more scenarios that describe how the system interacts with other users or systems to achieve a specific business goal. In this technique, it is not explained how the system works internally or its implementation. What is shown are what steps the user takes in using the software[12].

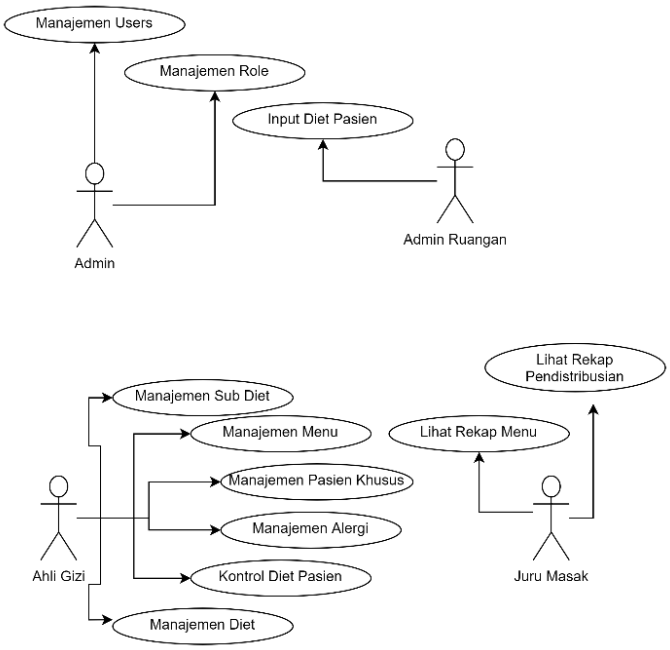

Figure 2. Use Case Diagrams

The third design is to create a Class Diagram. The diagram class is generated based on the scenario. Where from the decomposition of the scenario, it is decomposed in more detail into classes of existing objects. A Diagram class is an activity that shows the static structure of the actual class in the system. A diagram class is a

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collection of similar objects. An object has a momentary state (state) and behavior (behavior). The state of an object is the condition of that object expressed in attributes/properties. Meanwhile,[13] the behavior of an object defines how an object acts/acts and reacts. Here's the class diagram of this application. One of the advantages of the diagram class is that it provides an overview of the better application schema[14].

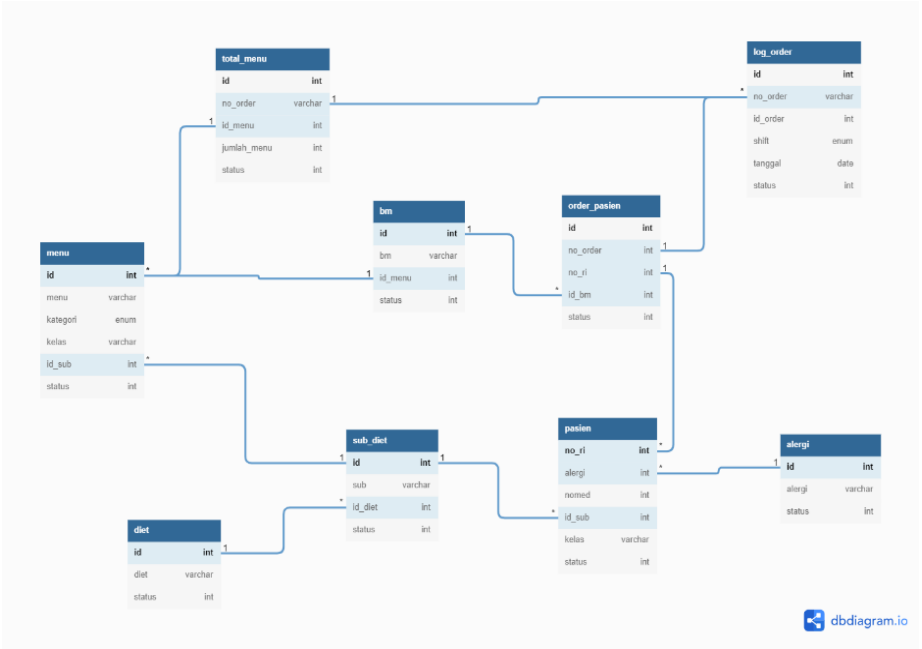

Figure 3. Class Diagram

3.3 Coding

At this stage, the encoding used is to use the PHP programming language and use the Laravel framework. Based on the design in the previous stage, several application views were generated. The first time you sign in to the application that appears is the login page view. In this view users are asked to enter a username and password.

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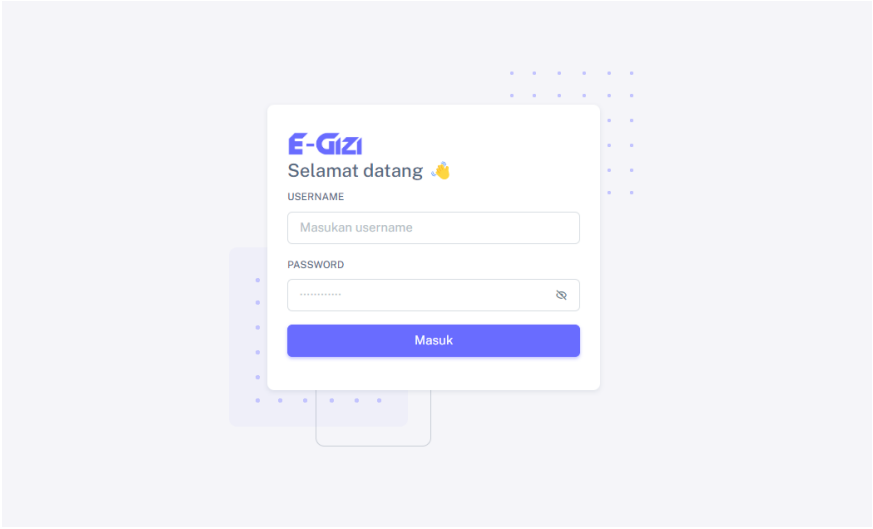

Figure 4. Login Page

The next view is the home page which is used to view information about the total inpatients treated per month and data on patients treated per room.

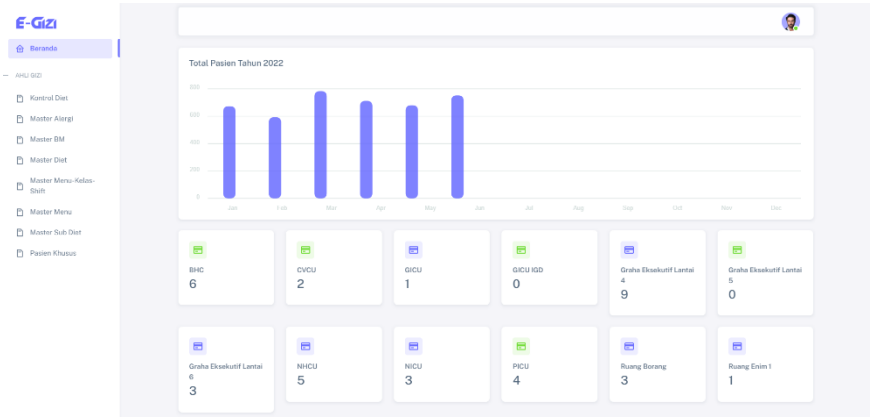

Figure 5. Home Page

The next view is the role master page, which is used by admins to add role data for the e-Nutrition application. Currently, it only has 3 roles, namely: Room Admin, Admin, Cook, and Nutritionist.

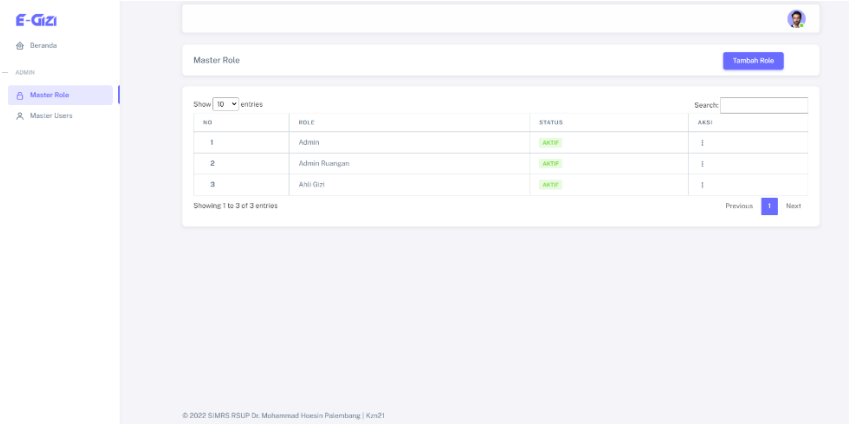

Figure 6. Role Master Page

The next view is the users master page, which is used by the admin to add users data to the e-Nutrition application. When inputting new users, the admin must specify the user role first.

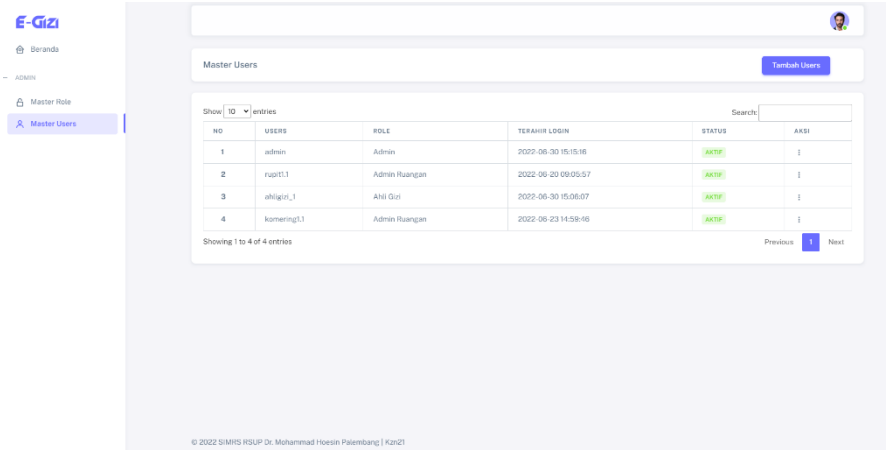

Figure 7. Users Master Page

The next view is the diet input page, which is used by the room admin to add patient diet data, allergies as well as if there are special and additional menus from the patient's e-Nutrition application.

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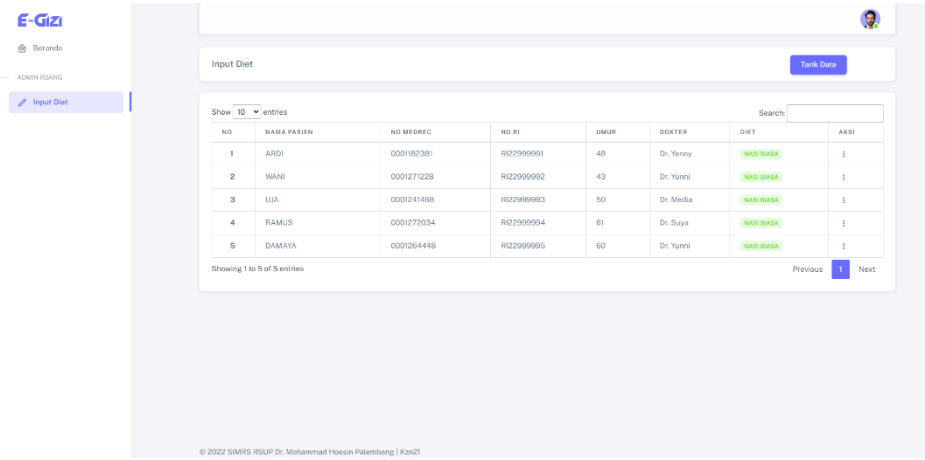

Figure 8. Diet Input Page

The next view is the diet control page, which is used by room admins to change patient diet data and view patient allergies e-Nutrition app. On this page, the room admin can also enter the patient's allergy and a special note if there is a special request from the doctor or patient.

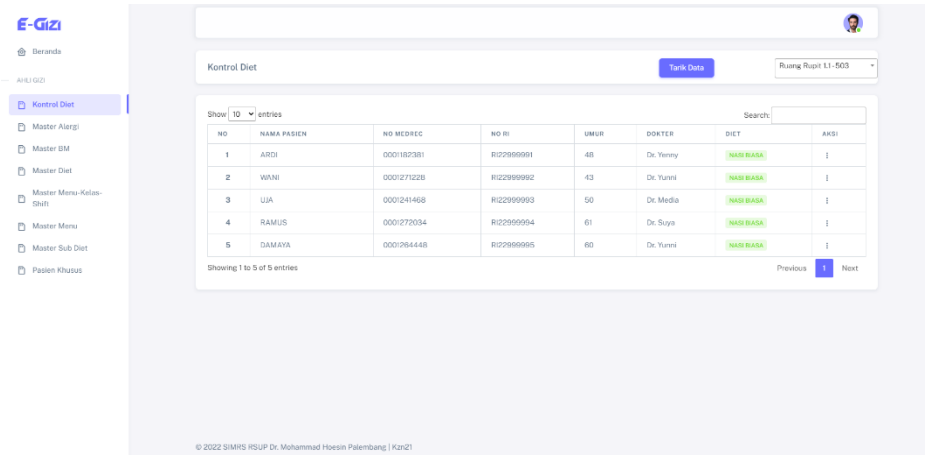

Figure 9. Diet Control Page

The next view is the diet master page, which is used by nutritionists to change the master diet data of the e-Nutrition application. The diet can also be inactive but if the diet already has a sub diet, then it cannot be deactivated.

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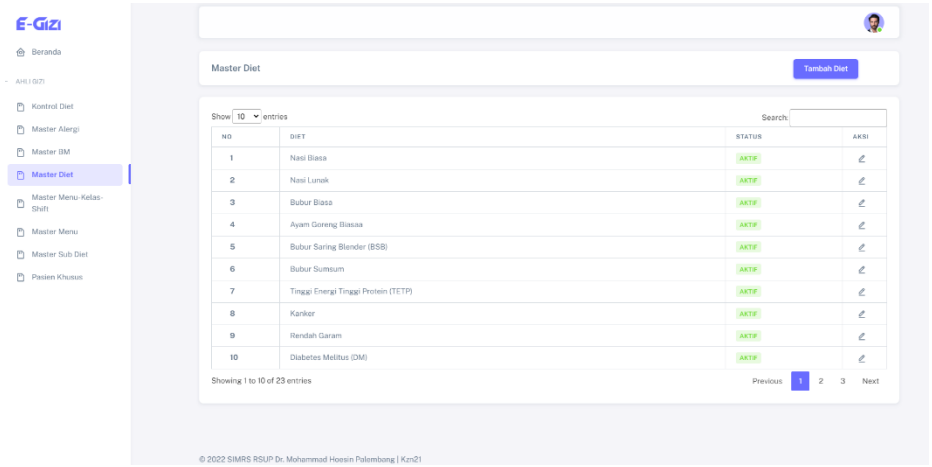

Figure 10. Diet Master Page

The next view is the sub-diet master page, which is used by nutritionists to change the master sub-diet data of the e-Nutrition app. The sub-diet is a derivative of the diet. This sub-diet is chosen by the room admin to determine the patient's diet.

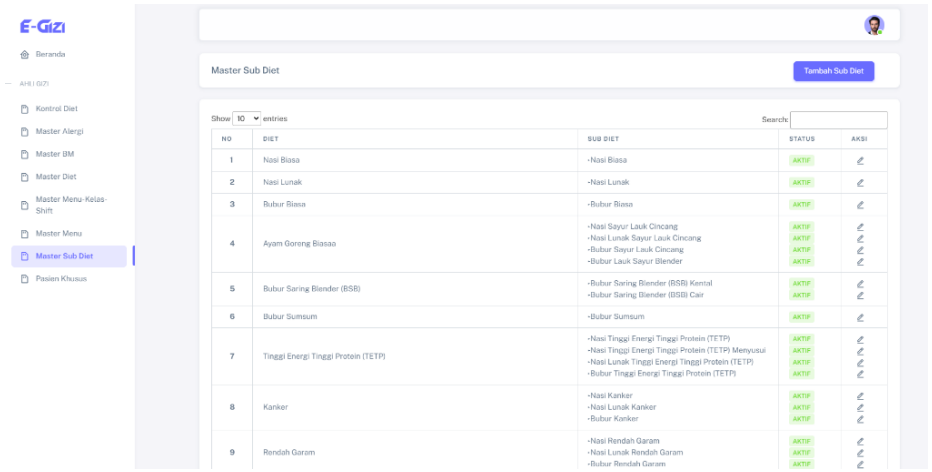

Figure 11. Sub Diet Master Page

The next display is the master menu page, which is used by nutritionists to change the master menu data used in the e-Nutrition application. The menu master data must be unique so it cannot store the same data.

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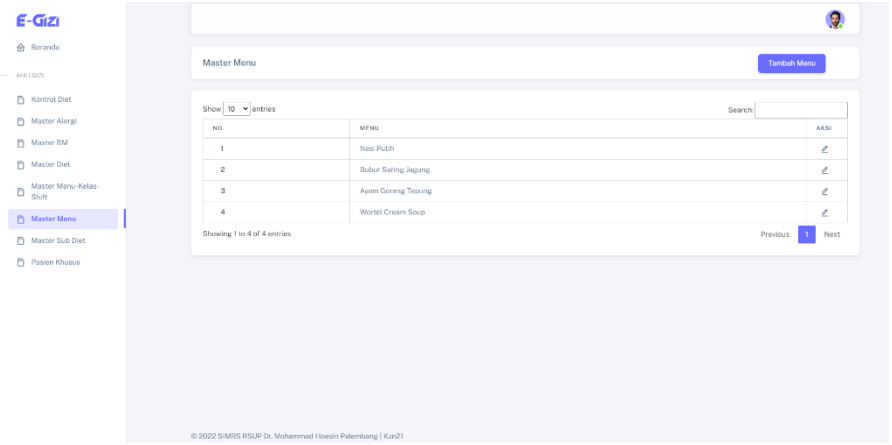

Figure 12. Menu Master Page

The next view is the Menu-Class-Shift master page, which is used by nutritionists to compile menus used in any class, category, and shift. This menu can also be disabled if it has not been selected in the BM master.

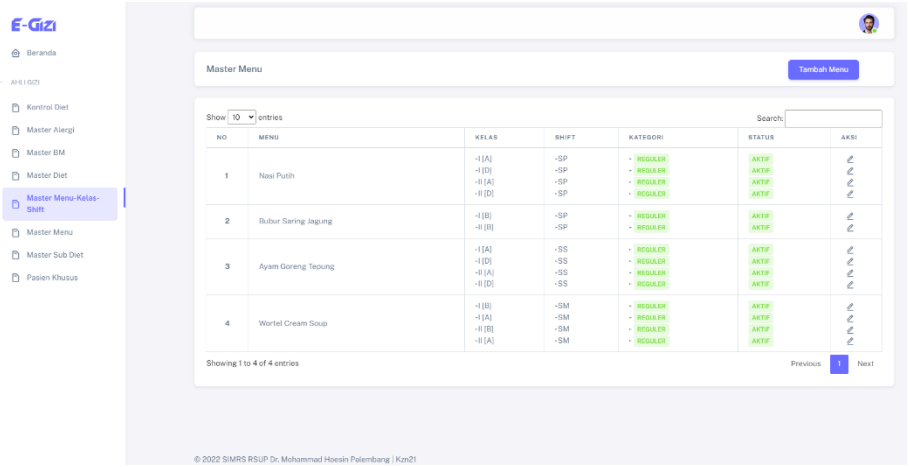

Figure 13. Menu-Class-Shift Master Page

The next display is the BM master page, which is used by nutritionists to compile a menu schedule that is used to bind to patient sub-diets and classes, categories, and food distribution shifts. So that patients can be linked to get any food according to the diet and category and class of the patient.

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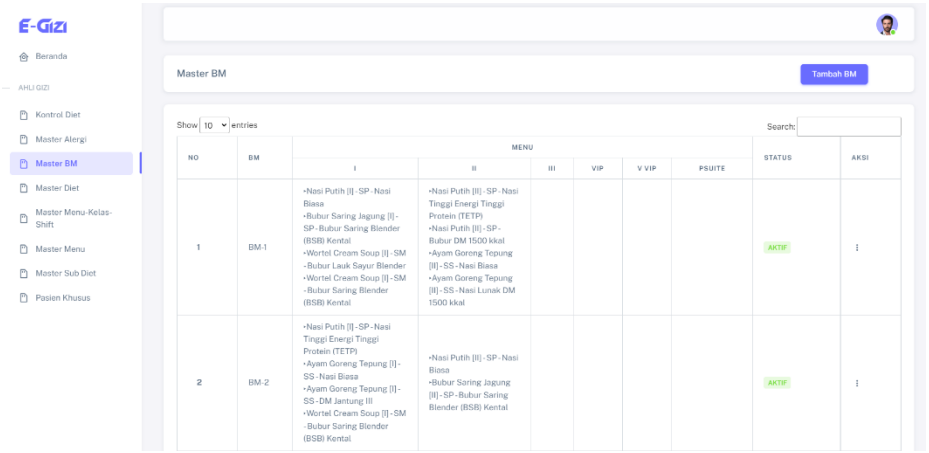

Figure 14. BM Master Page

The next display is a special patient page, which is used by nutritionists to select any special menu according to patients who have certain allergies and a request menu from a doctor.

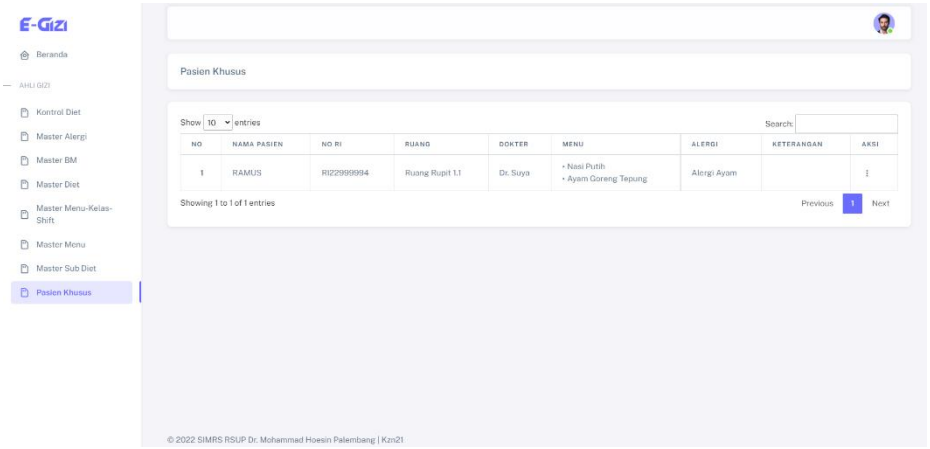

Figure 15. Special Patient Page

The next view is a menu distribution recap page, which is used by cooks to see which patients get any menu according to the food schedule that takes place.

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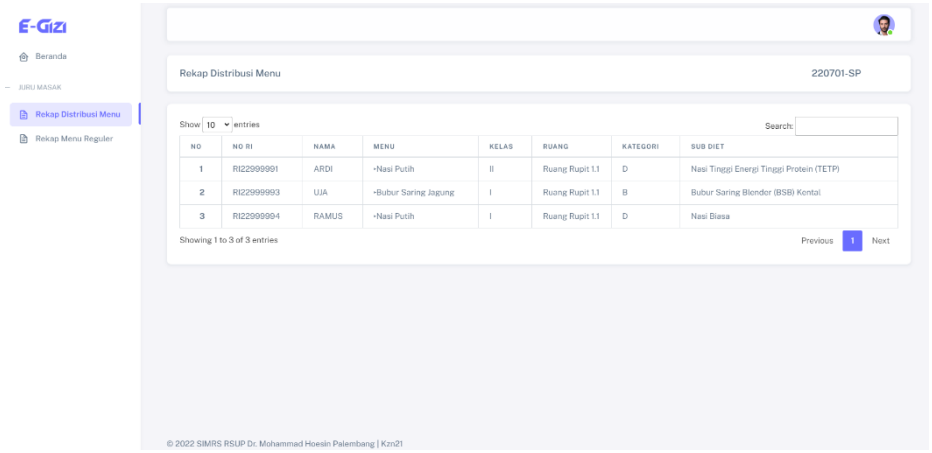

Figure 16. Menu Distribution Recap Page

The next view is the menu recap page, which is used by the cook to see the total of any menu according to the food schedule that takes place.

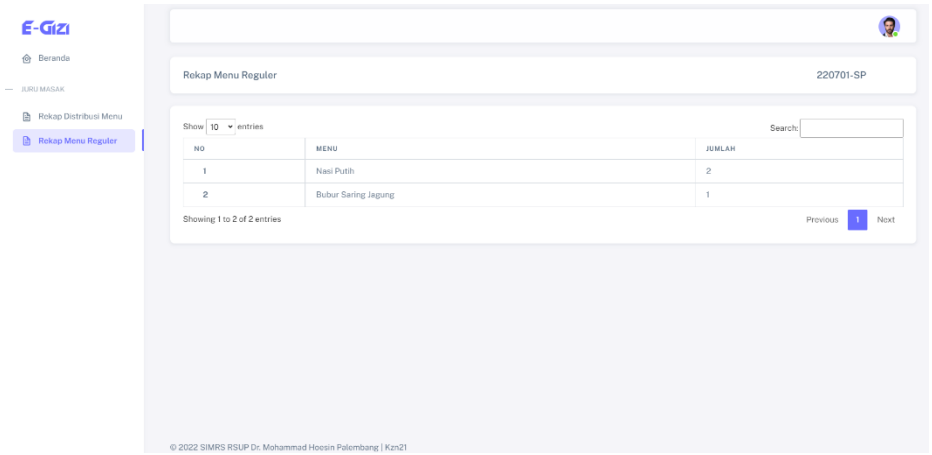

Figure 17. Menu Recap Page

3.4 Testing

This stage is the testing stage of the Website-based Electronic Nutrition (e-Nutrition) application as an effort to assist nutritionists in making a recap of the patient's menu. Testing has been carried out thoroughly starting from the database used to the electronic nutrition (e-Nutrition) application. This test uses Blackbox Testing where this test only aims to see if the program is compatible or not with the functions designed on the program without knowing the program code

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used[15]. After testing, it can be said that the application has run well and smoothly.

Table 1. Application test table

No	Test Case	Output	Actor	Result
1	Open the app	Login page display	Admin, Room Admin, Nutritionist, Cook	Appropriate
2	Select dashboard menu	Dashboard page display	Admin, Room Admin, Nutritionist, Cook	Appropriate
3	Select the master users menu	Display user data	Admin	Appropriate
4	Select the add users button	Display the user data input form	Admin	Appropriate
5	Select the edit users button	The edit form for users data appears	Admin	Appropriate
6	Select the master role menu	Display user data	Admin	Appropriate
7	Select the add role button	Display form input data role	Admin	Appropriate
8	Select the edit role button	Display the role data edit form	Admin	Appropriate
9	Select the diet input menu	Display patient data	Room Admin	Appropriate
10	Select the edit diet button	Display the patient data edit form	Room Admin	Appropriate
11	Select the diet control menu	Display patient data	Nutritionist	Appropriate
12	Select the edit diet button	Display the patient data edit form	Nutritionist	Appropriate
13	Select the allergy master menu	Display allergy data	Nutrition Expert	Appropriate
14	Select the add allergy button	Display the allergy data input form	Nutrition Expert	Appropriate
15	Select the allergy edit button	Display the allergy data edit form	Nutrition Expert	Appropriate
16	Select the diet master menu	Display diet data	Nutrition Expert	Appropriate
17	Select the add diet button	Display the diet data input form	Nutrition Expert	Appropriate
18	Select the edit diet button	Display the diet data edit form	Nutrition Expert	Appropriate
19	Select the sub diet master menu	Display sub diet data	Nutrition Expert	Appropriate
20	Select the add sub diet button	Display sub diet data input form	Nutrition Expert	Appropriate
21	Select the edit sub diet button	Display the edit form of sub diet data	Nutrition Expert	Appropriate
22	Select the menu master menu	Display menu data	Nutrition Expert	Appropriate

No	Test Case	Output	Actor	Result
23	Select the add menu button	Menu data input form display	Nutrition Expert	Appropriate
24	Select the edit menu button	Menu data edit form appears	Nutrition Expert	Appropriate
25	Select the BM master menu	Display BM data	Nutrition Expert	Appropriate
26	Select the add BM button	Display the BM data input form	Nutrition Expert	Appropriate
27	Select the edit button BM	BM data edit form appears	Nutrition Expert	Appropriate
28	Select the Menu-Class-Shift master menu	Menu-Class-Shift data display	Nutrition Expert	Appropriate
29	Select the add Menu-Class-Shift button	Menu-Class-Shift data input form display	Nutrition Expert	Appropriate
30	Select the menu-Class-Shift edit button	Menu-Class-Shift data edit form display	Nutrition Expert	Appropriate
31	Select the special patient master menu	Show-specific patient data	Nutrition Expert	Appropriate
32	Select the add button to a special patient menu	Special patient menu data input form appears	Nutrition Expert	Appropriate
33	Select the allergy edit button	Display the allergy data edit form	Nutrition Expert	Appropriate
34	Select the menu distribution recap menu	Display patient menu data	Cook	Appropriate
35	Select the menu recap menu	Menu recap data display	Cook	Appropriate
36	Select the Logout button	Login page display	Admin, Room Admin, Nutritionist, Cook	Appropriate

4. CONCLUSSTION

After the discussion has been described in the previous, an Electronic Nutrition (e-Gizi) application has been produced which consists of recording the patient's diet, recapturing the patient's menu, and recapping patient distribution. This application is expected to help nutritionists in recording diets, menu preparation and menu distribution. Using the RAD (Rapid Application Development) method is very helpful in making this application because this method has advantages, namely: Reducing the possibility of errors and simplifying the integration process.

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