Andorid-based Diet Guide for Diabetes Mellitus, Heart, Maag, Kidney, and Impaired Liver Function Disease

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Abstract. In this study an android-based application was produced that can provide dietary information and knowledge to patients with diabetes mellitus, heart, maag, kidney, and impaired heart function disease, that for healthy living does not have to be expensive. The habit of consuming liquor, consuming fast food, and rarely doing physical activities is the cause. Diet is the first initial method recommended by doctors to patients. Eating patterns with the right menu, exercise and adequate and regular rest can help the patient's recovery. Based on 50 questionnaires distributed and returned by patients, 42 of the total 50 patients who went on a diet within 1 month routinely felt a very good recovery in their bodies.

Keyword: Dietary information, Android

1. Introduction

Data and information quality management is the formation and assignment of roles, responsibilities, provisions, and procedures related to the collection, maintenance, dissemination, and regulation of data.[1][2]

The habit of consuming alcohol, fast food, and rarely doing physical activities are unhealthy lifestyle habits that will cause the emergence of dangerous diseases.[3] Diet is a way to regulate the amount of food consumed by someone.[4] The most important thing in going on a diet is the combination of suitable foods in order to get the best results with the aim of getting health.[5] There are several types of diets including, low fat diets or low carbohydrate diets, the most important is the balanced distribution of proportions between the various nutritional contents of the food consumed with the body's needs to meet calories.[6] In addition, the diet is not only for weight loss, but there are also disease diets that are done to prevent disease in the body.[5]

Diabetes mellitus, heart disease, maag, kidney, and impaired liver function are diseases that have the potential to cause death for sufferers if not handled properly.[7] Handling fast and proper disease starts from regulating food patterns that have a balanced nutritional value.[8]

The need for the number of calories in accordance with the activity is mandatory that is met so that the body does not get ill easily. Lack of calories will cause the body to become weak, and easily sensitive or depressed, while excess calories will create a buildup of weight.[5] Therefore, it is necessary to know the nutritional status, calorie needs, ideal weight, and suggestions on the food consumed, as well as information on the list of foods and calorie content of the food.[3]
A smartphone is a device that is not just used for texting, receiving and answering calls, the presence of an application center on every smartphone, the smartphone can now be used as a business support, learning and entertainment facilities.[9]

2. Theoretical Review

2.1 Diet

Diet is an arrangement or selection of foods that must be consumed by a person or group of people.[4] Diet not only means losing weight, but it can be broader meaning that is daily food management. A balanced diet combination is a dietary arrangement that is adjusted to the body's nutritional needs associated with time, i.e., morning, afternoon, and evening.[5] A balanced diet combined diet refers to a balanced nutritious diet in order to get the best results for health purposes.[4] Efforts to improve improving nutrition through food both for groups or individuals which include collection, processing, analysis, advice, and implementation of food to obtain optimal health is called nutrition services. Integration, the application of the principles of food science, nutrition and basic science to achieve optimal nutritional status individually with the development, supply and management of food nutrition services is called dietetic or dietary guidelines.[8]

2.2 Calorie

Calories are one of the nutrients contained in food.[5] A person's calorie needs according to FAO/WHO are energy consumption or Basal Metabolic Rate (BMR) [10] comes from food and physical activity needed to meet the body's calorie needs. For this reason, we should maintain a balance between energy entering and exiting the body. If food and physical activity are below or above our calorie requirements, the risk of developing the disease will be greater.[5] Calculation of calorie needs using rounding from the Harris-Benedict BMR formula as a basis [10]

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\text{Man} : 66.5 + 13.75 \times W + 5.003 \times H - 6.775 \times A \\
\text{Woman} : 655.1 + 9.563 \times W + 1.85 \times H - 4.676 \times A \]

\[
(1) \quad (2)
\]

\[ W = \text{Weight (kg)} \]
\[ H = \text{Height (cm)} \]
\[ A = \text{Age} \]

2.3 Lifestyle

Lifestyle is an indicator that can determine a person's quality of life and health.[11] People who have a healthy lifestyle tend to pay attention to factors that support their health such as food, habits to exercise, a healthy environment, and rest periods.[3] Because by paying attention to these things will cause an increase in the quality of health which will have an impact on the quality of life.[11] Alternatively someone who has an unhealthy lifestyle like eating fast food, lack of exercise, smoking, staying up late, and an unhealthy environment will cause many dangerous diseases such as heart disease, maag, diabetes mellitus, stroke and many others.[12]

2.4 Disease

More known as health problems not only marked by the presence of disease, but the existence of health problems in a person's physical, mental and spiritual. The reason can be obtained from various aspects such as the environment, individuals, history.[13] According to Hippocrates the imbalance in life is a disease.[14]

2.5 Android

Android is a software for mobile applications that uses the Android SDK (Software Development Kit) as a tool and API (Application Programming Interface) needed to develop applications on the Android platform using the Java programming language.[15] Android was originally bought by Google, but after a consortium of thirty four of software, hardware and telecommunications
companies, the Open Handset Alliance was formed. Android provides an open platform for developers to share their applications.[16]

3. Methodology and Application Design
The procedure applied in this research is by collecting and analyzing data through literature studies and interviews with specialists in internal medicine at the Merauke Regional General Hospital, making and testing applications to implementation. Testing is done with the blackbox method for application functionality and questionnaires to measure user expectations after using the application.

3.1 Methodology
3.1.1 Research Procedure
The research procedure is the stages carried out in a study, from the beginning to the completion of the study. The description of the procedure carried out in this study which starts from the data collection stage until the test of the application produced more clearly can be illustrated through in a flowchart shown in Figure 1.

![Figure 1. Research procedure flowchart](image)

3.2 Application Design
Diet guide application design started with conceptual design show on use case diagram at Figure 2.

4. Result
The results obtained in this study are an application of dietary guidelines for sufferers of diabetes mellitus, maag, heart, kidney, and impaired liver function with an interface that is quite attractive, easy to use and, most importantly, can help patients familiarize healthy lifestyles with patterns and a diet that meets the balance of meeting daily nutritional and calorie needs, patients can feel positive changes in their bodies.
Figure 2. Use case application

Figure 3. Standart Diet Menu

Figure 4. Diet Menu body calorie need

Figure 5. Food menu for impaired liver function
Figure 6. Food Menu for diabetes melitus

Figure 7. Calculation calorie for man

Figure 8. Calculation calorie for women

Table 1. List Quistionaire Result

| Questions                | Criteria       | Respondent | Percentage |
|--------------------------|----------------|------------|------------|
|                          | Very easy      | 40         | 80%        |
|                          | Easy           | 8          | 20%        |
|Easy to use applications?| Difficult      | 2          | 4%         |
|                          | Bad            | 0          | 0%         |
|                          | Very easy      | 45         | 90%        |
| Died guide instructions?| Easy           | 5          | 10%        |
|                          | Difficult      | 0          | 0%         |
|                          | Bad            | 0          | 0%         |
|                          | Very easy      | 0          | 0%         |
| Find the menu for diet?  | Easy           | 48         | 96%        |
|                          | Difficult      | 2          | 4%         |
5. **Discussion**

Diet guide application has a look that can be said to be simple but quite interesting because it is designed with colorful colors that are quite comfortable to look at. Users of the application in this case the patient can choose the menu according to complaints of illness experienced as in Figure 3, see the recommended and prohibited food menu of the illness experienced in Figure 5 and Figure 6, adjusted also to the calorie requirements needed in Figure 4. Patients also can do physical activity according to calorie requirements according to the sex, age, body weight of the patient. The recommended food menu, as well as the prohibited ones listed in the application are food menus that are adjusted from the recommendations of the specialist doctors of each disease at the Merauke Regional General Hospital, which are mostly obtained from the nutrition guide book that every doctor handles. The results of using the application by patients can be seen in the questionnaire report shown in Figure 9.

6. **Conclusion**

Based on the results of the application use questionnaire which showed that 42% of all 50 patients each had 10 patients with diabetes mellitus, 10 patients with heart disease, 10 patients with maag disease, 10 patients with impaired liver function, and 10 patients with kidney disease, feel the changes in health in the body after regularly following the dietary guidelines on the application, so it can be stated that this android-based diet guide application is very helpful for patients in running a diet program based on their respective diseases.

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