Decision Support System Of Food Selection For Obese Sufferer

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ABSTRACT

The purpose of making this application program is to facilitate obese sufferers in choosing appropriate foods to be able to regulate their calorie needs. In this application program the Analytic Hierarchy Process (AHP) method is used to determine the weight of each criterion and alternative. In making application programs using the PHP programming language and MySql database. This application program can display the food chosen by the user based on the level of importance for obesity sufferers, so users can easily determine which foods are good for their health.

Keywords

Obesity, selection, food, AHP, calories

1.Introduction

Obesity is one of the health problems that have been experienced by every circle of the elderly, teenagers, and children. According to the latest data obtained from the World Health Organization in 2016 an estimated 41 million children under the age of 5 suffer from obesity and more than 650 million adults suffer from obesity [1] [2] [3]. In the past 50 years, obesity has become an international health problem that has affected the quality of life, increased the risk of disease, and increased health care costs [4]. The basic cause of obesity is an energy imbalance between incoming calories and excreted calories [5] [6] [7]. Obesity can cause psychological disorders, hypertension, atherosclerosis, coronary heart disease, and diabetes, which greatly affect human health [8].

2.Method and Materials

2.1. *Sample Preparation*

The data used for this study is a variety of foods and the number of calories from each food. The data was taken from health experts and the Minister of Health.

2.2. *Method*

AHP calculation method is used in determining alternative weights from each predetermined category. Criteria in determining AHP weights were obtained by interviewing nutrition experts and also through empirical studies using questionnaires with 100 respondents.

3.Result and Discussion

3.1 *Hierarchy Structure*

The hierarchical structure consists of three levels, namely goal at the first level, criteria at the second level, and alternatives at the third level. The hierarchical structure in this study can be seen in **Figure 1.**

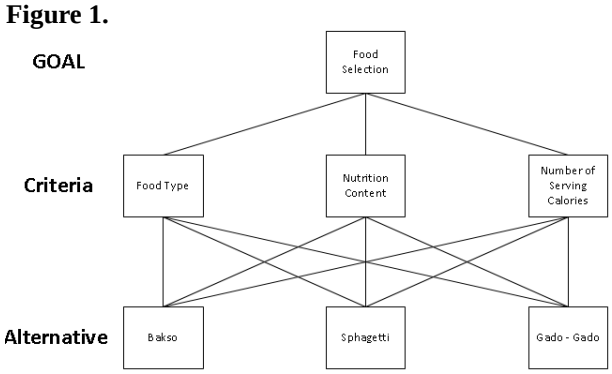


Figure 1 Hierarchy Structure

3.2 *Application of the AHP Method*

1. Determine the criteria in the selection of food for obese people. The criteria are determined based on the literature study undertaken and an interview with with one of the experts. The hierarchical structure can be seen in **Figure 1**, and detailed criteria can be seen in **Table 1.**

Tabel 1 Criteria

Criteria	Information
FT	Food Type

NC	Nutrition Content
NSC	Number of Serving Calories

In determining the level of importance of each criterion, questionnaires were distributed to 50 respondents through Google form. The results of the questionnaire can be seen in **Figure 2**.

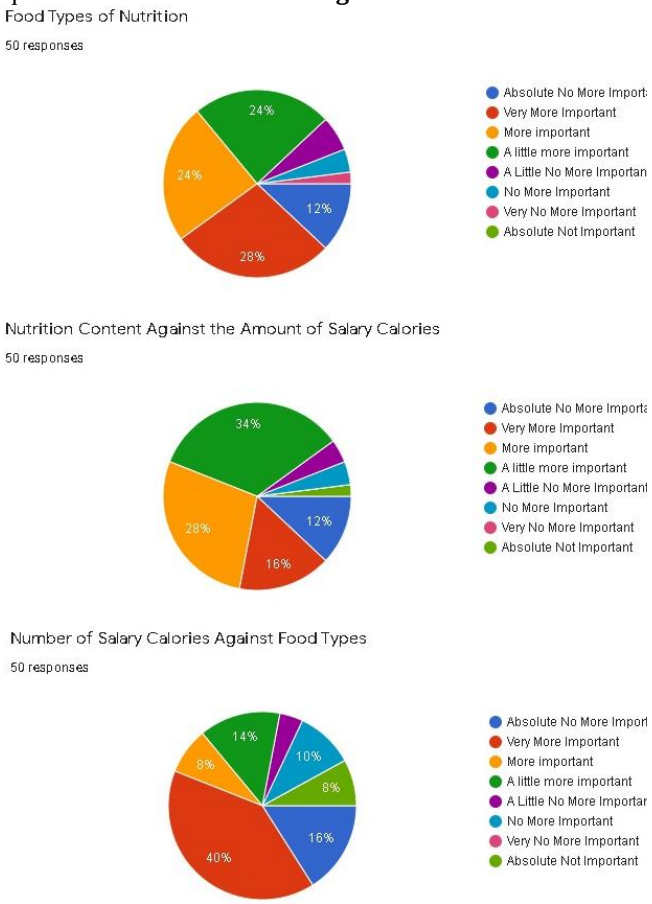


Figure 2 Interest Level Questionnaire

then normalize it along with priority weights and *consistency measurements.* The comparison matrix can be seen in **Table 2,** and the results of normalization in **Table 3.**

Table 2 Criteria Comparison Matrix

	FT	**NC**	**NSC**
FT	1.00	0.20	0.20
NC	5.00	1.00	0.33
NSC	5.00	3.00	1.00
Total	11.00	4.20	1.53

Table 3 Normalization results, priority weights and *Consistency Measures.*

	FT	**NC**	**NSC**	**RESULT**	**CM**
FT	0.09	0.05	0.13	0.09	0.27
NC	0.45	0.24	0.22	0.30	0.95
NSC	0.45	0.71	0.65	0.61	1.97

2. The next step is to compare each alternative per criteria. The alternatives to be compared are meatballs, spaghetti, and gado-gado. For a sample, an alternative comparison will be made on the **FT** criteria in **Table 4.** Then for the results of normalization can be seen in **Table 5.**

Table 4 Comparison of Alternative Types of Food

FT	**Bakso**	**Sphagetti**	**Gado-Gado**
Bakso	1.00	7.00	0.33
Spaghetti	0.14	1.00	0.11
Gado-Gado	3.00	9.00	1.00
Total	4.14	17.00	1.44

Table 5 Normalization Result and Calculation of Priority Weight on Food Type Criteria

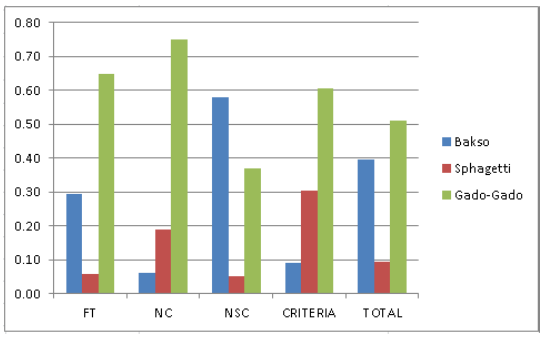
FT	Bakso	Sphagetti	Gado-Gado	Bobot
Bakso	0.24	0.41	0.23	0.29
Sphagetti	0.03	0.06	0.08	0.06
Gado-Gado	0.72	0.53	0.69	0.65

The results will be obtained by multiplying the matrix between the results of alternative weights from each criterion, with the criteria weights. The calculation results can be seen in **Table 6.**

Table 6 Results of Calculation of Alternative Values Based on Criteria

	FT	**NC**	**NSC**	**CRITERIA**	**RESULT**	**RANK**
Bakso	0.29	0.06	0.58	0.09	**0.40**	2.00
Sphagetti	0.06	0.19	0.05	0.30	**0.09**	3.00
Gado-Gado	0.65	0.75	0.37	0.61	**0.51**	1.00

Sensitivity analysis: To test the sensitivity of the analysis, in table 6 the weight of the **FT** criteria is 0.09, from these conditions the weight of the Gado-gado priority is 0.51, Bakso0.40 and Spahgetti 0.09. If the weight of the **FT** criteria is increased to 0.80 then the priority order of food will be Gado-gado 0.97, Bakso 0.61, and Sphagetti 0.13. The results can be seen in **Figure 3.**



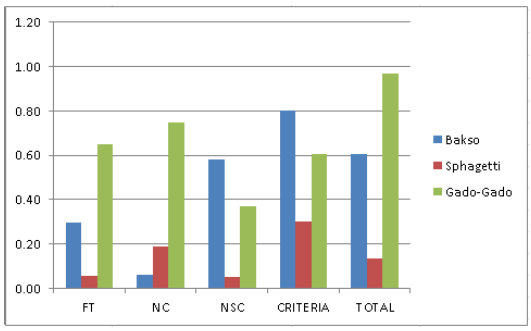


Figure 3 Sensitivity Analysis Graph

The framework of the food selection process to control calorie requirements for obese people with the AHP method can be seen in Figure 4 .

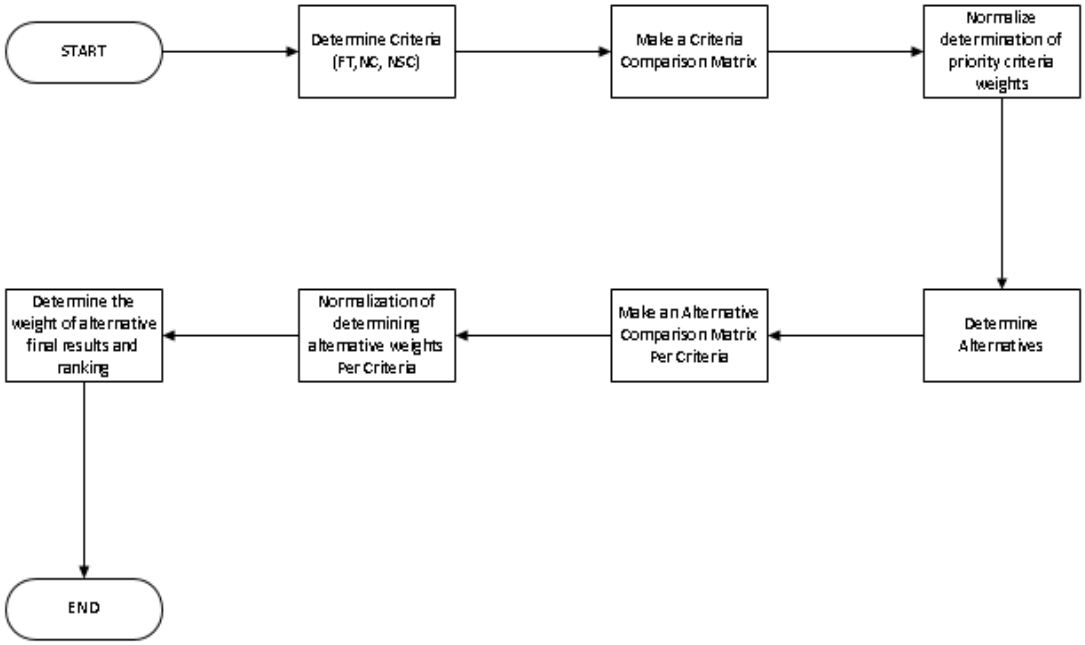
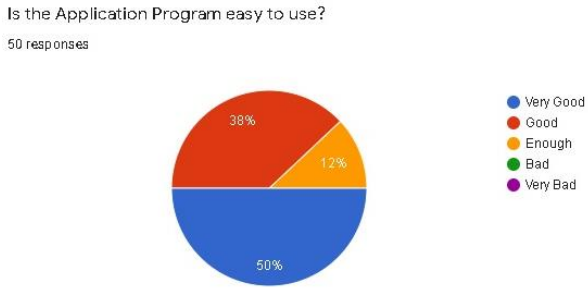
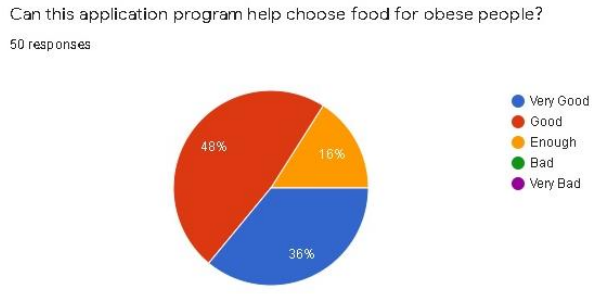


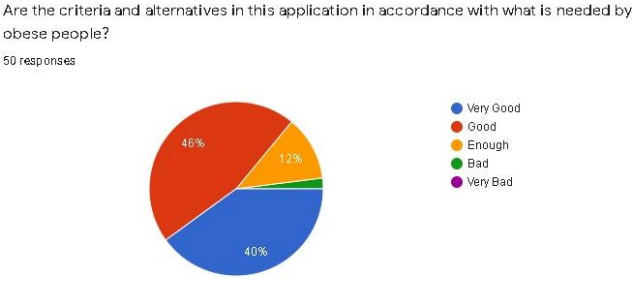
Figure 4 Framework thinking

3.3 Test result

To test the application questionnaires were distributed by 50 respondents by giving them 4 questions. Questions and results of the questionnaire can be seen in **Figure 5**







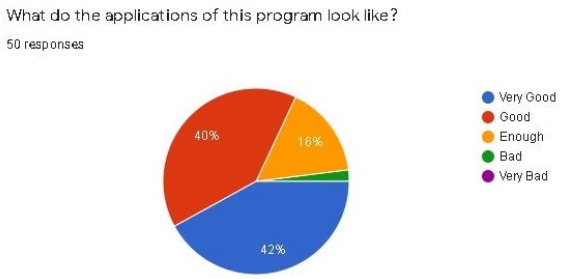


Figure 5 User Evaluation Questionnaire

4. Conclusion

Based on the results obtained from the making of a Food Selection Decision Support System to Control Calorie Needs for Obesity Sufferers, it can be concluded that in this study the Analytic Hierarchy Process method can be used in determining the best food ranking for obese people. In this study shows that this application is very easy to use by users. In this study the application can help users to choose foods properly. In this study the criteria and alternatives are in accordance with the needs of obese people. For display on this application is good.

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