Controlling diet effectiveness through smartphones: An android-based application design

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Abstract. Obesity has become a global issue, and has almost doubled since 1980. One of the strategies chosen for handling or preventing obesity is by diet. Various types of diets are widely developed in the community, such as the ketogenic, Atkins, and mayo diet. There is no definitive data on what diet protocol is the most effective both in the short and long term. Provide an overview and data about diets that are most effective in losing weight. Analytic observational with cross sectional design. Subjects were the total population of women who took the Atkins, the ketogenic, and the Mayo diet at a diet provider in Bandung during 2017-2018 totalling 59 people. Data was analyzed using ANOVA test. To see the difference of those diets with duration 5 or 13 days, Independent T Test was tested. There were differences in weight loss and BMI in women who underwent the Atkins diet, ketogenic diet, and mayo diet with p=0.008 (p=0.05) for weight loss and p=0.007 (p value<0.05) for reduce BMI. The difference was also found in duration with p<0.001 (p value<0.05) for weight loss and p=0.001 (p value 50.05) for decrease in BMI. In both tests Mayo has the highest decrease in weight and BMI.

1. Introduction

The incidence of obesity in Indonesia is currently increasing, concerned with globalization. The increase due to various factors, especially lifestyle associated with excessive eating habits, and low physical activity [1,2]. Obesity indicate a state of abnormal deposits of body fat that can lead to many non-communicable diseases. Indicators that can be used to estimate obesity are body weight and body mass index (BMI) [3]. The prevalence of obesity in Indonesia are higher in females in the age group of teens and adults [4]. Estimated in 2013, there are around 32.9% who are obese for adult women (>18 years). Based on that data, it can be concluded that obesity in Indonesia has become a major issue that requires handling seriously [5].

Many of the strategies chosen for decrease body weight by reducing energy intake (diet, medication, and Bariatric Surgery) and increase energy expenditure (exercise and movement of non-exercise). Awareness of health, especially at a young age, tend to increase. In addition to health, because they don't want to have a fat body in order to be more confident and look attractive to many people. But with the
flurry of today's society, many are not able to take the time to work out. Therefore, they prefer to look at the intake of the food in a way 6 diet.

In the literature, foods that are rich in carbohydrates, especially sugar and fructose can be eaten, often associated with metabolic syndrome. Therefore, to lose weight could be by way of low-carb diets, like the Atkins diet, diet, diet or mayo ketogenic [6,7].

Atkins Diet restrict carbohydrate while emphasizing protein and fat, with the amount of carbohydrates, 10% protein, 25% and 65% fat. While the diet ketogenic with the amount of carbohydrates 5% protein, 35%, and 60% fat. Ketogenic diet and the Atkins diet can lead to ketosis in a State body. To ketosis has significant effects in suppressing hunger [8]. While the diet is a diet low carb mayo without the use of sugar and salt as well as increasing the consumption of fruit and vegetables. The workings of this diet on emphasized on the use of salt, because salt has to retain water, so as not to consume salt, water that is stuck in the body will participate less, and any weight reduced [9].

Diet is one of the controversial issues, many of the recommended way to lose weight, but scientific evidence to recommend a diet is still very low. There has been no definite data on diet Protocol what's most effective both in the short as well as long. Based on the explanation above, the authors are interested in researching the comparative effectiveness of the Atkins diet, diet, diet and ketogenic mayo against the weight and body mass index (BMI).

2. Method
Sampling is done with the data retrieval the woman who is doing the Atkins diet, diet, diet ketogenic and mayo in catering Dietplus Bandung in 2017-2018. The number of subjects for this research are all women who follow a diet that meets the criteria of inclusion and exclusion.

This research was conducted by the method of analytic design observational design of cross sectional. The variables of this research consists of free variables, namely the type of diet that is done (the Atkins diet, diet, diet ketogenic and mayo) and a bound variable i.e. weight and body mass index (BMI).

3. Result
Research has been conducted on one of the caterers diet in Bandung in catering dietplus, with the subject is a woman who is doing the Atkins diet, diet, diet ketogenic and mayo in catering in 2017-2018 IE dietplus as much as 59 person. The research results will be explained through the tables below.

| Table 1. Characteristics of the study subjects were based on age, length of diet and height in women who carried out the Atkins diet, ketogenic diet, and diet mayo. |

| Variabel | Diet | Nilai p$^*$ |
|----------|-----|-------------|
|          | Atkins (Rerata (SD) n (%)) | Mayo (Rerata (SD) n (%)) | Ketogenic (Rerata (SD) n (%)) |
| Usia (tahun) | | | |
| ≤20 | 35,88(8,78) 0(0,0) | 33,12(10,74) 1(4,0) | 31,56(9,13) 1(8,0) | 0,279 |
| 21-35 | 11(52,0) | 13(68,0) | 12(60,0) | |
| 36-50 | 9(44,0) | 3(16,0) | 4(32,0) | |
| >50 | 1(4,0) | 2(12,0) | 0(0,0) | |
| Lama diet 5 hari | 4(24,0) | 6(32,0) | 10(44,0) | 0,319 |
| 13 hari | 17(76,0) | 14(68,0) | 7(56,0) | |
| TB | 160,92(8,81) | 161,60(7,03) | 161,68(10,55) | 0,947 |

Based on table 1 shows that women who are doing the Atkins diet, diet, diet and ketogenic mayo more aged 21-35 years. With most diets long 13 days on the Atkins diet and diet ketogenic diet, while mayo is 5 days.
Table 2. Comparison of weight reduction in women with Atkins, Mayo and Ketogenic diet.

| Variable       | Atkins | Mayo | Ketogenic | P value * ) |
|----------------|--------|------|-----------|-------------|
| Decrease BW    | 2,30   | 3,32 | 2,28      | 0,008       |

Based on table 2 shows that weight loss that most women who go on a diet of mayo and the results of statistical tests using ANOVA test on the degree of confidence 95% indicate that there is a difference in weight loss in women who is doing the Atkins diet, diet, diet ketogenic and mayo with a value of p = 0.008 (p ≤ 0.05).

Table 3. Comparison of BMI reduction in women with Atkins, mayo and ketogenic diet.

| Variable       | Atkins | Mayo | Ketogenic | P value * ) |
|----------------|--------|------|-----------|-------------|
| Decrease BMI   | 0,93   | 1,26 | 0,82      | 0,007       |

Based on table 3 shows that the greatest decline in the BMI in women who go on a diet of mayo and the results of statistical tests using ANOVA test on the degree of confidence 95% indicate that there is a difference decrease in body mass index (BMI) on women who are doing the Atkins diet, diet, diet ketogenic and mayo with a value of p = 0.007 (p ≤ 0.05).

Table 4. Comparison of body weight reduction in women with Atkins, mayo and ketogenic diet for 5 and 13 days.

| Duration       | All Diet | Atkins | Mayo | Ketogenic | P value * ) |
|----------------|----------|--------|------|-----------|-------------|
| 5 days         | 1,87     | 1,65   | 2,11 | 1,81      | 0,001       |
| 13 days        | 3,01     | 2,50   | 3,89 | 2,64      | 0,034       |

Based on table 4 visible that the results of statistical tests using Independent T test on the degree of confidence 95% indicate that there is a difference in weight loss in women on the Atkins diet, diet, diet ketogenic and mayo for 5 days and 13 a day with a value of p < 0,001 (p ≤ 0,05) But there was no difference in weight loss in women on the Atkins diet for 5 days and 13 days with a value of p = (p value 0,176 > 0,05).

Table 5. Comparison of BMI reduction in women with Atkins, Mayo and Ketogenic diet for 5 and 13 days.

| Duration       | All Diet | Atkins | Mayo | Ketogenic | P value * ) |
|----------------|----------|--------|------|-----------|-------------|
| 5 days         | 0,74     | 0,68   | 0,80 | 0,72      | 0,001       |
| 13 days        | 1,14     | 1,01   | 1,47 | 0,91      | 0,138       |

Based on table 5 visible that the results of statistical tests using Independent T test on the degree of confidence 95% indicate that there is a difference in weight loss in women on the Atkins diet, diet, diet ketogenic and mayo for 5 days and 13 a day with a value of p < 0,001 (p ≤ 0,05) But there was no difference in weight loss in women on the Atkins diet for 5 days and 13 days with a value of p = (p value 0,176 > 0,05).
Based on table 5 seen that the results of the statistical tests using Independent T test on the degree of confidence 95% indicate that there is a difference decrease in BMI in women reply doing Atkins diet, diet, diet ketogenic and mayo for 5 days and 13 days with a value of \( p = 0.001 \) (\( p \leq 0.05 \)). But there was no difference in the decline in BMI in women reply doing Atkins diet for 5 days and 13 days with a value of \( p = 0.207 \) (\( p \) value of 0.05 >).

4. Discussion

Based on the results of the research there is a difference in weight loss and body mass index (BMI) in women who do the Atkins, ketogenic and mayo. With the average decline of the greatest diet in mayo. Weight loss and BMI is one indicator that can be assessed for diet effectiveness, so it can be concluded that of the three types of the Atkins diet, diet, diet and ketogenic mayo, the most effective diet is a type of mayo.

All types of low-carb diets such as the Atkins, ketogenic and mayo has the same way of working in losing weight and BMI [10].

Metabolism at the time a diet low in carbohydrates, blood glucose levels will start to decline, as a result of insulin levels decreased while glucagon levels rise. It is a catabolic effect, i.e. result in the breakdown of deposits to meet the energy needs of the body. The first time will take place as a reserve of glycogen breakdown to glucose, then if glycogen is up, then it will occur the solution of lipids known as lipolysis. At a time when the process of lipolysis, the liver will convert the acetyl CoA are ketone bodies being formed which will be used for an energy source, a State called to ketosis. To ketosis has significant effects in suppressing hunger. As such, a diet low in carbohydrates is a good balance of caloric intake and body mimics the effects of famine in the body. Lost hunger related to ketosis causing the total caloric intake is lower [10-12].

The difference in these three types of this diet on the amount of carbohydrates, protein, and fat is rendered. On a diet of carbohydrates quantities given Ketogenic least compared the Atkins diet, diet and mayo, but given the amount of protein that many compared to the Atkins diet [13,14]. According the theory, the role of protein in weight loss i.e. proteins can increase negative energy balance because a significant limitation in the type and amount of food eaten, so result in weight will go down. Many are consuming foods sourced from protein also has the effect of the glut of 16 research on childhood obesity conducted Nature Medicine showed that food consumption i.e. proteins in the body will speed up your metabolism and prevents weight weights added. So, it can be concluded that a diet that is more the amount of protein diet such as ketogenic will be faster in losing weight than the Atkins diet is less protein. It is also comparable with research that compares the amount of protein (12% to 25% kcal of protein), and the results showed that weight loss with high protein diet (8.9 kg) compared with protein low (5.1 kg) for 2 months [15,16] however, there are other studies that show the same weight loss with varying amounts of protein and fat composition, which shows that the total energy intake is the most important determinant for weight loss [17]. While the results of this research show that the Atkins diet with fewer amount of protein has a weight loss diet compared with the larger ketogenic with a larger amount of protein. This is incompatible with the theory and previous research.

Based on the literature, on the Atkins diet can lose weight around 15 pounds (6.8 kilograms) in the first two weeks of the diet [13]. Mayo can lose weight around 2.7 to 4.5 pounds in the first two weeks [18]. While on the diet ketogenic can lose weight up to 5% of body weight in the first two weeks [19]. Such matters in accordance with the research that there is a difference in weight loss between the Atkins diet, diet, diet ketogenic and mayo. However, if the comparison of weight loss is not in accordance with the research showing that diet mayo has a weight loss greater than diet Atkin diet and ketogenic.

On mayo diet, although the reduction of carbohydrates not as much on the Atkins diet and diet ketogenic diet, mayo had other work in weight loss by consuming more fruits and vegetables. Fruit and vegetable consumption has been recommended both handler on prevention of obesity. Not only is obesity, the recommendations of vegetable and fruit consumption has also been linked on the handling of the disease is not contagious such as hypertension, diabetes mellitus, coronary heart disease, stroke, and cancer 17. In addition, because it is free of fat and cholesterol, fruit and vegetable can also be
digestives. Smooth digestion will help shed fat, improve your heart, and help meet the needs of nutrition for the benefit of metabolic processes. Metabolism has enormous influence in the combustion process. In addition to a rich vegetable and fruits, all foodstuffs in the diet of processed without using mayo salt and cooking oil and sugar with a very limited amount.

Based on the results of the study also shows that there is a difference in weight loss and BMI on ladies doing the Atkins diet, diet, diet ketogenic and mayo for 5 days and 13 days. However, if seen in each type of diet, the Atkins diet is not only there is a difference in weight loss and the BMI for 5 days and 13 days.

On the Atkins diet can lose weight around 15 pounds (6.8 kilograms) in the first two weeks on the phase 1 i.e. induction phase. In this rigorous phase, reducing almost all carbohydrate from the diet, i.e. eating only 20 grams of net carbs a day, mainly derived from vegetables. In normal circumstances, as recommended by the Guide to nutrition, carbohydrates consumed per day i.e. 45% to 65% of calories, but in this phase only get about 10% [15]. Mayo diet can lose weight around 2.7 to 4.5 pounds in the first two weeks on the phase 1 i.e. it loose phases designed to accelerate weight loss diet ketogenic [18]. Effective as a weight loss therapy with an average can lose weight up to 5% on the first two weeks of the 19th.

The study of the literature shows from these three types of diet, good diet Atkin, diet ketogenic diet, and mayo, time effective for achieving weight loss is in the second week. So if than do the diet 5 days there will be a difference with the diets 13 days from either weight loss or decrease of BMI.

5. Conclusion
Based on data obtained from research can be drawn the following conclusions:

- There is a difference in weight loss in women who are doing the Atkins diet, diet, diet ketogenic and mayo.
- There is a difference decrease in body mass index (BMI) in women who do the Atkins diet ketogenic and mayo.
- There is a difference in weight loss in women is doing Atkins diet, ketogenic and mayo for 5 days and 13 days.
- There is a difference decrease in BMI in women reply doing Atkins diet, ketogenic and Mayo for 5 days and 13 days.

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