THE EFFECT OF NUTRITION COUNSELING USING WHATSAPP AND MYFITNESSPAL APPLICATION ON VEGETABLE AND FRUIT CONSUMPTION IN OVERWEIGHT AND OBESE STUDENTS

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ABSTRACT

Overweight and obesity are the fifth-leading causes of death around the globe. One of the causes of these health problems is the need for a diet high in vegetables and fruits. The average intake of vegetables in the Special Region of Yogyakarta, such as Kulon Progo, is 2%, Bantul 1.7%, Sleman 1.8%, and the city of Yogyakarta 1.6%, respectively. Meanwhile, the average fruit consumption in Kulon Progo is 0.8%, in Sleman it is 0.7%, in Yogyakarta it is 0.8%, and in Bantul it has declined. So, interventions are needed, such as nutritional counseling and intake monitoring, to boost the consumption of vegetables and fruits. The aim is to examine the effect of nutritional advice using WhatsApp and MyFitnessPal apps on vegetable and fruit consumption among overweight and obese students. A pretest-post-test study design with a control group design was used. The study population was students of Alma Ata University. The sample size was 78 overweight and obese students, employing a purposeful sampling technique. Collecting data using analytical scales for weight factors and food intake using the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) Data analysis approaches used paired t-tests, Wilcoxon tests, and Mann-Whitney tests. Two times, dietary advice is given online via WhatsApp phone call. Based on the results of the test, the difference before and after counseling indicated insignificant results, with a value of P = 0.663 on vegetable intake and P = 0.268 on fruit consumption. There is no effect of nutritional advice using WhatsApp and MyFitnessPal applications on the consumption of vegetables and fruit among overweight and obese students.

Keywords: College Students, Fruits, Obesity, Students, Vegetables

1. INTRODUCTION

Health concerns such as overweight and obesity are a hazard to society because they are the fifth biggest cause of death on the globe. Every year, 2.8 million adults die as a result of being overweight or obese. Overweight and obesity are complex disorders caused by the excessive accumulation of adipose tissue. Overweight and obesity can be determined by calculating the Body Mass Index (BMI). (Department of Health, 2011). The prevalence of obesity in the world among adults (>18 years) with a BMI ≥25 kg/m2 is 39%, while the prevalence of overweight with a BMI ≥23 kg/m2 is 11% for males and 15% for females. (WHO, 2016).

Based on WHO estimates (2011), as many as 1.6 billion adults are overweight, and 400 million of them are obese. According to data from the American Heart Association (AHA) in 2011, the number of obese children aged 2–19 years in America was 12 million (16.3%). About one-third (32.9%) or 72 million adult citizens of the United States are obese. (Sientia, 2012). In Indonesia, the cases of overweight and obesity are increasing annually. According to RISKESDAS (2018), the prevalence of overweight in adults >18 years old in 2007 was 8.6%, in 2013 it was 11.5%, and in 2018 it was 13.6%. Obesity has also increased, namely by 10.5% in 2007, 14.8% in 2013, and 21.8% in 2018. (Public Health Office, 2016). The prevalence of nutritional status based on the BMI category in the adult population (> 18 years) in Yogyakarta was 13.9% for females and 12.6% for males, and it is the province that ranks the seventeenth highest in Indonesia. (Ministry of Health, 2018).

Overweight and obese, regardless of age group. Being overweight is prone to occur at a young age, especially in adulthood, for example, among students. (Halim, 2019). This time is prone to changes in eating practices, which result in the energy consumed being imbalanced. Lifestyle changes in the contemporary period make students tend to be more passive, which has an impact on increasing body weight. (Nelson, 2008). Students continually need energy, yet their daily consumption tends to be high-calorie foods. In the first year of college, both male and female students can acquire 3–4.3 kg in body weight. (De Vos, 2015). From matriculation to graduation, there was a weight gain of 1.7 kg for girls and 4.2 kg for males. (Racette, 2008).

Being overweight can result in increased metabolic effects on blood pressure, cholesterol, triglycerides, and insulin resistance. Increased BMI is connected with an increased risk of type 2 diabetes mellitus, coronary heart

disease, stroke, and cancer. Obesity and a lack of physical activity can contribute to a 30% risk of cancer. (WHO, 2016).

The cause of becoming overweight or obese is an improper lifestyle. A sedentary lifestyle is associated with excessive eating behaviors such as high carbohydrate and fat intake, protein intake, and low fiber intake, which generates an imbalance between nutritional intake and suggested nutritional adequacy. (Andriani, 2012). Fiber can be derived from vegetables and fruit. Fiber can control extra weight. (Santoso, 2011). According to the Balanced Nutrition Guidelines (PGS) recommendations, Indonesian individuals are urged to have 3–4 servings of vegetables every day, or the equivalent of 250 grams per day, and ingest 2-3 servings of fruit every day, or the equivalent of 150 grams per day. (Ministry of Health, 2014).

The average fruit serving consumption per day for ages >10 years old by DI Yogyakarta district is as much as Kulon Progo Regency (0.8%), Bantul (0.7%), Sleman (0.7%), and Yogyakarta City (0.8%). The average vegetable serving intake per day for residents ≥10 years old is as much as Kulon Progo 2.0%, Bantul 1.7%, Sleman 1.8%, and Yogyakarta City 1.6%. (Sugianto, 2013).

Consumption of vegetables and fruit in Bantul Regency According to SUSENAS in 2017, it has dropped in the last 3 years. In 2015, the average consumption of veggies was 4.82% and fruit consumption was 5.27%. The average consumption of vegetables and fruits in 2016 was 2.59% and 2.09%, respectively. In 2017, the average consumption of veggies was 3.20% and fruit consumption was 2.30%. (Central Statistics Agency, 2017).

Obese children consume fruit and vegetables <7 times more per week than non-obese youngsters (Nuraeni, 2013). Overweight teenagers consume very low fiber intake, which was 11.1 grams from the guidelines set based on the RDA of 30-35 g/day. (Iriantika, 2017). The incidence of overweight, if not treated immediately, will develop into obesity, which increases the risk factor for PTM. An overweight prevention program for university students has previously been carried out. (Wing, 2011).

According to the American College Health Association (2010), 28.8% of students are overweight, and 39.4% are obese. Several techniques can be utilized to enhance vegetable and fruit intake, namely nutritional counseling and a combination of interventions with the use of applications to promote the effectiveness of the intervention

program. (Carter, 2013). According to Ningrum (2019), nutritional counseling enhances the consumption of vegetables and fruit and reduces the consumption of fast food in adults with overweight and obesity. One sort of diet that is successful in decreasing weight to avoid non-communicable diseases is a low-calorie diet. This diet can achieve clinically meaningful weight loss regardless of which macronutrients are focused on and can minimize the risk of heart disease and DM. Another piece of software that can promote weight loss and be used to enhance vegetable and fruit intake is the MyFitnessPal application. This application can raise one's awareness of the meal to be consumed. This application exhibits relatively good validity, especially for the consumption of macronutrients and the intake of sodium. (Nurwanti, 2019).

According to Arrohmah (2019), the influence of nutrition education with parents on the average fiber consumption daily and fat in elementary school children in Bantul district is that there is a difference in fiber consumption before and after nutrition education with an increase of 1.61 gr/day. Then there was no difference in average fat consumption, but there was an increase of 3 grams per day. There was a significant difference in the average consumption of fiber and fat between the experimental and control groups ($p<0.05$). (Saputri, 2019).

Interventions are carried out completely through nutritional counseling and self-monitoring of intake so that eating behavior, physical activity, selection of food items, and changes in attitudes can be agreed upon and adherence to a diet can be determined according to mutual agreement. This intervention can help overweight and obese adolescents improve their eating behavior, especially vegetable and fruit consumption, and enhance physical activity to obtain a normal body weight and maintain a healthy body (PERSAGI, 2019).

Based on this explanation, researchers were interested in conducting research regarding "The Effect of Nutrition Counseling Using WhatsApp and MyFitnessPal Application on Vegetable and Fruit Consumption in Overweight and Obese Students."

2. METHOD

The research is a quantitative study using an experimental research design, specifically a pretest-post-test with a control group design. This experimental research method is a method that tests hypotheses in the form of a causal link. This research was

conducted to determine the influence of the independent variables, then assess the changes caused by the interventions carried out and the consequences of the interventions, which were changes in the value of the dependent variable (Machfoed, 2017). The pretest post-test with control group design, namely, the two groups each carried out a pre-test with the same material, after which the experimental group was given a counseling intervention by suggesting a low-calorie diet of 1200 Kcal and MyFitnessPal for self-monitoring of food intake, while the control group was only given a balanced nutrition leaflet and self-monitoring of food intake using MyFitnessPal.

Intervention for 2 weeks. After that, a post-test was carried out in two groups. The strategy for determining the sample utilized a purposive sampling method.

3. RESULT AND DISCUSSION

1) Characteristic

Based on the screening results of 144 overweight and obese students, 65 students met the inclusion requirements as research respondents. The research responses comprised 34 intervention groups and 31 control groups. The features of the respondents were gender, inheritance, pocket money each month, and types of vegetables and fruits ingested. The characteristics of the respondents may be found in Table.

Table 1. Respondents Distribution Based on Intervention Group.

Variables	Intervention	Control	*p*
Gender			0,145
Male	4 (33,3)	8 (66,7)	
Female	30 (56,6)	23 (43,4)	
Obesity history			0,123
Yes	15 (62,5)	8 (34,8)	
No	19 45,2)	23 (54,8)	
Pocket Money per Month			0,171
≤1.000.000 IDR	18 (47,4)	20 (52,6)	
>1.000.000 IDR	16 (59,3)	11 (40,7)	
Vegetables consumption per day			0,358
¼ portion	1 (33,3)	2 (66,7)	
½ portion	11 (64,7)	6 (35,3)	
1 portion	15 (57,7)	11 (42,3)	
2 portions	6 (42,9)	8 (57,1)	
3 portions	1 (20)	4 (80)	
Types of vegetables that are often consumed			0,734
Water spinach	22 (56,4)	17 (43,6)	
Spinach	17 (56,7)	13 (43,3)	
Cabbage	9 (33,3)	18 (66,7)	
Barries to consume vegetables			0,187
Nothing	20 (66,7)	10 (33,3)	
Do not have time	7 (36,8)	12 (63,2)	
Do not like	3 (37,5)	5 (62,5)	
Willingness	3 (42,9)	4 (57,1)	
Do not like cooking	1 (100)	0 (0)	
Fruits consumption per day			0,860
	¼ portion	1 (50)	1 (50)
	½ portion	5 (55,6)	4 (44,4)

	1 portion	19 (55,9)	15 (44,4)
	2 portions	5 (41,7)	7 (58,3)
	3 portions	3 (42,9)	4 (57,1)
Types of fruits that are often consumed			0.580
Banana	18 (64.3)	10 (35.7)	
Pir	13 (54.2)	11 (45.8)	
Papaya	9 (50)	9 (50)	
Barries to consume fruits			0,588
Nothing	17 (63)	10 (37)	
Allergic	1 (50)	1 (50)	
Do not like	1 (50)	1 (50)	
Expensive price	13 (41,9)	18 (58,1)	
Willingness	2 (66,7)	1 (33,3)	

Based on Table 1, chi-square analysis was used. It was observed that p> 0.05. This reveals that there is no significant variation in the characteristics of the respondents in the two groups.

2) Differences in Vegetable and Fruit Intake Before and After Intervention in Overweight and Obese Students During the Covid-19 Pandemic.

The analysis test was carried out to identify differences in vegetable and fruit intake before and after being offered counseling two times. The result of the difference in consumption of vegetables and fruit before and after the intervention may be observed in Table 2.

Table 2. Differences in Vegetable and Fruits Intake Before and After Treatment in Intervention and Control Group.

Variables	Intervention			Control			The Difference between two groups
	Pre	Post	p	Pre	Post	p	
Vegetables Intake (g)	81,4 ±45	84,7 ±41,7	0,663	195,6 ±58,6	102,8 ±77,6	0,601	0,317
Friuts Intake (g)	126,9±56,9	142,8 ±82,3	0,268	72,5 ±63,7	62±43,1	0,399	0,317

Table 2 reveals that in the intervention group, the average daily vegetable intake was 81.4 g ± 45, which increased to 84.7 g ± 41.7 following the intervention. Then the average fruit consumption value of 125.9 g ± 56.9 climbed to 142.8 g ± 82.3 following the intervention. The result of the paired sample t-test reveals there was no significant change between vegetable and fruit intake before and after the intervention (p > 0.05).

In the control group, the average value of vegetables per day was 102.8 g ± 77.6, which reduced to 95.6 g ± 58.6 after the intervention. In terms of fruit intake, the average value was 72.5 g ± 63.7, which reduced to 62 g ± 43.1 following the intervention. Based on the Wilcoxon test, the p-value was > 0.05, therefore there was no significant change in any variables, notably between vegetable and fruit intake and

total intake before and after the intervention.

DISCUSSION

The results of this study reveal that, following statistical analysis using the chi-square test, a value of p> 0.05 was achieved. So, there is no substantial variation in the features of the two groups evaluated. In addition, there was no significant difference between vegetable and fruit intake before and after the intervention with a p > 0.05 based on the paired t-test, and there was no difference in the average intake of vegetables and fruit before and after the intervention in the two groups (p > 0.05) based on the Mann-Whitney test.

1) Characteristics

The respondents were Alma Ata University students with overweight and obese nutritional status. The number of respondents in the intervention group was 39, and 39 respondents were in the control group. During the course of the trial, 34 respondents in the intervention group lived to the end of the study, and 31 respondents in the control group. This investigation was undertaken during the COVID-19 epidemic. The features of the respondents include gender, inheritance, pocket money each month, and types of vegetables and fruit that are often consumed.

a. Gender

Both groups were dominated by female respondents: 56.6% in the intervention group and 43.4% in the control group. The dietary demands of males and females are different. The distinction can be noticed in the body's constituent tissues and the actions carried out. Fat tissue in females tends to be higher than in males. Males have more muscle tissue; hence, men's lean body mass tends to be higher than females. Obesity is seen more in women than in men. This is because the proportion of body fat in females is higher and more is stored in the pelvic area, whereas males are stored in the stomach. (Sulistyoningsih, 2011).

b. Family history of obesity

Most of the respondents did not have an inheritance of obesity from their family in either the intervention or control groups. As much as 45.2% in the intervention group, and in the control group as much as 54.8%. Obesity history is a respondent's family history of being overweight or obese. Hereditary factors can have a crucial impact on the incidence of obesity. If both parents are obese, then 80% of their offspring will be obese in the future. However, if only one of them is obese, the incidence of obesity in children is 40%. (Pramudita, 2011).

Hereditary factors can determine the amount of fat cell

elements that exceed normal size so that they will automatically be easily passed on to the baby from the time he is in the womb. Fat cells eventually become storage places for excess fat, or fat cells might decline in size but are still in situ. (Henuhili, 2020).

c. Pocket money per month

Based on the pocket money per month, the intervention group had Rp. ≤1,000,000/month by 47.4%, while in the control group, it had 52.6%. Pocket money is a component that might affect student consumption expenditure, with an average income of pocket money that is variable every day or month. Some students rely on pocket money for consumption expenses in certain periods, so that pocket money and expenses are precisely proportionate. (Karoma, 2013).

d. Types of vegetables that are often consumed

The types of vegetables consumed predominantly in both the intervention group and the control group were kale, spinach, and cabbage. The intervention group that ingested kale was 56.4%, while the control group was 43.6%. In the intervention group, 56.7% consumed spinach, while in the control group, 43.3% Cabbage consumption in the intervention group was 33.3%, whereas in the control group, it was 18 (66.7%). Vegetables are great sources of vitamin A, vitamin C, and B vitamins, especially folate, and other minerals such as magnesium, potassium, calcium, and iron, yet they do not include fat and cholesterol.

Green veggies and orange vegetables such as carrots and tomatoes have more provitamin A in the form of beta-carotene than non-colored foods. Green vegetables are rich in calcium, iron, folic acid, and vitamin C, for example, spinach, papaya leaves, and katuk leaves. The greener the tint of the leaves, the richer the nutrients. Vegetables offer antioxidants that can fight free radicals and carcinogenic substances. (Wirakusumah, 2005).

e. Types of fruit that are often consumed

The varieties of fruit that were often consumed by respondents in the intervention and control groups were banana, pear, and papaya. The intervention group that ingested bananas was 64.3%, while the control group was 35.7%. In the intervention group, 54.2% ingested pear, while in the control group, 45.8% The consumption of papaya in each group was 50%.

Fruit is a source of vitamin A, vitamin C, potassium, and fiber. Sodium is not included in fruit, fat (excluding avocado), or cholesterol. The fiber content in fruit has benefits

and is particularly influential in the digestive system, which can bind water and resistance to fermentation by bacteria so that fiber is needed by the body. (Ichsan, 2015).

Based on the Balanced Nutrition Tumpeng (TGS), the recommended consumption of vegetables in Indonesia is 3–4 servings a day. Meanwhile, consume 2-3 servings of fruit a day. TGS incorporates 4 elements of balanced nutrition, namely consuming a range of foods according to needs, hygiene, physical exercise, and monitoring ideal body weight. Vegetables and fruit are rich in vitamins and minerals whose role cannot be substituted by other nutrients. (Roe, 2013)

2) Differences in Vegetable and Fruit Intake Before and After Intervention in Overweight and Obese Students.

In the intervention group, nutrition counseling was carried out twice, which was predicted to be able to influence the eating behavior of overweight and obese students, especially by increasing the intake of vegetables and fruit. Nutrition counseling enhances vegetable and fruit intake and reduces the incidence of overweight and obesity. (Ningrum, 2019).

According to the normality test in the intervention group, it revealed that the data had a normal distribution. In addition, to see the difference in the average intake of vegetables and fruit before and after the intervention, a statistical test was carried out using a paired sample test. The findings of the research indicated that in the intervention group, P = 0.663 for vegetable consumption and P = 0.268 for fruit intake. Whereas in the control group, the Wilcoxon test was performed. For vegetable intake, P = 0.601, and P = 0.39 for fruit intake.

Based on these statistical analyses, there was no significant difference in vegetable and fruit intake before and after being given nutrition counseling twice ($p > 0.05$). This is in line with research conducted by Herman (2020) demonstrating the findings of vegetable intake frequency ($p = 1{,}000$), vegetable consumption portion ($p = 1{,}000$), fruit consumption frequency ($p = 0{,}815$), and fruit consumption portion ($p = 1{,}000$).

Furthermore, the p-value is above 0.05, meaning there are no differences in knowledge, attitudes, and consumption habits of vegetables and fruit in adolescents before and after being offered education through leaflet media. (Madruga, 2009).

The results showed that the average value of vegetable and fruit intake in the intervention group after the nutritional counseling was carried out was greater than before the

nutritional counseling was carried out. Although there was no significant difference, Table 2 reveals that there was a bigger difference in fruit intake in the intervention group that was given nutrition counseling than in the control group. This is in line with another study conducted by Yulianto et al. (2007), which found that providing education on the advantages of vegetables and fruit had a bigger influence on raising the amount of fruit eating than the amount of vegetable consumption in respondents. (Noia, 2013).

The factors that can influence eating behavior consist of numerous factors, such as the availability of food ingredients, the expenses needed to procure food ingredients, food preparation time, flavor, and other factors that can change eating behavior. (Krolner, 2011). Availability and access to food sources of fiber are favorably connected to vegetable and fruit intake in college students. (Syifa, 2019). Most parents, especially moms of students who work, cannot ensure the availability of or prepare vegetables and fruit at home.

The COVID-19 pandemic has prompted several locations to remain in lockdown, making it increasingly difficult for students to provide groceries at boarding houses. In addition, boarding facilities that do not have kitchens make kids resort to instant food. Students rarely buy consumables such as fruit since pocket money is diverted to purchase staple items. Students only consume particular types of fruit whose costs are more accessible. The lockdown has also led fruit prices to become more expensive due to the food distribution system being impeded by the COVID pandemic. (Rachman, 2017).

During the counseling session, numerous kids claimed they did not like vegetables because they tasted horrible, they were soft, they had limited time to prepare since they were processed, they only consumed certain veggies, and the processing method was not adequate. This is in line with other studies that claim that flavor is the key reason for the difficulty of boosting vegetable intake. Vegetables are connected with negative and unpleasant tastes such as bitter, sour, tasteless, and soft. (Lestari, 2015)

Based on Table 2, the P value is >0.05, thus it can be claimed that there is no effect of counseling and self-monitoring of consumption (MyFitnessPal) on vegetable and fruit intake in overweight and obese students in Alma Ata. This is in line with research conducted by Syiva et al. (2019), which indicated that poster media did not have a significant influence on both the intervention group and the control group.

According to Rachman et al. (2017), various factors can influence vegetable and fruit consumption, including attitudes, nutritional awareness, food availability, media exposure, and parental income. Attitude is a reaction to a stimulus or object, in this case, the behavior of consuming vegetables and fruit. The attitude of acceptance of food in a person is highly impacted by peers.

Knowledge of nutrition is one's understanding of nutrition, nutrition, and the interplay between nutrients and nutritional status and health. Knowledge of healthy food is an important aspect of food choices because it is one of the factors in healthy eating behavior. Someone with little knowledge of nutrition can make mistakes in food selection, raising the risk of nutritional issues.

The availability of food might affect a person's eating patterns and the choice of food to be consumed. If the supply of food is low, a person's ability to access that food will be more challenging. More types of food available have a greater possibility of being consumed. Media exposure has a big influence on vegetable and fruit intake behavior. One of them is advertising. Apart from being a marketing medium, advertising also has a significant role as a source of nutrition information. Meeting the necessities of a family depends on family income, especially parents' income. Income is a factor that impacts the quality and quantity of food consumed. The bigger the income, the greater the opportunity to choose healthy cuisine. In conjunction with changes in a person's income, it will be followed by changes in the content of food consumed. Someone with high economic standing likes to consume meals with regard to nutritional content. (Almatsier, 2011).

4. CONCLUSION

1. There was no significant difference in the average vegetable intake before and after the intervention among overweight and obese students at Alma Ata University, with a P value of 0.663 in the intervention group.
2. There was no significant difference in the average fruit intake before and after the intervention among overweight and obese students at Alma Ata University, with a P value of 0.268 in the intervention group.
3. There was no difference in the average intake of vegetables and fruit before and after the intervention in the intervention and control groups, with P = 0.371.

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