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Evaluasi Pemberian Intervensi Gizi terhadap Kebiasaan Makan Snack dan Status Antropometri pada Mahasiswa di Kota Malang

Evaluation of Nutrition Intervention on Snack's Eating Habits and Anthropometric Status of College Students in Malang City

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ABSTRAK

Latar Belakang: *Lebih dari 80% mahasiswa di Malang suka mengonsumsi snack tidak sehat misalnya snack kemasan, gorengan, dan bakso. Snack tersebut mengandung tinggi energi, karbohidrat, protein, lemak jenuh, dan garam. Kelebihan asupan energi dan zat-zat gizi tersebut berhubungan dengan meningkatnya kejadian sindroma metabolik dan faktor risiko utama penyakit kardiovaskuler.*
Tujuan: *Penelitian ini bertujuan untuk mengetahui efektifitas pemberian intervensi edukasi gizi terhadap kebiasaan makan snack sehat dan status antropometri pada mahasiswa di kota Malang.*
Metode: *Penelitian ini menggunakan desain quasi-experimental: pre-test dan post-test, Non-Equivalent Control Group Design dengan 31 orang subyek penelitian yang berstatus sebagai mahasiswa di kota Malang. Intervensi gizi yang diberikan selama 3 bulan berupa edukasi terkait snack sehat dan pendampingan pembuatan snack sehat. Instrumen yang digunakan dengan pretest-posttest, kuesioner, dan semi FFQ. Pengolahan data dilakukan dengan analisis statistik deskriptif, Wilcoxon signed rank test, dan t-test berpasangan pada tingkat kepercayaan 95%.*
Hasil: *Terdapat peningkatan pengetahuan terkait snack sehat secara signifikan pada subyek penelitian (p<0.01) yang ditunjukkan dari hasil pre-test dan post-test sebanyak 30%. Terjadi peningkatan pengaruh 'nutrition claims' pada pemilihan snack sebanyak 31% serta terdapat perbedaan yang signifikan antara sebelum dan sesudah diberikan intervensi (p=0.013). Hasil semi FFQ snack sehat untuk kategori buah mengalami peningkatan yang signifikan setelah diberikan program intervensi (p < 0.01), sedangkan hasil semi-FFQ snack tidak sehat (kategori krakers asin, coklat/permen, pudding, dan jajan pasar) cenderung mengalami penurunan jumlah konsumsi meskipun tidak signifikan. Prevalensi overweight dan obesitas pada peserta sebelum diberikan intervensi sebanyak 29%, dan mengalami penurunan setelah diberikan intervensi menjadi 22.6% meskipun tidak ada perbedaan yang signifikan (p=0.096).*
Kesimpulan: *Terdapat peningkatan pengaruh atas 'nutrition claim' pada pemilihan snack, dan peningkatan konsumsi buah setelah dilakukan intervensi. Selain itu, terdapat kecenderungan penurunan prevalensi overweight dan obese meskipun tidak signifikan.*

Kata Kunci: *Snack, Kebiasaan Makan, Status Antropometri, Mahasiswa*

ABSTRACT

Background: More than 80% of students tend to consume unhealthy snacks such as packaged snacks, fried foods, and meatballs. The unhealthy snacks contain high energy, carbohydrates, protein, saturated fat, and salt. The excess energy and those nutrients intake are related to increasing of metabolic syndromes and the main risk factors for cardiovascular disease.
Objectives: This study aims to determine the effectiveness of giving nutritional interventions to snack's eating habits and anthropometric status of college students in Malang.
Methods: This research applied quasi-experimental design: pre-test and post-test, Non-Equivalent Control Group Design with 31 participants from college students in Malang city. Nutrition interventions provided for 3 months were in the form of giving education related to healthy snacks and assistance in making healthy snacks. The instruments used were pretest and posttest, questionnaire, and semi FFQ. Data processing was carried out by descriptive statistical analysis,Wilcoxon signed rank test, and paired t-test at a 95% confidence level.
Results: There was a significant increase in knowledge related to healthy snacks for research subjects (p <0.01) indicated by the results of the pre-test and post-test at 30%. There was an increase in the influence of nutrition claims towards choosing snacks by 31% and there was a significant difference between before and after the intervention (p = 0.013). The results of a healthy semi FFQ snack for the fruit category experienced a significant increase after being given an intervention program (p <0.01), while the semi FFQ results for unhealthy snacks for the category of salted crackers, chocolate / candy, pudding, and

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market snacks tended to decrease in consumption although it is not significant. The prevalence of overweight and obese in participants before being given intervention was 29% and decreased after being given intervention to 22.
Conclusions: There is an increase in the influence of 'nutrition claims' and fruit consumption significantly. While the prevalence of obese tends to fall even though it is not significant between college students.

Keywords: Snacks, Eating Habits, Anthropometric Status, College Students

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INTRODUCTION

This research is based on the number of students who lack awareness of healthy snack consumption. Problems that arise in overseas students based on the results of the study show that there are more than 80% of the 397 overseas students like to eat unhealthy snacks such as packaged snacks, fried foods, instant noodles, and meatballs.[1] These snacks contain high energy, carbohydrates, saturated fat protein, and salt. The excess salt intake is associated with the increase of blood pressure and a major risk factor for cardiovascular disease[2,3]. Meanwhile, the high consumption of energy dense foods can increase the risk of obesity[4]. The prevalence of overweight and obesity has also become the main concern, since according to a report from the World Health Organization in 2016, 1.9 billion adults aged 18 years and over are overweight and 650 million are obese. Overweight and obesity are major risk factors for non-communicable diseases such as cardiovascular disease, type 2 diabetes mellitus, muscle bone disorders, and cancer.[5]. Even though the consumption of snacks, which are less than the three main meals, contributes to energy and nutrient intake. In case control research[6] and cross-sectional [7]shows that the frequency of snack consumption is associated with the consumption of energy dense foods and increases the risk of obesity. In addition, consumption of foods high in protein can also increase the risk of type 2 diabetes mellitus (DM)[8,9].

Giving intervention to students with education and mentoring will increase their knowledge regarding the selection of healthy snacks, avoiding unhealthy snacks, how to read nutrition labels on packaged snacks, being aware of hazardous food additives, and general guidelines for balanced nutrition. Furthermore, mentoring, they will improve their skills in making healthy snacks. Therefore, they will improve their eating habits, become healthy, nutritious, and balanced. The social benefits that can be generated are broad, namely the research subjects will provide information to their colleagues / campus canteen / other food organizers regarding healthy and nutritionally balanced snacks. This study aims to determine the effectiveness of nutritional interventions in the form of education and assistance in making healthy snacks for students before and after treatment.

METHOD

The research design was a quasi-experimental design: pretest and post-test, and Non-Equivalent Control Group Design. The research was conducted in universities located in Malang such as Brawijaya University, State University of Malang, and State Islamic University of Malang. The screening process for taking subject sampling according to the inclusion criteria was started from April 2018 to May 2018. According to 2018 SMBPTN data, Malang is the first place for prospective students to continue their university level. Therefore, Malang city has the highest number of student contributions among other cities. The education provision was held at the Faculty of Computer Science Brawijaya University, while the assistance was carried out at the boarding house for each student from June 2018 to August 2018.

The subject of the research were taken using purposive sampling technique based on the inclusion criteria. The inclusion criteria of the subjects were students who lived in a boarding house or rented and were willing to take part in a nutrition intervention program in the form of providing education and assistance in making healthy snacks. The initial screening was conducted in 61 people, but there were only 31 students met the inclusion criteria. The recruitment of subjects was carried out by enumerators who graduated from 3-years Diploma and 4-years Diploma Nutrition through questionnaires. The enumerator provided an explanation related to the research before asking for informed consent for filling out the questionnaire. The questionnaire used as an instrument in this study contained anthropometric data (weight, height, and

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waist circumference), snack shopping habits and orientation, and a semi-quantitative - food frequency questionnaire (SQ-FFQ) related to snack consumption. The types of snacks listed in the SQ-FFQ, which are energy-dense and high-fat foods, are categorized as unhealthy foods. Meanwhile, foods high in fiber and processed milk (including yogurt) are categorized as healthy eating. The screening questionnaire and SQFFQ are the adoption of previous research questionnaires. The questionnaire was given before and after giving the intervention. Meanwhile, to measure the level of knowledge, research subjects were given a pretest and posttest during the educational session by asking as many as 20 questions. Research tools and materials such as anthropometric tools, educational material handouts, assistance tools and materials were provided by researchers. The measurement of body weight was conducted by digital weighing scales, while the measurements and waist circumference were carried out with the Medline tape measure before and after the intervention.

Healthy and unhealthy snack consumption habits were measured by 11 semi-quantitative FFQ items adapted from the Anti-Cancer Council Dietary Questionnaire (Giles & Ireland, 1996). Based on the energy density classification, the definition of a healthy snack is a snack that has a low energy density of <150 kcal / 100 grams of BDD (Edible Weight). Including healthy snacks such as fruit, vegetables, yogurt, cheese. The category of unhealthy snacks is if they have a high energy density of 225-275 kcal / 100 grams, as what can be found in cheese crackers, sweet biscuits, cakes and pastries, chocolate, candy, sweetened drinks, and fried foods (WCRF-UK, 2007).

This research was conducted in 2018, which began with measuring eating habits using the semi-quantitative FFQ form and providing a pre-test to find out knowledge before intervention. Furthermore, the intervention was given in the form of education on 4 nutritional materials from 4 sources, namely a lecturer in the Department of Nutrition, Health Polytechnic of the Ministry of Health Malang. The material presented is in the form of definitions of healthy snacks, how to read nutrition labels on packaged snacks, hazardous food additives, and general guidelines for balanced nutrition. Furthermore, the research subjects will be given assistance in making healthy snacks with recipes that have been developed by the researcher. This intervention method will be used as a development method for providing nutrition education interventions to research subjects. This research has passed the ethics test at the Health Polytechnic Research Ethics Commission of the Ministry of Health Malang with Reg. no: 469 / KEPK-POLKESMA / 2018.

Data processing was performed using descriptive statistical analysis and dependent t-test (if the data were not normally distributed, using the Wilcoxon signed-rank test) to compare the differences in control and treatment. Paired t-test to compare differences in knowledge levels through the results of the pretest and posttest (if the data are not normally distributed, use the Wilcoxon signed-rank test). Statistical test using SPSS version 23 software at a 95% confidence level.

RESULTS AND DISCUSSION

The results of socio-demographic data show that 31 people consist of 21 women and 10 men. The age of the research subjects ranged from 18-24 years. Marital status there are 30 people who are not married and only 1 person is married. The majority of the research subjects were from Java as many as 23 people and other as many as 9 people. The cities of research subjects were from Bekasi, Bima, Blitar, Bojonegoro, Flores, Gresik, Jakarta, Jember, Kediri, Lamongan, Makassar, Malang Regency, Mataram, Mojokerto, Nganjuk, Pasuruan, Pati, Probolinggo, Sidoarjo, Sumbawa, and Tuban. The educational level of the research subjects were 24 people still studying S1, 5 people from D4, and S2 as many as 2 people.

There was a significant increase in knowledge in the research subjects as much as 30% ($p < 0.01$) which was indicated by the results of the pre-test with an average of 8 out of 20 questions and a post-test with an average of 14 out of 20 questions (Table 1). Several studies have shown the effectiveness of nutrition education in increasing nutritional knowledge, as in previous studies[10–12] . The results of Pakhri et al's research (2018) show that there is a change in the average nutritional knowledge before and after nutrition education. The result of the T test shows that there is a significant effect where the value of $p = 0.000$ ($\alpha < 0.05$). This is because the treatment given in the form of nutritional education with materials on efforts to meet the energy, protein, and iron needs of adolescents has been successfully understood by them.[13]. The results of research by Fitri et al (2020) show that there is an effect of nutrition education about healthy and traditional snacks on the knowledge of elementary school children. Based on this, it can be seen that the provision of knowledge by means of counseling has an effect on increasing children's knowledge[14].

Anthropometric status in table 1 shows the mean body mass index (BMI) of study subjects in the normal category, before 22.3 ± 4.4 kg / m2 and after decreasing to 21.7 ± 4.2 kg / m2. Meanwhile, the prevalence of overweight and obesity in participants before being given intervention was 29%, and it decreased after being given the intervention to 22.6% although it was not significant ($p = 0.096$). The results of waist circumference showed an increase in subjects who had abnormal waist circumference by 2 people although it was not significant. However, in general there was no significant difference in waist circumference between before and after the intervention ($p = 0.48$). Research Baldaso, et al. (2016) also showed a decrease in BMI, especially among respondents who were obese[15]. The results of Hasibuan (2020) show that the results of $p = 0.008$ are smaller than alpha 0.05, so it can be said that there is a relationship between knowledge of eating habits and nutritional status. [16]

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Table 1. Differences in Knowledge Level, Anthropometric Status, Habits and Orientation in Eating Snacks Before and After the Nutrition Intervention (n = 31)

Item	Nutrition Interventions		P
	Before n (%)	After n (%)	
Knowledge level (pre-post test)	8 ± 1.9 (40)	14 ± 2.3 (70)	<0.01 *
BMI (kg / m2)			
Average	22.3 ± 4.4	21.7 ± 4.2	0.096
Malnutrition	5 (16.1)	6 (19.4)	
Normal	17 (54.8)	18 (58.1)	
Fat	3 (9.7)	3 (9.7)	
Obesity	6 (19.4)	4 (13)	
Waist (cm)			
Average	76.4 ± 7.9	75.7 ± 9.5	0.48
Normal	26 (83.9)	24 (77.4)	
Abnormal	5 (16.1)	7 (22.6)	
The habit of avoiding places that sell unhealthy food			
Very rarely	1 (3.2)	1 (3.2)	0.668
Rarely	5 (16.1)	2 (6.5)	
Neutral	14 (45.2)	21 (67.7)	
Often	11 (35.5)	4 (12.9)	
Very often	0	3 (9.7)	
The habit of avoiding buying candy, chips, biscuits and cakes			
Very rarely	2 (6.5)	2 (6.5)	0.128
Rarely	10 (32.3)	3 (9.7)	
Neutral	12 (38.7)	18 (58.1)	
Often	7 (22.6)	7 (12)	
Very often	0	1 (3.2)	
The thought of not eating lots of high-fat snacks			
Strongly disagree	5 (16.1)	2 (6.5)	0.737
Disagree	1 (3.2)	3 (9.7)	
Neutral	9 (29)	13 (41.9)	
Agree	5 (16.1)	4 (12.9)	
Strongly agree	11 (35.5)	9 (29)	
The thought of not eating a lot of junk food			
Strongly disagree	2 (6.5)	2 (6.5)	0.935
Disagree	1 (3.2)	1 (3.2)	
Neutral	7 (22.6)	9 (29)	
Agree	7 (22.6)	4 (12.9)	
Strongly agree	14 (45.2)	15 (48.4)	
The distance to the nearest supermarket from the residence			
<0.8 km	29 (93.5)	31 (100)	0.157
≥ 0.8 km	2 (6.5)	0	
Accustomed to checking labels on packages			
Yes	6 (19.4)	10 (32.3)	0.206
Not	25 (80.6)	21 (67.7)	
Affected by nutrition claims			
Yes	10 (32.3)	19 (61.3)	0.013 *
Not	21 (67.7)	12 (38.7)	
Be affected by discount offers			
Yes	20 (64.5)	19 (61.3)	0.705
Not	11 (35.5)	12 (38.7)	
Accustomed to carrying a shopping list when buying snacks			
Yes	11 (35.5)	12 (38.7)	0.705
Not	20 (64.5)	19 (61.3)	

* Wilcoxon Signed Rank test to analyze the difference before and after with a significance of p <0.05.

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Table 1 also shows that the habit of avoiding places that sell unhealthy foods has increased in frequency, although not significantly (p = 0.668). Before being given the intervention program, no one chose 'very often', but after being given the intervention there were 3 people who chose 'very often' (9.7%). Then, the habit of avoiding buying candy, chips, biscuits, and cakes before being given the program, no one chose 'very often', increased although not significantly (p = 0.128). Furthermore, there was a decrease from the agreement and strongly agree to the agreement that there were not many high-fat snacks, although there was no significant difference (p = 0.737). Then, the thought of not eating a lot of junk food has decreased from the statement of agreeing and strongly agreeing, although there was no significant difference (p = 0.935). In addition, the majority of participants have close access to supermarkets and residences. Then, there was an increase in the habit of checking labels on packages by 25%. However, there was no significant difference between before and after the intervention program was given (p = 0.206). Furthermore, there was an increase in compliance with nutrition claims by 31% and there was a significant difference between before and after the intervention program was given (p = 0.013). Then there was an increase in the effect of discount offers on snack shopping by 31%, although there was no significant difference between before and after the intervention program was given (p = 0.705). Other than that,

Table 2. Semi-quantitative FFQ results for snack consumption (n = 31)

Item	Nutrition Intervention (gram / serving)		P
	Before	After	
Healthy Snack			
Fruit	22.9 ± 24.5	84.5 ± 80.5	< 0.01 *
Vegetable	45.4 ± 71.9	35.7 ± 44.2	0.203
Processed milk	16.8 ± 26.3	24.6 ± 34.6	0.313
Unhealthy Snack			
Sweet biscuits	21.1 ± 41.9	35.8 ± 65.3	0.269
Potato chips	18.6 ± 42.9	21.6 ± 47.6	0.575
Salt krakers	11.7 ± 29.2	11.2 ± 22.2	0.886
Fried food b	36.4 ± 39.4	43.6 ± 42.9	0.914
Pastry / cake	16.6 ± 34.4	17.4 ± 34.2	0.768
Chocolate / candy	11.7 ± 20.8	6.7 ± 8.8	0.746
Sweet drinks	159.7 ± 142.1	177.4 ± 158.4	0.494
Ice cream	18.9 ± 22.7	40.6 ± 57.9	0.019 *
Pudding	7.6 ± 17.7	6.6 ± 13.9	0.876
Market snacks	33.9 ± 61.6	28.1 ± 46.1	0.923
Meatballs	21.9 ± 28.8	33.6 ± 36.3	0.148

* Wilcoxon Signed Rank test to analyze the difference before and after with a significance of p <0.05. mean ± SD in grams
[a]yogurt, cheese and skim milk
[b]*Paired t-test*

Table 2 shows the semi-quantitative results of the healthy snack FFQ for the fruit category experienced a significant increase after being given a service program (p <0.01). This result is in accordance with the research of Baldaso, et al. (2016) which also showed an increase in fruit consumption after nutrition education interventions were carried out.The research of Ningrum et al (2019) stated that counseling with booklet media succeeded in increasing fruit consumption in the intervention group by 0.63 portions, but the results of the Mann Whitney test showed that there was no difference in fruit consumption before giving nutritional counseling (p = 0.53) and after giving counseling. nutrition (p = 0.74) between the control and intervention groups. Meanwhile, the Mann Whitney test on the difference in the mean portion of fruit consumption showed that there was a significant difference between the control group and the intervention group (p = 0.01)[17].

In the vegetable and dairy category (table 2), it shows that there is no significant difference between before and after being given the service program. However, there is a tendency for increased consumption of dairy products, while vegetables have decreased. The semi-quantitative results of the FFQ for unhealthy snacks for the category of salty crackers, chocolate / candy, pudding, and market snacks tended to decrease in the amount of consumption, although not significantly. Then for the category of meatballs, sweet biscuits, potato chips, fried foods, pastries / cakes, and sweet drinks, the consumption tends to increase. In addition, the ice cream category experienced a significant increase (p = 0.019) after being given the intervention. Nuryani's research (2018) states thatThe habit of eating snacks among elementary school children is 78.4% and it is found that there is a relationship between eating habits and nutritional status (p = 0.030)[18].

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Even though the consumption of snacks, which are less than the three main meals, contributes to energy and nutrient intake. In case control research[6] and cross-sectional[7] shows that the frequency of snack consumption is associated with the consumption of energy dense foods and increases the risk of obesity.

Labeling related to nutritional information has been recommended by WHO as a policy measure to promote a healthy diet, which can prevent and control obesity and non-communicable diseases.[19]. Labeling of nutritional information on food packaging, especially snacks, can also improve consumers' ability to identify unhealthy foods, which is the key to behavior change[20]. In addition, nutritional information labels serve as a boost by making nutritional information stand out more[21].

The limitation in this study is that from the initial screening there were 61 people, only some of them came during education and were willing to participate in assistance in making healthy snacks. Even though they had received an explanation before conducting the study and signed an informed consent.

CONCLUSION

There is a significant increase in knowledge in research subjects as much as 30%. In addition, the prevalence of obesity tends to fall, although not significantly. The habit of avoiding places that sell unhealthy food tends to increase, although not significantly. The habit of avoiding buying candy, chips, biscuits and cakes tended to increase, although not significantly. All participants did not experience difficulties in accessing food to supermarkets due to the proximity of their residence. There has been an increase in the habit of checking labels before buying snack packs as well as an increase in the influence of nutrition claims and discount offers for snack shopping. There is an increase in the habit of carrying a shopping list when buying snacks and a significant increase in the amount of fruit consumption.

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