ISSN: 13412051
Volume 25, Issue 08, August, 2020

EFFECTIVENESS OF BLACK TAPAI BERRY ICE SHERBET AGAINST REDUCTION OF WAIST CIRCUMFERENCE, WEIGHT AND BODY PERCENT FAT

Fauziyah, Roro Nur[1], Afiani, Mitha[1], Sulaeman, Agus[1], Fitria, Mona[1], Syarief, Osman[1]

Department of Nutrition Health Polytechnic Ministry of Health, Bandung, Indonesia[1]

ABSTRACT— Consumption of fiber and anthocyanins can reduce waist circumference, body weight and body fat percent by reducing fat content. Black Tapai Berry Ice Sherbet is a distraction with fiber and anthocyanin sources. The purpose of this study was to determine the effect of giving black tapai berry ice sherbet on decreasing waist circumference, body weight and body fat percent in obese adolescents in Bandung. The experimental research design uses two groups pre and posttest with control experimental design. The study was conducted in December 2019 - May 2020. The population is fat teenage girls in the city of Bandung. The total sample of 16 people in each group. The study was conducted for 30 days. The intervention group was given black tapai berry ice sherbet 50 grams and education on a low calorie diet. The control group was given a low calorie diet education. Waist circumference was measured using a medline band. Body weight was measured directly using a digital scale and body fat percent was measured directly using Bioelectrical Impedance Analysis (BIA). The results showed that there was an effect of giving black tapai berry ice sherbet on decreasing waist circumference, body weight and percent body fat with $p = 0.001$ and $p < 0.001$ ($p \leq 0.05$). Need to socialization about black tapai berry ice sherbet as an alternative distraction to overcome obesity.

KEYWORDS: Black Tapai Berry Ice Sherbet, Weight, Waist Circumference, percent body fat

1. INTRODUCTION

Obesity occurs due to energy intake is higher than the energy expended. Obesity is found in adults, adolescents and children. If not resolved, overweight especially if it has become obese in adolescents will continue into adulthood. Eating patterns in childhood and adolescence affect obesity in adulthood[2]. Indonesia faces multiple nutritional problems, one of which is obesity in adolescents. Based on 2018 Basic Health Research data, the percentage of overweight and obesity at the age of 13-15 years according to the BMI category is 16%. For ages 16-18 years the percentage of overweight and obesity is 13.5%[3]. Indicators that are often used in determining obesity used in determining obesity in the community are the Body Mass Index (BMI), waist circumference, and hip waist circumference ratio (RLPP) 4. Percent of body fat is one aspect that can be used to see the presence or absence of nutritional problems. Percent of body fat can reflect proportions in body composition[5]. One alternative way to prevent obesity is to consume foods high in fiber. Foods with high fiber usually contain low calories, low sugar and fat levels which can help reduce weight gain. This is in line with research conducted by Maryusman high fiber diet intervention for two weeks can significantly lose weight[6]. The consumption of anthocyanin has been shown to provide a protective effect against cardiovascular disease, diabetes mellitus, antioxidants, anti-inflammatory, and anti-cancer[7]. Based on the results of research conducted by Rohmawati showed that there was an effect of giving black sticky tape in the form of snack bars as much as 1 piece a day (25 grams' weight with anthocyanin content 1,115.28 ppm) carried out for 30 days on decreasing waist circumference and body weight[8]. Fajriyanti's research on making Sherbet products as a source of anthocyanin and a source of fiber based on black sticky rice and strawberries as an alternative to preventing obesity. The content of anthocyanin and fiber in Black Tapai Berry Ice Sherbet products is 22.1 mg and 3.25 grams per 100 grams of product[9]. The purpose of this

study was to determine the effect of giving Black Tapai Berry Ice Sherbet on decreasing waist circumference, body weight and body fat percent in obese adolescents in Bandung.

2. METHOD

The research used was an experimental study using two groups of pre and posttest with experimental design which was divided into two groups namely the intervention group and the control group. The intervention group was given 50 grams of black tapai berry ice sherbet for 30 days and low calorie education. The control group was given low calorie education with leaflet media. Research conducted has obtained ethical standards issued by the Health Research Ethics Commission with No.23 / KEPK / EC / II / 2020. The process of making Black Tapai Berry Ice Sherbet was made by first destroying 562 grams of black sticky rice and 188 grams of strawberries using a blender until smooth. Put the mixture into a container, then add 250 ml of full cream milk and 1 gram of CMC homogeneously using a mixer. Then do as much as 50 grams of correction into a plastic cup. Cool to 4oC and put it in the freezer before giving it to the sample. The study was conducted in December 2019 - May 2020. The sample for this study was calculated using the two-hypothesis hypothesis test formula. The number of samples for each group were 16 people with inclusion criteria of young women, aged 13-18 years, BMI> 1SD, and willing to join the study. The selection of samples is done in stages; the first stage is selected school areas in the Sukahaji Village environment with the highest prevalence of obesity. Samples were selected from the school that met the inclusion criteria as an intervention group and a control group. Prior to the intervention, the sample was randomized by being shaken to divide the research subjects into the intervention group or the control group.

Data collected in this study consisted of primary data and secondary data. Primary data consists of data on age, education and physical activity characteristics obtained from interviews with the help of questionnaires. Data on nutritional status is done by direct measurement of the body weight and height of the sample. Waist circumference data is obtained by measuring directly using the medline tape. Weight data using digital stamped scales with an accuracy of 0.1 kg. Body fat percent data is obtained by measuring percent of body fat mass body weight measured by Bioelectrical Impedance Analysis (BIA). Food intake data such as fiber intake and anthocyanin intake using SFFQ. Energy intake data obtained from interviews with samples using a 1x24 hour recall form. Food intake data is processed using the Nutrisurvey program, then compared to individual needs. The data collected is processed and analyzed using a computer program called SPSS. Univariate analysis aims to see a description of the distribution of data on age, education and physical activity. Bivariate analysis was performed to see the effect of intervention and decrease in waist circumference, body weight and body fat percent between the intervention group and the control group. Before analyzing the data, the normality test was done using Shapiro Wilk. To find out the average difference, an Independent T test is performed if the data is normally distributed, whereas if the data is not normally distributed, the data is analyzed using the Mann- Whitney test. To determine the effect of the intervention between the intervention group and the control group if the data were normally distributed analyzed by the T-Dependent test, if the data were not normally distributed the data were analyzed by the Wilcoxon test.

3. RESULT

The sample in this study was teenage girls with obesity. The division of the sample into 2 groups and carried out randomly. The sample in this study amounted to 32 people consisting of 16 intervention groups and 16 control groups. Based on data obtained from the interviews, a general description and distribution of samples according to the characteristics of the samples from the intervention group and the control group are shown in table 1:

Table 1. Characteristics of Samples

ISSN: 13412051
Volume 25, Issue 08, August, 2020

Characteristics	Group			
	Intervention		Control	
	n	%	n	%
Age				
14 years	4	25	5	31,3
15 years	6	37,5	4	25
16 years	3	18,8	4	25
17 years	3	18,8	3	18,8
Education				
JHS	10	62,5	9	56,3
SHS	6	37,5	7	43,8
Physical Activity				
Light	14	87,5	10	62,5
Moderate	2	12,5	6	37,5
Total	**16**	**100**	**16**	**100**

Based on the table most of the samples in the intervention group were 15 years old (37.5%) with a junior high school level (62.5%) and had physical activity with a moderate category of 14 people (87.5%). The control group was mostly 14 years old (31.3%) with a junior high school education level (56.3%) and had physical activity with a moderate category of 10 people (62.5%). Data on BMI, fiber intake, anthocyanin intake and percent energy intake in the intervention and control groups are shown in table 2 below:

Table 2. BMI, Fiber Intake, Anthocyanin Intake and Percent of Energy Intake

Variable	Group		p*
	Intervention	Control	
	Average ±SD	Average ±SD	
BMI			
Pre	27,93±1,90	27,4±1,02	<0,001*[1]
Post	27,42±1,83	27,18±1,07	<0,001*[1]
Fiber Intake			
Pre	6,45±1,67	4,71±1,31	<0,001*[1]
Post	8,35±1,47	5,84±1,27	<0,001*[1]
Anthocyanin Intake			
Pre	2,56±0,85	2,50±0,52	<0,001*[2]
Post	13,77±1,13	3,37±0,46	<0,001*[2]
Percent of Energy Intake			
Energy	103,76±10,1	107,4±8,6	0,283*[1]

*1: T-Dependent 2: Wilcoxon Test

Based on the statistical test table used on BMI variables, the T-Dependent at a 95% confidence level indicates that there were significant differences in the mean and pre BMI in each group, namely the intervention group and the control group with a p value <0.001. The statistical test used in the fiber intake variable was the T-Dependent at a 95% confidence level, indicating that there were significant differences in pre and post fiber intake significantly in each group, namely the intervention group and the control group with a p value <0.001.The statistical test used on the anthocyanin intake variable was the Wilcoxon Test at a 95% confidence level showing that there were significant differences in pre and post anthocyanin intake significantly in each group, namely the intervention group and the control group with a p value <0.001. The mean percent of energy intake using the T-Dependent statistical test at a 95% confidence level with a p

value of 0.283 can be agreed to not contain differences between the intervention group and the control group. Data on waist circumference, body weight and body fat percent before and after treatment in the intervention and control groups are shown in table 3:

Table 3. Waist Circumference, Body Weight and Percent Body Fat Pre and Post Intervention in the Intervention and Control Groups

Variable	Group					
	Intervention			Control		
	Average	SD	p* Value	Average	SD	p* Value
Waist Circumference						
Pre	91,03	2,18	<0,001*[1]	85,48	1,73	<0,001*[1]
Post	87,53	2,15		84,88	1,65	
Body Weight						
Pre	66,81	6,14	<0,001*[2]	64,51	3,69	0,038*[2]
Post	65,59	5,96		64,00	3,66	
Percent Body Fat						
Pre	31,32	1,41	<0,001*[1]	30,46	1,26	<0,001*[2]
Post	29,91	1,38		30,50	1,15	

*1: T-Dependent 2: Wilcoxon Test

Based on table 3, the waist circumference variable with the intervention group showed a significant difference in waist circumference at pre and post of the study with a p value <0.001. Similarly, in the control group there were differences in the mean waist circumference at pre and post of the study with a p value <0.001. The weight variable in the intervention group showed a significant difference at pre and post of the study with a p value <0.001. The control group also showed a significant difference in body weight at pre and post of the study with a p value <0.001. Percent of body fat in the intervention group showed a significant difference at pre and post of the study with a p value <0.001. In the control group there were significant differences at pre and post of the study with p <0.001. The results of differences in waist circumference, body weight and percent body fat pre and post the intervention between the intervention group and the control group are shown in table 4.

Table 4. Decreased Waist Circumference, Body Weight and Body Fat Percentage Pre and Post Intervention in the Intervention and Control Groups

Variable	Group				p* Value
	Intervention		Control		
	Average	SD	Average	SD	
Waist Circumference	3,50	0,45	0,59	0,33	0,001**
Body Weight	1,22	0,42	0,51	0,17	<0,001*
Body Fat Percentage	1,40	0,36	0,58	0,27	<0,001**

*) T-Dependent **) Wilcoxon Test

The statistical test used on the waist circumference variable is the Mann-Whitney Test with a 95% confidence level showing a significant difference in decreasing waist circumference between the intervention group and the control group with a value of p = 0.001 (p≤0.05). So that there is an effect of giving black tapai berry ice sherbet and low calorie diet education on decreasing waist circumference. The statistical test used in the weight variable was T-Independent with a 95% confidence level showing a significant difference in weight loss between the intervention group and the control group with a value of p <0.001 (p≤0.05). So that there is an effect of giving black tapai berry ice sherbet and low-calorie diet

education on weight loss. The statistical test used on the variable body fat percent is Mann Whitney with a 95% confidence level showing there is a significant difference in the decrease in body fat percent between the intervention group and the control group with a value of p <0.001 (p≤0.05). So there is the effect of giving black tapai berry ice sherbet and low-calorie diet education on reducing body fat percent.

4. DISCUSSION

The results showed that the decrease in waist circumference in the intervention group was the group given black tapai berry ice sherbet and low calorie education by 3.50 cm. The control group that was given low calorie education obtained a decrease of 0.59 cm. Based on the statistical test used is the Mann-Whitney Test with a 95% confidence level showing that there is a significant difference in decreasing waist circumference between the intervention group and the control group with a value of p = 0.001 (p≤0.05). So that there is an effect of giving black tapai berry ice sherbet and low calorie diet education on decreasing waist circumference. Black tapai berry ice sherbet given to samples made from black sticky tape and strawberries which are a source of fiber and anthocyanin. This study is in line with Hartanti's research (2018), which states that there is a relationship between fiber intake and waist circumference which shows a significant relationship. The correlation of fiber intake with waist circumference is negative, meaning that the higher the fiber intake, the lower the waist circumference[10]. Weight loss in the intervention group was 1.22 kg and the control group was 0.51 kg. The results of statistical tests using Wilcoxon showed that there were significant differences in body weight at the beginning and end of the study in the intervention group with p <0.001 (p0010.05), whereas in the control group using the same statistical test showed there were significant differences in body weight at pre and post of the study with a value of p = 0.038 (p≤0.05). This study is in line with research conducted by Rohmawati (2018) there is an effect of giving black sticky rice tape bars to weight loss. Fiber and anthocyanin are known to overcome obesity. The fiber contained in the black sticky tape is a type of insoluble food fiber.

Fiber can provide a longer full effect, so that it can reduce weight and excess body weight can be avoided. Slowing emptying of the stomach causes a person to feel full after eating and thus eat less[8]. Percent decrease in body fat in the intervention group by 1.4% while in the control group by 0.058%. The results of statistical tests using Mann Whitney showed that there were significant differences in the decrease in body fat percent between the intervention group and the control group with a p value <0.001 (p≤0.05). So there is the effect of giving black tapai berry ice sherbet and low-calorie diet education on reducing body fat percent. This is in line with research conducted by Sari (2018) giving Rosela drinks a tendency to decrease body fat percent by 0.76%, but not statistically significant. The results of this study are consistent with the research of Lee et al. (2016) gave black soybean extract containing anthocyanin 75.48 mg / g for 8 weeks in obese subjects significantly reduced weight (-1.14 kg), BMI (-0.44 kg / m2) and waist circumference (-1.87 cm), but did not differ manifest with the control group. This reduction in body weight and body fat is due to a mechanism for reducing lipogenic factors such as PPARα, ACC, and C / EBPa which are associated with anti-obesity effects11. Anthocyanin has a role in inhibiting body weight, reducing insulin resistance, reducing adipocyte size, and decreasing fat accumulation[12]. Anthocyanin significantly reduces body fat accumulation by 60% by activating the AMPK pathway in white adipose tissue, skeletal muscle and liver and decreasing TNF-α and ACC. Other polyphenol content also plays a role in decreasing body fat. This decrease in fat content occurs because anthocyanin plays a role / protein (CETP), which is a plasma protein that mediates the removal of cholesteryl esters from HDL that are converted into triglycerides. Decreased fatty acids in the body such as triglycerides, VLDL, LDL, and HDL so that fatty acid synthesis decreases as well as β-oxidation of fatty acids. Hydroxycitric acid and hibiscus acid increase the excretion of fat content in feces which then decreases fat and accumulation of adipose tissue in the body[13].

Anthocyanins also play a role in inhibiting the release of ROS (Reactive Oxygen Species) which suppress free radicals in mediating lipid peroxidase and endothelial cell death, thereby contributing to the antihyperlipidemic effect. Anthocyanins have mechanisms as antioxidants, anti-inflammatories and are involved in fat and glucose metabolism[14]. Fiber is associated with decreased fat accumulation through the mechanism of the hormone insulin. Fiber intake can increase insulin sensitivity. Insulin sensitivity is the ability of the insulin hormone to lower blood glucose levels by suppressing hepatic glucose production and stimulating glucose utilization in skeletal muscle and adipose tissue18. In circumstances where insulin sensitivity decreases, the insulin hormone cannot capture glucose to be able to enter and be utilized into cells, so glucose will be stored in the body as fat deposits. This is what causes an increase in fat deposits that tend to be in the abdominal part. The hormone insulin can make a lot of fat accumulated in the body, especially in the dangerous part of the visceral, around the liver, tissue in the heart and pancreatic β cells[10]. Fiber also, resulting in a large and soft stool mass (because it contains water), one of which is an increase in the frequency of bowel movements and a reduction in transit time in the colon16. With increasing frequency of bowel movements and decreasing frequency of eating due to longer satiety causing weight loss[19]. It is known that the results of this study both in the intervention group and the control group decreased waist circumference, body weight and percent body fat. This, in line with research conducted by Nurmasyita (2016) nutrition education in overweight adolescents reduces BMI[15].

5. CONCLUSION

Giving black tapai berry ice sherbet as much as 50 grams for 30 consecutive days in adolescent girls with obesity gave significant results in reducing waist circumference of 3.50 cm, 1.22 kg body weight and 1.40% body fat percent. In future studies it is recommended to use a larger number of samples using various doses of administration and a longer treatment time.

6. REFERENCES

[1] Kemenkes RI. Panduan Gerakan Nusantara Tekan Angka Obesitas (GENTAS). Kementerian Kesehatan RI. 2017.

[2] Rusilanti, Dahlia M, Yulianti Y. Gizi dan Kesehatan Anak Prasekolah. Bandung; 2015.

[3] Kementerian Kesehatan RI. Hasil Utama Laporan Riskesdas (Riskesdas) 2018. Kementerian Kesehatan Republik Indonesia. 2018.

[4] Wirawan, Novita Nia. Sensitifitas dan Spesifisitas IMT dan Lingkar Pinggang-Panggul dalam Mengklasifikasikan Kegemukan pada Wanita. Indonesian Jurnal Human Nutrition. 2014, 1(1):23-34.

[5] Inandia K. Kejadian Obesitas Berdasarkan Persen Lemak Tubuh dan Rasio Lingkar Pinggang Pinggul Serta Faktor-Faktor Lain Yang Berhubungan Pada Prelansia dan Lansia Kelurahan Depok Jaya. Universitas Indonesia. 2012

[6] Maryusman T, Fauziyah A, Fatmawati I, Firdausa NI, Imtihanah S. Pengaruh Kombinasi Diet Tinggi Serat dan Senam Aerobik terhadap Penurunan Berat Badan. Jurnal Kedokteran dan Kesehatan. 2018,14(1)56-62. https://jurnal.umj.ac.id/index.php/JKK diakses November, 20 2019.

[7] Widyastuti N, Dieny FF, Fitranti DY. Asupan Lemak Jenuh Dan Serat Pada Remaja Obesitas Kaitannya Dengan Sindrom Metabolik. Jurnal Gizi Klinik Indonesia. 2016,12(4)131.

[8] Rohmawati IN, Fauziyah RN. Pengaruh Pemberian Snack Bar Tape Ketan Hitam terhadap Penurunan Lingkar Pinggang dan Berat Badan pada Dewasa Gemuk di Kota Cimahi. Politeknik Kesehatan Kementerian Kesehatan Bandung, Jurusan Gizi; 2018

[9] Fajriyanti N, Fauziyah RN. Produk Black Tapai Ice Sherbet sumber Antosianin dan Serat berbasis Tape Ketan Hitam dan Stroberi sebagai Altenatif pencegah Kegemukan. Politeknik Kesehatan Kementerian Kesehatan Bandung; 2018.

[10] Hartanti D, Mulyati T. Hubungan Asupan Energi, Serat, dan Pengeluaran Energi dengan Rasio Lingkar Pinggang-Panggul (RLPP). Universitas Islam Negeri Walisongo Semarang; 2018.

[11] Lee M, Sorn S, Park Y, Park H. Anthocyanin rich-black soybean testa improved visceral fat and plasma lipid profiles in overweight/obese korean adults: a randomized controlled trial. Med Food. 2016,19(11):1–9. https://www.ncbi.nlm.nih.gov/pubmed/27809637 diakses April, 27 2020.

[12] Azzini E, Giacometti J, Russo GL. Review Article Antiobesity Effects of Anthocyanins in Preclinical and Clinical Studies. 2017.

[13] Sari FY kartika. Efek intervensi minuman rosela kaya antosianin terhadap profil lipid pada laki- laki dewasa kegemukan. Institut Pertanian Bogor; 2018.

[14] Sari FY kartika. Efek Intervensi Minuman Rosela Kaya Antosianin Terhadap Profil Lipid Pada Laki-Laki Dewasa Kegemukan. Institut Pertanian Bogor; 2018.

[15] Nurmasyita, Widjanarko B, Margawati A. Pengaruh Intervensi Pendidikan Gizi Terhadap Peningkatan Pengetahuan Gizi, Perubahan Asupan Zat Gizi Dan Indeks Massa Tubuh Remaja Kelebihan Berat Badan. Jurnal Gizi Indonesia. 2016,4(1):38–47.

[16] Fauziyah, Roro Nur, Putri, Mardiyah Maulida, Surmita. 2020. Effect of Pie Based on Fermented Black Glutinous Rice and Sweet Purple Potato to Frequency of Defecation in Adolescents with Contipation. International Medical Journal. Vol 25, Issue 04. Artikel https://www.seronijihou.com/volume/IMJ/25/4/effect-of-pie-based-on-fermented-black- glutinous-rice-and-sweet-purple-potato-to-frequency-of-defecation-in-adolescents-with- constipation-5ec80c6fdc2fa.pdf

[17] Trinovani, Elvi, Afifah Riska Rafa, Fauziyah, Roro Nur. 2020. Determination of Antosianin Total Levels and Antioksidant Activities in Black Glutinous Rice Extract and Fermented Black Glutinous Extract. International Medical Journal. Vol 25, Issue 05. Artikel https://www.seronijihou.com/volume/IMJ/25/5/determination-of-antosianin-total-levels-and- antioxidant-activities-in-black-glutinous-rice-extract-and-fermented-black-glutinous-rice- extract-5ec8099a8eb18.pdf

[18] Kusmiyati, Mimin, Trinovani, Elvi, Fauziyah, Roro Nur. 2020. Activity of Mixed Ethanol Extract Selected Black Tea (Camelia sinesis L.) and Stevia (Stevia rebaudiana B.) as an Alternative Anti Diabetes Herbal Medicine. International Medical Journal. Vol 25, Issue 06. Artikel https://www.seronijihou.com/volume/IMJ/25/6/activity-of-mixed-ethanol-extract-selected- black-tea-camelia-sinensis-l-and-stevia-stevia-rebaudiana-b-as-an-alternative-anti-diabetes- herbal-medicine-5ef522fdaa75e.pdf

[19] Fauziyah, Roro Nur, Mimin AMinah, Osman Syarief, Holil M Par'I, Widi Hastuti, Surmita. 2020. Effectiveness of Steamed Brownies Base on Fermented Black Glutinous Rice on Decreased Waist Circumference in Abdominal Obesity. Jurnal Ilmu dan Teknologi Kesehatan. Vol x No x. Artikel http://ejurnal.poltekkesjakarta3.ac.id/index.php/jitek