PROCEEDING BOOK

THE 1ᵗʰ INTERNATIONAL CONFERENCE
ON INTERPROFESSIONAL
HEALTH COLLABORATION

"Combating The Growing Epidemic of
Triple Burden Diseases through
Interprofessional Health Collaboration in
Developing Countries"

GRAGE HOTEL BENGKULU, INDONESIA
October 30-31th
2018

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Proceeding Book

The 1th INTERNATIONALCONFERENCE ON
INTERPROFESSIONAL HEALTH COLLABORATION

"Combating The Growing Epidemic of Triple Burden Diseases
through Interprofessional Health Collaboration in Developing
Countries"

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Address from the Governor of Bengkulu Province

Dear honorary guests and participants,

First, I Recommend Welcome To Our Guests From State Friends Of Thailaind, Malaysia, Philifina, And India And Speakers From Indonesia As The Host.

Welcome To *Bumi Rafflesia.* And Happy To Enjoy The Beauty Of Bengkulu City Which Is A Historical City For The Indonesian Nation.

To Poltekkes, Bengkulu Ministry Of Health, Which Has Implemented International Seminars Today, This Polytech Is A Higher Education, Which Is Superior In Educing Health Personnel, Bengkulu And Indonesia Property In General And Always Visiting The Tri Dharma Of Higher Education.

I Realize That An Important Thing In Life Is Health, There Is No Meaning We Life If We Are Not Healthy, Then From The Role Of Health Personnel Is Very Important To Improve Optimal Health.

Ladies And Gentlemen,

The Success Of Health Development In Indonesia Must Implement The Entire And Integrated Health Development Program According To The Health Problems Faced By The Community.

At The Time Of Existing Diseases From Infection Disease To Degenerative Diseases That Need Handling Readiness Carefully Through The Approach To The Potential And Empowerment Of The Community. With The Multi Discipline Approach.

Increasing Health Services Can Improve The Apptitude Of Community As Well As Decrease The Number Of Illness And Mortality In Any Region, And To Enhance The Available Health Service.

That Is All And Thank You

Governor Of Bengkulu

Dr Drh Rohidin Mersyah, MMA

Address from the Director of Health Polytechnic of Health Ministry Bengkulu

Dear honorary guests and participants,

Welcome to the International Conference whichis held annually in our institution Bengkulu Health Polytechnic. This is our first event of International Conference. We hope this event can be our place to share knowledge from many field studies related to health science.

It is a great pleasure to invite you in The 1st International Conference on Interprofessional Health Collaboration. The International Conference on Health Sciences Named "Combating The Growing Epidemic of Triple Burden Diseases through Interprofessional Health Collaboration in Developing Countries**".** We have missions to improve health collaboration in other health education, research and community service.This conference is one of the way to achieve our vision and mission Bengkulu Health Polytechnic.

We have a great expectation that this conference can be our good environment to develop knowledge, to share experience, to have interaction between us and of course to give contribution for our health world. We do hope the success of the conference and we hope you all enjoy it.

Sincerely,

Darwis, S.Kp.,M.Kes
Director Bengkulu Health Polytechnic

EFFECT OF SNACK BAR BASED ON FERMENTED GLUTINOUS BLACK RICE IN WAIST CIRCUMFERENCE DECREASE AND WEIGHT LOSS IN OBESE ADULTS

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Abstract

Consumption of fiber and anthocyanins helps lower waist circumference and weight by lowering body fat levels. Snack Bar Based on Fermented Glutinous Black Rice is one of cereals with antioxidants, bioactive compounds, and fiber. The purpose of this research is to determine the effect of Snack Bar Based on Fermented Glutinous Black Rice in waist circumference and weight decrease in obese adults. The Research design use in this study is experimental using two group pre and post test with control experimental design. The population is adult women (30-50 years) in Pasirkaliki Village, North Cimahi Subdistrict, Cimahi City.The total samples are 24 people in each group .The research was done in 30 days .Intervention group were given a Snack Bar Based on Fermented Glutinous Black Rice 1 puck (30 grams) and low calorie diet education.The control group were given low calorie diet education. Statistical tests with Paired T Test showed that there is a siginificant difference in waist circumference and weight loss at the beginning and the end of the research with a value of p<0,001 (p≤0,05). Statistical tests with Mann- Whitney showed that there is an effect in Snack Bar Based on Fermented Glutinous Black Rice giving to a waist

circumference and weight decrease by the value of p = 0,003 and p<0,001 (p≤0,05). Socialization about this Fermented Glutinous Black Rice Snack Bar to public as an alternative food for decreasing waist circumference and weight needs to be done.

Keywords: Snack Bar Based on Fermented Glutinous Black Rice, waist circumference, weight

INTRODUCTION

Obesity is an accumulation of abnormal or excessive fat that can interfere with health. Obesity is increasing sharply throughout the world, which reaches a dangerous level [1]. Based on the 2013 Basic Health Research data, the percentage of overweight and obesity at the age of> 18 years according to the BMI category in West Java was 26.9% [2]. Whereas, Cimahi City is 32.1% with the same category. The percentage of obesity according to the Stomach Circular (LP) indicator of Cimahi city was 34.4%, this percentage was higher than the percentage of West Java, which was 26.4% [3].

Obesity is caused by the wrong diet (excessive food intake) by consuming high carbohydrates simple, high fat and low in fiber and not accustomed to consuming a balanced menu (balanced nutrition) [4]. Someone who has a fat intake higher than the need to have a 4.4 times higher risk of being overweight [5].

Eating fiber-containing foods can help with weight loss, where foods that contain high levels of fiber usually contain low calories [6]. In general, foods high in fiber will stay longer in the stomach. There is a slowdown in gastric emptying that causes a person to feel full after eating and eating less [7]. Subjects with lower levels of fiber intake have a 4 times greater risk of being obese [5]. According to the Ministry of Health of the Republic of Indonesia in

2013, the average number of fiber sufficiency for adults aged 19-64 years in Indonesia is 36.3 gr / day for men and 30 gr / day for women [8].

Anthocyanins are absorbed into the blood in their intact form and metabolized to methoxy derivatives in the liver and kidneys. Anthocyanin then activates AMPK (Adenosine Monophosphate-Activated Protein Kinase) which is induced by significant phosphorylation of ACC (Anti-AcetylcoA Carboxylase) and regulated by PPARα (Peroxisome Proliferator-Activated Receptor α) and ACO (Acetyl-coA Carboxylase) in the liver thereby increasing fat content through increased fatty acid oxidation [9]. Based on research conducted by Tsuda (2003) in rats that were intentionally made to become obese by being given a high-fat diet, explained that the consumption of anthocyanins from food (purple corn) can significantly prevent obesity and diabetes [10]. According to research conducted prior in mice, anthocyanin extract from blueberries if added as a supplement can significantly inhibit weight gain and accumulation of body fat [11].

Fermented Glutinous Black Rice is one of the potential commodities as a source of carbohydrates, antioxidants, bioactive compounds, and fiber which are important for health [12]. One of the products developed from the Snack Bar Based on Fermented Glutinous Black Rice is a snack bar. Processing does not have much effect on anthocyanin levels. Therefore, researchers are interested in knowing the effect of Snack Bar Based on Fermented Glutinous Black Rice on decreasing waist circumference and weight in obese adults in Cimahi City.

METHOD

The research design used was Experimental using two groups pre and post test with experimental design control. This study divides the sample into 2 sample groups namely intervention and control group. In the intervention group, there was 1 piece of black stick tape snack bar (30 grams) for 30 days with a frequency of 1 time a day and education on a low-calorie diet, while for the control group were only given a low-calorie diet. At the beginning and end of the study, both groups of samples were measured waist circumference and body weight.

The study was conducted on adult individuals (30-50 years) in RW 03 and RW 10 Pasirkaliki Village, Cimahi Utara District, Cimahi City. The inclusion criteria for both sample groups were 30-50 years old, overweight with BMI> 25.0 kg / m2, female sex and willing to take part in the study and sign informed consent forms while the exclusion criteria were pregnant, sick and sportsman.

This study is a study using secondary data which includes data on the characteristics of the sample (age, education, occupation and physical activity), waist circumference data, weight data, data on energy, fat and fiber intake taken from Fauziyah (2017) research data [13]

Analysis of sample characteristics data (age, education, occupation and physical activity) is presented in the form of a frequency distribution table that displays the number and percentage, then analyzed descriptively. BMI data, energy intake data, fat intake data, and fiber intake data are presented in the form of distribution tables showing the average, standard deviation, median, and maximum minimum.

Prior to the bivariate analysis, the normality of the waist circumference and body weight data were tested for normality. Shapiro Wilk statistical tests were conducted because the sample was <50 people. If the p value> 0.05 then the data is normally distributed, but if the p value is 50.05 then the data is not normally distributed.

If the data is normally distributed then use the Dependent Paired T-Test statistical test while if the data is not normally distributed

then use the Wilcoxon statistical test with a 95% confidence level (α = 0.05). Statistical test to determine differences in waist circumference and body weight in each group, namely the intervention group and the control group.

If the data is normally distributed, then use the Independent T-Test statistical test while if the data is not normally distributed then use the Mann-Whitney statistical test. Statistical test to see the difference in decrease in waist circumference and body weight between the two different groups, namely the intervention group and the control group with a 95% confidence level (α = 0.05).

RESULT

Data Normality Test
In table 1 shows that the data for initial waist circumference and final waist circumference and initial and final body weight in the intervention group and the control group are normally distributed so that it will be tested using Paired T-Test. Meanwhile, data on waist circumference and weight loss between the intervention group and the control group were not normally distributed so that they would be

tested using the Mann-Whitney Test to see differences in waist circumference and weight loss between the intervention group and the control group. The Pre and Post BMI data in the intervention group were normally distributed while the Pre and Post BMI data in the control group were not normally distributed so that they were subsequently tested using Wilcoxon. Mean data on the decline in BMI between the intervention group and the control group were not normally distributed so that they were then tested using the Mann-Whitney Test.

Percentage of energy and fat intake between the intervention group and the control group was not normally distributed so that it would then be tested using the Mann-Whitney Test to see the difference in percent of energy and fat intake between the intervention group and the control group. The initial and final fiber intake data in the intervention group and control group were normally distributed so that they would be tested using Paired T-Test. Data on increasing fiber intake between the intervention group and the control group were also normally distributed so that they would be tested using the Independent T Test

Table 1. Data Normality Test Results

Variabel	Intervensi (n=24)		Kontrol (n=24)		Uji Statistik
	Nilai p	Distribusi	Nilai p	Distribusi	
Waist circumference Pre	0,084	Normal	0,380	Normal	Parametric
Waist Circumference Post	0,494	Normal	0,310	Normal	Parametric
Decreasing Circumference	0,025	Abnormal	0,050	Abnormal	Non Parametric
Pre Weight	0,070	Normal	0,495	Normal	Parametric
Post Weight	0,121	Normal	0,721	Normal	Parametric
Decreasing weight	0,000	Abnormal	0,002	Abnormal	Non Parametric
Pre BMI	0,490	Normal	0,045	Abnormal	Non Parametric
Post BMI	0,897	Normal	0,067	Normal	Parametric
Decrease BMI	0,008	Abnormal	0,631	Normal	Non Parametric
Percent of energy intake	0,916	Normal	0,028	Abnormal	Non Parametric
Percent of fat intake	0,009	Abnormal	0,541	Normal	Non Parametric
Pre fiber intake	0,084	Normal	0,154	Normal	Parametric
Post fiber intake	0,221	Normal	0,270	Normal	Parametric
Increased fiber intake	0,707	Normal	0,079	Normal	Parametric

Sample Characteristics

Age

Based on Table 2 it is known that most of the samples (66.7%) of intervention were aged 41-50 years and a small portion of the sample (33.3%) were aged 31-40 years. While for the control group some (58.3%) were 41-50 years old, some (33.3%) were aged 31-40 years and a small proportion (8.3%) were <30 years old. For the age data between the intervention group and the control group, p = 0.234 (p> 0.05) so that the data is said to be homogeneous.

Work

Based on table 2 it can be seen that most of the samples were housewives in the intervention group (91.7%) and in the control group (62.75%). In the intervention group only a small proportion were employed as laborers (4.2%) and self-employed (4.2%). Whereas, in the control group profession is quite diverse as laborers (12.5%), entrepreneurs (12.5%), civil servants (8.3%) and teachers (4.2%). For job data has a value of p = 0.108 (p>

0.05) so that it can be said homogeneous job data.

Education

Based on Table 2 it is known that in the intervention group a portion of the sample (45.8%) had the last education in elementary school, some (29.2%) had the last education in junior high school and some (20.8%) had the last high school education, and only a small portion (4, 2%) with the last D3 education. While for the control group some of the sample had the last high school education (37.5%), junior high school (33.3%) and elementary school (20.8%). Only a small percentage (8.3%) have a final education S1. For education data has a value of p = 0.104 (p> 0.05) can be said to be homogeneous education data.

Physical Activity

Based on Table 2 it is known that in the intervention group most of the samples

(66.7%) had mild physical activity and some samples (33.3%) had moderate category physical activity. Likewise, in the control group most of it (70.8%) with physical activity in the light category and only a portion of the sample (29.2%) with moderate category physical activity. For physical activity data has a value of p = 1,000 (p> 0.05) can be said homogeneous physical activity data.

Table 2. Frequency Distribution of Sample Characteristics

Variabel	Intervention		Control		P value
	n	%	n	%	
Age					0,234
< 30	0	0	2	8,3	
31 – 40	8	33	8	33,3	
41 – 50	16	67	14	58,3	
Work					0,108
Housewife	22	92	15	6	
Labor	1	4	3	13	
Private	1	4	3	13	
Teacher	0	0	1	4	
Government employees	0	0	2	8	
Education					0,104
SD	11	46	5	21	
SMP	7	29	8	33	
SMA	5	21	9	38	
D3	1	4	0	0	
S1	0	0	2	8	
Physical Activity					1,000
Light	16	67	17	71	
Medium	8	33	7	29	
Weight	0	0	9	0	
Total	24	100	24	100	

The mean BMI of the intervention group at the beginning of the study was 30.16 kg / m2 and in the control group 30.04 kg / m2. Whereas, the mean BMI of the intervention group at the end of the study was 29.66 kg / m2 and in the control group 29.90 kg / m2. The mean decrease in the BMI of the intervention group was 0.50 and the control group was 0.13.

BMI, Energy Intake, Fat Intake and Fiber Intake

Table 3. Distribution of Average BMI, Energy Intake, Fat Intake, and Fiber Intake

Variabel	Kelompok	Rerata	SD
Pre BMI	Intervention	30,16	2,95
	Control	30,04	3,47
Post BMI	Intervention	29,66	2,86
	Control	29,90	3,42
Decrease BMI	Intervention	0,50	0,53
	Control	0,13	0,69
Percent of energy intake	Intervention	116,85	25,96
	Control	114,58	27,73
Percent of fat intake	Intervention	140,95	28,68
	Control	135,98	42,82
Pre fiber intake	Intervention	7,92	2,70
	Control	8,00	3,26
Post fiber intake	Intervention	9,63	2,74
	Control	10,08	3,41
Post fiber intake	Intervention	1,72	0,60
Increased fiber intake	Control	2,08	0,67

The mean percent of the energy intake of the intervention group was 116.85% and in the control group 114.58% with p value = 0.967 (p> 0.05) or it could be said that there were no significant differences between the intervention group and the

control group or homogeneous data. The mean fat intake of the intervention group was 140.95% and in the control group 135.98% with p value = 0.837 (p> 0.05) or it could be said that there were no significant differences between the intervention group and the control group or homogeneous data.

The mean fiber intake in the intervention group at the beginning of the study was 7.92 g and in the control group 8.00 g. Meanwhile, the mean fiber intake in the intervention group at the end of the study was 9.63 g and in the control group 10.08 gr. The average increase in fiber intake in the intervention group was 1.72 gr and the control group was 2.08 gr.

The statistical test used is Paired T Test on the degree of trust 95% showed a significant difference in mean fiber intake at the beginning and end of the study in each group, namely the intervention group and the control group with p <0.001 (p≤0.05). Based on the results of statistical tests using the Independent T Test, it was known that p = 0.053 (p> 0.05) there was no difference in the increase in fiber intake between the intervention group and the control group.

Bivariate analysis

Table 4. Overview of waist circumference and initial and final body weight in the intervention group and control group

Kelompok	Variabel	Rerata	SD	Median	Min-Maks	Nilai p*
	Waist circumference					<0,001
Intervention	- Pre	90,28	7,70	91,25	77,30 – 101,80	
	- Post	83,02	7,33	82,50	71,00 – 95,50	
	Waist Circumference					0,003
Control	- Pre	89,70	8,62	91,65	67,50 – 105,90	
	- Post	86,53	7,86	86,40	67,70 – 99,00	
	Weight					<0,001
Intervention	- Pre	67,32	9,10	70,05	47,60 – 83,50	
	- Post	66,03	8,90	68,20	46,70 – 82,00	
	Weight					0,563
Control	- Pre	67,26	12,0	66,20	45,20 – 97,50	
	- Post	67,48	11,77	67,30	45,60 – 94,40	

*) Paired T Test

Table 5. Overview of Decreasing Circumference and Weight Loss Between Intervention and Control Groups

Variabel	Mean	SD	Median	Min-Max	P$_{value}$*
Decreasing Circumference					0,003
- Intervention	7,26	3,78	6,75	2,40 – 16,70	
- Control	3,17	4,70	2,25	-4,40 – 11,40	
Decreasing weight					<0,001
- Intervention	1,30	0,94	1,20	0,00 – 4,20	
- Control	-0,21	1,78	-0,30	-6,50 – 3,10	

*) Mann-Whitney Test

Differences in waist circumference and initial and final body weight in each group Table 4 shows the mean waist circumference of the intervention group at the beginning of the study was 90.28 cm with a standard deviation of 7.70 cm and at the end of the study was 83.02 cm with a standard deviation of 7.33 cm. The statistical test used is Paired T Test at 95% confidence level shows that there is a significant difference in waist circumference at the beginning and end of the study in the intervention group, namely the group given black stick bar tape snack and low calorie diet education with p <0.001 (p ≤0.05).

Table 4 shows the mean waist circumference of the control group at the beginning of the study was 89.70 cm with a standard deviation of 8.62 cm and at the end of the study was 86.53 cm with a standard deviation of 7.86 cm. The statistical test used is Paired T Test at 95% confidence level shows that there is a significant difference in waist circumference at the beginning and end of the study in the control group, namely the group was only given a low calorie diet education with a value of p = 0.003 (p≤0.05).

Table 4 shows the mean weight of the intervention group at the beginning of the study was 67.32 kg with a standard deviation of 9.10 kg and at the end of the study is 66.03 kg with a standard deviation of 8.90 kg. The statistical test used is Paired T Test at 95% confidence level showed that there was a significant difference in mean weight at the beginning and end of the study in the intervention group, namely the group given the black stick tape bar snack and the low calorie diet education with p <0.001 (p≤0.05) .

Table 4 shows the mean weight of the control group at the beginning of the study was 67.26 kg with a standard deviation of 12.0 kg and at the end of the study was 67.48 kg with a standard deviation of 11.77 kg. The statistical test used is Paired T Test at 95% confidence level shows that there is no significant difference in mean weight at the beginning and end of the study in the control group, namely the group was only given a low calorie diet education with p = 0.563 (p> 0.05) .

Decrease in Waist Circumference and Weight Loss Between Intervention Groups and Control Groups

Table 5 shows the median decrease in waist circumference of the intervention group was 6.75 cm with a minimum value of 2.40 cm and a maximum of 16.70 cm. Whereas the median decrease in waist circumference of the control group was 2.25 cm with a minimum value of -4.40 cm and a maximum of 11.40 cm. The statistical test used is the Mann-Whitney Test with a 95% confidence level indicating there is a significant difference in the decrease in waist circumference between the intervention group and the control group with p = 0.003 (p≤0.05). So there is an effect of Snack Bar Based on Fermented Glutinous Black Rice and low

calorie diet education on decreasing waist circumference.

Table 5 shows the median weight loss of the intervention group was 1.20 kg with a minimum value of 0.00 kg and a maximum of 4.20 kg. Whereas, the median control group weight loss was -0.30 kg with a minimum value of -6.50 and a maximum of 3.10 kg. Statistical test used

is the Mann-Whitney Test with a 95% confidence level showed a significant difference in weight loss between the intervention group and the control group with p <0.001 (p≤0.05). So that there is the influence of Snack Bar Based on Fermented Glutinous Black Rice and education on low calorie diet for weight loss.

DISCUSSION

Sample Characteristics
Overweight occurs in adulthood because the amount of fat deposits in an adult's body has increased by 10 percent. Changes in a person's lifestyle have contributed to an increase in body fat [7]. This is in line with the research conducted by Nadimin, et al in 2015 which stated that age is one of the causes of obesity in adults with a total sample age of> 25 years [14].

Based on the results of the study, it is known that most of the samples were housewives in the intervention group (91.7%) and the control group (62.5%). Housewives have physical activity that is not too heavy so they have a tendency to be overweight. Physical activity is known to be one of the factors of obesity [15]. Technological advancements that are progressing from year to year provide convenience to lifestyle and reduce the number of physical activities in daily activities including domestic work [16].

It is known from the results of this study that in the two sample groups most of them had low category physical activity with the intervention group at 66.7% and the control group at 70.8%. This research is in line with the research conducted by

Aprianty (2015), which states housewives have a 5.5 times risk of becoming obese because they have low activity [17].

Some of the samples in the intervention group had the last education in elementary school (45.8%) and the rest were junior high (29.2%), high school (20.8%), and D3 (4.2%). While in the control group some had the last high school education (37.5%), junior high school (33.3%), and elementary school (20.8%).

BMI, Energy Intake, Fat Intake, and Fiber Intake
IMT is a simple tool for monitoring the nutritional status of adults especially those related to deficiency and being overweight [18]. IMT measurements are more sensitive in assessing the distribution of fat in the body, especially those in the abdominal wall [19]. Thus, a decrease in BMI can be a simple indicator to monitor weight loss and distribution of body fat, especially in the abdomen.

The mean percent of energy intake in the intervention group was 116.85% and in the control group 114.58%. The average energy intake in both groups was in the more category because of> 100% need [20]. High energy intake due to excessive consumption of food is not balanced with the use of energy for metabolism and physical activity causing obesity [21]. Based on the results of statistical tests using Mann-Whitney Test obtained p value = 0.967 (p> 0.05) or it can be said that there is no significant difference between the intervention group and the control group or homogeneous data. So, the sample energy intake does not affect the research.

The mean percent of fat intake in the intervention group was 140.95% and in the control group 135.98%. The average is in the more category because> 110% of needs [22]. Fat consumption which exceeds the body's needs can cause fat accumulation in adipose tissue and cause obesity [7]. Someone who has a fat intake higher than the need to have a 4.4 times higher risk of

being overweight [5]. Based on the results of statistical tests using Mann-Whitney Test p value = 0.837 (p> 0.05) or it can be said that there is no significant difference between the intervention group and the control group or homogeneous data. Thus, the fat intake of the sample did not affect the study.

The statistical test used is Paired T Test on 95% confidence level shows that there is a significant difference in mean fiber intake at the beginning and end of the study in each group, namely the intervention group and the control group with p<0.001 (p≤0.05). Based on the results of statistical tests using the Independent T Test, it was known that p = 0.053 (p> 0.05) there was no difference in the increase in fiber intake between the intervention group and the control group. This shows that dietary fiber intake does not affect research.

Bivariate analysis
The Influence of Snack Bar Based on Fermented Glutinous Black Rice and Low Calorie Diet Education Against Decreasing Waist circumference.

According to the WHO Asia-Pacific perspective guidelines, the cut-off point for obesity is waist circumference ≥90 cm for men and ≥80 cm for women [23]. In this study, of the 48 intervention and control samples there were only 7 samples with no obesity category based on waist circumference at the beginning of the study with 4 samples in the intervention group and 3 samples in the control group. At the end of the study it was found that there were 3 samples with a waist circumference including the obesity category and then decreased to reach the category of not obese (≥80 cm).

The Snack Bar Based on Fermented Glutinous Black Rice given to the sample made from Fermented Glutinous Black Rice is processed into a snack bar. Fermented Glutinous Black Rice is a fermented alcoholic food product that is consumed by Indonesian people because it is easy to make, cheap, and has a soft and watery texture with a sweet and sour taste [24]. In black glutinous rice the dominant phenoliccomponentdetectedis anthocyanin compounds and has antioxidant activity and fiber content [25,26].

Anthocyanins are absorbed into the blood in their intact form and metabolized to methoxy derivatives in the liver and kidneys. Anthocyanin then activates AMPK (Adenosine Monophosphate-Activated Protein Kinase) which is induced by significant phosphorylation of ACC (Anti-AcetylcoA Carboxylase) and regulated by PPARα (Peroxisome Proliferator-Activated Receptor α) and ACO (Acetyl-coA Carboxylase) in the liver thereby increasing fat content through increased fatty acid oxidation [9].

This study is in line with research conducted by Tsuda (2003) conducted on mice with a high-fat diet, explaining that the consumption of anthocyanins from food (purple corn) as a functional food factor can significantly prevent obesity and diabetes [10]. However, in this study using anthocyanins from Fermented Glutinous Black Rice, use the waist circumference indicator to determine obesity and do it in humans.

In addition, the fiber content in Fermented Glutinous Black Rice plays a role in decreasing waist circumference. Fiber causes slowing of emptying of the stomach so that someone feels full faster. Most of the fiber will be broken down by bacteria in saekum and colon. The process of decomposition by bacteria is in the form of gases, short chain fatty acids and other molecules. All of these substances and the nature of holding water in the remaining fiber fragments together will result in a larger stool mass. The result of many stool mass and soft (because it contains water) one of them is an increase in the frequency of bowel movements and a reduction in colonic transit time [7].

This study is in line with Santawati's (2010) study, which states that there is a relationship between fiber intake and waist

circumference that shows a meaningful relationship. In this study fiber was obtained from Fermented Glutinous Black Rice. The correlation of fiber intake with waist circumference is negative, meaning that the higher the fiber intake, the lower the waist circumference [27].

It is known that the results of this study both in the intervention group and in the control group significantly decreased waist circumference based on the results of statistical tests. This, shows that the education of a low-calorie diet also has an influence on the results of this study because in the control group who were only given a low-calorie diet, there was a decrease in waist circumference. This study is in line with the research conducted by Asiah (2009), which states that a balanced low-calorie diet for 14 days can cause a significant reduction in waist circumference of 2.5% [28].

Based on the results of this study it is known that, the sample with a age <40 years experienced a decrease in waist circumference averaging 5.9 cm while for samples with age ≥40 years experienced a decrease in waist circumference averaging 4.9 cm. Increases in waist circumference occur in tandem with the aging process, even without weight gain [29]. This occurs due to changes in physiological function in the age group of 20 to 64 years who experience an increase in body weight and fat tissue. Conversely, there is a decrease in muscle mass which causes redistribution of fat in the body, with reduced subcutaneous fat and accumulation of fat in the abdominal cavity, thus affecting the incidence of central obesity [30].

Effect of Snack Bar Based on Fermented Glutinous Black Rice and Low Calorie Diet Education on Weight Loss

It is known from the results of statistical tests, that there was no significant difference in mean weight at the beginning and end of the study in the control group while for the waist circumference variable in the same group showed significant mean differences at the beginning and end of the study. This research is not in line with the research conducted by Meidelwita (2010), shows that based on statistical tests it was found that there were significant differences between body weight before and after a low calorie balanced diet with aerobic physical exercise [31]. This can occur due to the physical activity of the sample which tends to be mild. Body weight describes the amount of protein, fat, water and minerals found in the body [32]. Meanwhile, waist circumference is used to predict the presence of fat deposits in the intra-abdominal region or often called central obesity [33]. Thus, it can be said that body weight describes the composition of the entire body while the waist circumference only describes the distribution of fat in the abdomen. Low calorie diet education is less effective for weight loss because of a longer reduction compared to waist circumference. The results of this study are in accordance with Heysmfield et al's report that weight loss will be slower due to fat oxidation takes longer than the time to oxidize carbohydrates and proteins [34].

This study is in line with research conducted prior to mice, anthocyanin extract from blueberries if added as a supplement can significantly inhibit weight gain and accumulation of body fat [11]. However, this study was carried out on humans and sources of anthocyanins were obtained from Fermented Glutinous Black Rice.

In this study, it was discovered that after a sample of Snack Bar Based on Fermented Glutinous Black Rice felt full longer and slightly bloated. It is known that Fermented Glutinous Black Rice is a product of alcoholic fermentation [24]. The dominant phenolic components detected in Fermented Glutinous Black Rice are anthocyanin compounds and other components such as fiber [25].

Anthocyanin is known to increase fat levels by increasing oxidation of fatty acids [9]. Thus, there is a decrease in body

fat levels faster than with the control group as a result of weight loss and the results of data analysis showed the mean weight loss of the intervention group was 1.30 kg.

The effects of satiety are produced from consuming Snack Bar Based on Fermented Glutinous Black Rice to fiber and fermentation. The fiber contained in Snack Bar Based on Fermented Glutinous Black Rice is a type of insoluble food fiber. Fiber can provide full effects for longer, so that losing weight and being overweight can be avoided [35]. A slowdown in gastric emptying causes a person to feel full after eating and thus eat less. Fiber also, resulting in a lot of stool mass and soft (because it contains water) one of which is an increase in the frequency of defecation and a reduction in colonic transit time [7]. With increasing frequency of defecation and decreased frequency of eating due to longer satiety caused weight loss in the intervention group who were given Snack Bar Based on Fermented Glutinous Black Rice and educated low calorie diet.

CONCLUSION

1. There were significant differences in waist circumference and body weight at the beginning and end of the study in the intervention group with p <0.001 (p≤0.05) respectively.
2. There is an effect of black sticky tape snack snack on decreasing waist circumference and body weight with each p value = 0.003 and p <0.001 (p≤0.05)

SUGGESTION

1. It is necessary to socialize the importance of consuming black sticky tape as an alternative functional food to prevent obesity by reducing waist circumference and weight
2. Further research is needed on the relationship between consumption of black sticky rice tape with a decrease in waist circumference and weight in a

larger sample size, using various doses of administration, paying attention to confounding factors such as food intake and physical activity, longer treatment times and paying attention to impressions. sample after consuming black sticky rice tape
3. There is a need to develop black snack bar tape snack products as a snack option to prevent obesity accompanied by a low calorie diet

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