Effect of Pie Based on Fermented Black Glutinous Rice and Sweet Purple Potato To Frequency of Defecation in Adolescent With Constipation

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EFFECT OF PIE BASED ON FERMENTED BLACK GLUTINOUS RICE AND SWEET PURPLE POTATO TO FREQUENCY OF DEFECATION IN ADOLESCENTS WITH CONSTIPATION

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ABSTRACT— Less fiber consumption will cause constipation. Dietary fiber has the ability to bind water in the colon to make the volume of feces bigger and will stimulate the nerves in the rectum The aim of the study was to determine the effect of pie product from fermented black glutinous rice and sweet purple potato to frequency of defecation in adolescent with constipation. The experimental research design used two groups pre and posttest with control experimental design. The population in this study were adolescents who lived around the Poltekkes Bandung. The number of samples is 19 people in each group. The study was conducted for 14 days. The intervention group was given 2 pieces of pie product from fermented black glutinous rice and sweet purple potato and a high-fiber diet education. The control group was educated on a high-fiber diet. Statictical analysis used was Wilcoxon and Mann Whitney test. Statistical tests with Wilcoxon showed a significant difference in the frequency of defecation at the beginning and end of the study with a value of p <0.001 (p≤0.05). The Mann-Whitney test showed that there was an effect of pie product from fermented black glutinous rice and sweet purple potato to the increased frequency of defecation in adolescents suffering from constipation with a value of p <0.001 (p≤0.05). It is necessary to socialize the importance of consuming fermented black glutinous rice as an alternative snack to prevent constipation.

KEYWORDS: Pie based on fermented black glutinous rice and sweet purple potato, contsipation, adolescent

1. INTRODUCTION

Constipation is defined as the frequency of defecation that is less than 3 times a week with hard and small feces with difficulties and pain (1). Constipation is a condition characterized by changes in feces consistency to hardness, large size, decreased frequency or difficulty in defecation. Constipation is often characterized by symptoms of anxiety when defecating, due to pain during defecation. Constipation can cause severe stress for sufferers due to discomfort. Constipation if not treated immediately can occur hemorrhoids and diverticles. Other effects due to functional constipation are disruption of activities such as abdominal cramps, decreased quality of life through decreased learning productivity and high rates of absenteeism at school (2). Constipation can lead to colon cancer (colon cancer) which can lead to death (3). Factors causing constipation include low fiber consumption and lack of fluid intake (4). Constipation is one of the digestive system diseases that is often diagnosed. Studies show that the prevalence of constipation in the general population reaches 12% - 19%. The prevalence increases with age and is more often experienced. In most cases, constipation is a primary or idiopathic disease, but can be caused by the use of drugs or other chronic diseases. The causes of constipation are multifactorial such as dietary patterns, motility and absorption of the colon, sensory and motor anorectal function, and behavioral and physiological factors of the individual (5). Based on data from the World Gastroenterology Organization (2017), each constipated patient can have

symptoms that are different from one another. Patients perceive constipation as the presence of tension in the abdomen (52%), while others feel the need to push because of hard stool (44%) or inability to defecate according to will (34%) and irregular bowel movements (33%) (5). Research conducted by Badrialaily (2004) on students of Community Nutrition and Family Resources and Forestry students at the Bogor Agriculture Institute, about 25% of students stated that they were not regularly defecating every day. Most students (96.7%) consume low fiber every day, where 63.3% of students consume about 7.8 grams of fiber / day (1). Fiber intake is calculated based on the consumption of all types of food samples in two days which are then averaged and converted into units of weight (grams). Fiber intake is said to be sufficient if it is in the range of 19-30 g / day. Vegetables and fruit are high sources of fiber food. Less fiber consumption will cause a person to experience constipation or constipation (6). Indonesian Minister of Health Regulation (2014) states that vegetables are recommended consumed by adolescent or adults as much as 3-4 servings a day or 3-4 bowls. The weight of one bowl of vegetables is 75 g, it is necessary to eat 250-300 g of vegetables a day [7].

Based on the results of a preliminary study conducted in December 2018, the aim was to find out the prevalence of constipation in adolescents. It was found that 73.9% of 142 respondents said they had symptoms of constipation, 21.9% said the frequency of defecation in 1 week was 2 times, 77, 1% had experienced hemorrhoids, 31.4% drank <1 liter in a day, 47.6% consumed vegetables only 3 times a week, 21% consumed only 2x in 1 week, and 70.5% had more physical activity compared to standing. Constipation occurs due to several factors including lack of fiber intake from vegetables and fruits, lack of drinking, and physical activity. Dietary fiber has the ability to bind water in the colon making the feces volume larger and will stimulate the nerves in the rectum, leading to a desire for defecation. Significant effects that have been proven are increasing feces volume, softening feces consistency and shortening intestinal transit time (1). One of the fiber sources is black sticky rice 5.9 gram / 100 gram and purple sweet potato 3 gram / 100 gram (8,9). If constipation occurs repeatedly and over a long period of time can cause several complications, including: arterial hypertension, faecal impaction, hemorrhoids, colon cancer, and rectum. Colon and rectal cancer is the most common gastrointestinal cancer at risk for long-term constipation [1]. Anthocyanin has a good function for health such as preventing the risk of colon cancer. Anthocyanins contained in sweet potatoes can block the rate of destruction of free radical cells such as cancer cells. Anthocyanin and fiber sources other than fruits and vegetables are anthocyanin-rich rice (Oryza sativa) such as black glutinous rice, black rice and brown rice. Black glutinous rice (Oryza sativa glutinosa) as raw material for black glutinous rice is a very potential commodity as a source of carbohydrates, antioxidants, bioactive compounds and fibers that are important for health. One of the foods in Indonesia made from black glutinous rice is “tape” (fermented black glutinous rice) which contains anthocyanin, phenol and antioxidant activity. Potential local foods to get high fiber and anthocyanin are fermented black glutionous rice and sweet purple potato. Sweet purple potato has high anthocyanin and fiber content. Fermented black glutinous rice contains a substance similar to purple sweet potato with a higher fiber content and the antioxidant activity of fermented black glutinous rice is better because it has undergone fermentation. Reseacher interested to study the content of fermented black glutinous rice and sweet purple get a new product (pie produk based of fermented black glutinous rice and sweet potato). This product is rich in fiber and antioxidants as a functional food for people with constipation.

2. Subjects and Methods

This study uses an experimental research design (two groups pre and post experimental design) to determine the effect pie based on fermented black glutinous rice and sweet purple potato on defecation frequency. The

intervention group was given 2 pieces of pie product and nutritional counselling (high fiber diet), while the control group was given nutritional conselling (high fiber diet) only. The study was conducted in the working area of the Pasirkaliki Community Health Center for 14 days. The population in this study were adolescents living around the Poltekkes Bandung. Samples were taken according to inclusion and exclusion criteria. In this study the sample size was determined using a two-hypothesis test with a sample size of 19 people in each group. Data analysis uses univariate and bivariate analysis. Univariate analysis is used to describe the characteristics of the sample. Bivariate analysis was used to analyze the effect of black sticky tape on the average increase in fiber intake, the frequency of defecation in the intervention and control groups, the difference in the frequency of defecation changes between the intervention and control groups, and the average change in the frequency of defecation.

3. Results

Description of Product

After repeated formula test, and organoleptic test, the most optimal formula is the pie based on fermented Glutinous rice formula with a balance of 75% black sticky tape: 25% purple sweet potato. 250 grams of black sticky rice tape and 25 grams of purple sweet potato produced 30 pieces of pie products weighing 50 grams. The fiber content per serving of pie products is 3.03 grams.

Table 1. Nutrition Fact Pie Based on Fermented Black Glutinous Rice and Sweet Purple Potato per portion (50 Gram)

Nutrition	Total
Energy	160,2 kkal
Protein	2,7 gram
Fat	4,6 gram
Carbohydrat	30,9 gram
Fiber	3,03 gram

Figure 1. Pie based on Fermented Black Glutonous Rice and Sweet Purple Potato

3.1 Description of Sample

The sample in this study were adolescents who lived around the Poltekkes Bandung, aged between 17-25 years, constipation, less than 3 times the frequency of defecation in one week, and willing to take part in the study.

3.2 Characterictic of Sample

In this study a total sample of 38 females, consisting of 16 people under the age of 20 years and 22 people aged 20 years or above.

3.3 Nutritional Status Based on Body Massa Index

The nutritional status of the samples is generally normal, but some are included in the category of malnutrition, 2 samples (10.5%) in the intervention group and 1 sample (5.3%) in the control group. There was 1 sample (5.3%) in the overweight category in the intervention group.

3.4 Uji Normalitas

Table. 2 Normality Test Data

Variable	Intervention (n=19)		Kontrol (n=19)		Uji Statistic
	P value	Distribution	P value	Distribution	
Defecation frequency before intervention	0,000	NN	0,000	NN	Non Parametric
Defecation frequency after intervention	0,000	NN	0,000	NN	Non Parametric
Increasing defecation frequency	0,000	NN	0,000	NN	Non Parametric
Fiber intake before intervention	0,003	NN	0,001	NN	Parametric
Fiber intake after intervention	0,000	NN	0,002	NN	Parametric
Different of fiber intake	0,000	NN	0,000	NN	Non Parametric

NN: Non Normal Distribution

Table 2 shows that defecation frequency data before and after the intervention in the intervention group and the control group were not normally distributed. Data analyzed used Wilcoxon test. Data fiber intake data before and after in the intervention and control group were not normally distributed. Data analyzed used Wilcoxon test.

3.5 Bivariate Analysis

3.5.1 Defecation Frequency in Intervention and Control Group

Defecation frequency in intervention and control display in Table 3.

Table 3. Defecation Frequency Before and After Intervention

Defecation Frequency	Before	After	p value *
Intervention			0,000
Mean (SD)	1.53 (0.69)	3.05 (1.02)	
Min-max	0-2	2-7	

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Control			1,000
Mean (SD)	2.11 (0.45)	2.11 (0.45)	
Min-Max	1-1	3-3	

*) Wilcoxon Sign Rank Test

Based on table 3 shows that there is an increase in the frequency of defecation after intervention. Based on the results of statistical tests using Wilcoxon obtained p = 0,000 (p <0.05), there was a difference in the increase in frequency of defecation between before and after intervention in the intervention group. Whereas the control group showed that there was no increase in the frequency of defecation after the intervention. Based on the results of statistical tests using Wilcoxon obtained p = 1,000 (p≥0.05), there was no difference in the increase in the frequency of bowel movements between before and after the intervention in the control group.

Table 4. Defecation Frequency in Intervention Group and Control

Group	Frekuensi of defecation				p*
	Mean	SD	Min	Max	
Intervention	1,53	1,02	1	5	<0,001
Control	0,00	0,00	0	0	

*) Mann-Whitney Test

Table 4 shows the statistical test used is the Mann-Whitney Test with a 95% confidence level showing that there is a significant difference in the frequency of defecation between the intervention and control groups with a value of p <0.001 (p≤0.05). There was a difference in the difference between the average frequency of defecation in the intervention and control groups.

4. Discussion

4.1 Characteristic of Sample

All samples were women aged between 18-24 years. Ages <20 years were 16 people, and ≥ 20 years were 22 people. Samples that have under nutritional status in the control group was 1 person, and normal were 18 people. Samples that have under nutritional status in the intervention group were 2 people, normal nutritional status were 16 people, and overweight was 1 person. All samples were college students.

4.2 Effect of Pie Based on Black Glutinous Rice and Nutrition Counselling High Fiber Diet to Defecation Frequen

Based on the results of the study, the average frequency of defecation before the intervention was twice a week (63.2%). The average frequency of defecation after intervention was three times a week (78.9%). There was an increase in the average frequency of defecation compared to before the intervention. The results of this study are similar to studies conducted in elementary school children in Bogor which show that there is a significant relationship between fiber intake and faecal consistency, p = 0.016. If the fiber is balanced with the need, the feces consistency will become soft, had volume, can be released smoothly and constipation does not occur [10]. The pie product given in the sample is made of fermented black glutinous rice and sweet purple sweet. Fermented black glutinous rice is a product produced from the fermentation process of black glutinous rice (8). Based on the results of research conducted by Roro, the fiver value of pie made from fermented black glutinous rice was 3.03 grams per portion (11). This caused an increase in the

frequency of defecation in the intervention group given pie products due to the presence of fiber components.

4.3 Effect of Nutrition Counselling High Fiber Diet to Defecation Frequency

Based on the results of the study, the average frequency of defecation before the intervention was twice a week (78.9%). The average frequency of defecation after intervention was twice a week (78.9%). This shows that there is no increase in the average frequency of defecation compared to before the intervention. This is due to the absence of high fiber products

Conclusion

Based on the results of the study it can be concluded that there was an increase in the frequency of defecation in the intervention group after the intervention of pie products, with an average increase in the frequency of defecation three times per week. There is an effect of pie product based on fermented black glutinous rice and sweet purple potate combine with high-fiber diet education toward increasing defecation frequency with p value <0.001 (p 0,0.05). The average increase in the frequency of defecation in the intervention group was 1.53 (twice per week).

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7. Acknowledgement

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