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Overweight and OBES: The Impact of Lactobacillus Casei Strain Shirota on Cholesterol and Weight of Children in the Pandemic Time COVID-19

Rudy Hartono[1,2*], Rusli[1,2,3], Mira Andini[1,2], Aswita Amir[1,2]

[1]Nutrition Department, Health Polytechnic of Makassar, South Sulawesi, Indonesia
[2]Centre of Exellence Urban Health, Indonesia
[3]Pharmacy Department, Health Polytechnic of Makassar, South Sulawesi, Indonesia

[*]**Corresponding Author**: Rudy Hartono
Email: dinomks70@gmail.com

ABSTRACT
Children overweight and obes are adorable circumstances but behind it save health problems until the moment of advanced growth and development. Lactobacillus casei strain Shirota is a functional food that is one of the types of probiotics. Some of the results of the study related to this type of probiotics is to lose weight and cholesterol levels in both animals and humans. The purpose of the study was to find out the impact of L. casei strains of Shirota on cholesterol levels and weight of obese and overweight children. This type of research is an experiment with pre-treatment design of only one sample. Data analysis using free sample t 2 test and Wilcoxon test. The results showed that the use of L. casei strain Shirota increased the weight of obese and overweight by 42,535±,10,607 kg to 44,905±13,896 kg (p = 0.00 8) and lowered total cholesterol levels by 179.05±33,763 mg/dl to 145.05±27,204 mg/dl (p = 0.000). The conclusion based on the results of this study is an intervention to increase the weight of obese and overweight children that are not too high and lower cholesterol levels that are still within normal limits.

Keywords: Lactobacillus casei strains Shirota, overweight and obes, children.

Correspondence:
Rudy Hartono
Nutrition Department, Health Polytechnic of Makassar, South Sulawesi, Indonesia
Email: dinomks70@gmail.com

INTRODUCTION
Functional foods are foods and or beverages that have health benefits that exceed their nutritional content. One type of functional eating is probiotics. Probiotics are living microorganisms, which in sufficient quantities can provide health benefits to the body [1][2][3]. The danger of obesity is to increase the risk of various diseases. Having excess fat in the body, especially in the waist area, will increase the risk of serious health disorders and is associated with the risk of developing some types of diseases such as cancer and heart disease. The habit of consuming foods containing high fats, high sugars and high protein is now common [25]. This of course can lead to increased levels of fat and sugar in the blood, in Indonesia alone there are 25 out of 1,000 people die from cholesterol, with the average cholesterol levels in the blood reaching 230-250 mg / dL [23]. Due to the high cholesterol levels, Many Indonesians have heart disease and stroke and obesity. Increased fat mass is associated with insulin resistance, hyperglycemia, dislipidemia, and hypertension, which together are called "metabolic syndrome".

Obesity makes a person a source of distress. The ideal weight is very good for health support. Therefore, it is important for us to maintain weight so as not to get too fat, especially for those who in their family have a history of high blood pressure, diabetes, heart disease, and high cholesterol levels. If any family member has the disease, losing weight can reduce the risk of developing a similar disease. Chubby cheeks that obese children have do look adorable but behind it there are health hazards that lurk in children with obesity [4]. Some circumstances can be the cause of childhood obesity. In addition to hereditary factors, poor diet, excessive milk feeding, and lack of physical activity and exercise can also cause children to become obese. This should not be allowed, because there are various health hazards that can be experienced by obese children. Not all children who look fat and big are obese. To determine it, it is necessary to check the child's body mass index (BMI) by competent [6][8].

In obese children, there are various health hazards that can occur, namely: High cholesterol and high blood pressure, type 2 diabetes, asthma, arthritis and fractures. Not only has an impact on physical health, children's psychic health can also be affected by obesity. Being overweight can make a child's confidence decrease. They are also vulnerable to being victims of bullying of their friends. This can trigger anxiety disorders and depression [4][5][7].

Obesity and overweight are major public health problems. Various factors, such as daily nutritional habits, physical activity, and genetics, are associated with the prevalence of obesity. Some research results reveal that the intestinal microflora can also play an important role in weight management. Probiotics are live bacteria that are given as dietary supplements that have a beneficial influence on the health of the host, by improving the balance of the intestinal microflora. Probiotics that are often used are bal group especially Lactobacillus and Bifidobacterium. In addition to improving intestinal health, probiotics also have cholesterol-lowering effects [14]. Maintained intestinal microbiota can induce the growth of ileum cells in the proximal intestine which improves the response of GLP-1 (Glucagonlike peptide-1) to the presence of food [2][4][7]. Lactobacillus casei shirota strain bacteria is a superior strain that is easy and suitable to be developed in milk base drinks. In addition to these bacteria are able to survive the influence of stomach acid, it is also able to survive in the bile fluid so that it can survive to the small intestine [3][10][13]. Sources of foods containing probiotics are dairy products such as yogurt, kefir, cheese, biodrink, bioyogurt and others. Obesity and overweight in children are one of the public health problems. Various

factors, such as daily nutritional habits, physical activity, and genetics, are associated with the prevalence of obesity. Some of the results revealed that intestinal microflora can also play an important role in weight management of cholesterol concentrations [11][13][18].

METHOD

Types of research

The implementation of this research is a pre-experiment with the design of one sample pre-posttest only. This study used only 1 group measured before and after intervention, based on the government's appeal during the covid-19 pandemic then in the sample selection using what's app (WA) application on each parent's handpone in this case the sample mother. Parents whose children occupy grades 1 to 6 of elementary school in Makassar City, South Sulawesi Province, Indonesia and have more weight and obesity, are physically healthy and willing to be sampled are given information about the implementation of the study, if they are willing to sign an agreement after explanation, then the sample parents will be included in the WhatsApp Group (WAG). The sample then examined weight and height to calculate the body mass index that belongs to the inclusion category.

Data Sources and Measurements

Based on the measurement of weight and height, 21 children were found to meet the sample criteria. But there was one sample that could not continue to follow this research. The intervention obtained by the sample was the administration of Lactobacillus casei strain Shirota supplement (6.5x 109) [15] for 2 months from August to September 2020. Once a week is guided in an integrated way in doing gymnastics through a zoom service. Lactobacillus casei strain Shirota supplement is a probiotic beverage product that is easily obtainable in the market.

The variable measurements studied were weight (kg) using digital scales, height (cm) using microtoa, cholesterol levels (mg / dl) using a digital tool check (Nesco Multicheck GCU 3 in 1) that was done twice before and after intervention. The control variable is nutritional intake using a recall 24 hours before and after the treatment of only macronutrients namely carbohydrates, proteins and fats.

Statistical Analysis

All data were analyzed using descriptive statistics, specifically for weight data, cholesterol levels and nutritional intake were tested t 2 samples paired if the data distributed normally and using wilcoxon signed ranks test if the data is not distributed normally. Data normality test using Shapiro Wilk test [27]. Descriptive presentation of data using averages and standard deviations and presentations of each variable.

RESULT

Sample Characteristics

Table 1. Profile from Sample

Variable	n	%
Age (years)		
< 10 years	11	55
≥ 10 years	9	45
Gender		
Male	11	55
Female	9	45
Class		
1 - 3	8	40
4 - 6	12	60
Body Mass Index (BMI)		
Overweight	7	35
Obesity	13	65
Religion		
Islam	20	100
Jumlah	**20**	**100**

Based on table 1 above shows the distribution of data by variable age, gender, classes occupied in elementary school, body mass index and religion embraced by the sample. Before the statistical test, normality data was carried out using Shapiro Wilk test on weight data and cholesterol levels both before and after intervention of the sample.

Macro nutrient intake as a control variable after the analysis using before after t test and wilcoxon test get results that are carbohydrate intake (p = 0.150), protein (p = 0.540) and fat (p = 0.233) and energy (p = 0.230) shows no difference before and after supplementation with Lactobacillus casei strain Shirota. This emphasizes that the results obtained purely come from the supplementation given. Shapiro Wilk test results as shown in table below:

Table 2. Test Data Normality on Variables

Variable	statistical value	p-value
Weight Loss before	0,906	0.052518
Weight Loss after	0,828	0.002341
Cholesterol before	0,968	0.705609
Cholesterol after	0,930	0.152426

Table 2 above describes the weight data after which has a value of p < 0.05 meaning that what is done according to the requirements is the analysis using Wilcoxon Signed Ranks Test (non-parametric statistics), while cholesterol data has a normal distribution with the value p>0.05

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Table 3 Distibusi Average Values Before and After Supplementation Lactobacillus casei Strain Shirota

Variable	Before	After	Calculated value	p-value
Weight (kg)	42,535±10,607	44,905±13,896	-2,634	0,008(1)
Cholesterol (mg/dl)	179,05±33,763	145,05±27,204	5,378	0,000(2)

(1) Wilcoxon Signed Ranks Test
(2) Paired t Test

According to table 3 above shows that the variable weight increased meaningfully from 42.535 kg to 44.905 kg (p = 0.008), while in the variable cholesterol there was a significant decrease in cholesterol levels ranging from 179.05 mg / dl to 145.05 ,g / dl (p = 0.000).

DISCUSSION

Starting a Healthy Diet, the step that needs to be done along with limiting fatty foods and drinks is to start a healthy diet. This healthy diet should not only be done by children, but also the whole family. Because children usually imitate what their parents and those closest to them do, including when it comes to food. if his parents and other family members are used to eating healthy food every day, he will also get used to eating it. So, again parenthood is very important here. Prepare a balanced diet as a daily family meal and limit the amount of sugar and fatty foods consumed, to lower cholesterol in children.
In table 1, the results of anthropometric measurement of BMI/U were obtained by 6 children (30%) with nutritional status of obese, and 14 children (70%) with obesity status. Obesity can occur in anyone and can occur from infant to old age, both male and female. One of the age groups that are at risk of more nutrition is the school age group, especially the age of 6-7 years because it can lower the level of intelligence so that children's activities and creativity become decreased and tend to be lazy due to being overweight. The tendency to lack physical activity decreases due to modern lifestyles that cause the nutritional status of children above normal, so that the child becomes obese or obese. This is because children eat a lot but lack of activities and use of electronic goods that make children become lazy activities so that the energy that enters the body is much more than the energy used for activities and growth [21].
The existence of a meaningful weight increase of 42,535±10,607 kg to 44,905±13,896 kg (p = 0±.008), this can be caused by bacteria contained in probiotic drinks containing lactic acid bacteria (Lactobacillus casei shirota) that can survive the influence of stomach acid, also able to survive in the bile so that it is able to survive to the small intestine, so that the absorption of food nutrients by the body is not disturbed , and can prevent indigestion, especially constipation and diarrhea and activate immune cells. Hal ini senada dengan yang diungkapkan Gomes et al bahwa Lactobacillus dapat memelihara biota usus yang dapat memberikan efektifitas yang baik dalam memelihara sensitifitas insulin, dengan cara menghambat aktivitas jalur inflamasi baik dari adanya pathogen, lipopolisakarida atau asam lemak bebas [11][15][16]. Although the use of these strains of bacteria can be effective for controlling overweight, but these strains of bacteria can be ineffective, if there are no changes in lifestyle. This situation can also easily occur due to the COVID-19 pandemic.
The total cholesterol test that experienced a meaningful experience ranging from 179.05±33.763 mg / dl to 145.05±27.204 mg / dl (p = 0.000). In the study conducted by Mari C. Fuentes showed results that lactobacillus biofunctionality has a better effect on patients with higher cholesterol levels, thus reducing cardiovascular risk in people with hypercholesterolemia [2][3][4], but no optimum concentration is used.
Lactobacillus which is a lactic acid bacteria, can lower cholesterol through mechanisms, lactic acid bacterial fermentation products inhibit the activity of enzymes for cholesterol synthesis and thus reduce cholesterol production; bacteria facilitate the elimination of body cholesterol in the stool; bacteria inhibit the re-absorption of cholesterol into the body by binding to cholesterol; bacteria interfere with the recycling of bile salts (cholesterol metabolism products) and facilitate elimination, which increases the demand for bile salts made from cholesterol and thus results in the consumption of the body's cholesterol; and, due to the assimilation of lactic acid bacteria, cholesterol in the host body is introduced into the cell membrane or cell wall of bacteria to increase the resistance of bacterial cell membranes to environmental challenges; thus, the host's cholesterol levels are reduced [21].
This is similar to what Matzusaki expressed in his exposure to research results that cholesterol can be converted in the intestine into coprostanol by bacteria, which is directly excreted through faeces. Decrease in the amount of cholesterol that is absorption, resulting in a decrease in cholesterol concentration. In addition, it is caused by other factors such as the presence of regular sports activities although some respondents exercise activities carried out irregularly [12][16]. Exercising regularly can help increase levels of HDL cholesterol (High-Density Lipoprotein), which serves to take fat deposits from the arteries and be returned to the liver organs to be broken down and enzymes released during exercise help to move LDL cholesterol from the blood in the vessels back to the liver to be converted into bile. Furthermore, bile is used as part of the digestive process or excreted [9][17][19].
In addition to consuming probiotic drinks, it can also be caused by regular diet and exercise activities can also be affected by the storage of probiotic drinks stored in a coolant dilemma, these probiotic drinks should be stored at a temperature of 10◦ C. Proper storage will help keep the quality of probiotic drinks effective[19][20]. In addition to helping to reduce cholesterol levels, regular exercise can also make a child's body healthier overall and his muscle strength increased [22][24]. To lower

cholesterol, the ideal duration of exercise to do is for 60 minutes. As a daily habit, try to start reducing the activities of playing gadgets and watching television. Then, invite the children to actively move in their daily activities. If after living a healthy lifestyle and regularly exercising high cholesterol children do not go down, it is best to consult a doctor further [25]. Nowadays, the use of artificial sweeteners has become a common habit by believing that they are special nonfatting agents of sucralose (splenda). Recent research has shown that the use of artificial sweeteners can increase the population of bacteria in the gut. Increased bacterial populations can increase the extraction of calories from food, leading to fat production and increasing levels of appetite hormones and which develop glucose intolerance, which ultimately leads to obesity and type II diabetes.

Utter et al's research showed that physical activities such as watching television had a positive relationship with the incidence of childhood obesity in New Zaeland, where children and adolescents watched TV for two hours or more were more likely to drink soft drinks five times a week or more[23].

CONCLUSION

The impact of interventions using Lactobacillus casei strains of Shirota in obese children and obes tends to increase weight but not too high as well as lower total cholesterol levels even though it is still within normal levels.

CONFLICT OF INTEREST

Researchers have no conflict of interest with the subjects studied.

ETHICS RESEARCH

The research was conducted after obtaining approval from the Makassar Polytechnic Health Research and Service Ethics Committee in accordance with certificate numbered 467/KEPK-PTKMKS/V/2020.

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