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

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ABSTRACT
Children overweight and obese are adorable circumstances but behind it save health problems until the moment of advanced growth and development. Lactobacillus casei strain Shirata 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 Shirata 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 test and Wilcoxon test. The results showed that the use of L. casei strain Shirata 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.

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 dairy products such as yogurt, kefir, cheese, biodrink, bioyogurt and others. This type of functional eating is probiotics. 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 shirato 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, i.e. live bacteria and have superior strain that is easy and suitable to be developed in milk base drinks. Lactobacillus casei strains Shirota, overweight and obese, children.

Keywords: Lactobacillus casei strains Shirata, overweight and obese, children.

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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 improvements in 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 shirato 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, kfeir, 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 10^9) [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 Multichcek 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].

**RESULT**

**Sample Characteristics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 10 years</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>≥ 10 years</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 3</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>4 - 6</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Body Mass Index (BMI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Obesity</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Islam</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td><strong>Jumlah</strong></td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Variable</th>
<th>statistical value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Loss before</td>
<td>0.906</td>
<td>0.052518</td>
</tr>
<tr>
<td>Weight Loss after</td>
<td>0.828</td>
<td>0.002341</td>
</tr>
<tr>
<td>Cholesterol before</td>
<td>0.968</td>
<td>0.705609</td>
</tr>
<tr>
<td>Cholesterol after</td>
<td>0.930</td>
<td>0.152426</td>
</tr>
</tbody>
</table>
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 intake 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), 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).

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).

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.

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

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before</th>
<th>After</th>
<th>Calculated value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>42.535±10.607</td>
<td>44.905±13.896</td>
<td>-2.634</td>
<td>0.008(1)</td>
</tr>
<tr>
<td>Cholesterol (mg/dl)</td>
<td>179.05±33.763</td>
<td>145.05±27.204</td>
<td>5.378</td>
<td>0.000(2)</td>
</tr>
</tbody>
</table>

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

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 are 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 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.
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 Zealand, 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 obese 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 number 467/KEPK-PTKMKS/V/2020.

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REFERENCES


