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Lactobacillus Casei Strain Shirota: Overview of Blood Sugar Levels and Blood Fat from Children Obesity and Fatting

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ABSTRACT

Some survey results show that the prevalence of obese and fatty children is increasing rapidly both in the world and in Indonesia. Impacts that can occur for obese and fatty children in the future are degenerative diseases and decreased productivity. Probiotics are natural microorganisms found in the digestive system, which are deliberately bred as food/beverage supplements which if consumed in balanced amounts will have a positive impact on health. One good probiotic for health is Lactobacillus cassei strain Shirota is a type of bacteria that is resistant to the reaction of stomach acid, and has many important roles in the human body in the intestine, and its important role is to help digestion. The purpose of this study was to prove the effect of supplementation of L. casei strain Shirota on the profile of blood sugar, total cholesterol, triglycerides, LDL, and HDL in obese and fatty children. Type of experimental research with pre-post test only design. Samples are children aged 6-12 years, obese and fatty, cooperative. The results showed that there was a significant effect of L. casei strain Shirota supplementation on total cholesterol ($p = 0.005$), but not significantly on when blood sugar, triglycerides, LDL and HDL ($p > 0.05$). Conclusion there was an decrease in total cholesterol levels after L. casei supplementation. Similarly, there was no significant increase in when blood sugar, decrease triglycerides, decrease LDL and decrease HDL levels. Suggestion L. casei needs to be given to obese and fatty children every day to improve digestion and reduce total cholesterol levels.

Keywords: *Lactobacillus casei, blood sugar, cholesterol, triglycerides, LDL and HDL*

Introduction

The rate of obesity in children in Indonesia has tripled, according to a global study released in the New England Journal of Medicine. They have the potential to suffer from various types of diseases as adults, including diabetes, heart disease and cancer. Based on the 2016 National Health Indicator Survey data, as many as 20.7% of Indonesia's adult population are overweight. This number increased from 15.4% in 2013[1,2,3,4]. The Global Burden of Diseases study published in the scientific journal, Lancet, in 2014 placed Indonesia at number 10 in the list of countries with the highest obesity rates in the world. The rate of obesity in children grows much faster than adults[5,6,7].

Some research findings have found evidence that obesity has an important role in cases of death in as many as four million cases in 2015.This has a greater global problem. This study proves that there is no country in the world that has succeeded in reducing the number of people with obesity, even though the economic losses caused are not small. Ironically, obesity cases are also increasing in countries that are threatened by food insecurity such as in Africa[8,9]. According to the study, Burkina Faso is the country that records the highest obesity growth in the world. While Egypt has the highest number of adult obesity sufferers.

The rate of obesity among children in Indonesia shows a sharp increase. The indication is an improvement in the family's economic conditions which causes easy access

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to various forms of food. However, there are external factors that also influence it. Some cases indicate that some children were asked by their mothers to play with their friends outside the home[10,11]. Moreover, after school, children of the same age are busy doing activities around the housing complex. But, the child prefers to be at home, spending time with his electronic game device. According to the mother, the child does not tend to be picky when eating, or enjoy whatever food is available. But on the other hand, he doesn't have much physical activity[12].

His parents' encouragement to take part in extracurricular activities in schools that burn calories, such as taekwondo or swimming, is only a few times. Not surprisingly, he was much heavier than his own brother who was 3 years older. The child has not been picky about food, anything eaten. Her pants are now wearing size number 34, because of the large circumference of her abdomen. The school uniform, if the older sibling can replace the new four years, if the child is only two months old, he has to change, because he is getting bigger[3,12].

According to experts obesity continues to increase, due to unhealthy consumption patterns. In Indonesia, children from families with middle to upper economic conditions experience this, because of the ease of accessing various types of food. Parents tend to want their children to eat a lot, and choose the types of high-calorie foods. This type of fast food is also popular and popular with children, including menus that contain high sugar. At the same time, children, especially in urban areas, began to lack physical activity, due to the increasing hobby of playing games. About 30 percent are obese in the adult group. Children and adolescents are in the top ten percent who are obese.However, in this group of adolescents this is not only a problem of obesity, because blood pressure also starts to rise[9,10,11].

In several studies found evidence also that the symptoms of high blood pressure among adolescents, as a follow-up impact of obesity, excessive salt consumption, high stress levels and lack of physical activity. Not surprisingly, now, various diseases such as sugar and heart have been found in the age group of 30 years. This phenomenon occurs because the actual trigger factors have been initiated and saved since the age of the children. One of the probiotics that are widely used today is L. casei with various advantages including improving metabolism[14,15,16].

Research purposes analyzing changes in profile of blood glucose levels, total cholesterol, triglycerides, LDL and HDL after receiving supplementation L. casei for obese and fatting children.

Material and Method

This type of research is an experiment with a pre-post test only design. Research locations at SD Inpres Perumnas I and IV Makassar City. Time of study in March - August 2018. Population: all students at SD Inpres Perumnas I and IV Kota Makassar

Samples: all obese and obese students. The sampling used was simple random side which was chosen by 12 people, but on the trip of the 1rd week of intervention resigned for technical reasons. So the end of the study only got 11 samples. The sample was given L. casei strain Shirota for 1 month. Data analysis using t-test 2 samples in pairs with normal data distribution requirements.

Blood sample result a serum examination was performed to determine the blood sugar levels, total cholesterol, triglycerides, HDL and LDL. Examination of the variables under study was carried out at the Community Eye Health Laboratory, Tajuddin Chalik Hospital, Makassar City.

Findings

Based on the results of this study shown in the table below:

Table 1: Effect of L. casei strain Shirota on Blood Sugar while and Blood Fat of Obesity and Fatting Children in 2018

Variable	Grade (mg/dl)		t	p
	Before	After		
when blood sugar	96,73 ± 7,66	97,09 ± 17,45	-0,083	0,936
Total cholesterol	173,91 ± 32,18	156,73 ± 29,76	3,536	0,005
Triglysceride	147,00 ± 67,69	119,91 ± 49,29	1,311	0,219
LDL	100,09 ± 26,84	92,36 ± 22,01	2,026	0,070
HDL	45,09 ± 6,20	42,27 ± 6,05	1,497	0,165

Based on table 1 above shows that L. casei supplementation increases when blood sugar levels and blood fat levels. When blood sugar levels increased from 96.73 ± 7.66 mg/dl to 97.09 ± 17.45 mg/dl but were not significant (p> 0.05), this implies that when blood sugar increased with L. casei supplementation, total cholesterol levels decreased significantly (p = 0.005), ie from 173.91 ± 32.18 mg/dl to 156.73 ± 29.76 mg/dl, it was proven that L. casei suplementation reduced total cholesterol levels.

Triglyceride levels decreased not significantly (p> 0.05), ie 147.00 ± 67.69 mg/dl to 119.91 ± 49.29 mg/dl. LDL levels decreased not significantly (p> 0.05) from 100.09 ± 26.84 mg/dl to 92.36 ± 22.01 mg/dl. HDL levels decreased not significantly (p> 0.05) from 45.09 ± 6.20 mg to 42.27 ± 6.05 mg.

Table 1 also shows that the average increased in when blood sugar levels is 0.36 mg/dl, total cholesterol levels decreased by an average of 17.18 mg/dl, triglyceride levels decreased by an average of 27.09 mg/dl, LDL levels decreased by an average of 7.73 mg/dl, HDL levels decreased by an average of 2.82 mg/dl.

Discussion

Cholesterol is a fat-shaped compound that is mostly produced by the body in the liver from fatty foods consumed which are needed by the body to make cell membranes, wrap nerve fibers, make various hormones and body acids. Cholesterol cannot be circulated directly by blood because it is insoluble in water. To circulate it, a "transport" molecule called lipoprotein is needed. There are two types of lipoprotein, namely high density lippoprotein (HDL) and low density lippoprotein (LDL)[1,9].

The mechanism of cholesterol reduction can occur because lactic acid can degrade cholesterol into coprostanol. Coprostanol is a substance that cannot be absorbed by the intestine. Thanks to coprostanol and the remaining cholesterol can be removed with feces. In other words, the amount of cholesterol absorbed by the body becomes low. A report on this matter explained that the reduction in cholesterol by lactic acid bacteria (Lactobacillus) could reach a range of 27-38%[9].

High fat consumption will increase sterol in the large intestine and increase the secretion of bile salts, which will then be metabolized by bacteria in the intestine to produce carcinogenic compounds (cancer triggers). Cholesterol in food ingredients through the stomach to the duodenum and in the intestine in the triacylglycerol oil phase[15,16].

Bile acids are absorbed from the bottom of the ileum and return to the liver. This is the hepatic circulation. The collection of bile acids in the liver is approximately 3.5 grams circulated 6-10 times per day. Each time 1%, which is around 500 milligrams/day, escapes absorption and is excreted through the stool. Furthermore, body cholesterol is secreted through the intestine by the intestinal wall. Bile salts are wasted through the stool and result in more cholesterol needed to synthesize bile salts and reduce the body's cholesterol levels[10,12,14].

The process of forming cholesterol and carcinogens (compounds that trigger tumors) starts from fat that will turn into bile acids which then become a series of enzymes. Then change the procarcinogen into a carcinogen, which among others triggers colon, breast, prostate, and pancreatic cancers[4,5,6,8].

The process of forming bile acids from fat is stimulated by faecal bacteria or coli bacteria originating from feces or feces. But with the presence of lactobacillin, the faecal bacteria become inactive so that the process of changing fat into bile acids is also stopped[6]. Another compound of lactic bacteria is NI (not yet identified or unknown)[8]. However, this compound has a known role in inhibiting the formation of cholesterol. NI works to inhibit the enzyme 3-hydroxy 3-methyl glutaril reductase which will convert NADH to nevalonic acid and NAD[4,8,12]. Thus, a series of other compounds that will form cholesterol are also inhibited. Therefore, it can be said that the presence of foods and beverages naturally acidified with lactic bacterial fermentation can help prevent cholesterol and cancer from arising[5,16].

Conclusion

1. L. casei strain Shirota supplementation in obesity and fatting children causes an not significant increase in when blood sugar levels.
2. L. casei strain Shirota supplementation in obesity and fatting children causes a significant reduction in total cholesterol levels
3. L. casei strain Shirota supplementation in obesity and fatting children caused a not significant decreased in triglyceride, LDL and HDL levels but the highest decreased in triglyceride levels.

Conflict of Interest Statement: This research without conflict of interest between researchers and subjects.

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Ethical Clearance: Research ethics was obtained through the ethics commission of the research of the health and health polytechnic of Makassar with No. 467/KEPK-PTKMKS/VII/2018.

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