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The Effect Of Dawood's Fasting In Removing Total Blood Cholesterol Levels In Surabaya Hidayatullah Islamic Boarding School's Student

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| ARTICLE INFO | ABSTRACT |
|---|---|
| Keywords: Dawood's fasting, total blood cholesterol | Background: Hypercholesterolemia is a risk factor for causing death at a young age. The World Health Organization reported in 2002 that 4.4 million deaths were caused by hypercholesterolemia, or 7.9% of the total number of deaths at a young age. Hypercholesterolemia is a condition in which cholesterol levels in the body exceed normal levels. One way that can be done to prevent hypercholesterolemia is to control diet, namely by fasting. Dawood's fasting is one of the obligatory fasts of Islam which is done with one-day fasting and one-day not. |
| Submission: October 15 th , 2021 | Objective: This study aims to determine the effect of Dawood's fasting in reducing total blood cholesterol levels in Hidayatullah Islamic Boarding School students in Surabaya. |
| Review: November 13 th , 2021 | Methods: This study was designed with a quasi-experimental study research method using a comparative pre-test post-test non-equivalent control group design. The sample in this study was divided into two groups, namely one control group and one treatment group from the sample selected by purposive sampling. The population studied were students of the Hidayatullah Islamic Boarding School in Surabaya. |
| Publish: January 20 th , 2022 | Result: The results of statistical analysis using the Wilcoxon signed-rank test showed an effect of Dawood's fasting in reducing total blood cholesterol levels in Hidayatullah Islamic Boarding School students in Surabaya. |
| | Conclusion: From research result that has been done, it can be concluded that there is an effect of Dawood's fasting in reducing total blood cholesterol levels in Hidayatullah Islamic Boarding School students in Surabaya. |

Introduction

Hypercholesterolemia is a risk factor for causing death at a young age. The World Health Organization report in 2002

noted that hypercholesterolemia causes 4.4 million deaths or 7.9% of the total number of deaths at a young age. Hypercholesterolemia is a condition where

cholesterol levels in the body exceed normal conditions (Fikri, Nursalam, & Has, 2010). In Indonesia, the prevalence of hypercholesterolemia at the age of 25-34 years is 9.3%, while at the age of 55-64 years, it is 15.5%. Risk factors for the occurrence include genetic factors, diet, and lack of exercise activity. The WHO report states that in 2002, there were 4.4 million CHD deaths due to hypercholesterolemia, or 7.9% of the total number of deaths at a young age (Batjo, Assa, & Tiho, 2013). In patients with hypercholesterolemia generally found in adults. In men, cholesterol increases from the age of 35 to the age of 50 years. A study in Thailand in 2006 showed that patients with hypercholesterolemia in men were dominated by the age of 30-39 years (Yani, 2015).

Total cholesterol is the amount of LDL, HDL, and other fats in the blood (British Heart Foundation, 2015). The results of the measurement of total cholesterol levels are categorized into normal (<200 mg/dL), high limit (200-239 mg/dL), and high (≥ 240 mg/dL) (Rizma, 2017). Cholesterol is transported in blood plasma as lipoproteins. The four main groups of important lipoproteins are chylomicrons, VLDL, LDL, and HDL. Chylomicrons transport lipids resulting from digestion and absorption; VLDL transports triacylglycerol from the liver;

LDL transports cholesterol to tissues, and HDL carries cholesterol to tissues and returns it to the liver excretion (Marfu'ah & Sari, 2018).

Nutrient intake can influence total cholesterol levels, namely from foods that are a source of fat. Increasing fat consumption by 100 mg/day can increase total cholesterol by 2-3 mg/dL (Yani, 2015). Frequent consumption of high-fat foods is the main cause of increasing total cholesterol levels in the blood. The results of Sulastr's research show that cholesterol levels will decrease along with low intake of fatty foods. Cholesterol levels that exceed normal limits will trigger the process of atherosclerosis, coronary heart disease, stroke, and high blood pressure (Yoeantafara & Martini, 2017). Cholesterol levels in the blood above normal levels are called hypercholesterolemia (Marfu'ah & Sari, 2018).

Handling is needed to control blood cholesterol levels to prevent further effects of hypercholesterolemia (Yani, 2015). Current therapy for hypercholesterolemia is regulating food intake, exercise, pharmacotherapy, and surgery / bariatric surgery. Fasting is one way to prevent food intake regulation.

Fasting is a Muslim obligation known to be beneficial for the body and begins to be used in children from the age

of 7 years. In addition to being worshiped, fasting also has health benefits and is safe for children, even for people with type 1 diabetes. Fasting can reduce ApoB levels and increase serum ApoAI levels so that fasting can regulate apolipoprotein metabolism and change total cholesterol and serum HDL levels. There are several other types of fasting, such as the Monday-Thursday fast and the Dawood's fast. Monday-Thursday fasting is done regularly every Monday and Thursday, while Dawood's fast is fasting that is done alternately (fasting a day and not) (Triliana & Airlangga, 2018).

Fasting can reduce blood LDL levels to avoid hypercholesterolemia (Triliana & Airlangga, 2018) automatically. In the period before and after the Dawood's fast, HDL levels may increase between 1 and 14 mg/dL, LDL levels may decrease between 1 and 47mg/dL, total cholesterol levels may decrease between 5 and 88 mg/dL, and triglyceride levels may decrease between 3 and 64 mg. /dL (Santos & Macedo, 2018).

Based on the description of the background above, the researchers wanted to find out more about the relationship between Dawood's fasting and total cholesterol levels in the blood of students who underwent Dawood's fasting.

Methods

This research is a quasi-experimental study using a comparative pre-test post-test non-equivalent control group design. This study was designed to fulfill the research objective of knowing the effect of Dawood's fasting in lowering total blood cholesterol levels. The sample in this study was divided into two groups, namely one control group and one treatment group from the sample selected by purposive sampling. The population studied was the students of the Hidayatullah Islamic Boarding School in Surabaya.

The research sample used in this study was the students of Hidayatullah Islamic Boarding School Surabaya who met the criteria for sample acceptance and were divided into two groups, namely the control group and the treatment group. The control group is the group that did not undergo the Dawood's fast for six consecutive weeks and was willing to participate in the study as evidenced by informed consent after being given information for consent. A treatment group is a sample group that is willing and able to undergo Dawood's fasting for six consecutive weeks and is willing to participate in research as evidenced by informed consent after being given information for consent. Sample selection was carried out by the purposive sampling method until the number of samples that

met the sample acceptance criteria was fulfilled. Simple random sampling would be carried out to determine whether volunteers were included in the control group or treatment group.

The research was carried out at the Hidayatullah Islamic Boarding School Surabaya, Jalan Kejawan Putih Tambak VI/1 Keputih Sukolilo Surabaya 60111 and the Clinical Pathology Laboratory of RSUD Dr. Soetomo Surabaya in October 2019 until the second week of November 2019.

The blood sampling procedure was carried out before performing the Dawood's fast and at the beginning of the 7th week after completing the Dawood's fast. The data that has been collected will be analyzed using statistical analysis software. Before being analyzed, the normality test data first used the Shapiro-Wilk test because the number of samples was <50. The distribution is said to be normal if $p > 0.05$. If the results obtained are typically distributed, then the Paired t-test is carried out. However, if it is ¹³ not normally distributed, the non-parametric Wilcoxon-signed rank test is used.

Result and Discussion

This research is an experimental laboratory study that aims to determine the

effect of Dawood's fasting on reducing total cholesterol levels in human blood, conducted at the Hidayatullah Islamic Boarding School Surabaya. This study used a pre-test and post-test control group ² design because the measurements were carried out twice before Dawood's fast and at the end of Dawood's fast.

In this study, researchers used two groups, namely ¹ the control group and the treatment group. In the control group, the subject did not come fast since the beginning of the study but was given the same food between respondents. In comparison, the treatment group did Dawood's fasting for six weeks with the same dawn meal and iftar menus as the control group. Both the control and treatment groups were checked for total blood cholesterol levels before and at the end of the study using Easy Touch brand cholesterol strip with strip packaging code 9337 with the normal level value 155 mg/dL – 252 mg/dL. Researchers took 16 people each in each group in both the treatment and control groups because there were several factors such as the respondent being sick, resigned, and included in the exclusion criteria.

Table 1 Characteristics of subjects based on age, weight, body mass index (BMI), and waist-hip ratio (WHR)

| No | Variable | n respondent | |
|----|---------------------------|---------------------|-------------------|
| | | Treatment n = 16 | Control n = 16 |
| 1. | Age | | |
| | 18 – 20 years old | 9 (56%) | 5 (31%) |
| | 21 – 23 years old | 6 (38%) | 11 (69%) |
| | 24 – 26 years old | 1 (6%) | 0 (0%) |
| | 27 – 30 years old | 0 (0%) | 0 (0%) |
| 2. | Body Mass Index (BMI) | | |
| | Underweight | 7 (44%) | 4 (25%) |
| | Normal | 9 (56%) | 11 (69%) |
| | Overweight | 0 (0%) | 1 (6%) |
| | Obesity 1 | 0 (0%) | 0 (0%) |
| | Obesity 2 | 0 (0%) | 0 (0%) |
| 3. | Waist – hip ratio (WHR) | | |
| | < 0,95 = low risk of CVD | 16 (100%) | 16 (100%) |
| | ≥ 0,95 = high risk of CVD | 0 (0%) | 0 (0%) |

Table 1 above shows the distribution of age, BMI, and WHR in research subjects. The age of the research subjects all met the inclusion criteria. All the subjects ranged from 18-30 years, with the most significant frequency in the treatment group being in the age range 18-20 years old as many as nine people (56%), then the age range 21-23 years old as many as six people (38%) and the age range of 24-26 years-old is one person (6%). Most of the subjects in the non-fasting group were in the age range 21-23 years old, as many as 11 people (69%) and the age range 18-20 years old as many as five people (31%). This data shows that the age distribution in the treatment group is relatively younger than the non-fasting group.

The distribution of BMI calculated based on body weight and height of the subject with the formula $BW \text{ (kg)} / BH^2 \text{ (m}^2\text{)}$ in the most treatment group with normal BMI was nine people (56%), followed by an underweight BMI of 7 people (44%). The distribution of the control group is different from the treatment group, namely the most normal BMI is 11 people (69%), BMI underweight is five people (25%), and BMI overweight is one person (6%). BMI can be used to assess nutritional status so that, in general, subjects in the non-fasting group showed better nutritional status than the treatment group.

WHR calculated based on the ratio of waist circumference, and hip circumference (in cm) showed that all

subjects in the non-fasting and fasting group had a WHR value of < 0.95 (100%). A WHR value < 0.95 indicates a low cardiovascular risk, while a value > 0.95 indicates a high cardiovascular risk.

Based on the general description of research subjects, it was found that all research subjects were in a state of nutritional status who were not obese.

Table 2 Descriptive data of the total blood cholesterol level (mg/dL)

| Variable | Group | Pre-test | Post-test |
|-------------------------|-------------|--------------------|--------------------|
| | | Mean \pm SD | Mean \pm SD |
| Total cholesterol level | Not fasting | 246 \pm 35.40 | 260,75 \pm 29.35 |
| | Fasting | 220,94 \pm 43.55 | 240,5 \pm 22.46 |

From the table, the mean of the treatment group in the pre-test was 220,94 mg/dL while the post-test result was 240,5 mg/dL. The average results show an increase in total blood cholesterol levels in the post-test compared to the pre-test, but still within normal levels. The average total blood cholesterol level in the control group in the pre-test was 246 mg/dL while the post-test results were 260,75 mg/dL. The average results show that the pre-test is still normal but the post-test has a total

cholesterol level that exceeds the normal level according to the Easy Touch brand cholesterol strip packaging, which is 155 mg/dL – 252 mg/dL.

Based on the table above, it can be concluded that the post-test average of the treatment group is much lower and is still within normal levels of total blood cholesterol compared to the post-test average of the control group which exceeds normal limits.

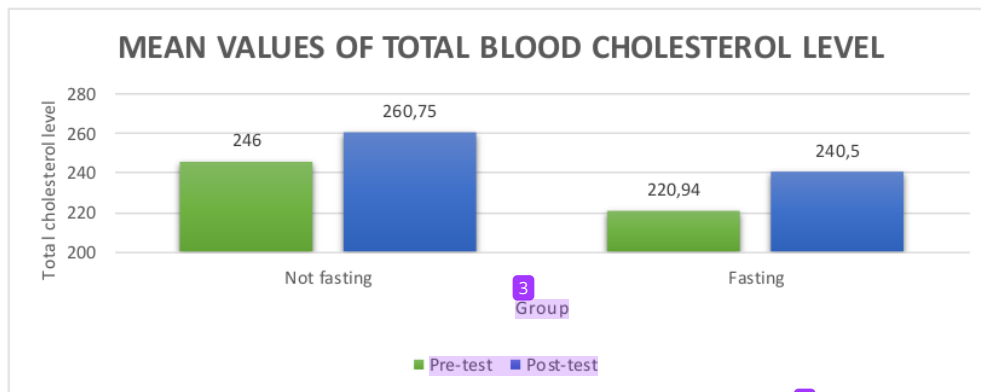


Figure 1 Bar chart of the mean values of total blood cholesterol levels pre and post-test of the treatment and control group

Based on the table above, it can be concluded that the post-test average of the treatment group is much lower and is still within normal levels of total blood cholesterol compared to the post-test average of the control group, which exceeds normal limits.

Table 3. Wilcoxon-signed rank test results

| | Wilcoxon-signed rank test |
|------------------------|---------------------------|
| Z | -2,421 |
| Asymp. Sig. (2-tailed) | 0,015 |

Based on the Wilcoxon-signed rank test results above, the significance value is 0,015, so that there is an effect of Dawood's fasting in lowering total cholesterol levels in human blood.

Based on Table 2, we saw an increase in the average total blood cholesterol level from pre-test to post-test in both the treatment and control groups. Each group experienced an average increase, but the control group experienced a lower average increase than the treatment group's average increase.

Based on the results of the study, it is known that the mean total blood cholesterol level of the treatment group at the pre-test was 220,94 mg/dL, which is lower than the mean total blood cholesterol level of the control group at the pre-test, which was 246 mg/dL. However, both

were still within the normal range or normal limit. Meanwhile, the control group's mean total blood cholesterol level at the post-test was 240,50 mg/dL, which was also lower than the average post-test blood cholesterol level in the control group, which was 260,75 mg/dL. It is known that the mean total blood cholesterol level of the control group during the post-test has exceeded the normal limit according to the guideline for normal values of cholesterol levels on the Easy Touch brand cholesterol strip with strip packaging code 9337.

After analyzing the data using the Wilcoxon signed-rank test, the results showed an effect of Dawood's fasting in lowering total blood cholesterol levels in Hidayatullah Islamic Boarding School students in Surabaya. This effect is corroborated by a review of articles written by Meng et al. (2020). They reviewed the effects of intermittent fasting and energy-restricted diets on lipid profiles (Meng et al., 2020). The article concludes that compared to non-dietary controls, intermittent fasting and an energy-restricted diet effectively improved circulating total cholesterol, LDL cholesterol, and TG concentrations but had no significant effect on HDL cholesterol concentrations. Several factors may influence this effect that may inform future

clinical practice and research (Meng et al., 2020).

The results of this study are from several previous studies that support theories about the body's metabolism. When the body lacks glucose, it will trigger the hormones glucagon and epinephrine to convert glycogen, which is called glycogenolysis (Kaharuddin, 2015). In order To avoid hypoglycemia, the body limits the conversion of glycogenolysis and starts lipolysis (Syafiq, 2002). During fasting, there is a decrease in fat utilization and a decrease in the Basal Metabolic Rate (BMR), reducing total cholesterol levels (Putranto, 2016). There is an increase in free fatty acid oxidation during lipolysis, which causes VLDL synthesis and lowers LDL (Izzaturahmi, 2017).

The habits of respondents who routinely carry out physical activities and diets that control the intake of foods containing animal fats can also influence the external factor, which can cause a decrease in cholesterol levels.

Conclusion

From research result that has been done, it can be concluded that there is an effect of Dawood's fasting in reducing total blood cholesterol levels in Hidayatullah Islamic Boarding School students in Surabaya.

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