

Effects of Exercise on Heart Disease

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ABSTRACT

This paper explains about the effects of exercises on heart disease. For instance, the appropriate exercise is aerobic exercise. Aerobic exercise refers to the endurance exercises that produce beneficial changes in our respiratory and circulatory systems by requiring only modest increases in our oxygen intake. Regular aerobic exercises can increase HDL cholesterol level. HDL cholesterol is good cholesterol, which carries bad cholesterol to the heart. To ensure the effectiveness of aerobic exercise, this paper also provides brief information on the principles of exercise.

Key words: Heart Disease, Exercise, Cholesterol

INTRODUCTION

Many countries in the world now facing the problem either coronary heart disease (CHD) or coronary artery disease (CAD) which is the disease related to the heart problems. According to Miller (10), it is also regarding to the disease of the heart or blood vessels, including hypertension (high blood pressure), rheumatic heart disease, and stroke. In other words, it can be defined as a form of cardiovascular disease (CVD). Moreover, if any one who is suffering from heart diseases soon or later he/she may face death at the end. If any person has a heart problem it can be fatal. In the United States of America more than 600,000 people died because of heart attack or myocardial infarction (12). In Malaysia about 82,356 patients were hospitalized in government hospitals in 1998 because of cardiovascular disease rather than 58,838 happened years ago (10). Almost all cardiovascular disease cases are associated with elevated cholesterol. As Hollenbeck (7) states, Lower Density Lipoprotein (LDL) cholesterol concentrations are leading risk factors in CVD cases occur due to highly concentrations either both total plasma or LDL cholesterol both which contribute to strong risk factors that cause CAD.

Cholesterol

Cholesterol is a waxy substance that is produced by the liver. According to Gupta (4), the cholesterol is a soft yellow – white, waxy element, present in the wall surrounding every cell of the body. It is found in the food we eat that comes from animals, like eggs yolks, shellfish, and whole milk dairy products.

There are two main types of cholesterol that can affect our health. It is Low-density lipoproteins (LDL) and High – density lipoproteins (HDL). LDL

cholesterol is known as bad cholesterol that can clog our arteries and put us at risk of heart disease. Meanwhile, HDL cholesterol has been given a nickname as good cholesterol because it helps remove bad cholesterol from the body.

Other types of cholesterol are very low-density lipoprotein (VLDL). VLDL contains a kind of fat called triglycerides. High triglycerides, like cholesterol, also can put us at risk of heart disease.

How does cholesterol contribute to heart disease?

Cholesterol is very important and needed for human being. This is because, it can help somebody to get energy to do work. However, the cholesterol level must not be high in the body. If not, it can contribute to a few diseases including heart disease. How does cholesterol contribute to heart disease?

According to Gupta (4), when the cholesterol level is high in the body, some of the excess cholesterol in the blood returns to the liver where it is broken down and secreted as bile by the gall bladder. But when cholesterol levels rise too high, they can lead to fatty deposits called ‘plaque’, which clog arteries and thus set the stage for heart disease. Just a small clot in a “plaque” clogged coronary artery is enough to arrest blood flow to the heart and thereby cause a heart attack.

Exercise effect on heart disease

Physical activity is defined as any form of muscle activity. Therefore physical activity results in the expenditure of energy proportional to muscular work, and is related to physical fitness. Exercise represents a subset of physical activity that is planned, with a goal of improving or maintaining fitness.

Exercise plays important role to decrease cholesterol level. Exercise can be divided to into categories. Firstly, anaerobic exercise and second is aerobic exercise. The anaerobic exercises are which the body system will use glycogen to increase energy in the body. But the aerobic exercise is which oxygen to increase energy in the body. In the other word, aerobic exercise is an activity that can do in prolonged period.

If we want to decrease the cholesterol level, we must use the aerobic exercise. However, we must know the principles of exercise. According to Powers and Howley (11), the exercise dose is usually characterized by the intensity, frequency, duration, and type of activity. The intensity can be described in terms of:

- % VO₂ max
- % maximal heart rate
- Rating of perceived exertion, and
- The onset of blood lactate accumulation (the lactate threshold)

The frequency could include;

- Number of days per week and
- Number of times per day

The duration of exercise for each exercise session can be given as the;

- Number of minutes of exercise
- Total kilocalorie (kcal) expended, and
- Total kcal expended per kilogram body weight.

All individual, must understand those things. If not, may be we cannot get any effect from our exercise. For example, the intensity, we must know how much intensity can improve our exercise? How many time we must do exercise per week? How long we need to exercise? All things depend on individual. Before you go

Meanwhile, Hardman (1989), Hill (1989) and Shepard (1980) said, if we do exercises, it can increase HDL cholesterol level in the body system (5,6,13). HDL cholesterol identified as good cholesterol. In the blood stream, HDL cholesterol removes cholesterol from blood and tissue cells. HDL cholesterol may also be able to collect cholesterol from the plaque, reversing the process that leads to heart attacks (1). Figure 2, is a

to exercise consult with a doctor to asses' fitness level. After that, arrange the exercise program based on the principles of exercise.

Exercise program includes dynamic large muscle dynamic large muscle activities such as walking, jogging, running, swimming, cycling, rowing, and dancing. For those activities, ACSM (American College Sports Medicine) recommends three to five sessions per week, for twenty to sixty minutes per session, at an intensity of about 55/65% to 90% maximal heart rate, or 40/50% to 85% heart rate reserve (HRR) or oxygen uptake reserve (VO₂ R). This program is consistent with achieving weight loss goals and reducing the risk factors associated with Coronary Heart Disease (11).

Theoretical

A few theory can be use to explain that exercise can reduce the cholesterol level. Powers and Howley (11) said, fats are primary fuel source for muscle during low intensity exercise (i.e. <30% VO₂ max), whereas carbohydrate is the dominant substrate during high-intensity exercise (i.e.>70% VO₂ max). The influence of exercise intensity on muscle fuel selection is illustrated in figure 1. Note that as the exercise intensity increases, there is a progressive increase in carbohydrate metabolism and a decrease in fat metabolism. Therefore, the level of fat can be reduce including triglyceride. Triglyceride is one of cholesterol element in the blood vessels.

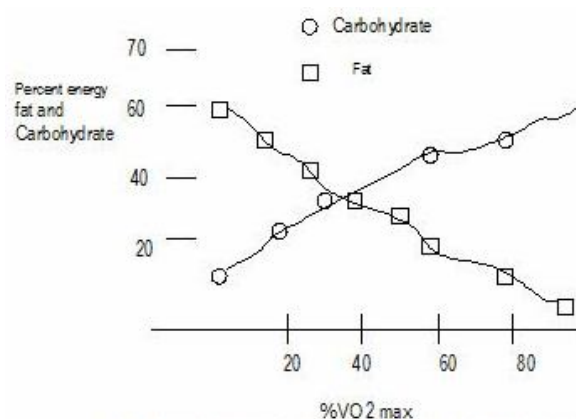


Figure 1. The influence of exercise intensity on muscle fuel selection (11).

schematic drawing of how the HDL cholesterol removing excess cholesterol.

Based on schematic drawing that the higher HDL cholesterol level is better. Jamaluddin and Khairul (2003) said, because HDL cholesterol will pick up LDL cholesterol from blood stream and then deliver them to the

liver (8). HDL cholesterol is like a bus and blood vessels is like a highway. If HDL cholesterol more than LDL cholesterol, it's can pick up almost the LDL cholesterol from the highway and send it to the liver. Therefore, it's can't build up in artery walls and block the free flow of blood. Instance, there is great benefit in bringing HDL numbers up and even greater benefit by doing both – lowering LDL / HDL cholesterol. Lowering LDL cholesterol is easier to do than raising HDL cholesterol. Lowering LDL cholesterol usually using B3 (Niacin) and other method of medications. But, raising HDL cholesterol must be adhering when go out for exercise. Example, Douglas and Keyser (3) has been a related research and they have good procedure. Such as initial interview, had blood drawn for cholesterol measurement, and underwent a maximal exercise test no longer than 24 hours after the blood was drawn. Then, during the initial interview, the consent procedure was completed and the health history was obtained. If the exercise not goes through those all things may be the outcome of the exercise program not achieve.

Many researchers have been done the research concerning exercise and heart disease. Williams (15), has done a research to asses the relationship of exercise amount and exercise intensity to coronary heart disease risk factors measured cross-sectional in runners. In this research subjects' reported average running amount (kilometers run per week) and running intensity during their best recent 10-km race (kilometers per hour) in 7059 male and 1837 female recreational runners. Ten kilometer race velocity (kilometers per hour) is known to be related to exercise intensity during training. Research finding has shown exercising more intensely could improve coronary heart disease risk factor level beyond that achieved by exercise amount alone.

Urata et al. (14) has done a research about effect of mild aerobic exercise on serum lipids and apolipoproteins in patients with coronary artery disease. Activities were examined in 11 male patients with coronary artery disease and 4 healthy male controls. The mild aerobic exercise program involved exercise intensity at 50% of maximal oxygen uptake, as determined from the blood lactate threshold, for 60 min periods 3 times per week for 10 weeks. Following mild aerobic exercise, serum levels of high density lipoprotein cholesterol (HDL-C) were increased significantly from $50 \pm 11\text{mg/dl}$ ($P < 0.05$) with a simultaneous increase in apolipoprotein A-1 (apo A-1) in normal controls. There was significant correlation between the initial HDL-C level and the change in HDL-C level following the exercise program in the combined group of normal controls and patients with coronary artery disease.

CONCLUSIONS

According to the research, it is shown that exercise can reduce heart disease risk factor level. This is because after we do exercise the HDL cholesterol will increase in our blood stream. Then, it is will carry the bad cholesterol to the liver, which is then been eliminated. The exercise must have good principles training. It is include frequency, duration and intensity.

There are varies kind of exercises, such as walking, jogging, running, bicycling, jungle tracking and so on. Those exercises are cheaper rather than using equipment training such as treadmill, cycle ergometer, air walker, and etc. Everybody also must have the target when do the exercises. For examples, fitness level, weight loss, and so on. If you want to do exercise without bored, you can do it with your friends or along the music. So your exercises might be much more attractive than usual. Further on, exercise is part of healthy lifestyle.

Remember, sedentary lifestyle is considered a risk factor to the development of coronary artery disease (CAD), whereas regular exercise is associated with reducing CAD mortality (9). Therefore, make sure doing any exercise which is can give some benefit to our health and do not do aimlessness the activity.

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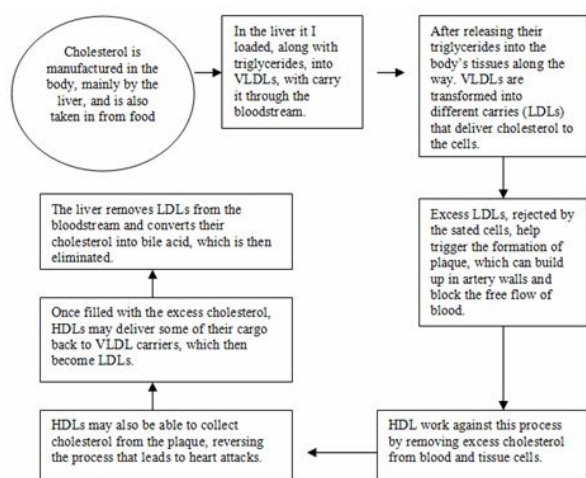


Figure 2. A schematic drawing of how the HDL cholesterol removing excess cholesterol (1).

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