

PHYSICAL ACTIVITY AND CARDIOVASCULAR DISEASE

Cardiovascular disease accounts for most deaths in the Caribbean. Many of these diseases are preventable by actions of major risk factors including unhealthy diet, physical inactivity and smoking. The major cardiovascular diseases include:

- Coronary (or ischemic) heart disease (heart attack).
- Cerebrovascular disease (stroke)
- Hypertension (high blood pressure)
- Heart failure
- Rheumatic heart disease.

High blood pressure, which affects both children and adults, is a major contributor to heart disease. The favourable effects of physical activity on cardiovascular diseases reflect positively on atherosclerosis, plasma lipid/lipo-protein profile, blood pressure, availability of oxygenated blood for the heart muscle needs

(ischemia), blood clotting (thrombosis) and heart rhythm disturbances (arrhythmias). Other effects of physical activity that may be associated with modification of cardiovascular disease risk include reduced incidence of obesity, healthier distribution of body fat and reduced incidents of Type 2 diabetes.

The rise in cardiovascular disease reflects a significant change in diet habits, physical activity levels, and tobacco consumption worldwide as a result of industrialization, urbanization, economic development and food market globalization.

Studies have found inverse relationship between cardiovascular diseases and physical activity. Reports are that moderately physically active individuals benefit, in response to reduction in cardiovascular disease, in much the same way as

the vigorously active. There is also evidence that men who are active, lower the risk of cardiovascular disease when compared to sedentary men. Favourable results between physical activity and cardiovascular disease are arrived at when an individual engages in moderate physical activity and improve cardio-respiratory fitness. In fact, regular physical activity leads to cardiovascular fitness which decreases the risk of cardiovascular disease mortality in particular coronary artery disease. Regular physical activity prevents or delays the development of high blood pressure and exercise reduces blood pressure in people with hypertension. Physical activity can also lower blood cholesterol levels which will eventually decrease the risk of developing cardiovascular disease.

One study shows that persons with low cardio-respiratory fitness had a 52 per cent increased risk of developing high blood pressure than physically inactive individuals. Cardiorespiratory systems respond to physical activity in an effort to meet metabolic demands for oxygen, nutrients and for disposal of metabolic waste products from the body. A variety of processes are directly associated with cardiorespiratory fitness, all of which are positively affected by physical activity and exercise. Among the processes which exercise influence, as it relates to cardiorespiratory fitness, are:

- Heart rate and cardiac output - these increase as exercise increases.
- Systolic pressure (blood pressure) can also be modified by physical activity as changes in blood flow increase favourably in blood supply to the skeletal muscles and to the skin to dispose of heat as the body temperature rises with exercise. The coronary blood flow also increases as a result of coronary perfusion pressure and coronary vasodilation.
- Arteriovenous oxygen difference increases with increase in physical activity and is due to the increase in oxygen extraction from the arteries as it passes through exercising muscles.
- The respiratory system responds to exercise by increasing pulmonary ventilation thereby increasing the rate and depth of respiratory movements.

Regular aerobic physical activity increases your fitness level and plays a role in both primary and secondary prevention of cardiovascular diseases. Physical inactivity is a major risk factor for heart disease and stroke and is linked to cardiovascular mortality. Studies have shown that people who modify their behaviour and start regular physical activity after heart attack have better rates of survival and thereby preserving quality of life. Healthy patients with cardiovascular disease can improve their condition through their engagement in physical activity and maintenance of physical fitness. Thus, individuals who already have heart disease are recommended to engage in regular physical activity (exercise) in an effort to prevent it from getting worst.

Regular physical activity or cardiorespiratory fitness decreases the risk of cardiovascular disease, particularly coronary heart disease. Evidence on the relationship between stroke and physical activity is, however, not conclusive. Physical inactivity is a major risk factor in the development of coronary artery disease. The decreased in levels of coronary heart disease, in relationship to physical activity, is similar to other lifestyle factors such as keeping away from cigarette smoke. Coronary artery disease is characterised by deposits of fatty substances, cholesterol and calcium among other substances in the inner lining of the artery that supply blood to the heart muscles. It is a major

contributor of other risk factor such as obesity, high blood pressure, high triglycerides, a low level of HDL (good) cholesterol and diabetes. Even moderately intense physical activity such as brisk walking is beneficial when done regularly for a total of 30 minutes or longer on most or all days of the week.

Coronary Heart Disease

Although physical activity is inversely related to the risk of coronary heart disease, it should be noted that physical activity may also increase the risk of coronary event among persons with coronary heart disease - especially among those who do not exercise regularly. Physical activity therefore lowers the risk for major coronary events but should be done in moderation in an effort to yield maximum results. High blood pressure is a major underlying cause of cardiovascular problems and mortality. Among the damages of organs and complications related to elevated blood pressure are the following:

- Left ventricular hypertrophy - this can lead to ventricular dysfunction and congestive heart failure.
- Hemorrhagic stroke
- Aortic aneurysms and dissection
- Renal failure
- Retinopathy.

Studies have found that hypertension is inversely related to participation in sports or exercise. In fact, when individuals

participate in vigorous sports, the cases of hypertension were reduced by more than 19%. Less active men are said to have a 30% increased risk of developing hypertension. There are similar results in women as most active women were found to have 30 percent per cent reduced risk of the developing hypertension. Thus physical inactivity or sedentary lifestyle is associated with the development of hypertension in both men and women. In another study, there was conclusive evidence that the high risk of developing hypertension can be lowered by weight loss and improvements in dietary and physical activity practices. As a result, in order to minimise the cases of cardiovascular disease, particularly hypertension, one should practice eating healthy diets as well as maintaining physical and cardio-respiratory fitness through exercise.

There are also atherosclerotic complications of high blood pressure which include coronary heart disease, ischemic stroke and peripheral vascular disease. Atherosclerosis begins when cholesterol is transported from the blood into the artery wall by lipoproteins, particularly low density lipoprotein. Studies have found that the severity in progression of atherosclerosis in the coronary artery can be reduced by endurance training, together with a cholesterol-lowering diet and interventions for other cardiovascular disease risk factors. Cardio respiratory fitness is also known to reduce atherosclerosis in the neck artery to the head. High density

lipoprotein helps protect against atherosclerosis by transporting cholesterol to the liver for elimination. Evidence shows lipoprotein lipase activity (an enzyme that removes cholesterol and fatty acid from the blood) is increased by exercise training. Exercise training also reduces elevated levels of triglyceride – a blood lipid associated with heart disease.

Coronary heart disease (CHD) is rare in childhood, as a result, the cardiovascular effects of physical activity are assessed in relation to risk factors associated with coronary heart disease such as low density lipoprotein cholesterol levels (LDL-C), lowered high-density lipoprotein level (HDL-C) and elevated blood pressure. Regular physical activity delays or prevents the development of high blood pressure. Lower body mass index is also a contributor to lowered blood pressure, hence, its relationship with physical activity. That is, physical activity reduces the blood pressure levels in people with hypertension. In fact, regular physical activity can help control blood lipid abnormalities, diabetes and obesity. Aerobic physical activity can also help reduce blood pressure.

Blood pressure is directly proportional to cardiac output and total resistance in the peripheral blood vessel. An episode of physical activity has the immediate and temporary effect of lowering blood pressure through dilating peripheral blood vessel, and exercise training has the ongoing effect of lowering blood pressure

attenuating sympathetic nervous system activity. Overweight children between the ages of five and ten years have at least one risk factor associated with heart disease, including elevated blood cholesterol, blood pressure or increased insulin level. Atherosclerosis is also said to develop from childhood and as such coronary heart disease is of major concern. This is so because coronary heart disease in adults is related to elevated blood lipids in children. That is, the risk factor of cardiovascular disease persists from childhood to adulthood.

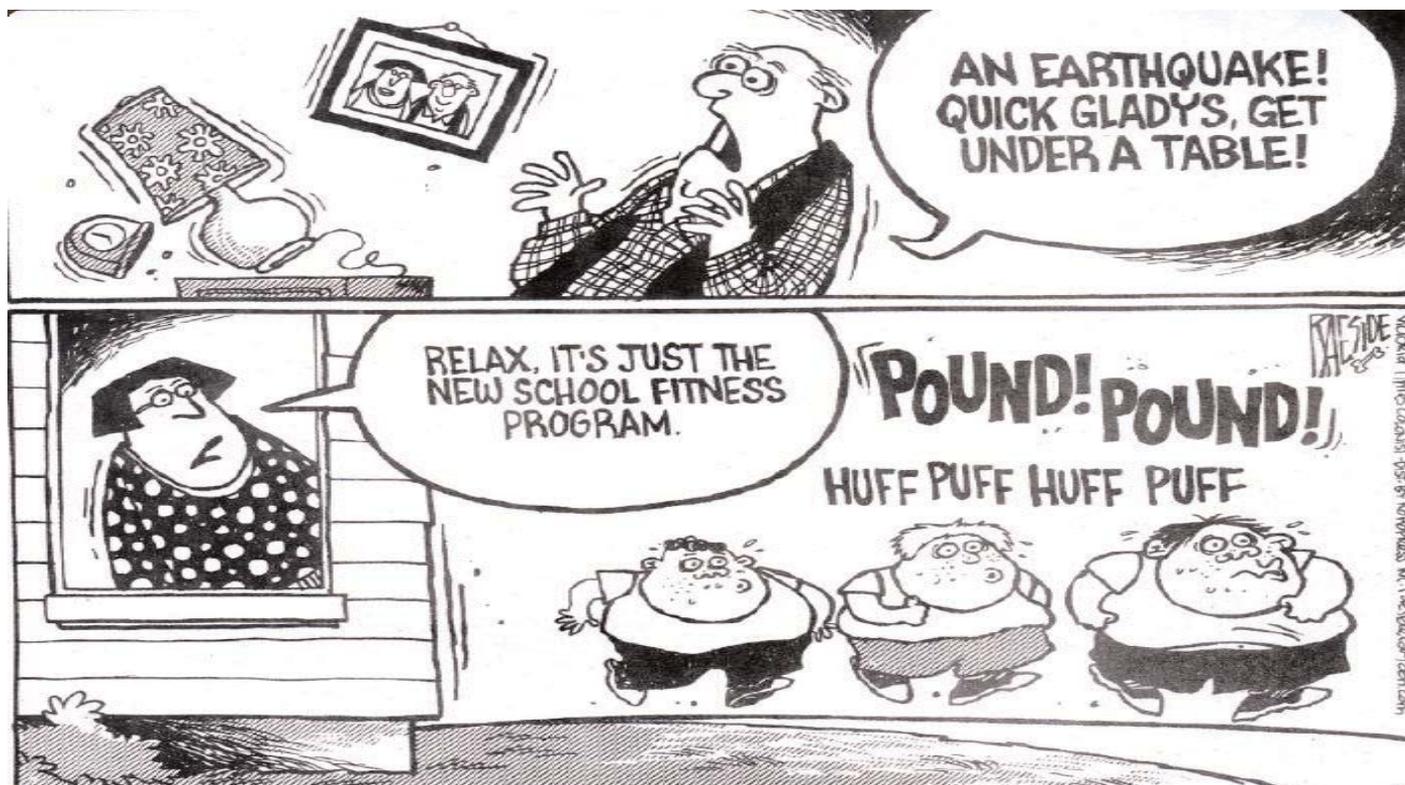
The risk of developing heart disease, for example angina or heart attack, is remarkably reduced in people who are physically active when compared to sedentary individuals. In fact, inactive persons have almost double the risk of having a heart attack when compared to those who are regularly physically active. Blood pressure, cholesterol, and body weight are lowered in people who are regularly physically active compared to those who are not. Thus, physiological mechanisms contribute to the favourable effects of physical activity on cardiovascular diseases (CVDs).

Coronary circulation that is induced by endurance exercise training can decrease the development of ischemia. Ischemia is a cardiovascular disease that occurs when the heart muscles (myocardium) needs more oxygen than can be supplied from blood flowing through narrow coronary arteries. The shortage in oxygen leads to ischemia in the heart muscles. Endurance training also

reduces thrombosis by enhancing the enzymatic breakdown of blood clots (fibrinolysis) and by decreasing platelets adhesiveness and preventing clot formation. There is also an association between coronary artery disease and ventricular fibrillation – life-threatening heart rhythm

disturbances. However, the engagement in vigorous physical activity prevents individuals with healthy cardiovascular system from incurring elevated risk of ventricular fibrillation. Exercise training may reduce the risk of ventricular fibrillation in healthy persons and in cardiac patients by

improving myocardial oxygen supply and demand and by reducing sympathetic nervous system activity. Finally, research evidence shows that a physically active lifestyle reduces the risk of sudden cardiac deaths, even among persons with advanced coronary atherosclerosis. ♦



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