



EXERCISE- A DRUG FREE WAY TO REDUCE THE CHANCE OF HEART DISEASE

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Abstract

Heart disease is the non-communicable disease which is the leading cause of death globally and in India also.. The causes and prevention of heart disease have been studied for years, and new information is emerging. The coronary artery diseases can play a crucial medico- legal role to decide the cause of sudden death whether natural or unnatural. There are certain occasions, when a person dies on the operating table or soon after surgery, and a coronary attack is probably the cause of death. A final coronary episode may sometimes be associated with an operative procedure supposedly due to hypertensive state. These conditions indicate that intervention of Forensic Pathologist is significant to decide the actual cause of death apart from injury or disease of vital organs. For the last several decades, saturated fat and cholesterol have been thought to be major contributors to coronary artery disease. However, recent studies are indicating that it may not be wise to strictly limit the intake of dietary saturated fatty acids or replace them with polyunsaturated fatty acids when taking other health conditions into consideration. Depending on a person's genetics, diet may or may not be an important factor in preventing heart disease. Exercise is also the drug free way in preventing heart disease. When considering human development, humans still have a lot to learn about the human body and the interaction of diet, the environment, and genetics.

Keywords: Angina, atherosclerosis , Coronary artery disease, cardiovascular disease, Heart Attack.

Human development can be defined as changes in the interactions between an individual and their environment across the lifespan. There are many factors that can affect healthy development, but perhaps none is so devastating globally as cardiovascular disease. The term cardiovascular disease refers to a variety of ailments that affect the heart as well as all of the blood vessels in the body. Atherosclerosis is one of these ailments, and is caused by a buildup of plaque in a person's arteries, this buildup can accumulate to the point that a clot forms and clogs the artery completely, leading to either a stroke or a heart attack. When atherosclerosis occurs in the heart, it is then called Coronary Artery Disease (CAD) and CAD is the leading cause of death amongst people with heart disease.

Coronary artery diseases constitute the most important single disease state that is likely to become a serious cause of disagreement on either side of the bench, in a court of law. When an apparently normal healthy individual, dies all of a sudden, more so in the absence of any medical examination before his death, innumerable doubts may erupt up in the minds of not only the family physician and close relatives but also of the enquiring police officers. The medico-legal opinion may be asked about the state of coronary artery in sudden death in road accidents, operations, and occupational diseases. Coronary artery disease is responsible for over 70% of sudden cardiac deaths. In the young, the primary cause of death is the non-atherosclerotic coronary abnormalities. In the older patients; the most prevalent cause is atherosclerotic Coronary disease.

Among athletes, the occurrence of sudden death is calculated at 0.46 deaths per 1 lakh athletes per year. Although most of these are incidental with little clinical relevance, a number do present with cardiac symptoms and tragic sudden death. The causes and prevention of heart disease have been studied for years, and new information is always emerging.

Symptoms of CAD: If your coronary arteries narrow, they can't supply enough oxygen-rich blood to your heart —

especially when it's beating hard, such as during exercise. At first, the decreased blood flow may not cause any coronary artery disease symptoms. As plaque continues to build up in your coronary arteries, however, you may develop coronary artery disease signs and symptoms, including:

Chest pain (angina). Angina—also sometimes called angina pectoris—is a symptom of an underlying heart condition. It means that the heart is not getting enough blood and as a result, not enough oxygen. This decrease of oxygen being delivered to the muscle of the heart happens if one or more coronary arteries are narrowed or blocked, a condition called atherosclerosis. This type of blockage may result in chest pain. And while angina does not usually damage the heart, and the pain might only last a few minutes, it is a warning sign that you should not ignore. Your body is telling you that your risk for a heart attack or cardiac arrest is increased. Very simply, angina is your heart's way of getting your attention. An angina attack is not the same as a heart attack, although many of the symptoms are the same. An angina attack may be provoked by extremes in emotion (being very angry or upset), eating a large meal or eating it very quickly, doing more exercise than usual (overexerting yourself), being exposed to extremes in temperature (too hot or too cold), or smoking. If the angina is a result of physical activity, stopping the activity generally stops the pain. But no matter what the cause of the chest pain or discomfort, it is important that you get medical attention as soon as possible. There are several different kinds of angina. These are explained here.

Different types of angina Five different kinds of angina have been identified, with the two most common being stable angina and unstable angina. Stable angina occurs when the heart has to work harder than normal, during exercise, for example. It has a regular pattern, and if you already know that you have stable angina, you will be able to predict the pattern. Once you stop exercising, or take medication (usually nitroglycerin) the pain goes away, usually within a few minutes. Unstable angina is more serious, and may be



a sign that a heart attack could happen soon. There is no predictable pattern to this kind of angina; it can just as easily occur during exercise as it can while you are resting. It should always be treated as an emergency. People with unstable angina are at increased risk for heart attacks, cardiac arrest, or severe cardiac arrhythmias (irregular heartbeat or abnormal heart rhythm). Less common kinds of angina include:

- variant angina
- microvascular angina
- atypical angina

Shortness of breath. If your heart can't pump enough blood to meet your body's needs, you may develop shortness of breath or extreme fatigue with exertion.

Heart attack. A completely blocked coronary artery may cause a heart attack. The classic signs and symptoms of a heart attack include crushing pressure in your chest and pain in your shoulder or arm, sometimes with shortness of breath and sweating.

Causes of coronary artery disease

Development of atherosclerosis: Coronary artery disease is thought to begin with damage or injury to the inner layer of a coronary artery, sometimes as early as childhood. The damage may be caused by various factors, including: Smoking, High blood pressure, High cholesterol, Diabetes or insulin resistance, Sedentary lifestyle.

Once the inner wall of an artery is damaged, fatty deposits (plaque) made of cholesterol and other cellular waste products tend to accumulate at the site of injury in a process called atherosclerosis. If the surface of the plaque breaks or ruptures, blood cells called platelets will clump at the site to try to repair the artery. This clump can block the artery, leading to a heart attack.

Basic Categories of Risk Factors of coronary artery disease include:

Category	Risk Factors
Nonmodifiable risk factors	Age, sex, family history, genetic
Modifiable risk factors	Smoking, atherogenic diet, alcohol intake, physical activity, dyslipidemias, hypertension, obesity, diabetes, metabolic syndrome
Emerging risk factors	C-reactive protein (CRP), fibrinogen, coronary artery calcification (CAC), homocysteine, lipoprotein(a), and small, dense LDL

Risk factors often occur in clusters and may build on one another, such as obesity leading to type 2 diabetes and high blood pressure. When grouped together, certain risk factors put you at an even greater risk of coronary artery disease. Sometimes coronary artery disease develops without any classic risk factors. Researchers are studying other possible factors, including:

Sleep apnea. This disorder causes you to repeatedly stop and start breathing while you're sleeping. Sudden drops in blood oxygen levels that occur during sleep apnea increase blood pressure and strain the cardiovascular system, possibly leading to coronary artery disease.

High sensitivity C-reactive protein. High sensitivity C-reactive protein (hs-CRP) is a normal protein that appears in higher amounts when there's inflammation somewhere in your body. High hs-CRP levels may be a risk factor for heart

disease. It's thought that as coronary arteries narrow, you'll have more hs-CRP in your blood.

High triglycerides. This is a type of fat (lipid) in your blood. Lipids are "...oily or fatty biological substances that are not soluble in water. Lipids include fatty acids as well as cholesterol (which is a steroid), and other substances such as fat soluble vitamins. There are two types of fatty acids: saturated and unsaturated. Unsaturated fatty acids are further broken down into two subcategories: polyunsaturated and monounsaturated. Saturated fatty acid molecules have a hydrogen atom for each carbon atom in the molecule, hence they are called saturated. Polyunsaturated fatty acid molecules have one carbon to carbon bond (or double bond), meaning that additional hydrogens can be added; monounsaturated fatty acid molecules have two or more double bonds High levels may raise the risk of coronary artery disease, especially for women.

Cholesterol. Cholesterol levels were also linked to atherosclerosis. Cholesterol is only found in animal sources not in plant sources and it is also supposed to be limited in the diet since the human body makes its own cholesterol.

Homocysteine. Homocysteine is an amino acid your body uses to make protein and to build and maintain tissue. But high levels of homocysteine may increase your risk of coronary artery disease.

Complications: Coronary artery disease can lead to:

Chest pain (angina). When your coronary arteries narrow, your heart may not receive enough blood when demand is greatest — particularly during physical activity. This can cause chest pain (angina) or shortness of breath.

Heart attack. If a cholesterol plaque ruptures and a blood clot forms, complete blockage of your heart artery may trigger a heart attack. The lack of blood flow to your heart may damage your heart muscle. The amount of damage depends in part on how quickly you receive treatment.

Heart failure. If some areas of your heart are chronically deprived of oxygen and nutrients because of reduced blood flow, or if your heart has been damaged by a heart attack, your heart may become too weak to pump enough blood to meet your body's needs. This condition is known as heart failure.

Abnormal heart rhythm (arrhythmia). Inadequate blood supply to the heart or damage to heart tissue can interfere with your heart's electrical impulses, causing abnormal heart rhythms.

Diagnosis: If coronary heart disease is suspected a thorough physical assessment will be undertaken. This will include an assessment of risk factors and current symptoms. Additional tests to assist with making an accurate diagnosis may also be undertaken. Tests may include: Blood tests, Electrocardiogram (ECG), Exercise ECG/ Exercise Tolerance Test (ETT), Echocardiography, Stress Echocardiography, Angiogram, CT Angiography, Nuclear Isotope Imaging, Coronary Angioplasty and Stenting, Coronary Artery Bypass Surgery (CABG), Coronary Angioplasty and Stenting, Coronary Artery Bypass Surgery (CABG)

Make the Effort to Prevent Heart Disease:

Get Active. You don't have to join a gym or run in a 5K. Start small by incorporating physical activity into your daily routine more and more: Take the stairs instead of the elevator, park at the farthest end of the parking lot or use



your lunch break to take a quick walk. For a healthy heart, aim for at least 2 ½ hours of moderate physical activity each week. Up for an intense workout? You'll get heart-pumping benefits with at least 75 minutes of vigorous exercise throughout the week or a combination of both.

Along with gaining strength and stamina, regular physical activity can lower blood pressure, keep body weight under control and lower your LDL — otherwise known as “bad” cholesterol. Regular physical activity is also associated with lower risk of type 2 diabetes, reduced depression, improved bone density, and improved sleep quality for adults.

Control Cholesterol. We all have cholesterol, a waxy substance in the bloodstream and in the cells of our body. But despite its reputation, cholesterol isn't all bad. In fact, it plays an important role in keeping us healthy. But a balance must be struck to prevent too much cholesterol in the blood. There are two types: the “good” kind (HDL) and the “bad” kind (LDL). High levels of bad cholesterol can clog your arteries, increasing your risk of heart attack and stroke. This is where good cholesterol comes into play: HDL cleans out that bad cholesterol from the arteries.

Regular physical activity, limiting saturated fat by limiting red meats and choosing low-fat dairy, and including healthier fats such as certain vegetable oils can help adults who need to lower LDL cholesterol levels. It's also important to limit *trans* fats, too. For some people, diet and lifestyle changes alone aren't enough. Your doctor may prescribe cholesterol-lowering medication to keep your cholesterol levels in check. If you don't know your cholesterol levels, talk to your doctor about scheduling a cholesterol screening.

Eat Better. Eating the right foods can help you control your weight, blood pressure, blood sugar and cholesterol. Follow a dietary pattern that includes fruits, vegetables, whole grains, and other healthy choices. It's important to choose fruits and vegetables over empty-calorie foods.

Manage Blood Pressure. About 33 percent of American adults has high blood pressure — yet about 14% of adults 60 years and older don't even know they have it. That's because high blood pressure, “the silent killer,” has no symptoms. Keeping your blood pressure in a healthy range starts with eating a heart-healthy diet. Other important factors are exercising regularly; maintaining a healthy weight; limiting salt and alcohol; and taking medication prescribed by your doctor.

Maintain a Healthy Weight. Overweight and obesity are risk factors for cardiovascular disease. In the US, 69% of adults are either overweight or obese. Higher body mass index (BMI) is associated with higher risk of type 2 diabetes and obesity is a strong predictor of sleep disordered breathing. For overweight or obese adults with other cardiovascular risk factors (such as high blood pressure), maintaining a weight loss of 3-5% of body weight can produce clinically meaningful results. Greater weight loss can produce even greater results on BP, cholesterol levels, and blood sugar. Learn more about losing weight.

Reduce Blood Sugar. Diabetes is a risk factor for cardiovascular disease. Heart disease death rates among adults with diabetes are 2 to 4 times higher than adults without diabetes. You can minimize the impact of diabetes on your body — and even prevent or delay the onset of diabetes — by eating right, controlling your weight, exercising and taking medication prescribed your doctor. In some cases, lifestyle changes result in less need for medication.

Stop Smoking. It's time to kick the habit. Going smoke-free can help reduce risk of heart disease and stroke, but also cancer and chronic lung disease. The payoff is almost immediate. Quit smoking and you'll lower your excess risk of developing heart disease and stroke within only a few years.

Treatment: Depending on test results, various treatment options will be considered. Treatment may include medication, coronary angioplasty (with or without coronary artery stenting), or coronary artery bypass surgery (sometimes abbreviated to CABG). Treatment is aimed at reducing or eliminating symptoms and reducing the risk of having a heart attack.

Medications: Classes of medications commonly used to treat coronary heart disease include: Beta Blockers - These medications slow the heart rate and reduce the blood pressure thus reducing the heart's workload.; Nitrates - These medications dilate (widen) the arteries making it easier for blood to be pumped through.; Calcium Channel Blockers/ Calcium Antagonists - These medications work by slowing the entry of calcium into the heart and blood vessel walls. This relaxes the arteries causing them to dilate. This lowers the blood pressure and reduces the heart's workload.; ACE Inhibitors - These medications prevent the constriction of peripheral blood vessels thereby reducing the pressure against which the heart must pump.; Aspirin will also be prescribed (unless there's a medical reason not to) as it helps to prevent the formation of blood clots. Some people require medication to lower their blood cholesterol levels, thereby reducing plaque build-up in the arteries and reducing the risk of having a heart attack. Common cholesterol lowering medications include Lipex and Lipitor.

How exercise reduce the Cholesterol level: Sometimes it may seem like it takes all of your energy just to drag yourself out of bed for your morning jog or your evening workout at the gym. But let's face it: exercise has many, amazing health benefits. Not only can it keep your weight down, build up your muscles, and reduce your risk of developing certain medical conditions, exercising regularly also has beneficial effects on the heart - including your cholesterol levels.

But exactly how does exercise affect your cholesterol? Unfortunately, the way exercise works in improving your cholesterol levels is still not very clear. Although there have been studies examining the effects of exercise on cholesterol, these studies have also been coupled with other cholesterol-lowering lifestyle changes, such as following a healthy diet or losing weight. Because all of these factors can have an impact on cholesterol, researchers are not exactly sure how much of a contribution exercise makes to lowering your cholesterol. However, more recent studies examining the effect of exercise alone reveal a few ways that exercise may help improve your cholesterol levels.

Lipoprotein particle size: Some studies have shown that exercise can affect the size of your LDL. Smaller lipoproteins, such as small, dense LDL, have been associated with contributing to cardiovascular disease. Having larger LDL particles does not carry this same risk. Studies have shown that moderate exercise can increase the size of your LDL particles, which can help to reduce your risk of developing cardiovascular disease. In one study, a 12-week endurance exercise program reduced small, dense LDL by up to 17%.

Reverse cholesterol transport: A few studies in mice have suggested that exercise can enhance the transport of



cholesterol from the bloodstream to the liver, where it will eventually be removed.

Absorption: A few studies have shown that 8 to 12 weeks of endurance exercise may slightly reduce the absorption of cholesterol from the small intestine into the bloodstream. The amount of cholesterol made by the liver does not appear to be affected by exercise.

Although researchers are still trying to determine exactly how exercise affects your cholesterol, the bottom line is clear: moderate exercise appears to have favorable effects on your cholesterol levels:

Moderate exercise may reduce LDL cholesterol by up to 10% in some studies. There are a few studies that suggest that exercise may have a slightly positive or neutral effect on LDL. Exercising regularly can increase your HDL cholesterol by between 3 and 6%.

Although this may not seem like much, combining exercise with other lifestyle changes can help keep your cholesterol levels - as well as the rest of your body - healthy.

Cleveland Clinic offers fitness, nutrition and wellness programs that can help you lower your cholesterol.

Check with your doctor to ensure safety before starting an exercise program. Do not take part in any activity that causes chest pain, excessive shortness of breath, dizziness, or lightheadedness. Stop immediately if you have any of these symptoms.; Wear comfortable clothes with sneakers or flat shoes with laces. It is important to wear a shoe with good support so that you can reduce the risk of orthopedic problems.; Exercise has the greatest effect on triglycerides (lowers them) and HDL, the good cholesterol (increases it). Exercise does not have much impact on LDL unless it is combined with changes in diet and weight loss.; Start slowly. The American Heart Association and the American College of Sports Medicine recommend that people exercise most days of the week in an aerobic fashion. This type of exercise is repetitive in nature and uses multiple muscle groups. Examples of aerobic exercises include cycling, swimming, walking, elliptical machines, and step machines.; Start out with 15 to 20 minutes; in some cases, you may have to do 10-minute intervals. Try to build up over time so that the exercise lasts at least 30 minutes or your intervals add up to 30 minutes. Do not forget to include a warm-up and a cool-down of about five minutes each. These periods are in addition to your 30 minutes. The ideal goal is to achieve approximately 200 minutes of exercise per week. This can be accomplished by doing 30 minutes of exercise seven days per week, or doing 40 minutes of exercise five days per week. The exercise should feel moderate to somewhat heavy so that you can still carry on a conversation without being too breathless; however, you should not be able to sing comfortably.; It is important to remain well-hydrated during exercise. A good guideline is to drink eight ounces of water for every 20 minutes of exercise.; Make exercise a regular part of your healthy lifestyle, and try to exercise at the same time of day so that it becomes a habit.; Use caution when exercising right after meals, when it is very hot or humid, or if you do not feel up to exercising; Ask family and friends to join you to help keep you motivated. This also can help them to start or continue on the road to a healthy lifestyle.; Note your activities on a calendar or in a record book. Record the type of exercise, distance/amount of time,

and how you felt during the activity. This will help you keep track of your progress.; Use a variety of exercises to keep up your interest. Try things such as yoga, Tai Chi, Pilates, or kickboxing. Join an exercise group, health club, or the YMCA. Many churches and senior centers also offer exercise programs.; Look for chances to be more active during the day. Some examples would be walking the mall before shopping, parking your car farther away from your destination than necessary, choosing a flight of stairs over an escalator, or taking 10- to 15-minute walking breaks while watching TV or sitting for some other activity.; If there is a break in your exercise due to illness or other factors, remember that your body adapts to whatever level of exertion is put on it. You might have to restart at a slightly slower level than before the break.

Conclusion

The cardiovascular diseases and its risk factors are increasing with a rapid pace in Asian Indian population. Though the prevalence of CVD risk factors is found higher in urban population, yet it is increasing at an alarming rate in rural population also, which is a serious threatening to the nation. Since majority of the Indians live in rural area, CVD may lead to epidemic proportions. We need health promotion and awareness programs and reorientation of primary health care to improve CVD detection in earlier stage and its management.

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