Diet and the probability of Heart Disease

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Abstract

The greatest cause of disease burden and mortality worldwide is cardiovascular disease (CVD), sometimes known as the "silent killer." Due to a protracted period of epidemiological transition, Coronary artery disease is a common heart condition. Coronary artery disease may also be called coronary heart disease. Atherosclerosis, a condition that causes the blood vessels supplying the heart to narrow, is what causes heart disease. Symptoms may go unrecognized at first, or they may only occur when the heart is beating hard like during exercise. As the coronary arteries continue to narrow, less and less blood gets to the heart and symptoms can become more severe or frequent. Chest pain (angina). You may feel pressure or tightness in your chest. Some people say it feels like someone is standing on their chest. Heart attack. A completely blocked coronary artery will cause a heart attack. Your risk of heart disease is decreased, for instance, by staying physically active, making sure you have strong social support, and quitting smoking. Multiple factors, including those related to social, economic, psychological, lifestyle. High blood pressure (hypertension) is associated with a high salt diet, which can raise your risk of heart disease and stroke. To lower your risk of acquiring heart disease restricts your intake of processed and fried foods. Eat more veggies, fruits, and wholegrain cereals. Increase the quantity and diversity of plant-based foods you consume. Reduce consumption of processed foods with added sugars and higher glycaemic indexes of carbs.

Key words: Coronary artery Disease, Atherosclerosis, Heart attack, angina and Heart health

Introduction

The greatest cause of disease burden and mortality worldwide is cardiovascular disease (CVD), sometimes known as the "silent killer." Due to a protracted period of epidemiological transition, the burden of CVDs increased in developed nations over a period of several decades. The transition from rural to industrialised societies is meant by this. In India, however, CVDs and associated risk factors have increased dramatically in a very short period of time as a result of the economy's fast post-independence growth. As a result, among non-communicable diseases, they now account for the majority of fatalities. [1] In contrast to rural areas, CVD prevalence is known to be higher in urban areas. Cardiovascular illnesses (CVDs) include, among other things, coronary heart disease, cerebrovascular illness, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis, and pulmonary embolism. CVDs were responsible for 17.9 million deaths worldwide in 2016, accounting for 31% of all fatalities. Heart attacks and strokes were responsible for 85% of these fatalities. n 2016, India accounted for 63% of all NCD-related deaths, with CVDs accounting for 27% of those deaths. Furthermore, 45% of deaths among adults over the age of 40 to 70 are caused by CVD.

Characteristics of heart disease

Coronary artery disease is a prevalent type of heart disease. The primary blood vessels that supply the heart (coronary arteries) are having difficulty sending enough blood, oxygen, and nutrients to the heart muscle. Coronary artery disease, also known as CAD, is typically characterised by accumulation of cholesterol (plaques) and inflammation in the heart arteries. When the heart does not receive enough oxygen-rich blood, signs of coronary artery disease appear.[4] Reduced blood flow to the heart from coronary artery disease can result in angina (chest discomfort) and shortness of breath. A heart attack can happen if blood flow is completely restricted. Coronary artery disease is a chronic ailment that is become more common. Before there is a substantial blockage or a heart attack, symptoms might not be seen. Coronary artery disease can be prevented with the help of a heart-healthy lifestyle. Coronary heart disease is another name for coronary artery disease.

Atherosclerosis, a condition that causes the blood vessels supplying the heart to narrow, is what causes heart disease. On the inside of the arterial walls, fatty deposits (or plaque) progressively accumulate, constricting the passageway for blood to the heart. When

atherosclerosis first develops, it might be quite advanced by the time you reach middle age. Plaque accumulation may be steady or unstable. [5]The condition known as angina must be addressed if there is an excessive build-up of stable plaque because it narrows the arteries and causes pain and discomfort since not enough blood is getting to the heart. Unstable plaque is inflammatory, has a thin top that is prone to cracking, and is inflamed. This allows blood to reach the plaque's fatty contents. In an effort to close the gap, the blood will clot, but in doing so, it will block the artery. This stops the heart from receiving blood, robs the organ of oxygen, and damages or destroys the heart's cells. A heart attack has occurred.

At first, symptoms could be overlooked, or they might only show up when the heart is working hard, such during exercise. Less blood reaches the heart when the coronary arteries constrict more, and symptoms may worsen or worsen more frequently.

Signs and symptoms of coronary artery disease include:

Chest pain (angina) : You may have chest pressure or tightness. Some report feeling as if someone is standing on their chest. Chest discomfort is most commonly felt on the middle or left side of the chest. Angina can be triggered by physical activity or emotional emotions. The pain normally subsides within minutes of the triggering event. Some people, particularly women, may have brief or acute discomfort in the neck, arm, or back.

Shortness of breath: You may feel as if you are unable to catch your breath.

Fatigue: You may feel particularly exhausted if your heart is unable to pump enough blood to meet your body's needs.

Heart attack: A heart attack is caused by a totally clogged coronary artery. Crushing chest pain or pressure, shoulder or arm pain, shortness of breath, and perspiration are all classic indications and symptoms of a heart attack. Women may experience less common symptoms such as neck or jaw pain, nausea, and weariness. Some heart attacks have no visible indications or symptoms.

Complications

Angina (chest pain, When the coronary arteries narrow the heart may not receive enough blood when it is most needed, such as during exercise. Angina (chest pain) or shortness of breath can occur from this. A heart attack can happen when a cholesterol plaque ruptures and a blood clot develops. A clot can obstruct blood flow. A lack of blood may result in heart muscle damage. The speed with which you are treated influences the amount of your damage. Heart failure: Narrowed heart arteries or excessive blood pressure can weaken or stiffen the heart over time, making it difficult to pump blood, heart failure. Arrhythmias (irregular heart rhythms):

Risk factors for heart disease

Your chance of developing heart disease can be impacted by a variety of variables. The good news is that there are many risk factors that you can control, even though some of these cannot be altered. Your risk of heart disease is decreased, for instance, by staying physically active, making sure you have strong social support, and quitting smoking. Multiple factors, including those related to social, economic, psychological, lifestyle (smoking, sedentary lifestyle, poor diet), and biological (abnormal lipids, hypertension, diabetes, obesity) smoking, hypertension, diabetes, obesity, psychosocial stress, low intake of fruits and vegetables, low intake of alcohol, and sedentary lifestyle) could all contribute to premature coronary heart disease in Indian subjects. These factors accounted for more than 90% of acute myocardial infarction. [7]

Risk factors that can't be changed-Age, Gender, Ethnicity and Family History of Disease

Age- Growing older raises the risk of artery damage and narrowing. Men are more likely than women to develop coronary artery disease. However, for women, the risk increases after menopause. Family tree:-A family history of heart disease increases your chances of developing coronary artery disease. [8]This is especially prevalent if a close relative (parent, sibling) had heart disease when they were young. The risk is greatest if your father or brother acquired heart disease before the age of 55, or if your mother or sister developed it before the age of 65.

Risk factors can be controlled- Smoking status, diet, cholesterol, blood pressure, body weight, diabetes level, physical activity levels, depression, and social isolation are risk factors that you may change. Certain risk factors are interrelated. For instance, diet can have an impact

on your body weight, blood pressure, cholesterol levels, and diabetes control. So eating well and keeping a healthy weight are two of the finest things you can do to lower your chance of developing heart disease!

If you smoke, you should stop. Smoking is harmful to one's heart health. People who smoke are at a much higher risk of developing heart disease. Inhaling secondhand smoke also raises the danger. High blood pressure: Uncontrolled high blood pressure can harden and stiffen arteries (arterial stiffness). The coronary arteries may constrict and slow blood flow. High bad cholesterol levels in the blood can raise the risk of atherosclerosis. Low-density lipoprotein (LDL) cholesterol is bad cholesterol. A lack of healthy cholesterol, known as high-density lipoprotein (HDL), also contributes to atherosclerosis.

Diabetes increases one's chances of developing coronary artery disease. Obesity and hypertension are both risk factors for type 2 diabetes and coronary heart disease. Obesity or being overweight is bad for your health. Obesity increases the risk of type 2 diabetes and high blood pressure. Consult your doctor to determine what constitutes a healthy weight for you.[9] Chronic kidney disease (CKD): A long history of kidney disease increases the risk of coronary artery disease. Insufficient physical activity: Physical activity is essential for sustaining good health. Sedentary behaviour is linked to coronary artery disease and certain of its risk factors. Emotional stress can cause artery damage as well as enhance other risk factors for coronary heart disease. Consumption of foods heavy in saturated fat, trans fat, salt, and sugar raises the risk of coronary heart disease. Heavy alcohol use can harm the cardiac muscle. It has the potential to make worse already present risk factors for coronary artery disease. Sleep duration; both insufficient and excessive sleep have been linked to an increased risk of heart disease.

Discussion on Risk Factors within your control

Dietary fats and cholesterol levels

Cholesterol, a lipid necessary for various metabolic functions, is found in all cell membranes in the body. It is produced in the liver and is produced by the body from the food we consume. Low-density lipoprotein (LDL) and high-density lipoprotein (HDL) are cholesterol-containing blood lipids (fats). While HDL ('good') cholesterol facilitates the body's removal of cholesterol and hinders the development of arterial plaque, LDL ('bad') cholesterol can cause plaque to form in the arteries. Saturated fats, sometimes referred to as "bad fats," have a reputation for raising levels of LDL ('bad') cholesterol in the blood. Saturated fats are frequently present in processed meals like pastries and biscuits as well as animal products like butter, coconut oil, meat fats like lard and dripping, beef, lamb, and chicken skin. [10]

Full fat or little fat dairy products? Despite the presence of saturated fat in full-fat dairy products such as milk, cheese, and yoghurt, it appears that this type of fat has no effect on heart health. People who need to lower their LDL cholesterol should consume reduced fat milk, yoghurt, and cheese rather than unflavored kinds, according to the Heart Foundation.. Trans fats Similar to saturated fats, Trans fats tend to raise blood levels of LDL (bad) cholesterol while also lowering HDL (good) cholesterol levels. As a result, they can worsen our health and raise our risk of developing cardiovascular disorders (including heart disease and stroke) .Trans fatty acids are produced when monounsaturated or polyunsaturated vegetable oils are 'hydrogenated' and used to make margarines, deep-frying oils, or shortening for baked products.[11]

Monounsaturated and polyunsaturated fats By substituting unsaturated ('good fats') for saturated and trans dietary fats, you can lower your chance of developing heart disease. Oils derived from seeds or plants (such olive, avocado, sunflower, canola, safflower, peanut, soybean, and sesame) can be used in place of butter, coconut oil, and palm oil. Unsalted nuts, seeds, avocado, and a variety of seeds (such as chia, tahini, and linseed) are additional sources of unsaturated fats.

Blood pressure and salt (sodium) High blood pressure (hypertension) is associated with a high salt diet, which might make you more susceptible to heart disease and stroke. The majority of individuals consume more than ten times as much salt as they require since it includes both sodium and chloride. Instead of salt that is added at the table, the bulk of the sodium in our diet comes from packaged and processed goods. Despite not tasting "salty" or "sweet," certain foods

contain a lot more sodium than you may imagine. Utilising herbs and spices for flavour as well as fewer processed meals and fast foods are easy ways to lower the amount of sodium in your diet. [12]Eat healthily to lower your chances of developing heart disease. Variety in our diets is good for our health and can lower our risk of developing illnesses like heart disease.

Advisory from the Heart Foundation
A lot of whole grains, as well as fruits and vegetables. a wide range of nutritious protein sources, including fish and other seafood, nuts, seeds, and legumes like beans and lentils. Lean poultry and eggs in smaller portions can also be a part of a heart-healthy diet. Limit your consumption of red meat to one to three times each week and choose lean cuts. Cheese, yoghurt, and milk all lack taste. Patients with high blood cholesterol should choose low-fat choices. Healthy fat can be found in nuts, seeds, avocados, olives, and their cooking oils. Use herbs and spices to season food instead of salt. [13]

Foods important for heart health
There is no one "magic" diet that may significantly reduce our chance of getting heart disease, despite some evidence that some foods are crucial for heart health. These are listed below:
Fish high in omega-3 fatty acids include mackerel, sardines, tuna, and salmon. This fat has been demonstrated to lower triglycerides, elevate HDL cholesterol, improve blood vessel flexibility, and thin the blood, making it less prone to clot and obstruct blood flow. Some vegetable oils, such as canola and olive oil, as well as omega-3 fatty acid-rich oils including maize, soy and safflower oil (which also contains omega-6 fatty acids). When these are used in place of saturated fats such as butter, they can all assist to lower LDL cholesterol. [14]

Fruits and vegetables By including fibre, potassium, and other micronutrients (including antioxidants), you can lower your chance of developing heart disease. Additionally, they contain a lot of folate, which lowers blood levels of homocysteine, an amino acid related to a higher risk of heart disease.

Whole grains: There is a relationship between a diet high in fibre from wholegrain cereals and reduced LDL cholesterol levels and a lower risk of developing heart disease. Foods high in soluble fibre, such as oats, lentils, and barley, are beneficial for lowering total cholesterol levels. Wholegrain breads and cereals, legumes, some varieties of rice and pasta, and the majority of fruits and vegetables with a low glycaemic load can help lower blood triglyceride and glucose (sugar) levels, manage diabetes, and lower the risk of heart disease. Consume more legumes, nuts, and seeds to lower your risk of cardiovascular disease. They are high in plant proteins, fibre, healthy fats, and minerals.[15]

Tea: According to some research, antioxidants in tea may help prevent the accumulation of fatty deposits in the arteries. They may also increase blood vessel dilation to promote blood flow and act as an anti-clotting agent. According to some research, vitamin E-rich meals may act as an antioxidant and help to protect against LDL cholesterol. Vitamin E can be found in avocados, leafy green vegetables, vegetable oils, and wholegrain foods. [16]

How to lower your chance of developing heart disease by eating well: To lower your risk of acquiring heart disease, try these steps:
Limit the amount of processed and fried meals you eat. Saturated fats (such butter, coconut oil, and cream) should be swapped out for the healthy unsaturated fats included in extra virgin olive oil, avocados, sunflower, canola, safflower, peanuts, soybeans, and sesame seeds, as well as other seeds, plants, and foods. . Eat more fruits, veggies, and whole-grain cereals. Eat more plant-based foods—a wider range of them—and more of them overall. Limit the amount of processed meals and carbohydrates with high glycemic indexes that you consume. [17]

.Remove the skin from the chicken and trim away any visible fat from the flesh. Consume legumes on a regular basis, including tofu, baked beans (with reduced salt), soybeans, and lentils.. Reduce your intake of fast food and salty foods, Reduce your salt intake by refraining from processed and packaged meals. At the table and in the kitchen, herbs and spices can be used in place of salt. Choose goods with a low amount of salt.[18] Alcoholic beverages are classified as 'occasional foods' by the Australian Guide to Healthy Eating. Alcohol contains a lot of energy (kilojoules). If you prefer to consume alcohol, do so in moderation.

Limit your consumption of alcohol to two standard drinks each day. High alcohol consumption can cause an increase in blood lipids and blood pressure. [19] As you drink less alcohol, your risk of harm from alcohol decreases. One standard drink is equivalent to 375 mL of mid-strength beer, 100 mL of wine, or 30 mL of spirits. If you consume more than this, you should think about cutting back. This can be accomplished by increasing the number of days you don't drink alcohol per week or by mixing your alcoholic beverages with water.

Conclusion

Junk food consumption is related with a considerably increased risk of coronary heart disease. Consumption of fish, fruits, fresh vegetables, and fat-free yoghurt, on the other hand, has been shown to protect against CAD, whilst beef and eggs have been shown to raise the risk of CAD. More research on dietary risk factors is needed to investigate the risk of heart disorders associated with different food compositions and portion sizes. It is obvious that nutrition-related cardiac risk factors should be emphasised in our nation for the prevention of coronary artery disease. Consumption of junk food is associated with a significantly elevated risk of coronary heart disease. Fish, fruits, fresh vegetables, and fat-free yoghurt have been demonstrated to protect against CAD, but beef and eggs have been shown to increase the risk of CAD. More study on dietary risk factors is required to explore the risk of cardiovascular disease related with diverse food compositions and portion sizes. To avoid coronary artery disease, it is evident that nutrition-related cardiac risk factors should be stressed in our nation.

References:

1. .Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al. INTERHEART study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet. 2004;364:937–53. [PubMed] [Google Scholar]
2. echnical Report Series No. 854. Geneva: World Health Organization; 1995. Report of a WHO Expert Committee. Physical status: the use and interpretation of anthropometry. [PubMed] [Google Scholar]
3. . Jain P, Jain P, Bhandari S, Siddhu A. A case-control study of risk factors for coronary heart disease in urban Indian middle-aged males. Indian Heart J. 2008;60:233–40. [PubMed] [Google Scholar]
4. Gupta R, Joshi P, Mohan V, Reddy KS, Yusuf S. Epidemiology and causation of coronary heart disease and stroke in India. Heart. 2008;94:16–26. [PubMed] [Google Scholar]
5. Jomini V, Oppliger-Pasquali S, Wietlisbach V, Rodondi N, Jotterand V, Paccaud F, et al. Contribution of major cardiovascular risk factors to familial premature coronary artery dsiease: the GENECARD project. J Am Coll Cardiol. 2002;40:676–84. [PubMed] [Google Scholar]
6. Wilson PWF. Progressing from risk factors to omics. Circ Cardiovasc Genet. 2008;1:141–6. [PubMed] [Google Scholar]
7. Greenland P, Knoll MD, Stamler J, Neaton JD, Dyer AR, Garside DB, et al. Major risk factors as antecedents of fatal and nonfatal coronary heart disease events. JAMA. 2003;290:891–7. [PubMed] [Google Scholar]
8. Ayerbe, L., González, E., Gallo, V. et al. Clinical assessment of patients with chest pain; a systematic review of predictive tools. BMC Cardiovasc Disord 16, 18 (2016). https://doi.org/10.1186/s12872-016-0196-4
9. Vasan RS, Sullivan LM, Wilson PW, Sempos CT, Sundström J, Kannel WB, Levy D, D'Agostino RB. Relative importance of borderline and elevated levels of coronary heart disease risk factors. Ann Intern Med. 2005 Mar 15;142(6):393-402. [PubMed]
10. Fox CS, Pencina MJ, Wilson PW, Paynter NP, Vasan RS, D'Agostino RB. Lifetime risk of cardiovascular disease among individuals with and without diabetes stratified by obesity status in the Framingham heart study. Diabetes Care. 2008 Aug;31(8):1582-4. [PMC free article] [PubMed]

11. Njølstad I, Arnesen E, Lund-Larsen PG. Smoking, serum lipids, blood pressure, and sex differences in myocardial infarction. A 12-year follow-up of the Finnmark Study. Circulation. 1996 Feb 01;93(3):450-6. [PubMed]

12. Lloyd-Jones DM, Larson MG, Beiser A, Levy D. Lifetime risk of developing coronary heart disease. Lancet. 1999 Jan 09;353(9147):89-92. [PubMed]

13. Stary HC, Chandler AB, Dinsmore RE, Fuster V, Glagov S, Insull W, Rosenfeld ME, Schwartz CJ, Wagner WD, Wissler RW. A definition of advanced types of atherosclerotic lesions and a histological classification of atherosclerosis. A report from the Committee on Vascular Lesions of the Council on Arteriosclerosis, American Heart Association. Circulation. 1995 Sep 01;92(5):1355-74. [PubMed]

14. Ho KF, Gray RS, Welsh P, Rocha PF, Foster H, Waddell H, Anderson J, Lyall D, Sattar N, Gill MRJ, Mathers CJ, Pell PJ, Morales CC. Associations of fat and carbohydrate intake with cardiovascular disease and mortality: prospective cohort study of UK Biobank participants. BMJ. 2017;368:m688. https://doi.org/10.1136/bmj.m688

15. Barolia R., Sayani A.H. Risk factors of cardiovascular disease and its recommendations in Pakistani context. JPMA J. Pak. Med. Assoc. 2017;67:1723. – PubMed

16. Hu FB, Willett WC. Optimal diets for prevention of coronary heart disease. JAMA. 2002;288:2569.

17. Panagotakos D, Ptasavos C, Kokkinos P. Consumption of fruits and vegetables in relation to the risk of developing acute coronary syndromes; the CARDIO2000 case-control study. Nutr J. 2003;2:2.

18. Iscovick DS, Raghunathan T, King I, Weinmann S, Bovbjerg VE, Kushi L, Cobb LA, Copass MK, Psaty BM, Lemaitre R, Retzlaff B, Knopp RH. Dietary intake of long-chain. n-3 polyunsaturated fatty acids and the risk of primary cardiac arrest. Am J Clin Nutr. 2000;71(1 Suppl):208S–12S.

19. Chagas P, Mazocco L, Piccoli JDCE, Ardenghi TM, Badimon L, Caramori PRA, Pellanda L, Gomes I, Schwanke CHA. Association of alcohol consumption with coronary artery disease severity. Clin Nutr. 2017 Aug;36(4):1036-1039. doi: 10.1016/j.clnu.2016.06.017. Epub 2016 Jun 30. PMID: 27402474.