



Effect of Oilseeds on Cardiovascular Health: A review

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Abstract

Coronary heart disease (CHD) is the leading cause of death in both industrialised and developing countries, accounting for 31.4 percent of deaths in recent decades. According to current lifestyles, patients with CHD are more likely to develop atrial fibrillation. There are many risk factors which are associated with CHD, aging is one of the most common factors. This disease is most likely to occur in people of 65 or older and is increasing at exponential rate. Environmental factor is also associated with coronary heart disease (overnutrition, smoking, pollution, sedentary lifestyles) have been known to cause premature abnormalities. The cause of CHD is linked with increased intake of saturated and trans-fatty acids whereas unsaturated fatty acids help in sustaining cardiovascular health. Furthermore, dietary cholesterol consumption has been linked to an increase in saturated fatty acid which has directly shown to raise LDL cholesterol and with the risk of cardiovascular disease. In order to conclude this, there should be intake of foods such as nuts, legumes and grains, fruits, eggs and dairy food groups and foods such as fried and processed foods and sweetened beverages should be excluded from the diet. Also in this paper there has been discussion related to Mediterranean diet, DASH diet (dietary approaches to stop hypertension) and also the portfolio diet which are prescribed by the doctors to the patients which helps in managing CHD and improve the lipid profile.

Index terms: Coronary heart disease, oilseeds, flaxseeds, vegetarian diet, cholesterol levels

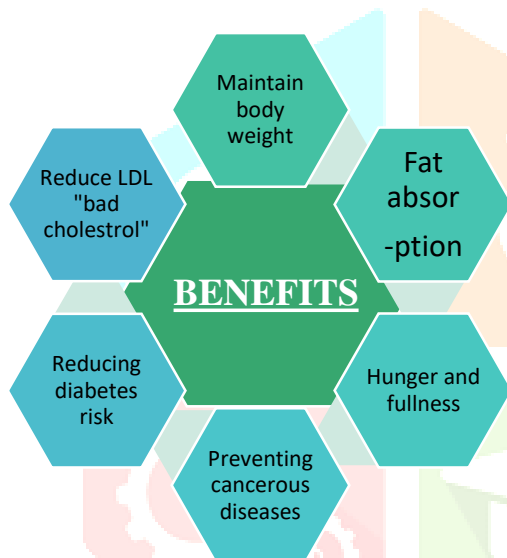
1. INTRODUCTION:

Coronary heart disease (CHD) is the cause of death in both industrialised and developing countries, accounting for about 31.4% of deaths in recent years. ⁽¹⁷⁾ The observational studies have found a link between dietary fats including saturated and trans-fat and CVD risk among middle-aged group. Also, unhealthy eating patterns may lead to the development of coronary heart disease, which have been linked with risk factors such as hypertension, type-2 diabetes. ⁽¹⁷⁾ The relationship b/w CHD and total fat intake is related to the type of fat used, so need to limit the saturated fatty acids and trans-fat while increase (monounsaturated fatty acids) MUFA and (polyunsaturated fatty acids) PUFA intake will help in reducing heart disease. ⁽⁴⁾ Obesity is one of the risk factor which is directly associated with unhealthy eating habits such as intake of saturated fatty acids (SFA), trans fatty acids (TFA), soft drinks and other refined carbohydrates also closely linked to consumption of cigarette and alcohol. ⁽¹⁸⁾ With the improved dietary patterns such as consuming fruits, whole grains, nuts and seeds and avoiding sugar-sweetened beverages, refined grains might help to reduce CVD risk, including proper nutrition in the diet will help to recover the disease. ⁽⁴⁾ There has been number of studies which have been associated to explore the relationship between CHD risk and nut consumption.

1.1 Risk factors associated with CHD:

^(4.) Hypertension, obesity, high cholesterol, diabetes mellitus (DM), age, and decreased physical activity are some of the important risk factors associated with chronic heart diseases. Other factors that contribute to CVD is ageing.^(4.)

- **Hypertension:** If there has been a history of hypertension in the family then there are chances that will lead to increase in atrial fibrosis (AF) by 34%.
- **Diabetes mellitus:** Poor glycemic index and DM are both linked to AF which is also correlated with HbA1c levels and can cause hypertension and obesity. ^(17.) It has also been stated that daily consumption of eggs has been linked with the increasing risk of type 2 diabetes both in men and women. ^(17.)
- **Obesity:** Obesity as a metabolic risk factor, is often associated with the development of AF. In order to improve this physical activity should be done on regular basis, so that the chance of getting the disease is reduced.
- **Age:** With the increasing age the chances of developing heart disease also increases and women might develop the disease at the age of 45 whereas men might get it around 55.
- **Family history:** This is one of the most important risk factor, if any person is suffering from it in the past then there is increase in chances of suffering from it.



1.2 Benefits of oilseeds:

- **Mustard seeds:** These seeds have antibacterial properties, and can also help in preventing cold, cough and skin problems.
- **Sunflower seeds:** These are rich in vitamin E and contains all other essential nutrients which are healthy for the body and most importantly promotes good functioning of nervous system.
- **Sesame seeds:** It is also used for cooking purposes and helps in preventing from diabetes.
- **Chia seeds:** They have become popular during the last decade and is rich in omega-3 which is present in ALA form (Alpha-Linolenic acid), and helps in reducing the risk of CHD.
- **Flax seeds:** These seeds are available in many varieties such as whole flax seeds, ground flax powder and flax oil and helps in burning fat i.e. in weight reduction.
- **Pupkin seeds:** These are rich in protein and also are good source of magnesium. The magnesium present in the seeds help in lowering cholesterol and lowers risk of heart stroke.
- **Watermelon seeds:** They are becoming one of the most common and popular food seeds and helps in providing benefits for the skin and helps in providing better control in blood sugar levels and in boosting energy.

1.3 Nutritional Value of oilseeds:

^(16.) Anti-oxidants such as vitamin E (tocopherol) might play an essential role in chronic heart disease prevention. Oilseeds such as almonds, peanuts, sunflower seeds have abundant content of vitamin E and helps in protection of atherosclerosis. ^(16.) On an average a person should take around 15mg of alpha-tocopherol according to the recent guidelines in RDA, it also helps in transportation of lipoproteins in the plasma (i.e HDL and LDL). ^(16.) Intake of vitamin E helps in enhancing the immune response, and plays an important role in prevention of heart disease and cancer. ^(16.) If a person does not intake proper amount of vitamin E in his or her diet then it can lead to its deficiency which might result in genetic abnormalities, protein-energy malnutrition and fat malabsorption syndrome. LDL (low density lipoproteins) and VLDLs (Very low density lipoproteins) can alter the Vitamin E absorption and transportation so it should be taken in sufficient amount.

This indicated that different types of oilseeds have different nutritious values, for example:

Oilseeds such as rapeseeds have sufficient levels of essential fatty acids, and helps in replacing toxicity and also have abundant levels of MUFA and alpha linolenic acids (ALA).

Secondly, sunflower and soyabean seeds have been used worldwide and have higher amounts of omega 6 polyunsaturated fatty acids and have different health effects. It has been suggested that there should be balance between the intake of n-6 and n-3 fatty acids as this will reduce the risk of heart diseases. Based on the recent research's omega-3 fatty acids have little or no influence on total blood cholesterol levels, but focuses on the capacity to lower blood triacylglycerol levels. By changing your food habits, you will have healthy lifestyle, and less chances of suffering from heart diseases.

1.4 Preventive measures for controlling CVD:

According to the recent studies obesity and increase in LDL (low-density lipoprotein) is linked to unhealthy dietary eating habits such as saturated fatty acids (SFA), trans fatty acid (tFA) and intake of other carbohydrates. Majority of the data supports that the healthy oils such as MUFA followed by PUFA helps in preventing the risk for CVD.

(4.) Foods included in controlling of CVD:

1. Nuts:

Almonds, hazelnuts and walnuts contain more than half of their calories from fat, with daily intake of 30g and intake of these nuts has shown decreased triglyceride (TG) and low-density lipoprotein (LDL) concentrations. These nuts have also shown improvement in oxidative stress, inflammation and reduced mortality and morbidity of type-2 diabetes mellitus.

2. Legumes and Grains:

These contain complex carbohydrates as well as protein and some other micronutrients that might comprises fruits, eggs, and dairy foods due to their effects in CVD risk factors.

3. Fruits:

There has been evidence shown that intake of fruit is connected to reduction in cardiometabolic risk factors and have shown a positive effect on blood pressure as well as lead to reduction in CVD risk.

4. Eggs:

These are rich in proteins and contain all essential amino acids and helps in lowering the cholesterol content. Moreover, recent studies had indicated that there has been no association of egg intake with dyslipidemia, although it could improve the lipid profile.

5. Dairy Foods:

During the randomised crossover trials, it was founded that after the consumption of dairy products such as milk and cheese there was neutral effects on LDL-C. ^(4.)

Foods that should be avoided to control CVD:

1. (4.) Fried and processed foods:

These foods should be taken into account in relation to cardiovascular health. Frying process alters food by increasing fat content and promoting oxidation which have shown to increase the risk for dyslipidemia as well as for high blood pressure and type 2 diabetes. ^(4.) Example: canned soups, fries etc.

2. Sweetened beverages:

There have been lots of outcomes which have been indicated that there has been a linear connection between the intake of sweetened beverages and cardio metabolic risk. ^(4.) Example: soda.

3. ^(5.) Meat and its products:

Consumption of meat products such as fish on daily basis has been linked to increase the risk of CHD, so intake of meat should be reduced in order to improve the disease. ^(5.) Eg: red meats should be restricted in the diet as it increases LDL cholesterol.

4. ^(4.) Alcohol Consumption:

Alcohol intake should low and moderate around 20-30g ^(4.), increasing the intake could affect the heart health and decreases lipid metabolism. Example: wine and beer

5. ^(12.) Fats intake:

Dietary guidelines advisory committee (DGAC) 2015, stated that substituting non-hydrogenated vegetable oils with animal fat, such as butter will help in reducing CHD. ^(12.)

2. **DISCUSSION:**

This review article focuses on the importance of oilseeds and its positive effect to human health and well-being. As the time changes, there has been new scientific developments in the content of 'heart health'. So, it has made easy for the consumers to reduce the risk of CHD by changing the type of fat intake.

Individuals can enhance their blood lipid profile by restricting the intakes of SFA and TFA consumption and consume appropriate amounts of PUFA. It has also shown that patients who are suffering from type-2 diabetes are at higher risk of developing CHD, so proper nutritional intake should be taken care of in order to prevent further damage.

According to the ^(4.) Mediterranean diet which includes intake of vegetables, fruits, whole grains, legumes, nuts, and seeds has shown improvement in glycemic control, chronic inflammation, oxidative stress and CVD risk. ^(4.) So, there were many epidemiological researches which has been linked between the consumption of PUFA and lower CHD morbidity and mortality.

The ^(4.) Dietary Approaches to Stop hypertension (DASH) has shown improvements in altering blood pressure (BP), and DASH diet contains fruits and vegetables along with some micronutrients such as fibre, potassium, magnesium and calcium. It has also resulted in significant reductions in LDL-C, HDL-C (high density lipoproteins), and total cholesterol and intermediate-density lipoprotein concentrations. So, it is a nutritional strategy for controlling cardiometabolic risk factors and CVD risk. ^(4.)

Another diet which can be discussed in a ^(4.) portfolio diet which have been recognised in the past decade. This is basically a plant-based diet which contains 4 types of food i.e (nuts, soy protein, soluble fibre and phytosterols) which mainly focuses on the managing of lipid profile. So, portfolio diet mainly focuses on the LDL-C which is the most important lipid profile. ^(4.)

With the increase in intake of vegetables, nuts and foods like fibre and nuts, phytosterols helps in preventing high blood cholesterol in adults and recommends the limitation of total fat intake. So, dietitians mostly include vegetarian diet in order to manage the fat intake. The 'combination' variant of vegetarian diet was also associated in reducing LDL-C which was followed by vegan and ovo-lacto-vegetarian diets.

3. CONCLUSION:

Evidence from observational studies suggested that lipoproteins have an important role in the development of CHD. Also, other factors such as oxidative stress, aging, obesity are some of the common factors which affects the functioning of heart.

To conclude this article, we could summarize that risk of CVD can be reduced by intake of oilseeds as they have high protein content and quality, as well as high caloric value, and are important phenolic molecules as they are rich in unsaturated fatty acids. So, taking care of nutritional requirements also plays an important role and rapeseeds and linseeds are the oilseeds that have increasing levels of ALA and helps in achieving our goal. Also, this paper focuses on the dietary patterns in order to improve lipid profile and various types of diets such as Mediterranean diet, DASH diet, vegetarian diets and portfolio diet in order to reduce cardiovascular problems.

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