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TRADITIONAL INDIAN MEDICINAL PLANTS WITH CARDIOPROTECTIVE ACTIVITY- A REVIEW

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ABSTRACT

Siddha system of Medicine is an ancient science, which belongs to Dravidian culture originating in Tamilnadu. Siddhars who were Natural scientists and who perfectly understood the human body health and illness from embryonic life to death. It deals with measures of healthy living during entire life span of life and its various phases. The Siddha system includes a combination of ancient medicinal practices and spiritual disciplines as well as alchemy and mysticism. As this system is known for its herbal in origin. Herbalism plays an important role to treat various diseases including acute and chronic conditions. Siddhars discovered thousands of raw drugs, medicines and invented their uses by using their Supernatural Powers. Plants play an important role in treating diseases like cardiovascular diseases (CVD). The most common CVD's are Arrhythmias, Coronary artery disease, high blood pressure, congestive heart failure, Myocardial infarction. A change in the lifestyle modification is the one which increases the risk for development of CVD's year by year. Mortality rate of CVD's were increased day by day. Several Attempts were done, which to overcome the mortality rate and to facilitate the cardioprotective activity by providing different types of medicinal plants and its botanical distribution, description, chemical constituents and pharmacological activity. In this review, few important herbs will protect the human being from CVDs and gives health and quality of life. Plants such as Azadirachta indica, Artocarpus heterophyllus, Bacopa monnieri, Curcuma longa, Hydrophila auriculata, Nigella sativa, Ocimum basilicum, Terminalia arjuna, Withania somnifera etc.

KEYWORDS: Cardiovascular diseases CVD's, Cardioprotective activity, Siddha system.

INTRODUCTION

Introduction to Siddha system

Siddha system of medicine is one of the ancient traditional medical system of Tamilnadu in south India, and it is considered as one of the oldest medicinal system. The roots of this system are linked with the culture of ancient Tamil civilization. The term 'Siddha' means one who is accomplished and 'Siddhars' masters who has achieved high degree of physical as well as spiritual perfection persons who achieved results in medicine. The foremost Siddhar Lord Shiva, preached Siddha medicine to his followers,[1] they are called Siddhars. Then Siddhars developed the system further called as Siddha system of Medicine. Its Preliminary aim is to maintain good body and mental health by Preservation and Protection. Siddhaa system include five elements (Aimpootham), three humours (Mukkuttram) and six tastes.[2] This review article is an analysis of Natural herbs on Cardioprotective activity.

Introduction to Cardiovascular system

The cardiovascular system consists of heart & blood vessels which circulate blood throughout the body. It is responsible for transporting oxygen, nutrients, and hormones to body and removes cellular waste products from the body.

The term cardiovascular disease (CVD) refers to a group of disorders that affects to the heart and its related Blood vessels. CVD is a major non communicable disease and it has become an important problem worldwide. According to World Health Organization (WHO), it will be a leading cause of mortality worldwide by 2020.[3] 80% of total deaths due to non-communicable diseases occur in the low income countries. Men and women are equally affected. Cancer, cardiovascular diseases (CVD) and diabetes are becoming of serious concern, accounting for 52 % of deaths. CVDs are increasing day by day in India and rest of the world. Most of the deaths in India are due to heart disorders besides deadly cancer. If this is allowed to continue, by 2030 an estimation of 23.6 million people will die because of cardiovascular diseases.[4]

Types of Cardiovascular disease

cardiovascular diseases involving the blood vessels.

- Coronary artery disease (also known as coronary heart disease and ischemic heart disease).
- Peripheral arterial disease – disease of blood vessels that supply blood to the arms and legs.

- Cerebrovascular disease – disease of blood vessels that supply blood to the brain (includes stroke).
- Renal artery stenosis.
- Aortic aneurysm cardiovascular diseases that involve the heart.
- Cardiomyopathy – diseases of cardiac muscle.
- Hypertensive heart disease – diseases of the heart secondary to high blood pressure or hypertension.
- Heart failure - a clinical syndrome caused by the inability of the heart to supply sufficient blood to the tissues to meet their metabolic requirements.
- Pulmonary heart disease – a failure at the right side of the heart with respiratory system involvement.
- Cardiac dysrhythmias – abnormalities of heart rhythm.[5]

Risk factors

Genetics: Genetics influence the development of cardiovascular disease in men who are less than 55 years old and in women who are less than 65 years old. Multiple single nucleotide polymorphisms (SNP) have been found to be associated with cardiovascular disease in genetic association studies.[6]

Age: Aging can cause changes in the Heart and Blood vessel associated with mechanical and structural properties, which leads to the lose of elasticity in arteries and reduced arterial compliance and may subsequently lead to coronary artery disease.[7]

Stress: Stress can cause unexpected increase in oxygen demand on the body, spasm of the coronary (heart) blood vessels, and electrical instability in the heart's conduction system. Chronic stress has been shown to increase the heart rate and blood pressure, making the heart work harder.[8]

Some Studies, suggest that the high levels of cortisol from long-term stress can increase blood cholesterol, triglycerides, blood sugar, and blood pressure. However, Increased risk of cardiovascular diseases seen in depression, stress, and anxiety.[9]

Smoking and Alcohol: Smokers have more than twice the risk for heart attack as nonsmokers and are much more likely to die due to

- Nicotine raises blood pressure.

- Carbon monoxide from cigarette smoke reduces the amount of oxygen that your blood can carry.[10]

Drinking too much alcohol can raise blood pressure levels and increases levels of triglycerides, a fatty substance in the blood which can increase the risk for heart disease.[11]

Diet: Eating poor quality diet which contain high in saturated fats, trans fat, and cholesterol has been linked to heart disease and related conditions, such as atherosclerosis. Also, adding too much salt (sodium) in the diet can raise blood pressure. There is evidence that higher consumption of sugar is associated with higher blood pressure and body lipids.[12]

Lack of Physical activity: It can also increase the chances of having other medical conditions that are risk factors, including obesity, high blood pressure, high cholesterol, and diabetes.[13]

Diet and CVD

Up to 90% of cardiovascular disease may be preventable, measures to prevent risk factors are.

- Reduction in salt intake
- Reduction in saturated fat
- Reduction in animal fat, dairy products,
- Increasing fruit and vegetable consumption
- Banning junk food
- Minimizing trans-fats in commercial products
- Tobacco cessation and avoidance, Limit alcohol consumption to the recommended daily limits
- Moderate exercise
- Decrease psychosocial stress.[14,15]

Irrespective of age, CVD in people makes at risk. Baseline drug therapy includes statins, organic Nitrates, Calcium Channel antagonists, beta blockers, antiplatelet agents and angiotensin receptor blockers are effective in preventing the heart diseases, their use is often limited because of their side effects and adverse reactivity.[16]

Nature itself is the best physician – Hippocrates

Inorder to prevent the Side effect and adverse effect of Modern medicine, Ancient Herbal medicine are gaining their importance because of their therapeutic effect on Modern diseases. Reviews of such plants which possess a Cardioprotective activity are carried out.

Variety bioactive phytoconstituents present in plants are well known for their minimal side effects, providing alternative therapeutic potential against cardiac diseases. Some of the plants having cardioprotective molecules are given below.

HERBS WITH CARDIOPROTECTIVE ACTIVITY

Table 1: Description of Cardioprotective Mediinal Plants.

S.no.	Botanical Name	family	Common Name	Phyto-constituents	Biological Activity
1.	*Azadirachta indica*	Meliaceae	neem, nimtree or Indianlilac, Margosa tree.	Terpinoid, Flavnoids, Azadirachtin (ABDH), Azadradione, nimbolin, nimbolide, nimbinene, desacetylnimbin, azadirone, salanim	Antioxidant activity,Anti inflammatory.[17]
2.	*Artocarpus heterophyllus*	Moraceae	Jack fruit.	Ethylacetate, Flavonoids, Sterols, Proteins, Tannins, Phenolic compounds	Antioxidant, Antiinflammatory,hyperglycemia.[18]
3.	*Bacopa monnieri*	Plantaginaceae	Theme leaved gratiola	Brahmine, herpestine, betulinicacid, stigmastenol, bacosides A & B.	Anti oxidant activity, Anti depression activiy, anti convulsant, analgesic.[19]
4.	*Curcuma longa*	Zingiberaceae	Turmeric.	Curcumin	Antioxidant, Anti inflammatory, anti diabetic.[20]
5.	*Hydrophila auriculata*	Acanthaceae	Long – leaved barieria	Flavonoids, Tannins, Glycosides, Anti-oxidants.	Antioxidant, Hypoglycemic.[21]
6.	*Nigella sativa*	Ranunculaceae	Black cumin, nigella, kalojeera,	Alkaloids (pyrozol), Saponins, Carbacvol, Carvone, Thymol, Myristic acid,	Antioxidant, Antihypertensive effect, Immunomodulator.[22]
7.	*Ocimum basilicum*	Lamiaceae	Sweet basil	contains phenolic compound 5.36% (galic acid), flavnoids 1.86%, rosemarinic acid 15.74%	Anti oxidant, hypolipidemic, Immunomodulator.[23]
8.	*Terminalia arjuna*	Combretaceae	Arjun, thella maddi	Polyphenols, Antioxidants, Myricetin,	Antioxidant, Anti stress effect, hypolipidimic,hypocholestrolaemic effect.[24]

				Flavonoids (quercetin, kaempferol)	
9.	*Withana somnifera*	Solanaceae	Winter cherry, ashwagandha, Indian ginseng, poison gooseberry	WithaferinA, Sitoindosides, Withanolides	Antioxidant, Anti stress, Antiinflammatory, Antihyperglycaemic.[25]
10.	*Allium sativum*	*Liliaceae*	Chinese onion, Garlic	*Allicin, sulfur compounds*	It reduces dangerous plaque buildup in arteries.[26]
11.	*Digitalis purpurea*	*Scrophulariaceae*	*Fox glove leaves*	*Cardiac glycosides*	treat congestive heart failure.[27]
12.	*Crocus sativus*	*Iridaceae*	saffron crocus, or autumn crocus	*Crocin*	Hypoglycemic Hypolipidemic.[28]
13.	*Glycyrrhiza glabra*	*Leguminaceae*	Liquorice	*Glycyrrhizic acid*	Antiarrhythmic, antihypertensive.[29]
14.	*Moringa oleifera*	*Moringaceae*	Drumstick tree	*Vincosamide*	Antioxidant.[30]
15.	*Zingiber officinale*	*Zingiberaceae*	Ginger	*Zingerone*	antiarrhythmic agent.[31]

a) Azadirachta indica

b) Artocarpus heterophyllus

c) Bacopa monnieri

d) Curcuma longa

e) Hydrophila auriculata

f) Nigella sativa

Fig. 1: Cardioprotective herbs.

CONCLUSION

All those above plants have been already evaluated individually, by ancient siddhars, for the cardioprotective potential. Siddhars often played an important role, as the mother medicine of ancient Tamils/Dravidians in South India. Herbalism is the oldest documented type of medicinal system which uses herbs and green leaved medicines to treat various aliments, disease to the people and make the life stronger, when these diseases cannot be cured with herbs, then they used metals, minerals and salts which are in calcined forms to treat the deadly diseases.

Cardiac diseases are the leading cause of death worldwide. Medicinal plants and their supplements can lower the risk of cardiovascular diseases. carotenoids, triterpenes, flavonoids, cardiac glycosides, alkaloids, saponins, polyphenols, terpenoids, fatty acids are Secondary metabolites present in Medicinal plants which are responsible for potent cardio-protective activity. An ideal combination of these Medicinal cardiovascular plants helps with Hypolipidemics, antihypertensive, antiplatelet, antioxidant, hypocholestrolaemic, antiarrhythmic. Hence this review proves that the Siddha system of medicine plays an important role in reducing mortality rate, preventing and reversing the cardiovascular diseases, and gives outline of some cardioprotective plants.

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CONFLICTS OF INTEREST

We declare that no conflicts of interest.

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