ROLE OF INDIGENOUS MEDICINAL HERBS IN THE MANAGEMENT OF TYPE 2 DIABETES MELITUS

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Diabetes mellitus commonly known as Madumegam one of the world's oldest known disease .WHO estimated in 1995 the increasing number of people with diabetes in the world would reach 300 million by 2025. The composition of appu and piruthivi give rise to sweetness among all the six different tastes. If there is excess of sweetness of the body it will be excreted in the urine , which contain sugar is called as Neerizhivu (Diabetes mellitus). Madumegam which is popularly known as Neerizhivu as per Siddha system of Medicine .it is characterized by an inordinate discharge of the urine containing sugar accompanied by thirst together with loss of strength.

The term diabetes mellitus describes a metabolic disorder, characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defective insulin metabolism. The effects of diabetes mellitus include long–term damage, dysfunction and failure of various organs. India with its dubious distinction of being called, "the diabetic capital of the world" is presently estimated to have over 30 million individuals affected by this deadly disease.

Diabetes is formerly known as Insulin-Dependent Diabetes Mellitus (IDDM), characterized by hyperglycemia due to an absolute deficiency of the insulin hormone produced by the pancreas. Patients require lifelong insulin injections for survival, usually develops in children and adolescents (although can occur later in life). It is usually caused by autoimmune destruction of the beta cells of the pancreas, with the presence of certain antibodies in blood. A complex disease caused by mutations in more than one gene, as

well as by environmental factors. The clinical features are increased urinary frequency (polyuria), thirst (polydipsia), hunger (polyphagia), and unexplained weight loss. numbness in extremities, pain in feet (disesthesias), fatigue, and blurred vision, recurrent or severe infections, loss of consciousness or severe nausea/vomiting (ketoacidosis) or coma.

Type 2 Diabetes is formerly named non-insulin-dependent diabetes mellitus (NIDDM). Characterized by hyperglycemia due to a defect in insulin secretion usually with a contribution from insulin resistance. Patients usually do not require lifelong insulin but can control blood glucose with diet and exercise alone, or in combination with oral medications,. Usually develops in adult hood. The etiology of Type 2 Diabetes is associated with obesity, decreased physical activity and unhealthy diets occurs more frequently in individuals with hypertension, dyslipidemia, and central obesity, and is a component of "metabolic syndrome". The symptoms of patients may have no symptoms at all or minimal symptoms for years before being diagnosed. may have increased urinary frequency (polyuria), thirst (polydipsia), hunger (polyphagia), and unexplained weight loss, may also experience numbness in extremities, pain in feet and blurred vision and may have recurrent or severe infections

Gestational diabetes is characterized hyperglycemia of varying severity diagnosed during pregnancy and usually resolving six weeks of delivery. The risks to the pregnancy itself include congenital malformations, increased birth weight and an elevated risk of prenatal preexisting diabetes mellitus.

Complications of Diabetes: Diabetes complications are divided into micro-vascular (due to damage to small blood vessels) and macrovascular (due to damage to larger blood vessels). Microvascular complications include damage to eyes (retinopathy) leading to blindness, to kidneys (nephropathy) leading to renal failure and to nerves (neuropathy) leading to impotence and diabetic foot disorders (which include severe infections leading to amputation). Macro vascular complications include cardiovascular diseases such as heart attacks, strokes and insufficiency in blood flow to legs.

The overall aim of treatment is symptom relief and prevention or delay of complications by targeting normal blood glucose levels. Patients treated with diet/exercise or with addition of one or more categories of oral medications, with a combination of oral medications and insulin, or with insulin alone. Ancient Tamil literature mentioned

"Veru paru thazhai paru minginikal , Mella mella parpam chenduram paru".

That means first preferred plant based drug if it is not working we go to another drug. Recently, global attention has been focused towards the utilization of herbal remedies for the prevention and management of various risk factors for Diabetes. Early identification of various risk factors may be helpful in launching the preventive measures among the likely victims. The role of plant-based medicine has been recently emphasized by world health organization. This organization has provided guidelines for evaluation of safely and efficacy profile of plant based product.

Medicines that reduce postprandial hyperglycemia by suppressing the absorption of carbohydrates have been shown to be effective for prevention and treatment of non-insulin-dependent diabetes mellitus. On the other hand, many traditional medicines are known to have preventive and therapeutic effects in diabetes and obesity, but their active components have not yet been characterized, except in a few cases. Ethno pharmacological surveys indicate that more than 1200 plants are used in traditional medicine for their alleged hypoglycemic activity, this concept is a core principle of Siddha medicine, an ancient Indian system of medicine, which emphasizes "Food is Medicine and Medicine is Food." Specific Food recipe grains of food crops are prescribed along with medicines for every ailment.

The roots and stems of S. reticulate and the roots of S. oblonga have been extensively used for the treatment of Diabetes and skin diseases, and particularly as a specific remedy for the initial stages of diabetes in the Siddha system of Indian traditional medicine.

Murraya koenigii (L.) Spreng is an aromatic pubescent shrub or small tree commonly known as ‘Curry patta’ in India. The plants distribute all parts of India . It adorns every house yard of Southern India The plant is used in Indian system of medicine to treat various ailments The aromatic leaves, which retains their flavor and other qualities even after drying, are slightly bitter, acrid, cooling, weakly acidic in tastes and are considered as tonic, analgesic, digestive, appetizing and are widely used in Indian cookery for flavoring food stuffs. The green leaves are used to treat piles, inflammation, itching, fresh cuts, dysentery, vomiting, burses and dropsy. The roots are slightly purgative, stimulant and used for general body aches, while the bark is used to treat snakebite. The essential oil of the leaves is reported to possess antimicrobial, antifungal and pesticide activities.

Gymnema sylvestre: The leaves of this plant Sarkarai kolli “sugar destroyer”, belonging to the botanical family Asclepidaceae have the property of abolishing the taste of sugar. Laboratory studies suggest that water extracts from the leaves help in improving sugar assimilation in animal models of diabetes. The active principles include a glycoside mixture, the gymnemic acids and a peptide, gurmarin, both of which inhibit the sweet taste response in mammals. In traditional medicine, the plant is used either singly or in combination with other traditional herbs.

Momordica charantia **(Bitter melon):** The fruits of the plant are well known in Ayurvedic medicine and in folk use as being useful in diabetes management. *Momordica charantia* is a proven hypoglycemic agent. In controlled clinical studies, *Momordica charantia* extracts have been shown to significantly lower blood sugar levels, particularly in patients with Type II diabetes. In view of these effects, *Momordica charantia* is a potential herbal alternative in diabetes management, particularly in non-insulin dependent diabetes.

***Trigonella foenum graecum* (Fenugreek):** A member of the Leguminosae family, the seeds of this commonly used spice contain about 50 percent fiber, of which 20 percent is mucilaginous fiber similar to guar gum, which is a known hypoglycemic agent. The protein fraction of the seeds contains the amino acid 4-hydroxyleucine which has been proven to stimulate insulin production. Saponins present in fenugreek seeds have also been shown to lower cholesterol levels in human subjects Recent studies have revealed the efficacy of defatted fenugreek seed extracts in the management of both Type I and Type II diabetes Administration of defatted fenugreek seed powder for a period of three weeks significantly improved the performance of Type II diabetes patients in the glucose tolerance test. This effect was found to be sustained and lasting with no undesirable side effects. Within the duration of this study, there were no new incidences of heart problems such as angina and myocardial infarction and no increases in blood pressure, indicating that fenugreek may be helpful in preventing the secondary complications of diabetes such as hyperlipidemia and atherosclerosis.

***Pterocarpus marsupium* (Vijayasar):** *Pterocarpus marsupium* Roxb. from the family of Leguminosae known in the vernacular as "Vijayasar" ofVengai is a large tree that commonly grows in the central, western, and southern parts of India and in Sri Lanka. The bark of the plant reduce the blood sugar level.

Salacia species Ponkoranti: One of the conventional therapeutic approaches to diabetes management is through the use of alpha-glucosidase inhibitors that lower glucose levels by blocking the enzymes that digest starches in the intestines. This results in delayed absorption of complex sugars and a lowering of blood sugar after taking of food This plant have alpha glucodise inhibiting property.

Several roots of ***Ocimum sanctum* (Tulsi, Holy basil)**, used in Traditional Siddha system for over 2000 years has now been explored as an adjunct to dietary therapy and drug treatment in mild to moderate Type II diabetes.

Tinospora cordifolia **(Seenthil)** The beneficial effects of this plant in diabetes management are well documented in traditional medicine. Recent research reveals that these effects observed in pre clinical studies can be attributed to the bitter principle isolated from the water extract. This principle has been shown to enhance insulin secretion and improve glucose metabolism, thereby lowering blood sugar levels.

Szygium cumini (***Eugenia jambolana***): The fruit kernels of this plant (Naval) are used traditionally in the management of diabetes. Several pre clinical studies revealed that extracts from the plant promote insulin secretion in isolated islets of Langerhans and lower blood sugar levels in experimental diabetes. The whole fruit powder is traditionally used in mixed formulations for diabetes management.

Another herb with potential blood sugar lowering activity is *Coleus forskohlii*. Forskolin, the active component in the plant extract, is a direct activator of adenylate cyclase and raises the levels of cyclic-adenosine monophosphate It is an effective anti-hypertensive agent., cinnamon is reported to enhance glucose metabolism and to provide insulin-like action. Cinnamon is used as a "balancing" herb in Traditional formulations, benefiting metabolic Processes.

Lifestyle management including diet control and adequate exercise is essential to the successful treatment of Type II diabetes. Experts on diet and health and the American Diabetes Association (ADA) state that there is no single dietary regimen for diabetes. Dietary recommendations may be developed based on the individual's requirements and treatment goals. Successful nutritional management of diabetes entails.

• Regular monitoring of metabolic parameters (including blood glucose, glycated hemoglobin, lipids, and blood pressure) In long term patients monitored the blood urea and serum creataine
• Maintaining healthy body weight
• Lifestyle management

Herbs used in management of Type 2 Diabetes Melitus.

Botanical name	**Tamil name**	**Part used**
Saraca indica	Ashoga	Bark, flower
Ficus glomavata	Atti	Fruit, Latex
Nymphaeastillata	Alli(white and red)	Flower
Ficus bengalensis	Alamaram	Bark,Leaf,Fruit,Flower,latex
Cassia auriculata	Aavaram	Leaf,bark,flower,seed,latex
Phoenix dactilifera	Perichai	Fruit
Slacia reticulate	Kadalalingil	bark
Diospyrous melanoxylon	Karungali	Root,bark
Cucurbito longa	Manjal	Rhizome
Erythrina indica	Kalyana murungai	Bark
Murraya koenigi	Curry leaves	Leaves
Phyllanthus amarus	Kizhanelli	Whole plant
Holarina antidysentrica	Kudasa palai	Bark,seed
Cassia fistulla	Sarakkondrai	Flower
Coccinia indica	Kovai	Tuber
Tinospora cordifolia	Seenthil	Bark
Gossypium arboreum	Chemparuthi	Leaf,flower,Bark,fruit
Asparagas racemosus	Thanneervittan	Tuber
Coccos nucifera	Thennai maram	Coconut jaggary
Strychnos potatorum	Thetran	Seed
Mimosa pudica	Thottatsuringi	Whole plant
Eugenia jambolana	Naaval	Seed,Root,Fruit
Curculigo orchioides	Nelappanai	Tuber
Nymphea alba	Neithart kizhangu	Seed
Setreospermum suaveolens	Pathiri	root
Aegle marmeloes	Vilvam	Leaf,fruit
Luffa ocutaugula	Peerku	Leaf
Terminalia arjuna	Maruthu	Bark
Anacardium occidentale	Munthiri	Root bark
Bambusa arundinaceae	Moongil	Rice(seed)
Nigella sativa	Karun seeragam	Seed
Aloe vera	Kumari	Fleshy plant