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TRADITIONAL PHYTOTHERAPY FOR DIABETES USED BY THE PEOPLE OF PERAMBALUR DISTRICT, TAMILNADU, SOUTH INDIA

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Abstract
Diabetes is caused due to deficiency in production of insulin by the pancreas, or by the ineffectiveness of the insulin produced. It is a global problem and the numbers of people affected are increasing day by day. Plants provide a potential source of antidiabetic drugs. In India, most of the people, especially in rural areas use traditional medicine of plants to treat many diseases including diabetes. The aim of the present study was to document medicinal plants, traditionally used to treat diabetes by the people of Perambalur district. Traditional health practitioners were interviewed with standardized questionnaires in order to obtain information on medicinal plants traditionally used for the management of diabetes. Thirty species of 29 genera and 22 families were encountered during this study.

Key Words: Traditional; Diabetes; Phytotherapy; Perambulur district.

Introduction

Diabetes is a major disease and growing health problem in most of the countries. It is a state of having excessive level of glucose in the blood. Insulin, a hormone and a major regulator of the glucose content in the blood is produced insufficient quantities in the beta cells of the islets of Langerhans in the pancreas. In people with diabetes the metabolic process is completely disturbed either due to lack of insulin or due to ineffectiveness of insulin that their bodies produce [1]. As a result, the body becomes unable to produce insulin, a pancreatic hypoglycaemic hormone. This disorder is characterized by polyuria (frequent and abundant urines), glycosuria (presence of glucose in urines) and hyperglycaemia (glucose rate on an empty stomach higher than 1.2 g/l in plasma blood). Diabetes leads to other complications like kidney failure and eye defects [2]. Diabetes is a major cause of disability and death [3]. The adoption of a sedentary lifestyle, the consumption of non-traditional foods, and a genetic predisposition to the disease are thought to be the major underlying causes of this disease [4-6]. Diabetes requires a lifelong treatment and people recognized and used the medicinal properties of many cultivated and wild plants to recover from diabetes. The management of diabetes without any side effects is still a challenge to the medical system [7]. Recent advances in the management of diabetes have considerably improved the outcome, but this is dependent on patient's awareness about the disease and their efforts to achieve the target goals. There are indications that the awareness about diabetes and its complications is rather very poor in Asian countries, where the burden of the disease is highest in the world [8]. Now a day, people believe on the phytoremedy for diabetes and world focus has been turned to traditional treatments using plants rather than English medicine (Allopathy).

India leads the world in the number of people suffering from diabetes and by 2030, nearly 9 % of the country's population is likely to be affected by this disease, the International Diabetic Federation (IDF) has warned. About 50.8 million people of India are now suffering from the looming epidemic of diabetes, followed by China with 43.2 million. There are 285 million or 7 % of the world populations have been affected by diabetes. Diabetes has become a serious issue of every country and it threatens the health and economic prosperity of people. It also predicted that diabetes would cost the world economy at least $376 billion by 2010, or 11.6 % of

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the total world health care expenditure. By 2030, this cost is projected to exceed $490 billion. More than 80 % of spending on diabetes is in the world's richest countries, where over 70 % of people with diabetes are living. India currently spends $2.8 billion or 1 % of the global cost to fight the same [9]. Though, diabetes seems to be an alarming disease, no work has been done so for to examine the antidiabetic potential of medicinal plants from Perambalur District of Tamilnadu state, South India.

India has an officially recorded list of 45,000 plant species and a various estimation of 7500 species of medicinal importance [10]. Since times immemorial, plant based drugs have been in use in the amelioration of various ailments ranging from common cold to cancer. In Ayurveda, Siddha and Unani systems of medicine, several herbs or plant products have been used for the treatment and management of diabetes. Though regular synthetic drugs have made considerable progress in the management of diabetes, traditional plant treatments for diabetes are also being used throughout the world and the search for natural anti-diabetic plant products for controlling diabetes is still going on. Anti-diabetic medicinal plants undoubtedly have significant effect on the lowering of blood sugar but their mechanism of action is yet to be elucidated. The first evidence that the natural products have insulin potentiating activity was reported in 1929 by Glazer and Halpern. Several medicinal plants having anti-diabetic properties have been listed in various studies [11-16]. Apart from currently available therapeutic options, many herbal medicines have been recommended for the treatment of diabetes. Traditional plant medicines are used throughout the world for a range of diabetic presentations. Herbal drugs are prescribed widely because of their effectiveness, less side effects and relatively low cost [17]. Therefore, investigation on such agents from traditional medicinal plants has become more important [18]. India has a rich history of using various potent herbs and herbal components for treating diabetes. Many Indian plants have been investigated for their beneficial use in different types of diabetes and reported in numerous scientific journals. Therefore, the present work has been made to document the indigenous medicinal plants used of the people of Perambalur District of Tamilnadu state for diabetes.

Materials and Methods

Perambalur district is an inland district of Tamilnadu, spreads over 3,691 Sq. km. without any coastal line. It is geographically located between 10º 54' and 11º.30' of Northern latitude and 78º 40' and 79º 30' of the eastern latitude.

In order to enumerate the medicinal plants and to note their seasonal variation in growth and productivity, different localities and colleting spots of Perambalur district were surveyed at regular intervals for about 2 years. The informations were gathered from many old people, vaidyas and medicine men of study areas. Subsequently, the informations gathered were confirmed with literatures for authentification of preparation of drugs from various plants. For this study, plants were collected from different localities and voucher specimens were prepared and identified with the help of suitable literatures namely, Indian Materia Medica, Flora of the Presidency of Madras, The flora of the plani hills, The Flora of the Tamilnadu Carnatic and Indian Medicinal plants [19-25].

Results and Discussion

The table shows a documentation of plant species collected from the study areas based on traditional reputation for their use as antidiabetes. Fifteen informants who had many years of experience in the use of traditional medicine were interviewed about the plants used for treatment of diabetes and the plant parts mostly reported in this regards were the root bark (16%), stem bark (12%), leaves (40%), flower (6%), fruit (10%), seed (6%) and whole plant (10%). The method of preparation was mostly a decoction or a hot water infusion usually prepared just before use. The plant material was used fresh or in dried form and most plants to be used as a remedy were stored for later use in the dry state, which allowed their utilization throughout the year. Doses were mainly taken twice a day i.e. at the morning and evening. Treatment was supposed to be continued until recovery.

The aim of the ethnomedical survey and documentation was to catalogue the plants used traditionally against diabetes. A considerable amount of duplication of information relating to the use of the plants was reported by several informants which may confirm the antidiabetes efficacy of traditional herbal remedies prepared from these species. Most of the plants collected have been reported in the literature earlier, as they having been used for diabetes and this is an indication that the healers could be trusted over the use of these plants. The results of this study show that a large number of medicinal plants are traditionally used for the treatment of diabetes among the people particularly in rural areas of Perambalur district. Thirty species of 29 genera and 22 families were documented. Apocynaceae, Caesalpiniaceae, Cucurbitaceae, Lamiaceae, Malvaceae, Moraceae, Myrtaceae and Rutaceae families represented the species of this kind twice.

Table - Plant species collected from Perambalur district, based on traditional reputation for their use as antidabetes

Botanical name, family belonging to and vernacular names of medicinal plants	Mode of preparation and administration of phytomedicines
Abutilon indicum (L.) Sw. (Malvaceae) Thutthi	Decoction of stem bark (25-50 ml) given two times daily after principal meals for 3-4 weeks.
Aegle marmelos (L.)Corr. ex.Roxb. (Rutaceae) Vilvam	Leaves of *A. marmelos* along with leaves of *Azadirachta indica* and *Ocimum sanctum* dried and powdered and given thrice a day for 15 days.
Aloe barbadensis Mill. (Liliaceae) Sotru kattraazhai	Fresh leaf pulp (40-50g) taken once a day in empty stomach for 10-12 weeks.
Andrographis paniculata Wall. (Acanthaceae) Kopuranthangi	Powdered leaf is mixed with cow or goat's milk and taken orally to treat diabetes.
Asparagus officinalis L. (Asparagaceae) Thaneervittankizhngu	A pinch of the powder of the dried tuber is taken orally with cow's milk daily in the morning.
Benincasa hispida Cogn. (Cucurbitaceae) Poosini	The fruit juice (10-15 ml, 3-5 times daily)is taken orally
Cajanus cajan L. (Fabaceae) Thuvarai	The pulses are obtained from these plants are cooked and taken internally.
Cannabis sativa L. (Cannabinaceae) Ganja	Leaf extracts (5-10 ml) taken two times daily for 3-4 weeks.
Cassia fistula L. (Caesalpiniaceae) Sarakondrai	Powdered seeds are given once in the morning.
Catharanthus roseus L. (Apocynaceae) Nithyakalyani	A thick extract is made from 250g crushed root or leaf in 2.5 liters or even more water. It is strained and evaporated on gentle heat. When the volume is reduced to about ½ litre, 1-2 teaspoonful is administered orally twice a day. Whole plant is powdered and mixed with cow's milk and taken orally.
Cinnamomum zeylanicum Bl. (Lauraceae) Elavangappattai	Decoction of stem bark taken three times daily for 3-4 weeks
Cissampelos pareira L. (Menispermaceae) Veliparuthi	Root bark extract (5-10 ml) taken one to two times daily for 2-3 weeks
Citrus medica L. (Rutaceae) Narthankai	Peels of three fruits are boiled in 1 litre of water for 10 minutes and filtered. The decoction is cooled and taken daily.
Coccinia indica W.&A. (Cucurbitaceae) Kovvai	The leaves, in form of curry or as decoction, are taken orally in diabetes.
Costus speciosus (Koenig.) Sm. (Zingiberaceae) Vasmbu	Powdered leaves are taken internally with cow's milk.
Ficus benghalensis L. (Moraceae) Aalamaram	Stem bark of *F. benghalensis* and root bark of *F. religiosa* are mixed with equal proportions and crushed into a paste. Five gram of the preparation is eaten with honey or milk at every morning and evening for 5-10 days.
Ficus racemosa L. (Moraceae) Atthi	Root powder is given orally.
Gymnema sylvestre B. Br. (Asclepiadaceae) Sirukurinja	Leaf powder is mixed with cow's milk and taken orally. Powdered leaves are mixed with cow's milk and cooked rice, kept overnight and taken internally twice a day.
Ichnocarpus frutescens R. Br. (Apocynaceae) Makalikilanzhu	About 10 flowers are chewed and the juice swallowed every morning.
Ipomoea batatas (L.)Lam. (Convolvulaceae) Sarkkaraivallikizhangu	The juice of the aerial part of the plant (25-30 ml) taken two times daily for 3-4 weeks.
Melia azedarach L. (Meliaceae) Malaivempu	The pericarp of fruit is obtained and dried for 4-5 days. Then they are ground to make paste. From the paste, about half teaspoon is mixed glass of water and taken at every morning for one month.
Ocimum sanctum L. (Lamiaceae)Tulasi	Leaves are dried under shade and ground to make powder. From this, use 21g twice a day.
Oroxylum indicum Vent. (Bignoniaceae) Peruvaagai	Decoction (15-20 ml) or juice (5-10 ml) prepared from stem bark is taken two or three times daily.
Orthosiphon grandiflorus Boldingh (Lamiaceae) Kidney Tea plant	The leaf decoction (10-15 ml, 2-3 times daily) is taken orally.
Psidium guajava L. (Myrtaceae) Koyya	Hot water extract made from the dried leaves of plant is used to reduce blood glucose level of diabetics.
Saraca asoca (Roxb.) Dewilde (Caesalpiniaceae) Ashoka	Infusion of dried flower (50-100ml) taken two times daily (before principal meals) for 4-5 weeks.
Scoparia dulcis L. (Scrophulariaceae) Sweet broomweed	50 ml of whole plant extract is taken orally every day.
Sida rhombifolia L. (Malvaceae)Phazhampasi	Aqueous extract of the plant is given thrice a day for 15 days.
Syzygium cuminii (L.) Skeels (Myrtaceae) Naaval	Leaf decoction is mixed with lime juice and honey. From this, per day, first dose of 10 ml is given orally on empty stomach in the morning and a second dose is at night for 60 days.
Zizyphus jujuba Gaertn. Non-Mill (Rhamnaceae) Elanthai	About 4-5 fresh leaves are plucked, washed with clean water and chewed daily to lower blood glucose level.

Diabetes is a disorder of carbohydrate, fat and protein metabolism attributed to diminished production of insulin. Herbal treatments for diabetes have been used in patients with insulin-dependent and non-insulin-dependent diabetes. Scientific validation of several Indian plant species has proved the efficacy of the botanicals in reducing the sugar level. From the reports on their potential effectiveness against diabetes, it is assumed that the botanicals have a major role to play in the management of diabetes, which needs further exploration for necessary development of drugs and nutraceuticals from natural resources [26-29]. However many herbal remedies used today have not undergone careful scientific assessment and some have the potential to cause serious toxic effects and major drug-to-drug interaction. Continuing research is necessary to elucidate the pharmacological activities of herbal remedies now being used to treat diabetes.

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