

Management of diabetes mellitus with medicinal plants

*Corresponding Author: **Muhammad Akram**

Email: makram_0451@hotmail.com

Muhammad Amjad Chishti¹; Muhammad Akram^{2*}; Surendar Rangasamy³; Francisco Garcia-Sierra⁴; Md Al Hasibuzzaman⁵; Fethi Ahmet Ozdemir⁶; Gawel Solowski⁶; Najmiatul Fitria⁷; Marcos Altable⁸; Mohamed M Hassan⁹; Adonis Sfera¹⁰

¹Faculty of Eastern Medicine, Hamdard University, Karachi, Pakistan.

²Department of Eastern Medicine, Government College University Faisalabad, Pakistan.

³Department of Community Medicine, Sri Venkateshwara Medical College Hospital & Research Centre (SVMCH&RC) Puducherry, India.

⁴Department of Cell Biology, Center of Research and Advanced Studies of the National Polytechnical Institute, Mexico City, Mexico.

⁵Department of Nutrition and Food Science, University of Dhaka, Dhaka 1000, Bangladesh.

⁶Department of Molecular Biology and Genetics, Faculty of Science and Art, Bingol University, Bingol, 1200, Türkiye.

⁷Department of Pharmacology and Clinical Pharmacy, Universitas Andalas, Indonesia.

⁸Department of Neurology, Neuroceuta, (Virgen de Africa Clinic), Spain.

⁹Department of Biology, College of Science, Taif University, P.O. Box 11099, Taif 21944, Saudi Arabia.

¹⁰Department of Psychiatry, Patton State Hospital, USA.

Abstract

Diabetes mellitus, additionally notorious as simple diabetes, be a metabolic condition that primarily influences the endocrine gland, where level of blood glucose are elevated for a more period of moment. The indications of this disease are excessive urination, enhanced desire to drink water. This disease influences a lot of 451 million people globally and in addition one of the foremost reasons of demise. In spite of the utilize of highly developed allopathic prescriptions designed for care, the utilize of medication obtained from natural sources is achieving greater significance. Natural plants have been extremely regarded a source of medicine in human history. They are commonly utilized nowadays to show that herbs are a rising element of up to date futuristic-medication. Preparations from herbs having actions against diabetic individuals are broadly developed marketability due to easily accessibility.

Introduction

Diabetes Mellitus is an endocrinological disease furthermore is a metabolic community heterogeneous affliction attributable to an irregularity in the secretion of insulin and insulin action or both. Insulin levels that are absent or decreased contribute to chronic abnormally high blood sugar and sensitivity of glucose [1,2].

According to a 2017 study by the International Diabetes Federation, 451 million peoples internationally are existing with diabetes, which are 693 million cases expected by 2045

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[3,4]. Symptoms such as polyuria, compensatory hunger and increased fluid consumption, exhaustion, weight loss, slow wound healing, blurred vision, increased appetite, tachycardia, hypotension and waste are also associated with this disease [5].

There is an increased prevalence of coronary, cerebrovascular, peripheral and arterial atherosclerotic diseases in patients with diabetes; chronic hyperglycaemia can also cause growth deficiency and vulnerability to certain infections [6]. Hypertension also coexists with diabetes and promotes progressive dam-

age to the kidneys [7]. Lipoprotein metabolism disorders are frequently observed in people with diabetes [8,9].

Blood sugar powerful can also alter if insulin manufacture and emission are changed by diseases. A decrease in the making of insulin can hinder the entrance of sugar into cells, consequence in hyperglycaemia. Inadequate use by the cells of pancreatic insulin often results in an irregular rise in the level of blood sugar. Blood glucose levels become unstable (hypoglycemia) when there is a rise in insulin secretion, when huge amount of sugar go into the cells and smallstays in the blood vessels [10].

Nowadays, various therapies are available, for instance insulin rehabilitation, treatment using pharmaceutical drugs and management through diet accessible for diabetes management [11,12]. Different side effects of synthetic drugs have been documented and there in vitro communications with every further necessity be taken into account by medical staff [13]. Despite the major advancements made in the treatment of diabetes over the previous three decades, the outcomes of management in enduring are still distant from optimal [14-23].

In current times, numerous *in vitro* and *in vivo* studies have displayed the anti-hyperglycaemic outcomes of garlic [24]. The consequences of garlic on many cardiovascular features and their unfavourable results were reviewed on forty five randomised testings were analysed and no upshots on glycaemic-associated conclusions were found in them. The instigators suggest upcoming studies with specific descriptions of ingredients and preparations, since there are wide differences of models (oil grind, aged allium and different types of fractions) and dosage (starting 10 mg to 10 g) in these clinical trials with mice. These results may play a significant responsibility in reducing the lipid outline of garlic, that would support the prospective for this diabetes management, but they should be seen in humans [25].

A trial of 72 diabetic female devoid of medicine treatment, split into 2 classes, selected the anti-diabetic properties of Aloe vera for 42 days. In the experimental phase, levels of blood sugar consequently declined from 250 mg to 141 mg/dL. In conjunction with standard oral antidiabetic therapy (25 mg oral glibenclamide), the identical investigate panel studied the upshots of aloe vera gel and the subjects obtained moreover aloe or placebo as mentioned over. The findings demonstrated comparable reductions in active blood sugar in the treatment category as illustrated in the initial report. These trials though were not randomised or blinded to either the patient or the researcher [26].

It is generally referred to as Gurrmaar that indicates 'destroyingsweetness' and comprises of the family unit of Asclepidaceae. Fraction of the leaf from *Gymnema Sylvestre* (3.4/13.4 mg/kg) demonstrated substantial diminutions in blood sugar intensities in rats caused by streptozotocin. It is largely employed for diabetes care in Indian ayurvedic medicines. In *Gymnema* the participating constituents' alkaloids, flavonoids, saponins and carbohydrates. It is also used to treat cancer, to treat inflammation and to treat different forms of microbial diseases [27-31].

Commonly referred to as Methi or Fenugreek seeds, it is present in Northern India as a natural herb and is also growing. In insulin-independent (type 1) diabetes patients, the upshot of fenugreek seeds on blood sugar and serum lipid outline has been documented. Before taking meal and after eating blood

sugar, somatostatin, insulin, glucagon, total cholesterol and triglycerides, and elevated HDL-cholesterol levels were decreased by handling of fat removing seeds (1.5-2.0 g/kg daily) to both regular and diabetic dogs. The seed fibre intake of Fenugreek decreases the absorption velocity of sugar and can holdup gastric emptying, thus avoiding blood sugar levels from increasing after a food. Seed fibre moreover promotes the burning of cellular glucose at high fibre diet insulin receptor sites [32,33]. The process of activity of methi seeds as an orally vigorous hypoglycemic result possibly will be arbitrated by motivating the production of insulin and/or by emission from Langerhans beta pancreatic cells. The therapeutic function of trigonella seed powder in type 1 diabetes is due to a shift in the activity of sugar and lipid metabolising enzymes to ordinary levels, therefore stabilising the liver and kidney homeostasis of glucose [34,35].

Commonly referred to as Cinnamon, it is harvested for two years by cultivating the tree and after that brushing it. They consist mostly of volatile, cinnamaldehyde-consisting oils. While evaluated through Area under the Curve (AUC) to oral sugar intake in addition to increased insulin sensitivity, cinnamon ingestion decreased total plasma glucose responses [36]. Therefore, *in vivo* glycaemic regulation along with insulin sensitivity in humans may be essential for supplementation with cinnamon furthermore they also become visible to be maintained for twelve hours. Cinnamon moreover substantially retarded gastric clearing and deeply reduced after taking meal glycaemic reaction devoid of any major impact on satiety as assessed by oral glucose intake Area Under the Curve (AUC) and improved insulin sensitivity [37,38].

A very boughed glabrous bush or little tree, harvested for its leaves, is commonly known as Henna or Mehndi, and is exhibited to comprise of different biological compounds for instance carbohydrates, fatty acids and proteins, phenolic compounds such as flavonoids, tannins, alkaloids, terpenoids. 70% ethanolic extract of *Lawsonia inermis* demonstrated important hypoglycaemic and hypolipidemic activity after oral administration in alloxan-induced diabetic mice [39]. Decreased to natural glucose, cholesterol and triglyceride concentrations were observed by feeding 0.8 g/kg extract of *Lawsonia inermis*. 95% methanolic *Lawsonia inermis* extract has been shown to have a major antihyperglycemic effect in vitro [40].

It is cultivated in warm and humid countryside of Asia, Africa and South America and is generally recognized as bitter melon, pungent gourd or karela. In creature investigational models in addition to clinical studies on human being, it is an extremely popular traditional medication for diabetes and lowering the blood glucose activity of juice of fresh karela or unripe outgrowth has been identified. Charantin, polypeptide-P and vicin are the key compounds extracted from this plant and known as hypoglycemic agents [41]. Several experiments have demonstrated hypoglycemic effects in different beast models using fruit squash, seed, and leaves with complete *Momordica charantia* plant extract [42]. Charantin alcohol-extracted from *Momordica charantia* is made up of combined steroids and was found in an animal experiment to be further active than the oral hypoglycemic mediator tolbutamide. Insulin-like polypeptide, polypeptide-P, parallel within form toward bovine insulin, is also present in bitter melon. While inserted subcutaneously into type 1 diabetic patient, it has been shown to diminish levels of blood glucose and tends to suppress generation of glucose by different compound and is suspected to enhance sugar patience in type II diabetes [43,44].

Just about two weeks subsequent to utilize of together extracts, blood glucose levels were usual. In comparison, no alterations in plasma insulin amounts in ordinary or streptozotocin diabetic rats were observed following treatment. The mechanisms of activity designed for these plants appear to be self-governing of the secretion of insulin. In fact, in diabetic STZ rats, the anti-hyperglycemic action of watery fractions from *Carum carvi* as well as *Capparis spinosa* occurs without affecting the concentration of basal plasma insulin [45].

Using STZ-induced diabetic rats, the lipid lowering and lowering blood glucose levelation of ethanolic extract from *Averrhoa bilimbi* (cucumber tree) leaves was examined. Diabetic rats were managed twice a day for two weeks by condensed water, ABE (125 mg/kg), or metformin (500 mg/kg). Like metformin, ABE substantially lowered the level of blood sugar by fifty percent and the level of triglyceride by 130 percent. However greatly reduced lipid peroxidation levels. Research has revealed that in STZ-induced diabetic rats, *Averrhoa bilimbi* has lowering glucose, lowering the level of triglyceride in blood, lipid lowering per oxidative and protection against atherogenesis actions [47].

Eugenia jambolana traditionally acknowledged as Jamun or Indian blackberry has been specified in Ayurveda, a very old method of *Indian* medication, for the management of Diabetes mellitus. In keeping toward its argued outcomes against diabetes in conventional medicine, *Eugenia jambolana* has been description to have lowering glucose upshots together in investigational models as well as clinical experiments [48].

Berberis vulgaris was investigated for its antihyperglycemic efficacy in streptozotocin-induced diabetic rats. B. study indicated that aqueous extract of *Berberis vulgaris* has significant antihyperglycemic potential [49].

A lowering blood sugar influence of the *Catharanthus roseus* methanol leaf extract in alloxan provoked diabetic mice. The blood glucose levels were considerably declined after evaluated by control mouse. The lowering blood sugar consequence of methanol fraction of *Catharanthus roseus* was more efficient than Glibenclamide as well as Metformin [50].

Bergenin outcome against diabetes commencing the cores of *Caesalpinia digyna* (*C. digyna*). The total cholesterol levels of plasma, triglycerides along with low density lipoprotein-C were extensively enhanced; while high density lipoprotein-C levels were considerably reduced in diabetic rodents when judge against to control. Following administration of bergenin 10 mg/kg the lipid outline were notably raised when evaluated with that of glibenclamide 10 mg/kg. The level of thiobarbituric acid relative substance was drastically elevated in diabetic rodent measure up to control rodent. The administration of bergenin 10 mg/kg notably raised the SOD and CAT correspondingly with decreased thiobarbituric acid relative substance level. Bergenin is awfully excellent activity for management of diabetes [51].

There is also prospective against diabetes in *Semen litchi*, a traditional therapeutic plant utilized by the people of China. The concentration of aqueous seeds from *Semen litchi* in the diabetic rat model provokes a decline in insulin resistance [52]. The *Juglans regia* leaves are utilized for the management of diabetes mellitus and high levels of glucose in conventional remedy in Iran, and the lipid outline capability was evaluated in sixty one type 2 diabetes mellitus individuals [53-59].

Conclusion

The most widespread endocrine condition in millions of community globally is diabetes mellitus. Rising resistance and inhabitants of patients at several dangers, together with the limited quantity of commercially obtainable diabetes drugs which have still numerous adverse outcomes and problems such as unexpected hypoglycaemic outcomes are reason for investigation to move into conventionally accessible medications with little adverse consequences and a broad series of organic activities. From this appraisal manuscript the advancement of evidence-based alternative medicine to treat the multiple forms of diabetes issue will benefit health care practitioners, scientists and researchers. Segregated substances and extracts from various biological resources participate a major function in the production of medicines and in the treatment of diabetes mellitus as well as hyperglycaemic problem.

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