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Diabetes: An Ayurvedic Perspective



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“The doctors of the future will give no medicine but will instruct his patients the care of the human frame, in diet and in the cause of prevention of disease.” Thomas Edison

In modern society, diabetes mellitus remains a challenge to countless people around the world. Despite innumerable advances in medical science, the global medical community has been met with minimal success in its fight to eradicate diabetes. Statistically, a gloomy picture has been painted due to its epidemic status combined with the unsuccessful attempts to cure this disorder. For instance, The World Health Organization (WHO) projects a sixty-four percent increase in diabetes in the United States alone and in developing countries, such as India, are projected to face a massive increase in the number of diabetes cases by as much as one hundred seventy percent by 2025. ⁱ

Despite the fact that scholars and medical personnel have established remarkable initiatives to tackle the disease, key facts from the World Health Organization state that the global prevalence of diabetes has increased considerably from 1980 to 2014 with the number of cases in 1980 being 108 million rising to 422 million in 2014. Diabetes mellitus cases almost doubled from 4.7% in 1980 to 8.5% in 2014 in adults over 18 years of ageⁱⁱ.

Diabetes Mellitus has gained negative recognition as one of the world's largest silent killer diseases. WHO projects diabetes will be the seventh leading cause of death in 2030ⁱⁱⁱ

Several kinds of literature trace the history of diabetes back to 1000 BC.^{iv} Ayurvedic research is one such vital source of information that furnishes the readers with descriptions of the disorder and its management. Sushruta Samhita^v (1000-600BC) and Caraka Samhita^{vi} (1000BC) attributed madhu meha (diabetes) to increased cases of frequent urination by individuals with this disease. According to Srikanth^{vii}, the mentioned urine exhibited a sweet taste, a sign of the presence of glucose in its contents. Ayurveda sites the causation of diabetes as a factor contributing to the multi-factorial etiology of the disease. The literature further classifies the medical condition among the eight major diseases that are not only refractory, but also pose challenges in treatment. Several factors, including lifestyle, environment, genetic (karmic), and dietary are habitually at the root of diabetes.

Diabetes Mellitus is a medical condition that is characterized by the body's inability to regulate its blood glucose levels resulting in hyperglycemia. This malfunction is often due to a faulty mechanism within the pancreas; thus, rendering its inability to produce adequate amounts of the hormone insulin. The challenge with this disorder is the inability to diagnose and treat it at an early stage where medical management can prolong or even detour the numerous complications that accompany this disease. However, Ayurveda's treatment strategy provides effective prevention, management, and even remission from certain forms of this disorder. This paper's focus is to pose a comparative analysis between Ayurvedic treatment strategies and the western medical model for Diabetes Mellitus by examining relevant scholarly and peer reviewed literature.

There are two types of diabetes recognized in the U.S. today: Type I (madhu meha) or insulin dependent (IDMM) and Type II (Iksu meha) or non-insulin dependent (NIDDM). Type 1 diabetes mellitus affects approximately 10% of the individuals diagnosed with diabetes^{viii}. Both western and Ayurvedic medicine believe that this type of diabetes is incurable, but manageable through proper treatment. Pathogenesis of Type I diabetes, from the Western perspective, is believed to be a culmination of lymphatic penetration resulting in the destruction or breakdown of the insulin secreting beta cells that are housed in the islets of Langerhans (pancreas). After sufficient loss of these beta cells in the pancreas, homeostasis in the blood glucose levels are unobtainable and hyperglycemia ensues. The negative feedback loop within the liver monitoring glucose levels recognizes the high level of sugar and incorporates the assistance of the urinary and endocrine systems. These systems assist the liver and try to help remove the toxic levels of sugar in the blood stream. As a result, the individual tends to urinate more frequently and exhibits increased sweating. Patients in this catabolic state are usually diagnosed with diabetes requiring insulin to normalize glucose, lower hyperglucogonia, and regulate protein and lipid digestion. Curious enough, it has been noted in studies that Type I diabetes tends to be a co-occurring disorder^{ix}. Often, persons living with diabetes will suffer with other auto-immune disorders such as vitiligo, hypothyroidism, graves disease, hashimoto thyroiditis, and Addisons disease. Mukherjee & Wahile 2006 attribute diabetes mellitus to environmental factors such as viruses that prompt the body's white blood cells to seek and destroy the insulin producing beta cells^x. This could be the link

between diabetes and the other types of auto-immune disorders that appear to occur around the same timeframe of diabetes within the individual.

Both western medicine and Ayurveda believe that Type I diabetes must be treated with insulin injections, dietary changes and implementation of an exercise regimen. The standard for western medicine treatment for individuals with Type I diabetes requires scheduled injections to help moderate their glucose levels. Each injection of insulin is determined by a sliding scale. This scale takes into account the person's age, diet, activity level and sensitivity to the insulin. Western medicine's unfortunate belief of 'one size fits all' dietary guideline does not take into account the quality of food nor the person's size and dosha (mind-body type).

This is the point where Ayurvedic treatment stands out from western medicine. From an Ayurvedic perspective, this form of diabetes is also incurable. However, Ayurveda sees the causation of the disease as a vata-vitiating lifestyle. This means that the individual has depleted their system from too little sleep, too much worry and stress with a possible genetic (karmic) connection. The symptoms are similar to western medicine but can also include complications due to candida, ulcerations, diabetic neuropathy (which can cause proprioception) difficulty, frequent nausea or vomiting and a fruity odor emanating from one's breath. (Halpern 1995). There are three main prognoses in Ayurveda, as described by Gogte; they are sadva (curable), yasya (palliable) and asadhya (incurable). Gogte explains that patients under sadva have received a diagnosis of this disorder at an early stage and also those who are obese. Their medical

condition is curable unlike yasya, which is set apart by the palliative management of prameha (diabetes). Asadhya, on the other hand, involves the hereditary and the incurable form of prameha^{xi}.

Although several schools of thought have concluded madhu meha is a difficult to treat concept, Ayurveda provides a large array of recommended actions on how to manage the disease. This differs from other modalities that perceive diabetes may only be regulated through dietary and exercise factors. This is an empowering concept in that it enables the individual to take charge and manage multiple areas of their life, rather than focusing on the disorder. Ayurveda provides a treatment agenda that actively engages the individual to participate in their own healing. The goal is to balance the individual's dosha (mind-body type) which will help eliminate additional stressors on the body and person, enabling them to focus on returning to health. Another significant difference between conventional medical therapy for the treatment of diabetes mellitus and the Ayurvedic regimen is visible in the handling of the complications that accompany this disorder. It is accepted in the medical model community that diabetes mellitus can cause numerous complications, including blindness, kidney failure, heart attacks, stroke and lower limb amputations.^{xii} Conventional medicine tends to focus on the acute or immediate issue of reduction of the blood glucose, whereas Ayurveda's primary focus is geared towards the chronic issues that lead up to the disease and treat the complications independently.

In Gogte's book he organizes the principles of treatment of diabetes into four groups: Midana privarjana (avoidance of etiological factors), aahara (diet), vihava (lifestyle modification), and aushuda (medical management). The author also highlights the corresponding advocacy measures to the principles mentioned above. For instance, such activities like that of the faulty dietary habits and lifestyle, working at night, day sleep and mental stress may play a critical role in setting the stage for the onset of madha meha.^{xiii} In addition, Ayurvedic treatment strategy advocates aasanas (yoga & exercise) as a means of virhara (lifestyle modification) as mentioned earlier. Ayurveda's treatment plan for madha mehu primarily focuses on the palliative care, as it is generally accepted that there is not a reliable cure for Type I diabetes. For this reason, Ayurveda believes the individual should consider a dual approach to treatment. While western medicine will assist in the management of the acute symptoms of the disease, Ayurveda manages the more chronic symptoms of diabetes as well as the potential causes of the disease. This approach often minimizes the level of insulin needed for the individual to maintain homeostatis. From an Ayurveda standpoint, a general recommendation for madhu meha, is a vata pacifying lifestyle. This lifestyle helps to reduce the overall stress in the individual participating in relaxing activities such as meditation, yoga, art therapy, along with finding daily routines to help regulate fluctuation, which lowers stress leading to more stabilized blood glucose levels.

Ayurvedic belief is that all disease and curative abilities begin in the digestive system; therefore, diabetic patients should consider their food choices as a priority as it is

a key component in the Ayurveda protocol. According to Ayurveda dietary guidelines, the use of barely is one of the most beneficial foods for the person with diabetes mellitus. Srikanth states that barely can be consumed in whichever form the individual prefers, and that chick pea (Bengal gram) is also another highly-preferred food for the diabetic client.^{xiv} This diabetic individual should rely on grains such as oriza, sativa, kodgrave and godham as a main staple in their diet as well. In addition, the consumption of legumes such as kalatta (horse grain), adhaki (red grain), mudga (green grain) in combination with astringent and bitter vegetables are all key to the overall diet (Srikanth)^{xv}. Vegetables are also considered a vital component in the diet of a diabetic patient undergoing Ayurvedic treatment. Other endorsed foods include green bananas and bitter vegetables as these help to improve overall liver functions while maintaining a relatively low glucose content. All foods should be organic, whole and fresh. Avoidance of processed, canned or fast food should be avoided entirely.

In addition to dietary guidelines for the patient, Ayurveda also outlines the use of endocrine tonics and blood sugar reducing herbs. The practitioner may prescribe a single herb or herbs as a compound that are formulated to treat diabetic patient. For example, single herbal drugs may include shalajit amalaki, meshashringi and karvella. A compound formulation may consist of nishanalaki churna, vanga bhasma, machumehari vati and katakakhadiradi kashayam.^{xvi} What makes herbal remedies stand out to the public is that they maintain their effectiveness while having fewer side effects than their pharmaceutical

counterparts. Additionally, they tend to work with the body as an assist in regulation whereas the pharmaceuticals tend to override and drown out the body's natural signals.

The second type of diabetes mellitus is called Type II or non-insulin dependent diabetes mellitus (NIDDM) or Iksu meha. Globally, the prevalence of obesity among individuals has set the stage for the rapid increase of Type II (Iksu meha) diabetes. It is estimated that ninety percent of all diagnosed cases of diabetes are Type II^{xvii}. Western medicine considers Type II, NIDDM, to be caused by the lack of insulin responsiveness in an individual. Due to the progressive nature of the disease, it is often necessary to transition patients with Type II diabetes to insulin.

The causal factors for diabetes mellitus are either a result of malfunction in the hormone that moves the glucose into the cells (insulin) or an inadequate amount of insulin produced. Treatment from a western perspective is to regulate diet, exercise and administer oral medications, typically Metformin. Type II diabetes from a western perspective is considered a non-curable, progressive disease especially if the individual has undergone prolonged therapy.

In Iksu meha (Type II) diabetes, Ayurveda believes the etiology factors are similar but differ in prognosis. Iksu meha is seen as a buildup of ama or toxins in the body, specifically at the receptor sites. This buildup of ama occludes the liver cells disabling the hormone's ability to pass through the cell and perform its specific metabolic action.^{xviii} From an Ayurvedic point of view, diabetes, Type II, is a direct result of improper eating

habits that lead to a buildup of ama and medas dhatu (fat), poor lifestyle choices and lack of exercise. Due to this belief, Ayurveda's primary practice for treating Type II diabetes mellitus places emphasis on the removal of the poor dietary and improved lifestyle choices. Often Ayurveda doctors and practitioners will prescribe panchakarma (Ayurveda's primary purification and detoxification treatment) to remove the excess ama (toxins), provide a jumpstart to weight loss, and help to clear the receptors to potentially enable the liver to receive the initiation message to break down the sugar and process it.

With a multi-modality approach, the Ayurveda treatment regimen has often proved successful. A study carried out by Sri Kanthet^{xix} to ascertain the efficacy of certain Ayurvedic plant medicines in the treatment of diabetes mellitus reported positive results. The study engaged 862 cases of diabetes to assess the effectiveness of four types of Ayurvedic drugs between 1998 and 2007 at the Central Council for Research in Ayurvedic Sciences (CCRAS). According to the data, 67.61 percent responded to the treatment with jamun and karalla seed extracts, while 53.21 percent responded favorably when given nisha amalaki churna coupled with yoga and meditation. Further reports stated there was a 61.73 percent positive response when the subject group participated in AYUSH oriented therapy (Ayurveda, yoga, naturopathy, unani, siddha, homeopathy) interventions. The results of this study on the efficacy of Ayurvedic interventions affirm the value in the mediums and modalities used in the formulas in treating persons with diabetes. The Ayurvedic regimen presents a varied treatment approach from the biomedical practice in

an assortment of ways. In addition to prescribing herbal drugs, Ayurveda also prioritizes changes in lifestyle accompanied with proper dietary intake. More importantly, it takes a holistic perspective by addressing the person as a whole, not just the disorder and all the associated complications of the disorder in the treatment plan. This is the distinctive nature of Ayurvedic therapy.

As mentioned, Ayurvedic treatment program requires a holistic approach, an issue that forms the backbone, or basis of its strength. However, such holistic approaches in the medical field present enormous challenges. For instance, Srikanth establishes that the complex approaches and diverse concepts in diagnosis, clinical trials, therapeutic interventions, assessments of the treatment drugs may present issues in research^{xx}. In this respect, there is a need to adopt a sound and suitable model that addresses the limitations mentioned above in the attempt to design research plans that restore the core aspects of Ayurvedic strategy. There is also a dire need for the implementation of a well-designed experimental research to authenticate the biological processes, safety, action plans, along with safety of the treatment to avail concrete evidence for the pursuance of a clinical study. Mukherjee and Wahile conclude that such a clinical research plan characterized by scientific parameters, sound research approaches, and plans is likely to improve the translational value of the model^{xxi}.

Diabetes Mellitus has continued to prevail in the global arena as one of the refractory lifestyle disorders despite the efforts to suppress its prevalence. Proponents in the medical community have adopted a bio-medical model that emphasizes scientific tools to pinpoint the causal factors of the illness and management options. The medical approach has also the ability to identify certain aspects of genetic makeup that choreograph or detect the disease onset, along with introducing therapeutic initiatives. On the contrary Ayurveda presents as a completely different approach in addressing diabetes mellitus. Ayurveda, not only utilizes medicines, but also emphasizes proper diet, pursuance of exercise, healthy lifestyle choices, among everyone as a preventative model. As mentioned, efforts are underway to generate evidence on the efficacy of the approach in addition to ascertain the extent of the use of Ayurveda as a standalone therapy for patients with diabetes mellitus. The pursuance of clinical studies with diverse evaluation criteria and broader objectives is key in generating substantial evidence on the effectiveness and efficacy of the Ayurvedic treatment protocols along with the extent of its use. Medical management is a complex and evolving science. Ayurveda is the oldest practiced medical science known to man, and it has proven itself as a foundational practice in holistic medicine, disease prevention and in the art of healing and healthy living. Unlike modern medicine which can mask an illnesses symptom with the use of pharmaceuticals, Ayurveda truly supports the person in being responsible for their health. Through the varied, and more importantly, specific treatment recommendations of herbal medicines,

diet, and lifestyle changes Ayurveda focuses on getting to the root cause of the disease and not just treatment of the symptoms.

Abstract

Srikanth

Diabetes mellitus (madhumeha) is one amongst the refractory disease conditions recognized by medical scholars of ancient India. Ayurvedic literatures vividly describe about the etiology, pathogenesis, prognosis, complications, its management and scientifically attributed the causal relationship of dietary, lifestyle, environmental and genetic factors. The treatment modalities are designed and recommended based on type and stage of disease. Furthermore many classical references to use dosage forms of single plant drugs and compound formulations, which are vogue in clinical practice call for further scientific validation for their attributes, principles and extent of use. Despite of recent progression in medical science, several challenges still exist in the management of diabetes that requires special attention to develop un- explored fields of medical knowledge. Ayurveda offers comprehensive, safe and effective approaches to manage such conditions. Designing pertinent research model is a key challenge behind the examination of Safety and efficacy of Ayurvedic interventions satisfying its fundamental principles and systems approach. Despite of challenges and constrains, some experimental and clinical studies on Ayurvedic approaches and therapies provide scientific evidence on efficacy and safety.

Murkherjee

Biodiversity of natural resources has served not only for the primary human needs but also for health care, since time immemorial. The Indian subcontinent, with the history of one of the oldest civilization, harbors many traditional health care systems. Their development was supported by the diverse biodiversity in flora and fauna due to variations in geographical landscaping. Ayurveda, whose history goes back to 5000 b.c., is one of the ancient health care systems. The Ayurveda was developed through daily life experiences with the mutual relationship between mankind and nature. The ancient text of Ayurveda reports more than 2000 plant species for their therapeutic potentials. Besides Ayurveda, other traditional and folklore systems of health care were developed in the different time periods in Indian subcontinent, where more than 7500 plant species were used. According to a WHO estimate, about 80% of the world population relies on traditional systems of medicines for primary health care, where plants form the dominant component over other natural resources. Renewed interest of developing as well as developed countries in the natural resources has opened new horizons for the exploration of natural sources with the perspectives of safety and efficacy. The development of these traditional systems of medicines with the perspectives of safety, efficacy and quality will help not only to preserve this traditional heritage but also to rationalize the use of natural products in the health care. Until recent past, the nature was considered as a compendium for templates of new chemical entities (NCEs). The plant species mentioned in the ancient texts of these Ayurveda and other Indian systems of medicines may be explored with the modern scientific approaches for better leads in the health care.

Bhavapria

Aavirai Kudineer (AK) is an herbal decoction of seven botanical drugs, cited in the Gunapadam; a Tamil Siddha medical text. The anti-diabetic efficacy of this formulation was evaluated using alloxan-induced diabetic and normal rats. Glucose tolerance was observed within 1 hr in AK-treated

rats (10 ml/kg body) as compared to control. A significant decrease in the severe hyperglycemia characteristic of alloxan diabetes was noted after 15 days of AK treatment. Further AK treatment reversed the elevated urea, creatinine, cholesterol and decreased protein values to near normal levels. Assay of glycogen content and chief carbohydrate-metabolizing enzymes, viz. hexokinase, glucose-6-phosphatase and fructose 1,6 diphosphatase in the liver of diabetic and AK-treated diabetic rats clearly ascertains the hypoglycemic efficacy of this formulation. The mode of action of this herbal formulation remains to be elucidated.

Kurivan

OBJECTIVE: *Coccinia indica* (synonym *Coccinia cordifolia*), an herb growing abundantly in India, has been used in traditional treatment of diabetes. However, carefully controlled studies of its efficacy are lacking. This study aimed to evaluate the effectiveness of *Coccinia cordifolia* on blood glucose levels of incident type 2 diabetic patients requiring only dietary or lifestyle modifications.

RESEARCH DESIGN AND METHODS: The study was a double-blind, placebo-controlled, randomized trial. Sixty incident type 2 diabetic subjects (aged 35-60 years) were recruited from St. Johns Medical College Hospital, Bangalore, India. The subjects were randomly assigned into the placebo or experimental group and were provided with 1 g alcoholic extract of the herb for 90 days. Anthropometric, biochemical, dietary, and physical activity assessment were carried out at baseline and were repeated at days 45 and 90 of the study. All subjects were provided with standard dietary and physical activity advice for blood sugar control.

RESULTS: There was a significant decrease in the fasting, postprandial blood glucose and A1C of the experimental group compared with that of the placebo group. The fasting and postprandial blood glucose levels of the experimental group at day 90 significantly decreased, by 16 and 18%, respectively. There were no significant changes observed in the serum lipid levels.

CONCLUSIONS: This study suggests that *Coccinia cordifolia* extract has a potential hypoglycemic action in patients with mild diabetes. However, further studies are needed to elucidate mechanisms of action.

Antidiabetic activity of Chandraprabha vati - A classical Ayurvedic formulation.

Wanjari MM¹, Mishra S², Dey YN³, Sharma D³, Gaidhani SN⁴, Jadhav AD³.

BACKGROUND: Chandraprabha vati is a classical Ayurvedic formulation, markedly used for mitigation of Prameha, which correlates in many ways with obesity, metabolic syndrome and diabetes mellitus. **METHODS:** Antidiabetic effect of Chandraprabha vati was studied in fifty five Wistar rats. Graded doses of Chandraprabha vati (50, 100 and 200 mg/kg) were administered orally for 7 days to normal and alloxan-hyperglycemic rats (65 mg/kg, intravenously), and to glucose loaded normal rats for oral glucose tolerance test (OGTT). Fasting plasma glucose levels were assessed on different time intervals along with plasma cholesterol and triglycerides. Metformin (500 mg/kg, orally) was used as standard drug. **RESULTS:** Chandraprabha vati did not cause any significant reduction in plasma glucose levels of normal rats ($p > 0.05$) but normalized the impaired glucose tolerance at 60 and 120 min ($p < 0.05$ - $p < 0.001$) in OGTT when compared to vehicle control. In alloxan-hyperglycemic rats, administration of Chandraprabha

vati(200 mg/kg) significantly reduced plasma glucose at 3 h, 12 h, 3rd day and 7th day ($p < 0.01$ - $p < 0.001$) along with reduction in cholesterol and triglycerides levels ($p < 0.01$ - $p < 0.001$) when compared to diabetic control group. The effects were comparable with metformin. **CONCLUSIONS:** Chandraprabha vati exhibited anti-hyperglycemic effect and attenuated alterations in lipid profile. The results support the use of Chandraprabha vati for correction of Prameha in clinical practice.

Endnotes

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