WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 15, 1400-1406. Review Article ISSN 2277– 7105

USE OF TRADITIONAL HERBS ON PRAMEHA (TYPE 2 DIABETES MELLITUS) AS DIETARY SUPPLEMENT: A CRITICAL REVIEW

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Article Received on
16 October 2020,

Revised on 06 Nov. 2020,
Accepted on 26 Nov. 2020

DOI: 10.20959/wjpr202015-19359

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ABSTRACT

Diabetes mellitus (DM) is one of the oldest known human disease currently affecting more than 200 million people worldwide. Diabetes mellitus is derived from two Greek words meaning siphon and sugar. The disease is classified into type 1 and type 2 DM. In DM, patients have high blood level of glucose. This occurs due to production of inadequate amount of insulin or the insulin which is produced does not work efficiently. This is called as type 2 DM. The cause of Type 2 DM is life style habits including unhealthy diet, obesity, lack of exercise, hereditary and environmental factors. If left untreated, DM can result in severe long-term complications such as kidney and heart failure, stroke, blindness, nerve damage, exocrine glands insufficiency and other forms of complications. T2DM can be treated and controlled by prescribed drugs, regular exercise, diet (including some plant-based food) and general change in life style habits. Ayurveda has concern with the herbs acting on *Prameha* (T2DM) since long years ago. *Yava* (Barley), *Karvellaka* (Bitter guard), *Rasone* (Garlic) and *Karkotaki* (Spiny guard) seen to be effective in *Prameha*. This review is concerned with the role of plant-based food as dietary supplement to treat Type 2 DM. Also, this review examines how the herbs show their anti-diabetic (hypoglycaemic) action and by various mechanisms they exert their beneficial effects in controlling and treating DM.

KEYWORDS: Type 2 Diabetes Mellitus, Prameha, Dietary Supplement, *Yava* (Barley), *Karvellaka* (Bitter guard), *Rasone* (Garlic) and *Karkotaki* (Spiny guard).

INTRODUCTION

Diabetes Mellitus refers to a group of chronic metabolic disease which is becoming a common disorder which has serious threat to public health in the world. As per WHO, Diabetes Mellitus is defined as a heterogenous metabolic disorder characterised by common feature of chronic hyperglycaemia with disturbance of Carbohydrate, fat and Protein metabolism.

Diabetes Mellitus is classified into two types- Type 1 DM and type 2 DM. Type 1 DM is called as juvenile diabetes and it constitutes about 10% cases of DM. Type 2DM comprises about 80% cases of DM. It occurs due to either a delayed insulin secretion relative to glucose load (impaired insulin secretion) or the peripheral tissue unable to respond to insulin (Insulin Resistance). The dietary habits, obesity, lack of exercise and sedentary life style are major factors for rapidly rising incidence of DM among developing countries.[1]

Globally, Type 2 DM is at present one of the most common disease and its level are progressively on the rise. If DM left untreated, it can result in severe long-term complications such as kidney and heart failure, stroke, blindness, nerve damage, exocrine glands insufficiency and other forms of complications.[1]

India has an estimated 77 million people with diabetes, which makes it the second most affected in the world.[2] The prevalence of diabetes in the population is 8.9% according to International Diabetes Federation (IDF).[3] According to the 2019 National Diabetes and Diabetic Retinopathy survey report released by the Ministry of Health and Family Welfare, the prevalence was found to be 11.8% in people over the age of 50.[4] Type 2 DM was long regarded as an exclusively adult disease, but in parallel with the rise in childhood obesity, there has been an alarming emergence of youth onset Type 2 DM.[5]

In the present era, People are taking only medicine on the regular basis for treating Diabetes Mellitus and also facing their side effects. As diabetes mellitus is a metabolic disease, Medical nutrition therapy is important in preventing diabetes, managing existing diabetes and preventing or slowing the onset of diabetes complications.[5] Also, many researches have shown that nutrition therapy of herbs can significantly decrease glycated haemoglobin in type 2 diabetes mellitus within 3 to 6 months.[6,7]

In Ayurveda, Diabetes Mellitus can be correlate with the *Roga Prameha*. In Traditional medicine of India, different harbs with its different parts are been used since thousands of years to treat *Prameha*. Also, these plants are grown in tropical countries worldwide and all over India. In Ayurveda classical text, so many herbs are described which are effective in *Prameha* (Type 2 Diabetes Mellitus). Out of these *Karvellaka* (bitter guard), *Yava* (barley), *Rasone* (Garlic) and *Karkotaki* (spiny guard) have better effect on *Prameha* and their nutritive value supports to control it.

Healthy and herbal eating practices and diabetic management with nutritional approach would serve as an adjuvant therapeutic tool and will benefit the diabetic community.[8] Therefore, the further study is planned to through study of herbs and to find out the mechanism of action of these herbs in management of type 2 diabetes mellitus. Also, this review examines how the nutritional dietetics act in preventing and treating Diabetes Mellitus.

MATERIAL AND METHOD

A systematic research was made through the medical database using keywords Type 2 Diabetes Mellitus, Hordeum Vulgare (Barley), Momordica Charantia (Bitter guard), Allium Sativum (Garlic), Momordica Dioica (Spiny guard) and dietary Supplement. Also, literature was collected from various Samhita and their commentaries, medical journal, newspaper, articles, etc.

prameha

According to Acharya *Charaka, Prameha* is *Tridoshaja vyadhi* occurred due to vitiation of all three *Doshas (Vata, Pitta, Kapha*) but the principal *Dosha* is *Kapha*.[9] The causes of *Prameha* are Sedentary life style, excessive sleep, lack of exercise and heavy meal (food having *Guru Guna* like curd, new grains, sweets and excessive non-veg) which vitiates *Kapha Dosha*.[10]

Diabetes mellitus – Nutrition & Dietetics

The fundamental principle of dietary control in diabetes is to give the individual only the necessary calories according to body's daily requirement. It may be vary from each patient. Reduction of body weight alone results in better functioning of beta cells and increased sensitivity to insulin action.

General principles of diet planning

- Carbohydrate should provide 40-50% of total energy in which simple carbohydrate should be more.
- Fats should fulfil 25-35%of total energy intake which mainly contain saturated fatty acids.
- Diabetics must consume 20-35 gm of fibre daily. Diet high in soluble fibre helps to reduce serum glucose level. It should de gradually increased maximum of 50gm per day. It also helps to reduce body weight.
- One should take food having low glycaemic index.[11]

Herbs & Its properties

Table 1: Herbs acting on *Pramrha* (Type 2 DM) & its properties.

Herb Name/ Properties	*Yava* (Barley)	*Karvellaka* (Bitter Guard)	*Rasone* (Garlic	*Karkotaki* (Spiny Guard)
Latin Name	Hordeum Vulgare	Momordica Charantia	Allium Sativum	Momordica Dioica
Rasa	*Kshaya, Madhura*	*Tikta, Katu*	*Katu, Madhura*	*Tikta, Madhura*
Guna	*Ruksha, Shita*	*Laghu, Shita*	*Tikshana, Sara*	*Laghu*
Veerya	*Shita*	*Shita*	*Ushna*	
Vipaka	*Katu*	*Katu*	*Katu*	
Doshaghnata	*Kapha Vata Shamaka*	*Vatavardhaka*	*Kapha Vata Shamaka*	*Tridosha Shamaka*
Rogaghnata	*Prameha*[12]	*Prameha*[14]	*Prameha*[16]	*Prameha*
Chemical composition	ß-glucan (Soluble fibre)[13]	Glucosides, Polypeptide- p[15]	Allin, Allicin[17]	
Part used	Fruit (Seed)	Fruit	Tuber	Fruit[18]

Nutritive value of food

Table 2: Nutritive value of herbs.

Herbs	**Carbohydrateg**	**Proteing**	**Fatg**	**Fibreg**
Yava (Oatmeal)	62.8	13.6	7.6	3.5
Karvellaka (Bitter Guard)	4.2	1.6	0.2	0.8[19]
Rasone (Garlic)	16.3	7.9	0.6	5.5[20]
Karkotaki (Spiny Guard)	7.7	3.1	3.1	3.0[21]

DISCUSSION

The herbs *Yava, Karvellaka, Rasone and Karkotaki* have *Katu, Tikta* and Madhura Rasa, *Katu Vipaka* and *Kapha Vata Samaka Doshaghnata* which are perfect combination for s*hamana* of *Kapha Dosha.* The *Laghu* and *Ruksha Guna* of these herbs are opposite to *Guna* of *Kapha Dosha.* This proves the mechanism of action of traditional herbs on *Prameha.*

ß-glucan is soluble fibre present in Barley, form gel like substance when mixed with water, resulting in viscous gastro-intestinal contents and reduce the rate of Gastric emptying and carbohydrate absorption.[22,23] Also, Barley is classified as Lowest Glycaemic Index (40) of the food grain which reduces the need of antihyperglycemic drugs.[24,25]

Polypeptide-p (an insulin analogue) is a glucoside present in *karavellaka* responsible for anti-diabetic activity. [26] Also Momordica Charantia and its extracts stimulate glucose uptake into skeletal muscle just like insulin and regulate glucose metabolism in body.[27]

Garlic Supplements in food inhibits the alpha glucosidase enzyme that is involved in the metabolism of sugars and reduces the blood glucose in Diabetic people.[28] The sulphur compound Allicin present in garlic prevent insulin inactivation in body.[17]

Fruit extract of *Karkotaki* (Spiny Guard) show a significant anti-diabetic activity by maintaining blood glucose level. This is the animal Experimental study and human trials are still remaining.[29]

CONCLOSION

Diabetes Mellitus is a Metabolic Syndrome, it can be kept well under control by proper nutritional supplements and awareness about its complications. For a diet in diabetes high Glycaemic Index carbohydrate should be replaced with low Glycaemic Index carbohydrate. Whole grain and high fibre intake are inversely proportional with insulin resistance. Therefore, people may get benefit in controlling diabetes with more dietary fibre food supplements than it recommended for general population. In this way, *Yava, Karvellaka, Rasone* and *Karkotaki* remain helpful in controlling *Prameha* (type 2 DM). Hence, it is strongly recommendation to use these traditional herbs in the form of any food recopies to get rid of type 2 Diabetes Mellitus.

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