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ANALYTICAL REVIEW OF YOGA AND PRANAYAMA IN DIABETES MELLITUS

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ABSTRACT

Diabetes Mellitus is a disease related to the impaired glucose tolerance of the body, substantially insulin functioning is affected. Type 1 diabetes is difficult to treat with Yoga. Whereas, Type 2 diabetes which is caused by disarranged life style, stress related diseases can be effectively treated with Yoga. Yoga is basically restraint of activities of mind. It helps maintain health in a person by keeping the individual's body, mind and spirit in perfect equilibrium with nature. Various *Asanas* in Yoga stimulates the organs which in turn improves the metabolic activities. This means that the chemical transformations within a cell are carried out more efficiently. The various trials have reported a general beneficial effect of yoga in diabetic patients. These effects were most prominent in FPG levels and lipid profiles. Certain long-term parameter, such as HbA1c was reported to improve slightly with the practice of yoga. It has been seen that Nerve conduction velocity is increased by Yoga. Thus improving blood supply to muscle and increasing muscular receptor activity. While a few *Asanas* help balance the functioning of the endocrine system. It massages and tones the abdominal organs like pancreas and liver, stimulate the nervous and circulatory system which in turn helps in controlling diabetes. Yoga *pranayamas* help us to control our breath and through this breath control to attain the mental poise or *samatvam* (*Bhagvat Gita*). Thus Yoga lessens the negative impact of stress and promotes multiple positive downstream effects on metabolic function, neuroendocrine status and various vascular complications.

KEYWORDS: Diabetes Mellitus, Yoga, *Pranayama*, Stress.

INTRODUCTION

Diabetes mellitus (DM) commonly referred to as diabetes is, a group of metabolic diseases characterized by high levels of blood glucose with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin production, insulin action, or both over a long period of time.[1] The prevalence of diabetes is on the rise, more alarmingly in the developing nations. Ranked 8th among leading causes of death,[2] it has been rated third when all its fatal complications are taken into account. Besides multiplying the risks for coronary heart disease, diabetes enhances the incidence of cerebrovascular strokes. Moreover, it is the leading cause of acquired blindness and accounts for over 25 percent of cases with end-stage renal failure (ESRD) as well as 50 percent of non-traumatic lower limb amputations.[3]

As of 2016, 422 million people have diabetes worldwide, up from an estimated 382 million people in 2013 and from 108 million in 1980. Accounting for the shifting age structure of the global population, the prevalence of diabetes is 8.5% among adults, nearly double the rate of 4.7% in 1980. Type2 DM makes up about 90% of the cases. Some data indicate rates are roughly equal in women and men, but male excess in diabetes has been found in many populations with higher type 2 incidence, possibly due to sex-related differences in insulin sensitivity, consequences of obesity and regional body fat deposition, and other contributing factors such as high blood pressure, tobacco smoking, and alcohol intake.[4]

Now, as per Ayurvedic point of view Diabetes is a disease which is caused due to *Nidana Sevana* that simultaneous vitiates all the 3 *doshas* and gives rise to 20 types of *Prameha*, in which there is mainly aggravation of *Kapha* and vitiation of *Meda Dhatu* in the body. All causative factors described in Ayurvedic classics prove that it is a life style disorder and which may have a genetic predisposition.[5]

आस्यासुखं स्वप्नसुखं दधीनि ग्राम्यौदकानूपरसाः पयांसि ।
नवान्नपानं गुडवैकृतं च प्रमेहहेतुः कफकृच्च सर्वम् ।। च. चि. (६/४)

A number of lifestyle factors are known to be important for the development of type 2 Diabetes. In one study, those who had high levels of physical activity, a healthy diet, did not smoke, and consumed alcohol in moderation had an 82% lower rate of Diabetes. Obesity has been found to contribute to approximately 55% type II Diabetes. Also *Acharya Charaka* says regular bathing and walk will help in reducing the probability of occurrence of *Madhumeha*.[6] Further elaborating the fact he claimed that *Sthaulya* (obesity) and *Karsha* (Emaciation) both are dependent on two factors mainly i.e. food habits and sleep of the individual. As the matter of fact it is already proved that obesity leads to *Madhumeha*.[7]

According to *Acharya Charak Vyayam, Upwas, Dhoompan* and *swedan* like activities are beneficial for *Prameh* patient.[8] *Pathyakara Aahara Vihara, Pranayama, Yogasanas* etc. play vital role in preventing Diabetes mellitus. Therefore the present paper has been designed with following aims and objectives i.e. to focus upon lifestyle along with *Pathya Vihara (Yogasanas)* as Ayurvedic treatment regime effective in managing type II Diabetes and to chart out non invasive, cost effective, easily adaptable but effective changes.

MATERIAL AND METHODS

The whole study is based on the literary material viz. *Brihat Trayis*, thesis related to topic, API textbook of Medicine and information from contemporary modern texts, available resources from the internet.

OBSERVATIONS

Yoga is actually 'yog'. Now day's people think yoga merely as postures, actually it's not only postures or *asana*, yoga defined as

योग: कर्मसु कौशलं ।[9]

Yog actually means 'the union'. Doing a work perfectly by involving with body and mind, without expecting the outcome that is Yog. Excellence in action is actually yog.

Yoga is a group of physical, mental and spiritual practices or disciplines. Yoga in Indian traditions, however is more than physical exercise, it has a meditative and spiritual core. Many studies have tried to determine the effectiveness of Yoga as a complementary intervention for Diabetes Mellitus.

Studies have been carried out in our country to evaluate the effect of yoga on diabetes. Most of these studies were done on small number of patients, over small periods of time and just relied on blood sugar estimations to assess the results. These studies had also combined *Pranayama* and several other yogic practices making it difficult to interpret their individual contributions.

How yoga helps to fight diabetes

Stress is one of the major reasons for diabetes. It increases the secretion of glucagon (a hormone responsible for increasing blood glucose levels) in the body. The consistent practice of yoga *aasanas, pranayam* and a few minutes of meditation can help reduce stress in the mind and protect the body from its adverse effects.

Here are some Yogasanas which helps in preventing diabetes.

- ***Surya namaskar*** aid weight loss. It increases the blood supply to almost all the parts of the body there by enhancing the administration of insulin in the body.
- ***Kapal bhati pranayama*** also aid weight loss. Breathing in deeply and breathing out helps oxygenate your blood, and improves circulation.
- ***Halasana*** stimulates the pancreas and activates immune system by massaging internal organs including pancreas.
- ***Vajrasana*** is a simple pose that is great to relax the mind, improve digestion and massages the *kanda.* According to Ayurvedic principles, *kanda* is a spot about 12 inches above the anus that is the point of convergence for over 72,000 nerves.
- ***Mandukasana,*** Abdominal organs are massaged in this yoga. It controls your weight.
- ***PRANAYAMA*** Pranayama is the extension and control of one's breath. Practicing proper techniques of breathing can help bring more oxygen to the blood and brain, eventually helping control prana or the vital life energy.
- ***Kapalbhati***
- ***Bhastrika***
- **Om chanting**
- ***Anulom vilom***

Previous studies done

In a study conducted to assess the effect of Yoga *Aasanas* on nerve conduction in type 2 Diabetes.[10] - 20 Type 2 diabetic subjects, 30-60 years, 40 days of Yoga *Aasanas* on the nerve conduction velocity. Yoga *Aasanas* have a beneficial effect on glycaemic control and improve nerve function in mild to moderate Type 2 Diabetes with sub-clinical neuropathy.

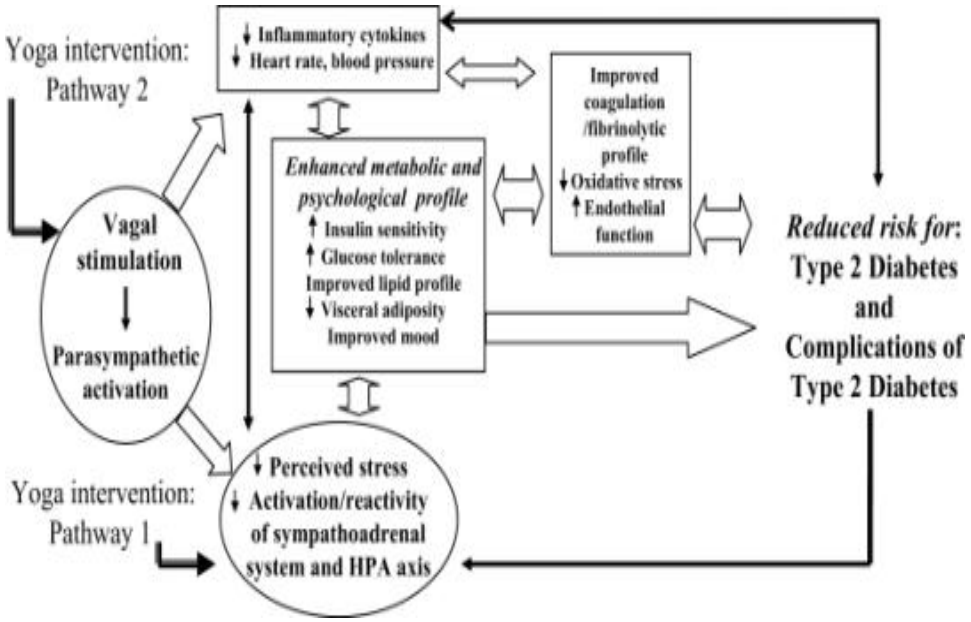
In another study conducted to assess the effect of *Kapalbhati* i.e. rapid performance of two selected yogic breathing techniques *Rechaka* (exhalation) and *Puraka* (inhalation) like (emptying and filling up of) the bellows of a blacksmith, on heart rate variability, in 12 male volunteers (age range, 21 to 33 years) it was noted that *Kapalbhati* modifies the autonomic status by increasing sympathetic activity with reduced vagal activity. The study also suggests that HRV is a more useful psycho physiological measure than heart rate alone was assessed before and after each practice on separate days.[11]

In a study conducted to assess the effect of yogic practices and individual *Asanas*, on elderly Type 2 Diabetics patients 20 subjects aged more than 60 years with a mean age of 66 years were randomly allotted to different groups and they performed yogic practices of that group for 45 minutes each day followed by relaxation practices i.e. *Shavasana* and *Makrasana*. Patients were followed up for a period of 7 years. They achieved good glycaemic control which was maintained over the period of 7 years. No long term complications of diabetes were encountered in them (Table).[12]

Table: Effect of yogic practices in elderly type 2 diabetics.
(n=20, mean age 66.44 ± 5.84 yr, mean duration of diabetes 12.79 ± 5.18 yr).

Mean±1SD	Initial	1yr	2yr	3yr
Fasting glucose	137.16 ± 29.80	91.42 ± 18.98	82.53 ± 15.08	30 ± 15.98
Postprandial glucose	199.79 ± 33.86	139.04 ±7.55	139.04 ±27.55	142.00 ±28.00
Drug score	1.47 ± 0.84	1.47 ± 0.84	0.50 ±0.91	0.34 ±0.47

POSTULATED MODE OF ACTION OF YOGA AND ASANAS IN DIABETES



DISSCUSSION

Yoga and *Pranayama* works on the possible mechanisms:

1. They effectively reduce stress thus reducing glucagon and possibly improving insulin action.
2. Weight reduction thus improves glucose tolerance of cells.
3. Muscular relaxation development and improved blood supply to muscle thus increasing muscular receptor activity.
4. Blood pressure maintenance thus preventing diabetic complications.
5. Many yogic postures do produce stretch on the pancreas.
6. Cardio respiratory fitness improves glucose tolerance and receptor mechanism as well.

CONCLUSION

Oxidative stress has been implicated as the root cause underlying the development of insulin resistance, β-cell dysfunction, diabetes, and its associated clinical conditions such as atherosclerosis, micro vascular complications, and neuropathy. Yoga has been found to be beneficial in reducing oxidative stress in type 2 diabetes, but there is a lack of controlled trials to demonstrate the same.

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