

## Impact of Pranayama on Control of Diabetes Mellitus

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### ABSTRACT

Diabetes mellitus is a chronic disease which cannot be cured except in very specific situations. Management concentrates on keeping blood sugar levels as close to normal as possible, without causing hypoglycemia. This can usually be accomplished with diet, exercise, and use of appropriate medications. But we can cure diabetes by Pranayama. Pranayama is the breathing process or the control of inhalation and exhalation. Glucagons secretion is enhanced by stress. Pranayama effectively reduce the stress. These reducing glucagons and possibly improving insulin action. So the present study was conducted to see the impact of pranayama on Diabetes mellitus. We selected 60 uncomplicated type 2 diabetic subjects in the age group of >40 years with diabetes duration of 1-10 years. They were divided into test group and control groups with 30 patients in each group. The test group were taught pranayama for 6 months, one hour every day in the evening by yoga expert. Both experimental and control groups were prescribed same medicines and diet. The basal blood glucose, lipid profile, glycosylated hemoglobin and anthropometric measurements was measured and repeated after 6 months of study. There was statistically decrease in FBS, PPBS, lipid profile, HbA1C. Similarly for anthropometric measurements also there was positive variation in experimental group. And there were no significant changes in the control group. There by concluding that, there are significant benefits of pranayama practices on metabolic parameters and anthropometric measurements in uncomplicated type 2 diabetes.

**Key words :** Anthropometric measurements, Diabetes mellitus, Hypoglycemia, Pranayama, Metabolic parameters.

Diabetes is the single most important metabolic disease which can affect nearly every organ system in the body. Diabetes is a disease in which the body does not produce or properly use insulin (Shoback 2011). Insulin is a hormone that is needed to convert sugar. The postulated risk factors predisposing the diabetes are age, sex, race and genetics which cannot be controlled or modified, where as the factors such as obesity, hypertension, exercise habits and stress can be modified or controlled to reduce the risk of diabetes (Haffner *et.al.*, 2010)

Uma Maheswari and Joseph (2009) studied that diabetes mellitus is one of the most burdensome chronic diseases that is increasing in epidemic proportion throughout the world. Deaths attributed to diet related non communicable disease in India is projected to increase from 31.6 to 43.3 of all deaths by 2020. Sinha *et.al.*,(2003) reported that the global prevalence of type 2 Diabetes mellitus will be more than double from 13.5 million in 1995 to 300 million by 2025.

Diabetes can be cured by Pranayama. Pranayama is the breathing process or the control of the motion of inhalation, exhalation. And the retention of vital energy one can control the rhythms of pranic energy with pranayama and achieve healthy body and mind (Iyengar 1997). The symptoms related to diabetes are also reduced to a great extent.

There are several types of Pranayama mentioned in Hatha Yoga. One of the basic preparations for pranayama is Nadi shodana pranayama alternate nostril breathing (Swami Niranjanananda Saraswati 2009). This type of pranayama can cure diabetes as alternate nostril breathing has calming effect on nervous system reduces stress levels and their helps in diabetes treatment (Aarthi Sood Mahajan 2003). It has been found that Bhastrika and bhrumari pranayama can help in curing diabetes. So the Investigators were interested to study the specific role of pranayama on diabetes patients.

Diabetes cure by pranayama in the following way.

- Pranayama controls the motion of inhalation, exhalation and the refaction of vital energy.
- Pranayama can cure diabetes by reducing blood sugar levels.
- It also reduces the blood pressure, weight the rate of progression to the complications and the severity of the complications as well.

#### **Pranayama also works on the possible mechanisms are**

1. Glucagons secretion enhanced by stress. Pranayama effectively reduce stress. These reducing glucagons and possibly improving insulin action (Shankardevananda 2005).
2. Weight reduction by pranayama is a well accepted mechanism (Ramdev 2005).
3. Muscular relaxation development and improved blood supply to muscle might enhance insulin receptor expression on muscle and their reducing blood sugar (Balaji *et.al.*, 2011).
4. Blood pressure plays a great role in development of diabetes and related complications, which is proven to be benefited by pranayama. The same holds true for increased cholesterol levels (Anupam Srivastava 2006).
5. Pranayama reduces adrenaline, non adrenaline and cortisol in blood which are termed as stress hormones. This is likely mechanism of improvement in insulin action (Sharma 2008).
6. Many yogic postures do produce stretch on the pancreas which is likely to stimulate the pancreatic function (Pallav Sengupta, 2012).

#### **MATERIAL AND METHODS**

The present study was conducted in Guntur city for 6 months. We selected 60 uncomplicated type 2 diabetic subjects in the age group of >40 years with diabetes duration of 1-10 years. They were divided into test group and control groups with 30 patients in each group. The test group were taught pranayama for one hour every day in the evening by yoga expert. Both test and control groups were prescribed medicines and diet. The subjects were under physician's control till the end of study period. The basal FBS, PPBS, HBA1C, total cholesterol, TGS, HDL, LDL, VLDL, Serum creatinine, blood urea, Urine glucose and anthropometric measurements were measured and repeated after 6 months of study. The recorded parameters were compared and statistically analyzed.

Table 1 shows that there was significant decrease in FBS, PPBS and HbA1c of test group. Similar significant change in triglycerides and LDL of test group and significant increase in HDL of test group was seen. There was no significant change in all the parameters of the control group. Table 2 indicates decrease in the weight, BMI and waist- hip ratio in test group. Such a change in the control group was not found.

#### **RESULTS AND DISCUSSION**

Diabetes is a disease in which the body does not produce or properly use insulin. Insulin is a hormone that is needed to convert sugar, starches and other blood into energy needed for daily life. There are many medications and insulin injections available to control diabetes, but it can be cured by pranayama.

Pranayama is the breathing process or the control of the motion of inhalation, exhalation and the retention of vital energy. Pranayama breathing techniques are not only effective in the control of diabetes, but also cure the disease as well (Krishnan *et.al.*,2003). Pranayama can control diabetes by reducing the blood sugar levels. It also reduces the blood pressure, weight, the vase of progression to the complications as well. The symptoms related to diabetes are also can be reduced to a great extent.

Right nostril breathing significantly increases blood glucose levels, whereas left nostril breathing lowers it and this is useful in understanding the mechanism by which this pranayama helps the diabetic patient (Bhavanani Ananda Balayogi 2003).

By observing the anthropometric measurements data, subjects with pranayama therapy (Test group) showed the normal ranges of anthropometric measurements when compared to the (control group) diabetes without pranayama therapy patients.

In the present study there was significant decrease in FBS, PPBS values in test group who underwent the 6 months pranayama practice. There was significant decrease in the total cholesterol, triglycerides and LDL levels. The improvement in the lipid profile after pranayama could be due to increased hepatic lipase and lipoprotein lipase at cellular level, which affects the metabolism of lipoprotein and thus increase uptake of triglycerides by adipose tissues (Delmonte 1985). There was no significant change in HDL

Table. Name and duration of Pranayama.

S.No	Name of the Pranayama	Duration
1.	Anuloma-Viloma	5-10 mins per day
2.	Bhramari	5-10 mins per day
3.	Bhastrika	3-5 mins per day
4.	Ujjayi	5-10 mins per day
5.	Kapalbhati	5-7 mins per day
6.	Nadi Sodhana	5-10 mins per day
7.	Shitali	3-5 mins per day
8.	Digra	3-5 mins per day

## Sequential events in the methodology

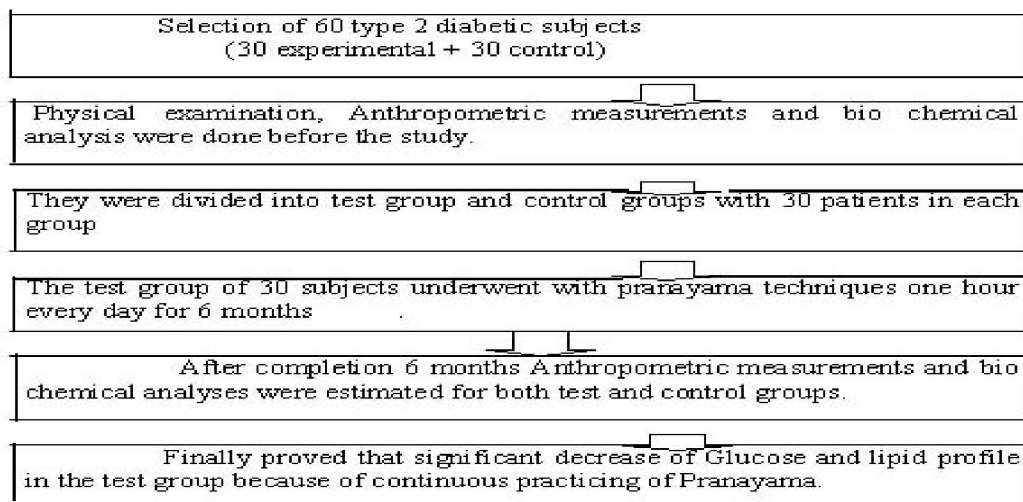


Table 1. Metabolic parameters.

S.No	Parameter	Test Group		Control group	
		Initial	Final	Initial	Final
1	FBS	175.2 ± 24.67	146.06±23.62	177.5 ± 27.64	166.3 ±30.40
2	PPBS	294.36± 46.62	214.33±24.28	291.5 ± 37.7	265.93±39.56
3	HBA1C	8.41 ± 0.62	7.33 ± 0.42	8.41 ± 0.57	8.06 ± 0.65
4	Triglycerides	165.2 ± 41.15	108.8 ±21.86	164.7 ± 42.55	143.7 ±40.22
5	HDL	33.13 ± 3.40	40.76 ± 4.14	34.03 ± 4.62	37.4 ±4.46
6	LDL	133.7 ± 43.20	91.03 ±40.37	131.13± 39.93	112.16±39.3
7	VLDL	32.8 ± 8.24	21.26 ±4.20	32.76 ± 8.38	28.43 ±7.89
8	T.Cholesterol	199.63 ±41.19	145.43±31.21	198.03± 40.39	178 ±39.57
9	S.Creatinine	1.12 ± 0.21	1.04 ± 0.21	1.10 ± 0.23	0.96 ±0.22
10	Urea	38.46 ± 4.46	35.03 ± 4.61	38.6 ± 5.21	36.1 ±5.31

levels in the control group. There was significant decrease in weight, BMI and waist-hip ratio. Similar findings were observed by (Sahay 2007). Also there was decrease in the HbA1c %. Finally in the present study it is concluded that there was significant difference in the Biochemical parameters of FBS,

PPBS, HBAIC, Total cholesterol, TGS, and LDL levels of test group. But there was no significant difference in the control group.

All these suggest that pranayama practices have a role in the prevention on the diabetes. So pranayama has the beneficial effect on the diabetes.

Table 2. Anthropometric measurements.

S.No	Parameter	Test Group		Control group	
		Initial	Final	Initial	Final
1	Weight	69.13 ± 8.34	67.46 ± 8.76	62.33 ± 8.63	61.63 ± 8.51
2	Waist	91.86 ± 6.99	90.73 ± 6.79	88.5 ± 5.50	87.23 ± 5.18
3	Hip	101.46 ± 4.53	100.16 ± 4.33	98.8 ± 6.23	97.53 ± 6.08
4	W/H Ratio	0.90 ± 0.04	0.90 ± 0.04	0.89 ± 0.02	0.89 ± 0.27
5	BMI	26.26 ± 2.18	25.36 ± 2.23	24.83 ± 2.05	24.06 ± 2.14

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