

EFFECT OF YOGIC EXERCISE ON BLOOD SUGAR AND BLOOD PRESSURE LEVEL IN PATIENTS OF DIABETES MELLITUS TYPE 2: A PRE AND POST INTERVENTIONAL STUDY

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ABSTRACT

Background: Diabetes is the fifth leading cause of death in the U.S. One hundred million persons have history of diabetes worldwide. Diabetes also contribute to higher rates of morbidity- people with diabetes are at higher risk for heart disease, blindness, kidney failure, extremity amputations and other chronic conditions. Diabetes imposes a substantial cost burden to society, & in particular to those individuals with diabetes and their families.

Aims & Objectives: To study the effect of six month of pranayam training on blood sugar and blood pressure in patients of diabetes mellitus type 2.

Materials and Methods: The Study comprised of 50 known Diabetic patients aged 35-65 years. The study population was subjected to practice yoga, anulom vilom pranayam and kapalbhati, 5 minutes each, daily for a total period of six month, under observation of a yoga instructor. The effect of yoga practice on various parameters were recorded and statistically analyzed for evaluation.

Results: There was a significant reduction in subject's fasting blood sugar level from 174.19 ± 39.57 at their first visit to 154.83 ± 24.579 after six months of pranayam. The change was significant in both the gender. Systolic and diastolic blood pressure had not shown any significant reduction after 6 months of pranayam (SBP- 154.50 ± 13.86 & 153.00 ± 12.76 , DBP- 92.92 ± 6.31 & 92.143 ± 5.54).

Conclusion: Pranayam practice is beneficial in diabetic patients in terms of reduction of blood sugar. However, no substantial reduction in blood pressure was noted. The two yoga practices, it appears, do help subjects to lower their blood sugar level, but are not helpful in achieving control of their blood pressure.

Key Words: Pranayam; Diabetes; Blood Sugar; Blood Pressure; Yoga

Introduction

"Our ancient genes and our modern environment have collided. Unless our environment changes, the 'diabetes epidemic' imperils human existence as we now know it". Globally, as of 2013, an estimated 382 million people had diabetes, with type 2 making up about 90% of the cases.^[1] Its incidence is increasing rapidly, and by 2030, this number is estimated to almost double.^[2]

Diabetes mellitus occurs throughout the world, but is more common (especially type 2) in the more developed countries. The greatest increase in prevalence is, however, expected to occur in Asia and Africa, where most patients will probably be found by 2030. The increase in incidence in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet.^[2]

India has more diabetics than any other country in the world, according to the International Diabetes Foundation^[3], although more recent data suggest that China has even more.^[4] The disease affects more than 50

million Indians - 7.1% of the nation's adults - and kills about 1 million Indians a year.^[5] The average age at the onset is 42.5 years.^[3] The high incidence is attributed to a combination of genetic susceptibility plus adoption of a high-calorie, low-activity lifestyle by India's growing middle class.^[5]

Diabetes is the fifth leading cause of death in the U.S.^[6] One hundred million persons have history of diabetes worldwide. Diabetes also contributes to higher rates of morbidity- people with diabetes are at higher risk for heart disease, blindness, kidney failure, extremity amputations and other chronic conditions. Diabetes imposes a substantial cost burden to society, & in particular to those individuals with diabetes and their families.

Ever since existence of this disease was found to be a threat to human health, no medication could cure it permanently. The treatment of diabetes mellitus is not confined to one single medication. Instead it requires a series of therapy, and that too, not for weeks or month but for whole life. It includes diet control, routine

exercise and drug – that is a diabetic patient should follow a strict disciplined life.

A healthy life-style, which includes exercise, is important in the fight against diabetes. Yoga can complement such a lifestyle and help to keep diabetes under control. The present study was aimed to observe any significant changes in blood pressure and blood sugar level after yogic exercises for a significant time in patients of diabetes mellitus type 2.

Materials and Methods

The present study was carried out in the department of physiology, NSCB Medical College, Jabalpur on diabetic patients for one year. The study was conducted on male patients suffering from diabetes mellitus type 2, between the age group of 30-60 years, for the period of six month. The subjects were introduced to a pretested questionnaire for assessing the nutritional status, the health status, type of medication, family history and duration of disease of the study population. A complete general and systemic examination was carried out, including relevant anthropometric measurements such as height, weight and body mass index. Height and weight were measured with participants standing without shoes. Body mass index was calculated by weight in kg divided by height in meter square [BMI = Weight (kg) / Height (m)²].

Resting blood pressure was measured in supine position by mercurial sphygmomanometer. Fasting blood glucose sample was taken. Estimation of blood glucose was done in central lab by “glucose oxidase—peroxidase” method.^[7] Prior to and during the course of study, the subjects were on their regular course of medication. Subjects acted as their own control; a separate control group was not incorporated. Subject practiced yoga (anulom vilom, kapalbhati) for a period of 6 months – for approximately 15 minutes daily, under observation of a yoga instructor. Patients below the age of 30 years and suffering from any other diseases were excluded from the study. Statistical analysis was done using SPSS ver. 15. Paired t test was used to compare the changes within the groups. P value ≤ 0.05 was considered to be significant.

Results

The age group comprised of 35-65 years of age and their relative numbers divided in age group interval of 10 years. Fasting blood sugar level at the start of the study

was 174.19 ± 39.57, which after 3 month of yoga was 162.68 ± 24.375, while after 6 month, it was 154.83 ± 24.579. Statistically the change in blood sugar was significantly low than their initial blood sugar value. No significant changes were observed in diastolic and systolic blood pressure at 3 month and 6 month of yoga practice.

Table-1: Changes in fasting blood sugar level in diabetic patients - study group (n=50)

Fasting Blood Sugar (Mean ± SD)				
At 1st Visit	After 3 Month	P value	After 6 Month	P value
174.19 ± 39.57	162.68±24.375	≥0.05	154.83±24.579	≤0.05

Table-2: Changes in blood pressure

Blood Pressure (mmHg)									
At 1st Visit		After 3 Month				After 6 Month			
SBP	DBP	SBP	P Value	DBP	P Value	SBP	P Value	DBP	P Value
154.50 ± 13.86	92.92 ± 6.31	153.64 ± 11.93	≥0.05	92.50 ± 5.64	≥0.05	153.00 ± 12.76	≥0.05	92.143 ± 5.54	≥0.05

S: Systolic Blood Pressure; DBP: Diastolic Blood Pressure

Discussion

The science of yoga is an ancient one. Several works has been done on the role of yoga in diabetes. In the present study, an attempt was made to evaluate the beneficial effects of pranayama on diabetic patients. Here we tried to assess the role of pranayama on glycemic control and various co morbidities, like hypertension.

The result of this study suggests that, after 6 month of yogic exercises, there is a significant decline in fasting blood sugar level of subjects but blood pressure has not shown any significant change.

One study conducted by Balaji P A et al^[8] reported that there was significant decrease in fasting and post prandial blood sugar in diabetic patients who underwent three month of yoga and pranayam. Similarly Sahay et al^[9] reported the useful role of yoga in the control of diabetes mellitus. Twenty eight type 2 diabetics and 4 type 1 diabetics were studied for one month. They practiced 4 types of pranayama for 30 minutes followed by shavasana for 15 minutes. Patients developed a sense of well-being within 7 to 10 days, and showed a significant fall in fasting and post-prandial blood glucose values. In 17 patients, the requirement of drugs came down significantly.

Malhotra et al^[10] studied the effect of yoga on twenty NIDDM subjects (mild to moderate diabetics) in the age group of 30-60 years for 40 days. Fasting and one hour postprandial blood glucose levels and anthropometric parameters were measured before and after yoga. The

results indicate that there was significant decrease in fasting glucose levels – from basal 208.3 ± 20.0 to 171.7 ± 19.5 mg/dl. One hour postprandial blood glucose levels decreased from 295.3 ± 22.0 to 269.7 ± 19.9 mg/dl.

Mercuri et al^[11] evaluated the clinical and metabolic changes. They observed immediate value, and value after 3 months of daily yoga practices in a group of people with type 2 diabetes mellitus. Blood pressure (BP), heart rate (HR), and glycaemia were also recorded at the beginning and end of 13 alternate sessions. There were no overall significant differences (beginning vs. end of the study) in BMI, HbA1, lipid profile, dietary plan, habitual physical activity practice, BP, and treatment schedule. Conversely, there was a significant decrease in HR (8 sessions; $p < 0.03$) and glycaemia (10 sessions; $p < 0.03$) immediately after the yoga sessions. The immediate positive effect of yoga practices on glycaemia and HR suggests that such practices would be beneficial for the treatment of people with DM.

The present study was conducted taking all precautions to maintain standardization of yoga procedure and lab investigation for all these subjects. However, as planned in study, the subjects were on their regular medication and dietary regime. No subject could achieve normal fasting blood sugar. It also appears that these subjects were happy about their blood sugar and other values achieved with medication regime they were following. They did not want to switch to insulin or go on a stricter diet medication-exercise regime like so many diabetics all over world.

Our study is limited by the fact that the allocation to the groups was not randomized. The results might be affected by some confounding factors. We didn't find the subjects of similar food habit. The age group was also very broad. The anthropometric factors, Types of medication and duration of disease were also different in different subjects. However, yoga was found beneficial in improving glycemic parameters but yoga was not beneficial in reducing the blood pressure in this short-term study. Further studies are needed to confirm that

yoga is beneficial in preventing the progression of diabetes and its complications.

Conclusion

Yoga, it appears, does help diabetic patients to lower their blood sugar level, but is not helpful in achieving full control of their diabetes mellitus. They are to be made aware that alternative easy way outs are not helping them to the full. As diabetes mellitus silently progresses, it compromises the function of many of the system. So, they should not delay in achieving the effective control. Yoga can be an adjuvant, but not a replacement for tested and tried medical management of diabetes mellitus type 2.

References

- Melmed S, Polonsky KS, Larsen PR, Kronenberg HM. Williams Textbook of Endocrinology. 12th ed. Philadelphia, Pa: Elsevier Saunders; 2011. p. 1371–435.
- Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047–53.
- Gale J. India's Diabetes Epidemic Cuts Down Millions Who Escape Poverty. Bloomberg news. November 7, 2010. Available from: URL: <http://www.bloomberg.com/news/2010-11-07/india-s-deadly-diabetes-scurge-cuts-down-millions-rising-to-middle-class.html>
- China faces 'diabetes epidemic', research suggests. BBC News. March 25, 2010. Available from: URL: <http://news.bbc.co.uk/2/hi/asia-pacific/8587032.stm>
- Kleinfield, NR. Modern Ways Open India's Doors to Diabetes. New York Times. September 13, 2006. Available from: URL: <http://www.nytimes.com/2006/09/13/world/asia/13diabetes.html?pagewanted=all&r=0>
- National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Centers for Disease Control and Prevention. 2011.
- Trinder P. Determination of Blood Glucose using an Oxidase-Peroxidase system with a non carcinogenic chromogen. *J Clin Path* 1969;22:158-69.
- Balaji PA, Varne SR, Ali SS. Effects of Yoga-Pranayampractices on metabolic parameters and anthropometry in Type 2 Diabetes. *International Multidisciplinary Research Journal* 2011;1:1-4.
- Sahay BK. Role of yoga in diabetes. *J Assoc Physicians India* 2007;55:121–6.
- Malhotra V, Singh S, Singh KP, Sharma SB, Madhu SV, Gupta P, et al. Effects of yoga asanas and pranayama in non-insulin dependent diabetes mellitus. *Indian Journal of Traditional Knowledge* 2004;3:162-7.
- Mercuri NE, Olivera M, Souto A, Guidi ML. Yoga practice in people with diabetes. *International Journal of Yoga Therapy* 2003;13:69-73.

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