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Original Article

Effects of Yogic Postures on Blood Glucose Levels in Patients with Type 2 Diabetes Mellitus

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***ABSTRACT*:**

Introduction: Industrialization and improved facilities in our country in the past three decades have changed our lifestyle with decreased physical activities, excess food intake with fat dense calories and stress of working. The role of regular exercise especially 'yoga' seems to be a beneficial and economical adjuvant in the management of the Type 2 diabetes mellitus (T2DM). Objectives: To evaluate the effects of yoga on blood glucose levels in non-diabetic and type 2 diabetes mellitus volunteers. **Materials and Methods:** The study was conducted in the Department of Pharmacology and at Yoga Centre over period of 6 months. The study subject were consisted of 20 female diabetic patients attending yoga Centre and 20 non diabetic female volunteers constituted control group, in the age group of 35 - 55 years with T2DM of at least six months duration and those on diabetic diet and anti-diabetic drugs were included in the study group .the age matched in healthy volunteers who had come to join the yoga training at yoga Centre were included in the control group .All the subjects were trained by yoga expert and they perform under the supervision and guidance of yoga expert for a period of six months. The parameters i.e. Fasting Blood Sugar (FBS) and post-prandial blood sugar (PPBS) in all the participants before the commencement of yoga exercises and after the yoga therapy were recorded Paired Student t-test was used to estimate difference in means calculated before and after yoga training in a same group. A p-value of <0.05 was considered statistically significant. **Results:** The distribution of age, mean height and mean weight among both the groups were comparable. The reduction in mean values of FBS and PPBS at the end of six months was highly significant (p <0.001) in both the groups when compared with the mean values before and during (threemonths) yoga practice. The reduction in these values at three months during yoga was highly significant in T2DM group when compared with mean values before yoga (p <0.001), but it was insignificant (p>0.05) in control group. **Conclusion:** The result of the present study demonstrated that yoga therapy may be considered as abeneficial adjuvant in reducing the blood glucose levels in patients with T2DM.

Key words: Hyperglycemia, Yoga , T2DM

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INTRODUCTION

Diabetes mellitus is a heterogeneous group of disease characterized by the state of chronic hyperglycemia resulting from a diversity of etiologies, genetic and environmental factors acting jointly.[1]

India with estimated 31 million diabetes in 2000 and 79 million by the year 2030 has the highest number of type 2 Diabetics.[2]

Effective control of blood glucose to reduce the risk of various complications, including diabetic nephropathy, diabetic foot, cardiovascular diseases and cataract, is especially important for type 2 DM management.[3]

Due to the chronic course of the disease the debilitation of complications and treat of death as well as the complexities of treatment plans people with diabetes often work proactively to manage their condition optimize their health and elevate complications through the use of complementary therapies.[4]

By yogic exercises the muscles absorbs the excess glucose in the blood thereby reducing the blood sugar levels. They

help the pancreas and liver to function effectively which regulates the blood sugars levels. Asanas help in rejuvenating the pancreatic cells, thereby assisting insulin secretion. The muscular movements also help in bringing down the blood sugar levels by increasing the glucose utilization. Asanas induce relaxation, which also plays a key role in the healthy functioning of the internal organs of the body[5]

The science of yoga is an ancient one. Yoga is a practical discipline in incorporating a wide variety of practices whose goal is development of a state of mental and physical health, wellbeing and ultimately union of the human individual with the universal and transcendental existence.[6]

MATERIALS AND METHODS:

In this study fasting blood sugar and postprandial blood sugar was estimated in all the participants (before, during 3month and after 6 months) yoga training was conducted in the department of pharmacology and yoga centre over a period of six months after obtaining institutional ethic committee clearance .The study subject were consisted of 20 female diabetic patients attending yoga Centre and 20 non diabetic volunteers constituted control group, in the age group of 35 -55 years with T2DM of at least six months duration and those on diabetic diet and anti-diabetic drugs were included in the study group .the age matched in healthy volunteers who had come to join the yoga training at yoga Centre were included in the control group and the height and weight were measured (table/fig1) all these patients performed yogic postures for approximately 40 minutes per day for 180 days under the supervision and guidance of yoga expert .the present study was explained to all the subjects and written duly signed consent was taken from all the subjects .the yoga was practiced daily from 5:30 am to 6:10 am .the practitioner was to perform techniques regarding breathing, position ,posture and movements.

Table 1: SCHEDULE OF YOGA PRACTICE

S.No.	YOGIC POSTURES	DURATION
1.	Prayer	5
2.	Omkar recitation	5
3.	Pranayama	5
4.	Various asanas (Vajrasana, Halasana, Matsyasana, Bhujangasana, Paschimottanasana, Shalabhasana, Vakrasana and Sarvangasana)	20
5.	Shavasana	5

Table 2: DISTRIBUTION OF AGE, MEAN WEIGHT AND MEAN HEIGHT IN BOTH GROUPS

Age in years	No. of Subjects		Mean weight (Kg)		Mean height (cms)	
	Control	T2DM	Control	T2DM	Control	T2DM
35-39	6	5	62.6	66.5	163.66	165.83
40-44	6	8	63.5	67.8	164.55	161.90
45-49	5	3	64.8	65.99	162.57	163.40
50-55	2	2	61.7	63.7	161.00	163.25

Table 3: MEAN VALUES OF FBS AND PPBS IN RELATION TO YOGA IN CONTROL AND T2DM GROUP

S.No	TIME	CONTROL N=19	CASES (N=18)	P-VALUE
1	Before yoga	88.6±4.5	94.4±5.5	0.0012
2	During yoga	88.5±5.5	92.8±4.5	0.01
3	After yoga	82.6±5.5	82.6±4.5	0.0009

Table 4: COMPARISON OF SIGNIFICANCE OF FBS AND PPBS LEVELS BEFORE AND AFTER YOGA

S. No.	Comparison	FBS				PPBS			
		Control		T2DM		Control		T2DM	
		t-value	p-value	t-value	p-value	t-value	p-value	t-value	p-value
1	Before Yoga and During Yoga	0.46	>0.05	7.59	<0.001	1.8	>0.05	10.40	<0.001
2	During Yoga and After yoga	4.75	<0.001	8.51	<0.001	4.73	<0.001	13.45	<0.001
3	Before yoga and After yoga	3.03	< 0.01	11.24	<0.001	5.32	<0.001	17.41	<0.001

RESULTS:

40 patients were included in the study out of which two patients with T2DM and one non diabetic volunteer did not complete the yoga practice for 6 months and were excluded from the study

The distribution of age, mean height and mean weight among both the groups were comparable. The reduction in mean values of FBS and PPBS at the end of six months was highly significant ($p < 0.001$) in both the groups when compared with the mean values before and during (three months) yoga practice. The reduction in these values at 3 months during yoga was highly significant in T2DM group when compared with mean values before yoga ($p < 0.001$), but it was insignificant ($p > 0.05$) in control group.

The data were presented as percentages, mean and standard deviation .the data was analyzed using paired student t test to compare the difference in mean calculated at the beginning and after yoga training in the same study group .p value less than 0.05 was considered significant.

DISCUSSION:

The aim of the present study was to assess the role of yoga in patients with Type 2 DM. Conventionalmedicine for individuals with diabetes as been geared towards regulation blood glucose with a combination of dietary modification insulin and or oral agents,maintaining ideal body weight , exercising regularly and self monitoring blood glucose.[7]Because of potential threat to quality of life and the chronic nature of diabetes many people turn to complimentary therapies seeking help to control the disease[8] To control blood glucose levels, numerous drugs are being invented and marketed for the benefit of diabetic patients. However, use of such drugs has its own drawbacks, such as drug dependency, drug resistance and adverse effects, if used for a long time. Hence, in recent years there has been an intense search for non-medical measures not only to control DM, but also to prevent its complications[9,10] The significant decrease in FBS and PPBS levels after yoga in both groups in the present study indicates potential role of yoga in preventive and management strategies for T2DM. A significant decrease in FBS and PPBS has been reported in T2DM patients on oral hypoglycemic agents (OHA) undergoing yoga training when compared to those only on OHA[11,12] Similarly, a significant decrease in FBS and PPBS after yoga training has been demonstrated in T2DM patients on OHA[13] The beneficial effect of yoga in T2DM has been attributed to increased insulin sensitivity at target tissues which decreases insulin resistance and consequently increases peripheral utilization of glucose [14]It has also been postulated that yoga can rejuvenate or regenerate beta cells of pancreas.[15] So yogic practice have a role in primary and secondary prevention in Diabetes Mellitus. Therefore, yoga therapy may be considered as a beneficial adjuvant for management of type 2 DM and also delays the progression of disease process.[16]

CONCLUSION

The result of the present study demonstrated that yoga therapy may be considered as abeneficial adjuvant in reducing the blood glucose levels in patients with T2DM. Further studies are needed to examine how far the results of the present study are valid also for those having DM specially because of the dramatic differences that have been reported earlier between diabetes and nondiabetics.

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