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Effect of Yoga and Aerobic Training on Bio Chemical Variables in Middle Aged Diabetic Patients

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Abstract

Diabetes is related to the impaired glucose tolerance of the body, where insulin functioning is affected. The beneficial effect of the practice of Yoga and other exercises like Aerobic Training on diabetes includes direct influence on pancreatic secretion by rejuvenation of the pancreatic cells, through alternate abdominal contractions and relaxations, during asana The purpose of the study was to find out the effects of yoga and Aerobic Training on selected biochemical variables blood sugar and Glucose Tolerance among diabetic patients. To achieve this purpose, sixty men patients who were not involved in any vigorous physical training programme, age ranging from 35 to 45, undergoing treatment for hypertension and type-II diabetes mellitus, were selected from in and around Pettai, Tirunelveli city. The selected subjects were divided into three groups at random with 20 each. Twenty patients in each category (type II Diabetes and Hypertension) would serve as control group and the remaining forty would undergo systematic Yoga training and Aerobic training in the department of physical education and sports sciences, under the supervision of physician, The M.D.T Hindu College, Tirunelveli. The control group did not undergo any special training programme. The remaining subjects constituted an experimental group who underwent Yoga and Aerobic Trainig Programme. The selected subjects were medically examined by a qualified medical person for undergoing the training programme Analysis of data using ANACOVA showed that there were significant difference between experimental groups and control group on selected variables blood sugar and oral glucose tolerance. The significant improvement in the above said variables highlights the effect of aerobic training and yoga training design for this study, its systematic progressive loading pattern and appropriate recovery phase between sessions during the training period. The control group did not participate any kind of training programme specifically for improving the selected variable level.

Keywords: Yoga**,** aerobic training, blood sugar**,** glucose tolerance

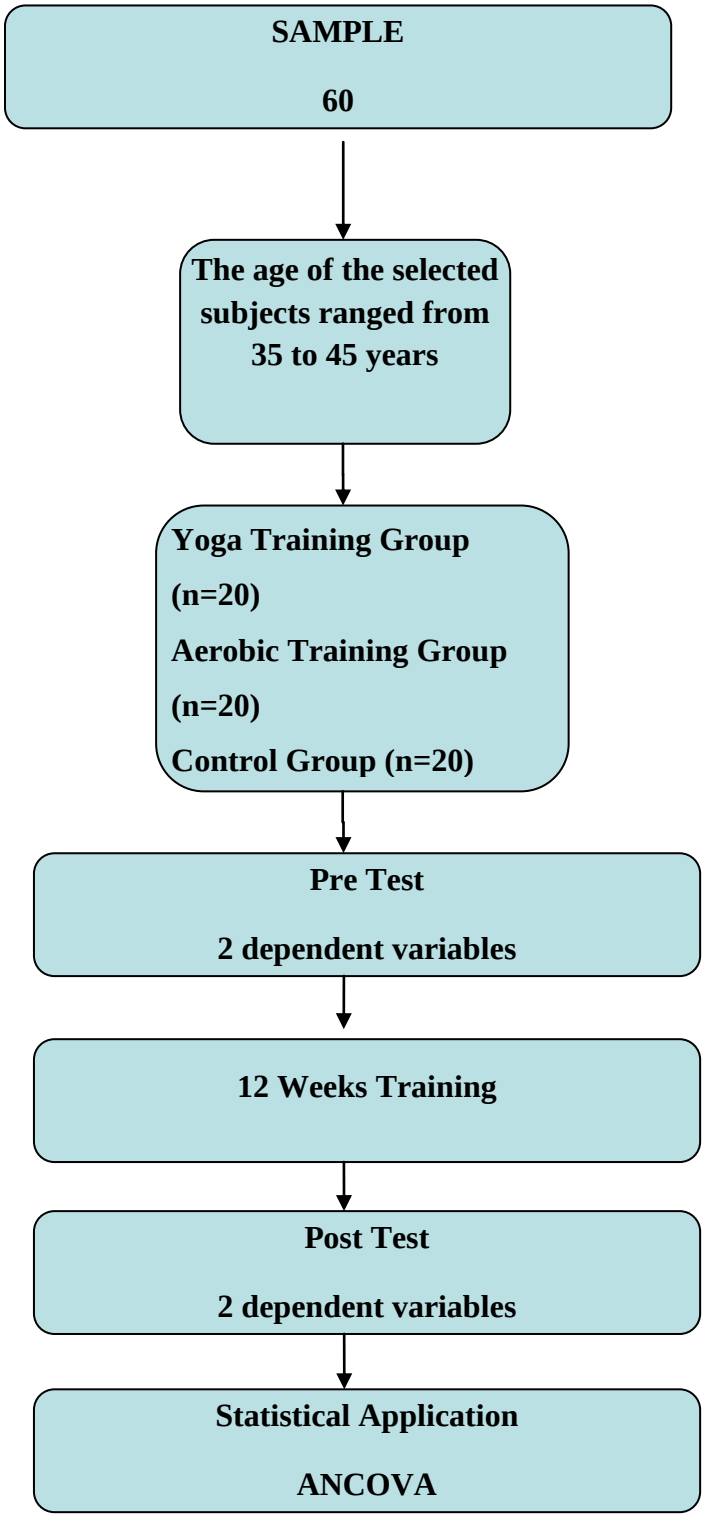
Introduction

Diabetes is a disease where there is an increased level of sugar in the blood due to diminished effectiveness or lack of insulin that is produced in the body. Insulin is a hormone that is needed to convert sugar, starches and other foods into energy needed for daily life. Insulin is a hormone secreted by beta cells of islets of langerhans, situated in pancreas. The glucagons produced by Alfa cells have anti-insulin action. Both in unison keep a constant glucose level in the blood. Insulin also acts as gate keeper, where, only in its presence can the blood glucose enter the body cells and provide fuel and energy to work. In diabetes, the cellular fuel is thus compromised, while excess of glucose remains in the circulation. If the Diabetes is mild it could be controlled with diet restriction and physical exercise. When these measures cannot control the problem, a doctor may prescribe drugs or insulin in specific doses after doing a thorough check-up and examining the blood sugar levels. Mild diabetes may be controlled by diet restriction. In any case even with active treatment of the disease, a strict diet schedule will help a person to lead a comfortable life.

The cause of diabetes may vary, although both genetic and environmental factors such as obesity, stress, lack of exercise, smoking, consumption of alcohol, fatty foods, etc., appear to play vital roles. Symptoms of diabetes include tiredness, thirst, feeling uncomfortable, frequent urination, dryness in the mouth, wounds don't heal quickly etc. Diabetes results in the body's inability to keep the amount of sugar in the blood at a healthy level. High blood sugar usually results in health problems. These include heart attacks, strokes, frequent infections, eye problems that can lead to blindness and kidney failure. Uncontrolled diabetes may cause damage to blood vessels, nerves and affects the immune system. Maintaining glucose in the blood at the right level is all that has to be done to avoid diabetes.

The purpose of this study was to find out the Effect of Yoga and Aerobic Training on Bio Chemical Variables in Middle aged Diabetic Patients.

Methodology



Findings

Table 1. Summary of Mean and Dependent 'T' Test for the Pre and Post Tests on Blood Sugar and Oral Glucose of Experimental and Control Groups

Variable	Tests	Yoga Training Group	Aerobic training Group	Control Group
Sugar	**Pre Test Mean**	246.97	279.77	188.86
	Post Test Mean	161.40	154.36	189.56
	Adjusted Post Test Mean	158.41	139.72	207.20
	't' value	**12.26***	**13.03***	**0.524**
Oral Glucose	**Pre Test Mean**	164.51	193.08	108.65
	Post Test Mean	98.96	95.66	108.51
	Adjusted Post Test Mean	93.62	73.52	135.99
	't' value	**18.70***	**21.40***	**0.254**

***Significant at .05 level. The table value required for .05 level of significance with df 19 is 2.093.*

The table 1 show that the obtained dependent t-ratio values between the pre and post test means on Blood Sugar and Oral Glucose of Yoga training, aerobic training and control groups are 12.26, 13.03 and 0.52, 18.70,21.40 and 0.254 respectively. The table value required for significant difference with df 19 at .05 level is 2.093. Since, the obtained't' ratio value of experimental group are greater than the table value, it is understood that training programmes had significantly improved the performance of blood sugar and oral glucose. However, the control group has not improved significantly as the obtained 't' value is less than the table value, because they were not subjected to any specific training.

Table2. Analysis of Covariance of Yoga training, Aerobic Training and Control Groups on Blood Sugar and oral glucose

Variable	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F'-ratio
Sugar	**Pre Test**	9963.25	1	9963.25	**25.91***
	Groups	25634.15	2	12817.08	**33.34***
	Error	21530.38	56	384.47	
Oral Glucose	**Pre Test**	7179.71	1	7179.71	**44.02***
	Groups	8952.69	**2**	4476.35	**27.44***
	Error	9134.35	56	163.11	

**Significant at .05 level of confidence. (The table value required for significance at .05 level with df 1 & 56 and 2 & 56 are 4.02 and 3.17 respectively).*

From the table 2, the obtained F-ratio for pre test is 25.91and 44.02 which is greater than the table value of 4.02 with df 1 and 56 required for significance at 0.05 level of confidence. The result of the study indicates that there was significant difference among the pre test means of yoga training, aerobic training and control groups on Blood Sugar and Oral Glucose.

Table 2 also shows that the obtained F-ratio value is 33.34 and 27.44 which is higher than the table value 3.17 with df 2 and 56 required for significance at .05 level. Since the value of F-ratio is higher than the table value, it indicates that there is significant difference among the adjusted post-test means of yoga training, aerobic training and control groups.

Table 3. Scheffe's Test for the Differences between the Adjusted Post Test Paired Means of Blood Sugar and oral glucose

Variable	Yoga Group			Mean Differences
	Yoga Group	Aerobic Training Group	Control Group	
Sugar	158.41	139.72		18.69
	158.41		207.20	48.79
		139.72	207.20	67.48
Oral Glucose	93.62	73.52		20.10
	93.62		135.99	42.37
		73.52	135.99	62.47

** Significant at 0.05 level.*

Table 3 shows that the adjusted post test mean differences on Blood Sugar and Oral Glucose between the yoga training and aerobic training groups; yoga training and control groups; aerobic training and control groups were 67.48, 48.79 and 18.69, 62.47, 42.37 and 20.10 respectively. The values are greater than the confidence interval value 15.61, which shows significant difference at .05 level of confidence.

It may be concluded from the results of the study that there is a significant difference in Blood Sugar and Oral Glucose between the yoga training and aerobic training groups; yoga training and control groups; aerobic training and control groups;

It was concluded that of Aerobic training groups is better than Yoga training and control groups in improving Blood Sugar and Oral Glucose.

Discussion

The results of the study indicated that there is a significant difference in blood Sugar between the yoga training and aerobic training groups; yoga training and control groups; aerobic training and control groups, it was concluded that aerobic training groups is better than yoga training and control groups in improving Blood Sugar.

The study also shows that there is a significant reduction in the blood sugar level of the subjects after the training period. This may happen due to the increased use of the energy for the physical exercise which we have assigned to the subjects. This study has been consonance with the findings of Manhothra (2004), Eriksson (1998), Pan et. al., (1997) and Eriksson (1991).

The results of the study indicated that there is a significant difference in oral glucose between the yoga training and aerobic training groups, yoga training and control groups, aerobic training and control groups. It was concluded that of aerobic training groups is better than yoga training and control groups in improving oral glucose.

The study reveals that the subjects have increased the oral glucose tolerance capacity after the training programme. Endurance exercise **training** improves **glucose** tolerance and enhances insulin sensitivity in response to an **oral glucose** load. Disposal of an **oral glucose** load is principally regulated by the actions of insulin and occurs primarily in skeletal muscle. Insulin accomplishes this disposal by both increasing the extraction of **glucose** via translocation of intracellular **glucose** transporter proteins and enhancing skeletal muscle **blood** flow. This finding is consonance with the findings of Baron et. al., (1993), Roadnick et. al., (1992), Seals (1984) and Katz et. al., (1983).

Conclusions

Analysis of data using ANACOVA showed that there were significant difference between experimental groups and control group on selected variables blood sugar and oral glucose tolerance. The significant improvement in the above said variables highlights the effect of aerobic training and yoga training design for this study, its systematic progressive loading pattern and appropriate recovery phase between sessions during the training period. The control group did not participate any kind of training programme specifically for improving the selected variable level.

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