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THE CHANGES ON SELECTED BIOCHEMICAL PARAMETERS AFTER SIX WEEKS OF PHYSICAL TRAINING AMONG TYPE-II DIABETIC PATIENTS

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Short Profile

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ABSTRACT:
Diabetes, or more specifically diabetes mellitus, is a disorder due to insulin insufficiency characterized by high blood sugar level (phypergly cemia) and presence of sugar in the urine (glycosuria). Most cases of diabetes fall into two major categories:

1.Insulin-dependent diabetes mellitus (IdDM), also called type I or Juvenile –onset diabetes.
2.Non-insulin-dependent diabetes mellitus (NIDM), also called type II or adult –onset diabetes.

KEYWORDS
Biochemical Parameters , Physical Training ,glycosuria.

INTRODUCTION :

Heredity appears to play a major role in both type I and type II diabetes. In type I diabetes, the beta cells of pancereas are destroyed. This destruction may be caused by the body's immune system, increased beta cell susceptibility to viruses or beta cell degeneration. Type I diabetes generally has a sudden oneset during childhood or young adulthood. This leads to almost total insulin deficiency and daily injections of insulin are usually required to control the desease. In type II diabetes, the onset of the disease is more gradual and the causes are more difficult to establish. Type II diabetes is often characterized by any one of the following three major metabolic abnormalities; The delayed or impaired insulin secretion, impaired insulin action (insulin resistance) in the insulin-responsive tissues of the body and excessive glucose output form the live. Obesity plays a major role in development of type II diabetes. With obesity, the beta cells of the pancreas often become less responsive to the stimulation of increased blood glucose concentration. Furthermore, the target cells throughout the body, number of activation of their insulin receptors, so the insulin in the blood is less effective in transporting glucose into the cell.

The major modes of treatment for diabetes are insulin administration, diet and exercise. Most physicians agree that a physical activity is an important part of the treatment plan. The role of regular exercise and physical training in improving glycemic control (regulation of blood sugar levels) in patients in the type I diabetes has been not been clearly defined and is controversial. Those with type I diabetes are prone to hypoglycemia during and immediately after exercise because the liver fails to release glucose at a rate that can keep up with glucose utilization. The degree of glycemic control during exercise varies tremendously between individuals with type I diabetes. As a result, exercise and exercise training can improving glycemic control in some patients, mainly those who are less prone to hypoglycemia, but not in others. Although glycemic control is generally not improved in most people with type I diabetes, there are other potential benefits of exercise for these patients. People with uncomplicated type I diabetes do not have to restrict physical activity, provided blood sugar levels are controlled appropriately. A number of athletes who have type I diabetes have trained and competed successfully. Exercise plays a major role in glycemic control for people with type II diabetes. A major problem with this form of diabetes. A major proglem with this from of diabetes is the lack of target cell response to insulin (insulin resistance). Because the cells become resistant to insulin, the hormne cannot perform its function of facilitating glucose transport across the cell membrane. Exercise improvise the membrane permeability to glucoise, decreases insulin resistance and increase insulin sensitivity.

METHODOLOGY:

The purpose of the study was to investigate that changes on selected biochemical parameters after six weeks of physical training among type-ii diabetic patients. To achieve this purpose, thirty men patients who were not involved in any vigorous physical training programme, age ranging from 35 to 45, undergoing treatment for type –II diabetes mellitus, were selected from S.Nijalingappa Medical College and Kumareshwar Hospital Research Centre, Bagalkot and University of Horticultural Science , Bagalkot.

The selected subjects were divided into two groups at random with 15 each, of which group-I underwent systematic physical training for the period of six weeks and group –II acted as control under the supervision of physician. The control group did not undergo any special training programme. The selected subjects were medically examined by a qualified medical person for undergoing the training programme. A written consent was obtained form the subjects to participate in the study.

The following biochemical parameters such as total cholesterol (TC) and Blood sugar were selected of this study. The data were collected prior to and immediately after six weeks of physical training on selected biochemical parameters. The blood samples were collected from the subjects in the early morning in fasting condition to assess the biochemical parameters viz., total cholesterol, and blood sugar. The collected blood samples were tested in the medical laboratory at S.Nijalingappa Medical College and Kumareshwar Hospital Research Centre, Bagalkot and University of Horticultural Science , Bagalkot.

TRAINING PROTOCOL:

During the training period, the experimental group (Diabetic patients)underwent combined walking and jogging exercises for the period of six weeks. On every dy of the training session the exercises were done for approximately 45 minutes which included warming –up and warming-down. During the first two weeks the subjects performed the walking and jogging exercises for thirty minutes then the load was increased once in two weeks. The control group did not participate in any special training programme of strenuous physical exercise apart from their day-to day activities.

STATISTICAL TECHNIQUES:

The data collected from the two groups prior to and post-experimentation on selected bio-chemical parameters were statistically analysed to find out the significant differences if any, by applying the analysis of covariance (ANCOVA) to make adjustment for difference in initial means, the adjusted post means were calculated. The criterion for statistical significance was set at 0.05 level of confidence (P<0.05), which was considered appropriate enough for the study. The analysis of covariance (ANCOVA) were calculated with the help of SPSS packages.

Analysis of the data :

Table –I

Test	Control Group	Experimental Group	Source of variance	Sum of squares	df	Mean squares	'F' Ratio
Pre-test	Mean 288.32	289.53	Between	10.92	1	10.92	0.009
	SD 1507	46.44	Within	333.66.20	28	1191.65	
Post-test	Mean 287.18	270.82	Between	2008.19	1	2008.19	14.901*
	SD 9.13	13.65	Within	3773.58	28	134.77	
Adjusted post Test	Mean 287.31	270.69	Between	2069.53	1	2069.53	23.953*
			Within	2332.87	27	86.40	

•Significanct as .05 level of confidence. (Table value required for significance at 0.05 level of confidence with df at 1 and 28 is 4.20 and df of 1 and 27 is 4.21.)

The pre-test mean values of control and experimental groups are 288.32 and 289.53

respectively. The obtained 'F' ration value 0.009 for pre –test mean values of control and experimental groups in total cholesterol (TC)was less than the required table value 4.20 for significance at .05 level of confidence with difference of 1 and 28.

Post-test mean values of total cholesterol (TC) of control and experimental groups are 287.18 and 270.82 respectively. The obtained 'F' ration value 14.901 for post-test mean values of control and experimental groups in total cholesterol (TC) was greater than the required table value 4.20 for significance at 0.05 level of confidence with df of 1 to 28.

The adjustment post-test mean values of total cholesterol (TC) of control and experimental groups are 287.31 and 270.69 respectively. The obtained 'F'ration value 23.953 for adjusted post-test means of control and experimental groups was greater than the required table value 4.21 for significance at 0.05 level of confidence with difference of 1 to 27.

The result of the study reveals that there was a significant difference between control and experimental groups in total cholesterol (TC) Hence is is concluded that diabetic patients can decrease the total cholesterol (TC) level by undergoing six weeks of physical Training

Table-2

Analysis of Covariance of Control and experimental Group in Blood Sugar of Diabetic patients.

Test	Control Group	Experimental Group	Source of variance	Sum of squares	df	Mean squares	'F' Ratio
Pre-test	Mean 181.76	180.8	Between	21.25	1	21.15	0.026
	SD 29.61	27.63	Within	22965.37	28	720.19	
Post-test	Mean 182.50	169.42	Between	1283.93	1	1283.93	1.960
	SD 26.28	24.89	Within	18340.63	28	655.023	
Adjusted post Test	Mean 181.79	170.13	Between	1017.63	1	1017.63	16.33*
			Within	1681.95	27	62.29	

•Significant at .05 level of confidence. (Table value required for significance at 0.05 level of confidence with df at 1 and 28 is 4.20 and df of 1 and 27 is 4.21.)

The pre-test mean values of control and experimental groups are 181.76 and 180.08 respectively. The obtained 'F' ration value 0.026 for pre-test mean values of control and experimental groups in blood sugar was less than the required table value 4.20 for significance at 0.05 level of confidence with difference of 1 and 28.

The adjusted post-test mena values of Blood Sugar of control and experimental groups are 181.79 and 170.13 respectively. The obtained 'F' ration value 16.33 for adjusted post –test means of control and experimental groups was greater than the required table value 4.21 for significance at 0.05 level of confidence with difference of 1 to 27.

The result of the study reveals that thee was a significant difference between control and experimental groups in blood sugar. Hence it is concluded that diabetic patients can decrease the blood sugar level by undergoing six weeks of physical training.

Result and discussion :

The results of the study reveals that the selected biochemical parameters such as total cholesterol, blood sugar, have significantly reduced due to the effect of six weeks of physical training. These results are in donformity with the findings of the previous studies.

White and Jacques (2007) assessed the effectiveness of a 12 week pilot employee wellness program in reducing risk factors for coronary heart disease.

The result of the study showed that there was a significant differences were observed between

pre- and post- intervention measurements of total cholesterol.

Kravitz, and heyward, (1993) studied the exercise & cholesterol controversy.) The result of the study revealed that Aerobic fitness and exercise programs such as walking, jogging, and aerobics have been encouraged as a means to reduce total cholesterol. Similar observations were made in the present study. The prevailing evidence supports the concept that Physical activity can help to reduce total cholesterol in diabetic and hypertensive patients.

The above inverstigator were proved with the supporting studies of White and Jacques (2007) assessed the effectiveness of a 12- week pilot employee wellness program in reducing risk factors for coronary heart disease. This multi –component, 12 week pilot employee wellness program was effective in reducing cardiovascular disease risk. Similar observations were made in the present study. The prevailing evidence supports the concept that physical activity can help to reduce blood sugar in diabetic and hypertensive patients.

CONCLUSION:

It was concluded that there was a significant reduction on selected biochemical variables such as total cholesterol, and blood sugar of diabetic patients after six weeks or physical training. The abbreviation on the findings revealed that for the sedentary diabetic and hypertensive patients. Physical training for six weeks period could cause changes or selected bio chemical and physiological parameters. But when the training advances and changes become permanent, probably that is why higher quantum of changes were observed after six weeks of physical training. In general, human needs certain duration of time to adapt to load and react accordingly As soon as the body adapted with the load, various bio-chemical and physiological changes occur and no exposure to exercise needs to better adaptation. This would be the possible reason why after the physical training, the changes were more prominent as compare to the initial stage. In the case of training effect on blood glucouse the significant decrease was observed after six weeks of training period. This might be because that training load was sub –maximal and all the subject taken were sedentary and not exercise prior to the training program. Because of their diabetic condition that is why they need a longer time to adjust with the training load and respond accordingly. Hence it is concluded that systematic physical training is not only the measure to improve the bio-chemical components but also as therapeutic values. We can say that physical exercise is itself a medicline.

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