

Effects of Isolated and Combined Effects of Aerobic Dancing and Resistance Training On High Density Lipoprotein Status of Type-2 DIABETIC PATIENTS

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ABSTRACT

The purpose of study was to find out the effects of isolated and combined effects of aerobic dancing and resistance training on high density lipoprotein status of type-2 diabetic patients. To achieve the purpose of the study, 60 type 2 diabetic patients from Karaikudi town, Sivaganga District, Tamilnadu were selected as subject at random. The study was formulated as pre and post test random group design, in which thirty subject were divided into four equal groups. The experimental group-1 (n=15, AD) underwent aerobic dancing, the experimental group-2 (n=15, RT) underwent resistance training, group – 3 (n=15, AD+RT) underwent combined training of aerobic dancing and resistance training (COM-T) and group-4 (n=15, CG) served as a control group did not undergo any training. In this study, three training programme were adopted as independent variable, i.e., aerobic dancing, resistance training and combined training. The high density lipoprotein level was chosen as dependent variable. It was observed by blood analysis and obtained value recorded in Mg/dl. The selected three treatment groups were performed twelve weeks, as per the stipulated training program. The high density lipoprotein level was collected before and after the training period. The collected pre and post data was critically analyzed with apt statistical tool of analysis of co-variance, for observed the significant adjusted post-test mean difference of three groups. The Scheffe's post hoc test was used to find out pair-wise comparisons between groups. To test the hypothesis 0.05 level of significant was fixed. The results of the present study proved that the three training interventions have produced significant alteration on high density lipoprotein. The level of high density lipoprotein was better decreased in aerobic dancing combined with resistance training group.

Key Words: 1. Aerobic dancing 2. Resistance training 3. Ancova 4. High density lipoprotein

INTRODUCTION:

There is a global diabetes epidemic. Over 180 million people worldwide have diabetes, and the World Health Organization (2008b) predicts that by 2030 this number is likely to more than double. At least 65% of people with diabetes mellitus die from some form of heart or blood vessel disease (American Heart Association 2008a). Also, diabetes is among the leading causes of kidney failure; 10% to 20% of people with diabetes die of kidney failure (World Health Organization 2008b). Over 48 million adults in Europe and 17 million adults in the United States have diabetes, and the prevalence is increasing (American Heart Association 2008a; British Heart Foundation Health Promotion Research Group 2005). Diabetes, the most common endocrine disorder, affects multiple organs and body functions, causing serious health complications, such as renal failure, heart disease, nerve damage, stroke, and blindness. The body cannot control the level of circulating blood glucose because of either insufficient insulin production or inadequate response by organs to circulating levels of insulin, the major hormone controlling the body's glucose homeostasis. Some of the most characteristic symptoms associated with the onset of diabetes include frequent urination, excessive thirst, and fatigue. Diabetes is diagnosed when the level of glucose in the blood is greater than 7.0 mmol/L (fasting). Three major types of diabetes have been defined: type 1 or insulin -dependent diabetes mellitus, type 2 or non-insulin-dependent diabetes mellitus, and gestational diabetes. In this study an attempt is made to find out the effects of isolated and combined effects of aerobic dancing and resistance training on high density lipoprotein status of type-2 diabetic patients.

METHODOLOGY:

The purpose of study was to find out the effects of isolated and combined effects of aerobic dancing and resistance training on high density lipoprotein status of type-2 diabetic patients. To achieve the purpose of the study, 60 type 2 diabetic patients from Karaikudi town, Sivaganga District, Tamilnadu were selected as subject at random. The study was formulated as pre and post test random group design, in which thirty subject were divided into four equal groups. The experimental group-1 (n=15, AD) underwent aerobic dancing the experimental group-2 (n=15, RT) underwent resistance training group – 3 (n=15, AD+RT) underwent combined training of aerobic dancing and resistance training (COM-T) and group-4 (n=15, CG) served as a control group did not undergo any training. In this study, three training programme were adopted as independent variable, i.e., aerobic dancing, resistance training and combined training. The high density lipoprotein level was chosen as dependent

variable. It was observed by blood analysis and obtained value recorded in Mg/dl. The pre test was taken from the patients before administering the training. The patients were involved with their respective training for a period of twelve weeks.

TABLE I

THE RESULTS OF ANALYSIS OF COVARIANCE ON HIGH DENSITY LIPOPROTEIN OF DIFFERENT GROUPS

(Mg/dl)

Test Conditions		Group 1 AD	Group 2 RT	Group 3 (AT+RT)	Group 4 CG	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	70.07	70.13	70.33	70.13	B	0.72	3	0.24	0.11
	S.D.	1.79	1.19	1.68	1.22	W	124.93	56	2.23	
Post test	Mean	63.87	65.53	61.07	71.27	B	833.40	3	277.80	111.65*
	S.D.	2.33	1.19	1.28	1.22	W	139.33	56	2.49	
Adjusted post test	Mean	63.94	65.55	60.91	71.34	B	860.09	3	286.70	293.94*
						W	53.64	55	0.98	

* Significant at .05 level of confidence. The required table value for test the significance was 2.77 and 2.77 with the df of 3 and 56, 2 and 55.

The pre test mean and standard deviation on high density lipoprotein scores G1, G2 G3 and G4 were 70.07 ± 1.79 , 70.33 ± 1.19 , 70.33 ± 1.68 and 70.13 ± 1.22 respectively. The obtained pre test F value of 0.11 was lesser than the required table F value 2.77. Hence the pre test means value of aerobic dancing; resistance training, combined training and control group on high density lipoprotein on before start of the respective treatments were found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirmed that the random assignment of subjects into four groups were successful.

The post test mean and standard deviation on high density lipoprotein of G1, G2 G3 and G4 were 63.87 ± 2.33 , 65.53 ± 1.19 , 61.07 ± 1.28 and 71.27 ± 1.22 respectively. The obtained post test F value of 111.65 was higher than the required table F value of 2.77. Hence the post test means value of aerobic dancing; resistance training, combined training and control group on

high density lipoprotein on after the treatments were found to be significant at 0.05 level of confidence for the degrees of freedom 3 and 56. The results proved that the selected three training interventions namely aerobic dancing; resistance training and combined training were produced significantly altered among the treatment group.

The adjusted post test means on high density lipoprotein scores of G1, G2 G3 and G4 were 63.94, 65.55, 60.91 and 71.34 respectively. The obtained adjusted post test F value of 293.94 was higher than the required table F value of 2.77. Hence adjusted post test means value of aerobic dancing; resistance training, combined training and control group on high density lipoprotein were found to be significant at 0.05 level of confidence for the degrees of freedom 3 and 55. The results confirm that the selected three training interventions namely aerobic dancing; resistance training, and combined training on high density lipoprotein were significantly altered.

TABLE II
THE RESULTS OF SCHEFFE'S POST HOC TEST MEAN DIFFERENCES
ON HIGH DENSITY LIPOPROTEIN AMONG THREE GROUPS
(Mg/dl)

Group 1 AD	Group 2 RT	Group 3 AD+RT	Group 4 C G	Mean Differences	Confidence Interval Value
63.94	65.55			1.61*	1.28
63.94		60.91		3.02*	1.28
63.94			71.34	7.40*	1.28
	65.55	60.91		4.63*	1.28
	65.55		71.34	5.79*	1.28
		60.91	71.34	10.42*	1.28

* Significant at .05 level of confidence.

The table II shows the paired mean differences of aerobic dancing; resistance training, combined training and control group on high density lipoprotein. The paired wise comparisons results as follows.

First comparison: Group 1 and Group 2: The pair wise mean difference of group 1 and group 2 values 1.61 was higher than the confidential interval value of 1.28. Hence the first

comparison was significant. The results of this comparison clearly proved that both training have produced significant alteration on high density lipoprotein. **Second comparison: Group 1 and Group 3:** The pair wise mean difference of group 1 and group 3 values 3.02 was higher than the confidential interval value of 1.28. Hence the second comparison was significant. The results of this comparison clearly proved that both training have produced significant alteration on high density lipoprotein. **Third comparison: Group 1 and Group 4:** The pair wise mean difference of group 1 and group 4 values 7.40 was higher than the confidential interval value of 1.28. Hence the third comparison was significant. The results of this comparison clearly proved that aerobic dancing group produced significant alteration on high density lipoprotein than the control group. **Fourth comparison: Group 2 and Group 3:** The pair wise mean difference of group 2 and group 3 values 4.63 was higher than the confidential interval value of 1.28. Hence the fourth comparison was significant. The results of this comparison clearly proved that both training have produced significant alteration on high density lipoprotein. **Fifth comparison: Group 2 and Group 4:** The pair wise mean difference of group 2 and group 4 values 5.79 was higher than the confidential interval value of 1.28. Hence the fifth comparison was significant. The results of this comparison clearly proved that resistance training have produced significant alteration on high density lipoprotein than the control group. **Sixth comparison: Group 3 and Group 4:** The pair wise mean difference of group 3 and group 4 values 10.42 was higher than the confidential interval value of 1.28. Hence the sixth comparison was significant. The results of this comparison clearly proved that combined training have produced significant alteration on high density lipoprotein than the control group.

Discussion on Findings

The therapeutic benefits of regular exercise in the treatment of type 2 diabetes have long been recognized. As early as 1919, there were reports of exercise lowering blood glucose concentrations in diabetic patients and improving glucose tolerance. In the 1935 edition of *The Treatment of Diabetes Mellitus* by Joslin and colleagues, exercise was recommended in the everyday treatment of diabetes." From the epidemiological studies discussed in the previous sections, clear that regular moderate-intensity exercise can be an important part of a regimen to prevent and treat type 2 diabetes. Regular physical activity potentiates the effects of diet and oral antihyperglycemic therapy examine (e.g., metformin and sulfonylureas) to lower glucose levels and improve insulin sensitivity in obese people type 2 diabetes. Many health benefits that regular physical activity provides in the prevention

of chronic metabolic diseases, such as type 2 diabetes, may be attributable to the overlapping actions of individual exercise sessions and long-term adaptations to exercise training. As mentioned elsewhere, acute exercise produces major effects on whole-body glucose disposal and skeletal muscle glucose uptake and metabolism. However, the elevated insulin-stimulated glucose disposal rates, responsible for the improved insulin sensitivity, tend to disappear after about 5 to 7 days of inactivity. Hence, the effects of exercise training in increasing insulin action are transient and require a regular and constant practice of physical activity. In addition to improving glucose tolerance and insulin resistance, exercise training has other beneficial effects, such as improving cardiovascular fitness, lowering blood pressure, improving blood lipid profiles, promoting weight loss, reducing abdominal and intra-abdominal fat (a major risk factor for insulin resistance), and promoting a sense of well-being, all of which are known to be associated with diabetes. Therefore, regular physical activity improves morbidity and mortality in people with type 2 diabetes. Multiple factors may modulate the response to exercise training in subjects with diabetes, such as the degree of insulin resistance and insulin deficiency, the frequency and intensity of exercise, the adherence to diet, and weight loss. Insulin sensitivity and the rate of glucose disposal are related to cardio respiratory fitness even in older persons. The additional potential beneficial effects of exercise training to lower cardiovascular risk in people with type 2 diabetes may reduce the risk of macrovascular or atherosclerotic complications typical of diabetes. Santilli F et al., (2013), conducted a study on, “effects of high-amount-high-intensity exercise on in vivo platelet activation: Modulation by lipid peroxidation and AGE/RAGE axis” with aerobic high-amount-high-intensity training program in 22 sedentary subjects. This study concluded in a beneficial effect on HDL cholesterol and triglyceride concentration. Hamid Arazi, EsmailFarzaneh, and Samira Gholamian.(2012)., conducted a study on “effects of morning aerobic training on lipid profile, body composition, and VO_{2max} , in sedentary overweight females”. In this Study 20 overweight (OW) subjects assigned to training group. Aerobic training consisted of 8 weekly period and 6 days per week was applied to subjects. In their study they found 8-weeks morning aerobic training had significant effect on LDL, HDL and weight except to TG. Mohammad Ali Sardar , Seyyed Mahmud Hejazi , RaminehAbedini.,(2012), conducted a study on “effects of an eight-week aerobic exercise training program on serum leptin and cardiovascular risk factors among obese men with type II diabetes”. . In this clinical study, 53 patients, who had type 2 diabetes mellitus were selected purposely and classified randomly into two groups, i.e., an aerobic exercise group (27patients) and a control

group (26 patients). The former participated in an eight-week training program three times a week that included 45 to 60 minutes with the intensity of 60 to 80% of maximum heart rate. In their study they found Aerobic exercise training caused a significant reduction in fat percentage, and it also significantly increased the HDL-c level. Balducci S et.al., .(2010), conducted a study on, “effect of an intensive exercise intervention strategy on modifiable cardiovascular risk factors in subjects with type 2 diabetes mellitus: a randomized controlled trial, with 691 eligible sedentary patients with Type2DM were practiced aerobic exercise for 12 months. They concluded that this exercise intervention strategy was effective in TC, LDL and HDL levels.

Conclusion

The results of this study indicate the high density lipoprotein level significantly altered over twelve weeks training period for aerobic dancing, resistance training and combined training group. The combined training group shows more alteration in high density lipoprotein level than aerobic dancing, resistance training and control group. The aerobic dancing and resistance training group produce less alteration on high density lipoprotein. The control participants did not show any significant changes on high density lipoprotein.

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