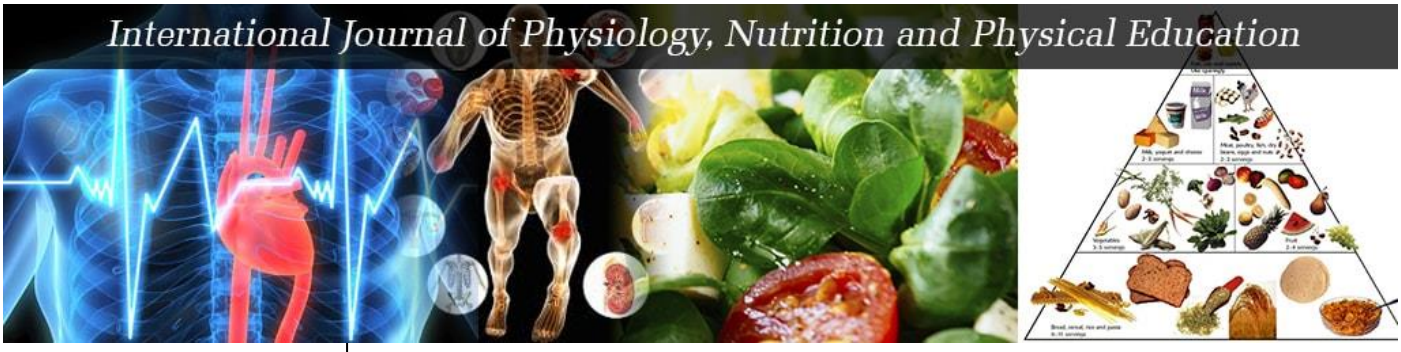

ISSN: 2456-0057
IJPNPE 2019; 4(1): 924-927

www.journalofsports.com
Received: 10-11-2018
Accepted: 11-12-2018

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Effect of cardio and pilates exercises on thyroid and premenstrual syndrome for overweight and obese women

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Abstract
Objective: The purpose of the study was to find out the effect of 12 weeks of Cardio and Pilates exercises training on thyroid and premenstrual syndrome for overweight and obese women.
Method: For the purpose of this study 45 overweight and obese women were selected as subjects from Pondicherry University, Puducherry, India. The age ranged between 20-29 years. The participants were divided into three groups namely Cardio Exercises group (Group-I, n=15), Pilates exercises group (Group-II, n-=15) and Control Group (Group-III, n=15). Both the Pilates exercises group and Cardio exercises group were undergone training of alternate three days for totally 12 weeks, in each session consist of 45minutes including warming up. The control group did not practice any special training programme. The pre and post of blood sampling test was conducted to assess the thyroid TSH, T3 & T4 in biochemistry lab. The Premenstrual Syndrome (PMS) test was conducted by Premenstrual Syndrome Severity questionnaire.
Findings: The results showed that Cardio and Pilates exercises training were significantly decreased thyroid and PMS in Obese women.
Conclusion: Pilates exercise group had significantly improved in thyroid disorder (4.7 to 4.13 u IU/ml) and fall in to normal value (0.27-4.2 u IU/ml) and Cardio exercise group had significantly improved in thyroid disorder (5.17 to 4. u IU/ml 8 u IU/ml) but not fall in to normal thyroid value. Premenstrual syndrome was significantly decreased in experimental groups when compared to the control group due to the influence of 12 weeks training of cardio and Pilates exercise training on obese women.

Keywords: Cardio Exercise training, Pilates exercise training, Thyroid TSH, T3, t4, Premenstrual Syndrome (PMS), Overweight and Obese Women

1. Introduction

1.1 Obesity

Obesity is a condition in which there is an excess of body fat. Being too fat, especially to the point of obesity, is positively harmful to the health. Of late, obesity is emerging as one of the most prevalent metabolic disorders. The voluminous researches have been carried out which revealed that wide spread derangements in various metabolic and endocrine functions are associated with obese state. It is associated with number of health hazards like it increases mortality and morbidity rates causing certain diseases.

1.2 Thyroid Hormone and Impact

Thyroid hormones regulate metabolic processes mainly by binding at peripheral receptors. High intensity resistance training (RT) for three weeks followed by three weeks of endurance training (ET).One week for recovery Blood samples were taken before and at the end of training, thyroid stimulating hormone (TSH), free T3 (fT3) and free T4 (T4) were measured. After RT, a significant reduction in TSH and T3 was found ($p < 0.05$). Simsch, C *et al*., (2002) [2]. Important interaction exists between thyroid function, weight control, and obesity. Obese people with a normal thyroid gland tend to have activation of the hypothalamic-pituitary-thyroid axis with higher serum TSH and thyroid hormones in serum. Laurberg, P *et al*. (2012) [1]. A study published in the International Journal of Obesity in 2006 compared BMI and TSH levels in 6,164 adults from 1995 to 2001.

In this study, higher BMI was associated with higher TSH (TSH is higher in hypothyroidism).

1.3 Premenstrual Disorder
A weight gain has been shown to influence menstrual cycle regularity, because changes in weight may lead to changes in hormone levels, including estrogen and testosterone, according to dietitian and fertility research expert. A strong linear relationship between BMI at baseline and risk of incident PMS, with each 1 kg/m2increase in BMI associated with a significant 3% increase in PMS risk. Bertone-Johnson, (2010) [3]. Obese women reported severe or extreme PMS symptom changes using the "Shortened Premenstrual Assessment Form". The main exposure variable was obesity as measured by Body Mass Index. South-Paul J. (2005) [4].

1.4 Cardio Exercises
Cardio exercise means a rhythmic activity that raises your heart rate into your target heart rate zone, the zone will burn the most fat and calories, the activity for at least 10 minutes.

1.5 Pilates Exercises
Pilates can be an aerobic and non-aerobic form of exercise. It requires concentration, focus, lengthens and stretches all the major muscle groups in your body in a balanced. Exercise has a prescribed placement, rhythm and breathing. The sequences of the exercise in low repetitions, usually five to ten times, over a session of 45 to 90 minutes.

2. Objective of the Study
Obese populations were neglected to exercises. They are fall into different type of disorder or diseases. In our university we are finding problems of obese women. The main objective of the study is to remedial for the obese women become normal at away from the disorder and diseases.

3. Statement of the problem
The purpose of the study was to find out the effect of 12 weeks of cardio and Pilates exercise group on thyroid of overweight and obese women.

4. Materials and Methods
4.1 Selection of Subjects
The purpose of the study was to find out the effect of 12 weeks of cardio and Pilates training on thyroid and Premenstrual Syndrome (PMS) of overweight and obese women. Totally forty five overweight and obese women were selected for this study from Pondicherry University, Puducherry. The age ranged between 20-29 years. The range of subject's Body Mass Index is between 25 to 35.75. They were divided into three groups each group consists of fifteen subjects. Group I underwent Cardio exercise group (n=15), the subjects who were 11 in overweight 4 in obesity. Group II underwent Pilates Exercise group (n=15), the subjects who were 13 in overweight 2 in obesity and Group III underwent Control Group (n=15), the subjects who were 12 in overweight 3 in obesity. Control group did not expose any training they are sedentary women.

4.2 Variables, Intervention and Collection of Data
Cardio exercise group was undergone training of alternate three days (Monday, Wednesday and Friday) in a week. Pilates exercise group was undergone training of alternate three days (Tuesday, Thursday and Saturday) in a week. Each session consist of 45minutes including warming up. The total duration of the training period was 12 weeks.

The pre and post of blood sampling test was conducted for thyroid TSH, T3 & T4. The blood sample test was conducted in the biochemistry lab and it was tested by the technical experts. All variables were tested pre and post test. The data were analyzed by paired 't' test. The Premenstrual Syndrome (PMS) test was conducted by Premenstrual Syndrome Severity questionnaire used to collect the data. All the data were analyzed by using computer with SPSS statistical 21 packages. The significance was fixed at 0.05 level of confidence.

5. Results and Discussion
5.1 Results of Thyroid

Table 1: Analysis of 'T' Test on Thyroid (Scores in u IU/ml)

Group	Test	Mean	S.D	MD	't'
Cardio Exercise Group	Pre	3.01	1.83	0.03	1.254
	Post	2.98	1.62		
Pilates Exercise Group	Pre	3.06	2.28	0.63	1.899
	Post	2.97	2.27		

Significant at 0.05 levels of confidence.

Table-1 shows the mean, standard deviation of the pre and post test data. The pre and post mean for the Cardio Exercise Group were 3.01, 2.98 and the Pilates Exercise Group were 3.06, 2.97 respectively. The obtained 't' value of Cardio and Pilates Exercise Group were 1.254 and 1.899 respectively which was lesser than the required table value of 2.15 for significant at 0.05 level for 14 df. There is no significant difference in Thyroid but there is a mean difference between the pre and post values.

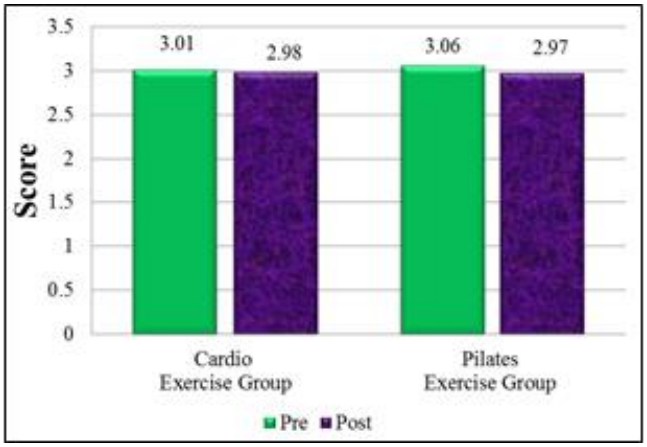

Fig 1: The Graph Shows the Pre and Post Test Mean Difference for the Cardio and Pilates Exercise Groups of Thyroid (Scores in u IU/ml)

Table 2: Significant Changes on Thyroid

Group	Test	Significant Value	Normal Value	MD
Cardio Exercise Group	Pre	5.17	0.27-4.2 u IU/ml	0.37
	Post	4.8		
Pilates Exercise Group	Pre	4.7	0.27-4.2 u IU/ml	0.57
	Post	4.13		

Paired 't' test was used to find out the significant difference if any, among the experimental group Pre and Post in selected variables. The results of the study indicated that the experimental group which underwent Cardio and Pilates exercise had showed no significant difference in thyroid. But

there is a difference between the pre and post test mean 5.17, 4.8 and 4.7, 4.13 respectively. Because there is only three subjects had thyroid among the each groups.

Findings

The results found that the mean difference between Cardio exercise and Pilates Exercise Group; the Pilates exercise group had significantly improved of reduction of thyroid from positive value to negative value in which it fall in to the average value of normal thyroid. The Cardio exercise group had significantly improved of reduction of thyroid from positive value of to negative value in which is not fall in to the average value of normal thyroid. Therefore, compare between Pilates exercise and cardio exercises, the Pilates exercise are better than the cardio exercise to improve thyroid disorder.

The table-3 shows the pretest, posttest and adjusted posttest mean, SD and F-ratio. The pretest F ratio was 0.014 it was lesser than the table values so that there is no significant difference in selected groups. The posttest F ratio was 18.18 it was greater than the table values so that, there is significant difference in selected groups. The adjusted posttest F ratio was 21.372 it was greater than the table values so that there is significant difference in selected groups.

5.2 Results of Premenstrual Syndrome (PMS)

Table 3: Computation of ANCOVA Test on Premenstrual Syndrome (PMS) (In 3 point scale)

Test	Group	Cardio exercise group	Pilates exercise group	Control group	SOV	SOS	df	MSOS	F ratio
Pre	Mean	38.73	38.6	38.53	B	0.311	2	0.156	0.014
	S.D	3.75	3.07	3.31	W	482.27	42	11.48	
Post	Mean	31.87	32.07	38.53	B	431.51	2	215.76	18.18*
	S.D	3.64	3.37	3.31	W	498.40	42	11.87	
Adjusted Post Test Mean	Mean	31.82	32.08	38.57	B	438.58	2	219.90	21.372*
					W	420.68	41	10.26	

* Significant at 0.05 levels of confidence for 2 and 41 (df) = 3.22

Table 4: Scheffe's Test for the Difference between the Adjusted Post Test Means of Premenstrual Symptom (PMS) (in 3 point scale)

Adjusted Post Test Mean			DM	Sig
Cardio Exercise Group	Pilates Exercise Group	Control Group		
31.82	32.08	-	0.26	.829
31.82	-	38.57	6.75	.000*
-	32.08	38.57	6.49	.000*

Significant at 0.05 levels of confidence

Table-4 shows the selected groups mean differences and significant values. When comparison of Cardio group and Pilates groups there was no significant difference between the experimental groups, comparison of cardio group and control group there was significant difference between the groups and the comparison of Pilates group and control group there was significant difference between the groups of premenstrual syndrome.

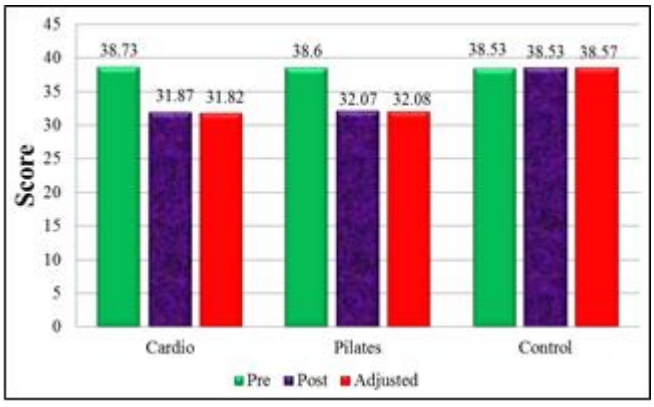

Fig 2: The Diagram Illustrates the Mean Difference on Experimental Group of Premenstrual Syndrome (Pms)

6. Conclusions

From the analysis of the data the following conclusions are drawn,

1. It was concluded that thyroid were no significant changes of cardio and Pilates exercise training on obese women after twelve weeks of training. But there is a mean difference in Pre and Post values.
2. Pilates exercise group had significantly improved in thyroid disorder and fall in to normal value.
3. Cardio exercise group had significantly improved in thyroid disorder but not fall in to normal thyroid value.
4. There were no significant differences between cardio and Pilates exercise group in Premenstrual Syndrome.
5. There was a significant differences between cardio exercise group and Control group and between Pilates exercise group and Control group in Premenstrual Syndrome.
6. It was concluded that Premenstrual syndrome were significantly decreased in experimental groups when compared to the control group due to the influence of 12weeks training of cardio and Pilates exercise training on obese women.

7. Recommendations

1. Pilates and Cardio both exercises are significantly improved thyroid level for the obese women. Therefore these exercises are recommended as suitable exercise to found the improvement on thyroid women.
2. Pilates exercises and Cardio exercises both exercise are recommended as suitable exercises to improve Pre Menstrual Syndrome for women.
3. Similar study may be conducted for the normal weighing women those who have thyroid problem as well as PMS.

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