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Effect Of Pilates Exercises, Yogic Practices and Combined Pilates Exercises and Yogic Practices on Selected Physical Fitness Variables Among College Female Students

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ABSTRACT

Background: The present study was designed to find out the effect of Pilates exercises, yogic practices and combined Pilates exercises and yogic practices on selected physical fitness variables among college female students.

Methods: For this purpose, sixty (N=60) college female students studying various affiliated colleges to Thiruvalluvar University, Vellore, Tamilnadu India were selected randomly as subjects. The age of the subjects was ranged between 18-21 years. The subjects were assigned at random into four groups of fifteen each (n=15) namely, Pilates exercises, yogic practices, combined Pilates exercises and yogic practices and control group. Group-I underwent Pilates Exercises, Group-II underwent yogic practices, Group-III underwent combined Pilates exercises and yogic practices and Group-IV acted as control. The duration of the training period for all the three experimental groups was restricted to twelve weeks and the number of sessions per week was confined to three in a week. For combined Pilates exercises and yogic practices, the training period was restricted to alternative weeks for twelve weeks. Among various physical fitness variables Agility and Flexibility were selected as dependent variable and agility assessed by 4x10 meters shuttle run test and flexibility was measured through sit & reach test. All the subjects were tested prior to and immediately after the training for the entire selected variable. **Results:** The data obtained from the experimental groups before and after the experimental period were statistically analyzed with Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted posttest means was found to be significant, the Scheffe's Post hoc test was applied to determine the paired mean differences. The level of confidence was fixed at 0.05 level for all the cases.

Conclusions: The results of the study showed that there was a significant difference among all the groups. Further the results of the study showed that combined Pilate's exercises and yogic practices group was found to be better than the Pilate's exercises group and yogic practices group in agility and flexibility

Keywords: *Pilates Exercises, Yogic Practices, Combined Pilates Exercises and Yogic Practices, Agility, Flexibility*

1. INTRODUCTION

Pilates is a movement and exercise regimen intended to improve balance, strength, and flexibility. It combines movement and breathing with appropriate body mechanics to improve awareness and make use of all the body's muscles as intended (Guimaraes et al., 2012). The majority of the exercises target the trunk and pelvis, training the body with both mobility and stability. It can be done on specialized Pilates equipment (the most popular is the Pilates Reformer) or on a mat with your own body and occasionally small props. Pilate offers both group and one-on-one classes. All ages and bodies can benefit from Pilates. The method's adaptability to each practitioner's needs and skill level is one of its many wonderful aspects (Essam et al., 2011).

Joseph Hubertus Pilates created Pilates. In 1883, he was born in Germany. It is known that he suffered from asthma and other illnesses as a child, though accounts differ. He created his own system to strengthen his own body after studying a variety of movements and exercises, including the Greek philosophy of mind, body, and spirit. He began his career as a boxer

and circus performer. Pilates has a lot of advantages. Improved flexibility, balanced muscles on both sides of the body, better posture, increased lung capacity, improved coordination and balance, improved body awareness, stress management, injury prevention, and rehabilitation are all examples of this. Increased muscle tone and strength, particularly in the core muscles, as well as the shoulders, arms, legs, and feet, is one important advantage (Wells et al., 2012). Pilates offers total body, mind, and spirit coordination. Pilates is founded on six principles that help reduce physical stress while improving cognitive abilities, motivation, and attention (Arline Muller et al., 2012).

Yoga is a way to achieve complete body, mind, and spirit harmony. The Sanskrit word yuj, meaning union, is where the word yoga originates. unity between the universal and individual consciousnesses. Yoga is more than just physical exercise. It is an age-old wisdom that eventually leads to union with the Self and promotes a happier, healthier, and more tranquil way of living. Humans have an innate desire to be happy. By studying life, the ancient sages were able to achieve a state of consciousness where they learned the keys to leading a happier, healthier, and more fulfilling life (Kanimozhi, K., B. Raja Mohamed Rabi, 2018)

2. METHODS

Study Participants

Sixty (N=60) female college students from different affiliated colleges at Thiruvalluvar University in Vellore, Tamilnadu, India, were chosen at random to participate in the study. The subjects were between the ages of 18 and 21. The participants were divided into four groups of fifteen at random (n=15): the control group, the combined Pilates and yoga exercises, the Pilates exercises, and the yoga practices. Group I performed Pilates exercises, Group II performed yoga, Group III performed a combination of yoga and Pilates exercises, and Group IV served as the control. For all three experimental groups, the training period was limited to twelve weeks, and there could be no more than three sessions per week. The training period for combined yoga and Pilates exercises was limited to alternate weeks for a total of twelve weeks. Agility and flexibility were chosen as dependent variables among a variety of physical fitness variables.

Experimental Design

In this study, a random group design was employed as the experimental design. The participants were divided into four groups of fifteen at random (n=15): the control group, the combined Pilates and yoga exercises, the Pilates exercises, and the yoga practices. Group I performed Pilates exercises, Group II performed yoga, Group III performed a combination of yoga and Pilates exercises, and Group IV served as the control.

Testing Procedure

Flexibility and agility were chosen as the dependent variables. Two days prior to the training program, pretest data were gathered, and posttest data was gathered right after the twelfth week of instruction.

Agility

One accurate way to gauge an athlete's agility is with the Agility 4x10m Shuttle Run test. It is a respectable way to demonstrate how a player can change direction, accelerate, decelerate, and then explode again to reach their maximum speed without losing control of their body. One test used to gauge a person's agility performance is the 4x10m Shuttle Run. This test consists of four repetitions of running back and forth between points A and B, spaced 10 meters (33 feet) apart, for a total timed shuttle run distance of 40 meters (4x10m). As you turn to run back to the starting point, you must also pick up two blocks of wood as part of the test.

Flexibility

With the aid of a sit-and-reach box, flexibility assessments were performed using the sit-and-reach assessment method. Prior to the measurements, participants were told to take off their shoes and dress in casual or athletic wear. After that, they were instructed to sit on the floor with their legs out in front of them, making sure the soles of their feet touched the sit-and-reach box. The tester held the participants' knees to keep their feet on the ground. Sitting with their palms facing down, participants clasped their hands together. They inhaled deeply, then reached as far forward as they could along the box's measurement line to exhale. There was a brief rest period between each of the two sit-and-reach tests. According to the furthest reach in centimeters, the best outcome from both trials was chosen for examination (Uppal & Gautam, 2006).

Statistical analysis

Analysis of Covariance (ANCOVA) was used to statistically analyze the data collected from the experimental groups both before and after the experimental period. The Scheffe's Post hoc test was used to ascertain the paired mean differences whenever the adjusted posttest mean's "F" ratio was determined to be significant. For every case, the level of confidence was set at the 0.05 level.

RESULTS

Table-1 shows the findings of the Analysis of Covariance on a selected physical fitness variable of the pre, post, and adjusted test scores of the groups that practiced yoga, Pilates exercises, combined Pilates exercises and yoga, and control group.

a) Agility

Table – 1 Values of Analysis of Covariance for Experimental Groups and Control Group on Agility

Certain Variables	Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
	Pilates Exercises Group	Yogic Practices Group	Combined Pilates Exercises and Yogic Practices Group	Control Group					
Pre Test	10.50	10.58	10.54	10.55	Between With in	0.12 7.03	3 56	0.006 0.13	0.04
Post Test	9.90	9.77	9.52	10.52	Between With in	8.16 5.21	3 56	2.72 0.09	29.23*
Adjusted Post Test	9.90	9.76	9.53	10.52	Between With in	8.12 2.79	3 55	2.71 0.05	53.38*

**** Significant at.05 level of confidence***

Table value for df (3, 56) at 0.05 level = 2.76 Table value for df (3, 55) at 0.05 level = 2.78

Table-1 shows that the pretest means value of Agility for Pilates Exercises group, Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group is 10.50, 10.58, 10.54 and 10.55 respectively. The obtained F-ratio of 0.04 for the adjusted posttest mean is less than the table value of 2.76 for df 3 and 56 required for significance at 0.05 level of confidence. The posttest means value of Agility for Pilates Exercises group, Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group is 9.90, 9.77, 9.52 and 10.52 respectively. The obtained F-ratio of 29.23 for the adjusted posttest mean is less than the table value of 2.76 for df 3 and 56 required for significance at 0.05 level of confidence.

Further the table-1 shows that the adjusted posttest means value of Agility for Pilates Exercises group, Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group is 9.90, 9.76, 9.53 and 10.52 respectively. The obtained F-ratio of 53.38 for the adjusted posttest mean is more than the table value of 2.78 for df 3 and 55 required for significance at 0.05 level of confidence.

The results of the study indicate that there are significant differences among the adjusted posttest means of Experimental groups on the increase of Agility. To determine which of the paired means had a significant difference, Scheffe's test was applied as Post hoc test and the results are presented in Table-2.

Table – 2 The Scheffe's test for the differences between the adjusted posttests paired means on Agility

Certain Variables	Adjusted Post test Means				Mean Difference	Confidence Interval
	Pilates Exercises Group	Yogic Practices Group	Combined Pilates Exercises and Yogic Practices Group	Control Group		
Agility	9.90	9.76			0.14	0.24
	9.90		9.53		0.37*	0.24
	9.90			10.52	0.62*	0.24
		9.76	9.53		0.23	0.24
		9.76		10.52	0.76*	0.24
			9.53	10.52	0.99*	0.24

**** Significant at.05 level of confidence***

Table-2 shows that the adjusted posttest mean differences on Agility between Pilates Exercises group and Combined Pilates Exercises and Yogic Practices group, Pilates Exercises group and Control group, Yogic Practices group and Combined Pilates Exercises and Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group are 0.37, 0.62, 0.76 and 0.99 respectively and they are greater than the confidence interval value 0.24, which shows significant differences at 0.05 level of confidence. Further the table-2 shows that the adjusted posttest means differences on Agility between Pilates Exercises group and Yogic Practices group & Yogic Practices group and Control group are 0.14 & 0.23 which is lesser than the confidence interval value 0.24, which shows there is no significant differences at 0.05 level of confidence.

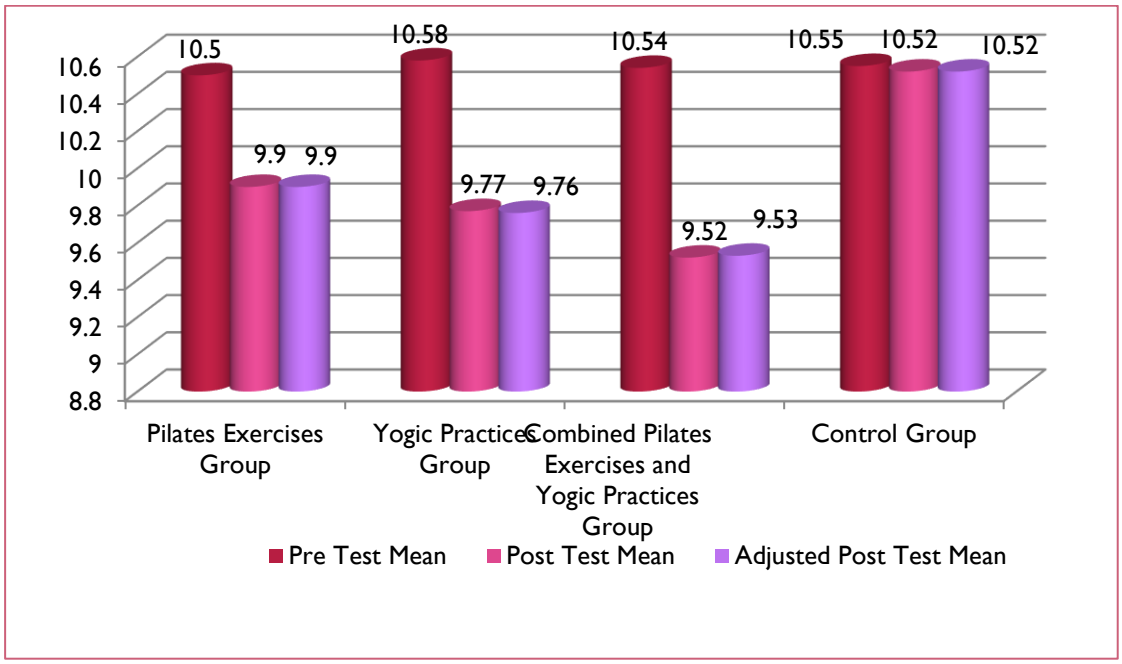
The results of the study have revealed that there is a significant difference in Agility between the adjusted posttest means of Pilates Exercises group and Combined Pilates Exercises and Yogic Practices group, Pilates Exercises group and Control group, Yogic Practices group and Combined Pilates Exercises and Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group. Further the results of the study further have revealed that there is no significant difference in Agility between the adjusted posttest means of Pilates Exercises group and Yogic Practices group & Yogic Practices group and Control group on Agility.

However, the increase in Agility was significantly higher for Combined Pilates Exercises and Yogic Practices group than other Experimental groups.

It may be concluded that the Combined Pilates Exercises and Yogic Practices group has exhibited better than the other experimental groups in decreasing Agility.

The mean value of experimental groups on Agility is graphically represented in the Figure -1.

Figure-1 Bar diagram on ordered means of Agility



b) Flexibility

Table – 3 Values of Analysis of Covariance for Experimental Groups and Control Group on Flexibility

Certain Variables	Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
	Pilates Exercises Group	Yogic Practices Group	Combined Pilates Exercises and Yogic Practices Group	Control Group					
Pre Test	17.93	18.20	17.87	18.00	Between With in	0.93 33.07	3 56	0.31 0.59	0.53
Post Test	23.40	23.47	26.40	18.13	Between With in	532.98 100.67	3 56	177.66 1.80	98.83*
Adjusted Post Test	23.43	23.39	26.45	18.13	Between With in	536.50 95.71	3 55	178.83 1.74	102.76*

**** Significant at.05 level of confidence***

Table value for df (3, 56) at 0.05 level = 2.76 Table value for df (3, 55) at 0.05 level = 2.78

Table-3 shows that the pretest means value of Flexibility for Pilates Exercises group, Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group is 17.93 18.20, 17.87 and 18.00 respectively. The obtained F-ratio of 0.53 for the adjusted posttest mean is less than the table value of 2.76 for df 3 and 56 required for significance at 0.05 level of confidence. The posttest means value of Flexibility for Pilates Exercises group, Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group is 23.40, 23.47, 26.40 and 18.13 respectively. The obtained F-ratio of 98.83 for the adjusted posttest mean is less than the table value of 2.76 for df 3 and 56 required for significance at 0.05 level of confidence.

Further the table-1 shows that the adjusted posttest means value of Flexibility for Pilates Exercises group, Yogic Practices group, Combined Pilates Exercises and Yogic Practices group and Control group is 23.43 23.39, 26.45 and 18.13 respectively. The obtained F-ratio of 102.76 for the adjusted posttest mean is more than the table value of 2.78 for df 3 and 55 required for significance at 0.05 level of confidence.

The results of the study indicate that there are significant differences among the adjusted posttest means of Experimental groups on the increase of Flexibility.

To determine which of the paired means had a significant difference, Scheffe's test was applied as Post hoc test and the results are presented in Table-4.

Table – 4 The Scheffe's test for the differences between the adjusted posttests paired means on Flexibility

Certain Variables	Adjusted Post test Means				Mean Difference	Confidence Interval
	Pilates Exercises Group	Yogic Practices Group	Combined Pilates Exercises and Yogic Practices Group	Control Group		
Flexibility	23.43	23.39			0.04	1.39
	23.43		26.45		3.03*	1.39
	23.43			18.13	5.29*	1.39
		23.39	26.45		3.06*	1.39
		23.39		18.13	5.26*	1.39
			26.45	18.13	8.32*	1.39

**** Significant at.05 level of confidence***

Table-4 shows that the adjusted posttest mean differences on Flexibility between Pilates Exercises group and Combined Pilates Exercises and Yogic Practices group, Pilates Exercises group and Control group, Yogic Practices group and Combined Pilates Exercises and Yogic Practices group, Yogic Practices group and Control group, Combined Pilates Exercises and Yogic Practices group and Control group are 3.03, 5.29, 3.06, 5.26 and 8.32 respectively and they are greater than the confidence interval value 1.39, which shows significant differences at 0.05 level of confidence. Further the table-2 shows that the adjusted posttest mean differences on Flexibility between Pilates Exercises group and Yogic Practices group is 0.04 which is lesser than the confidence interval value 1.39, which shows there is no significant differences at 0.05 level of confidence.

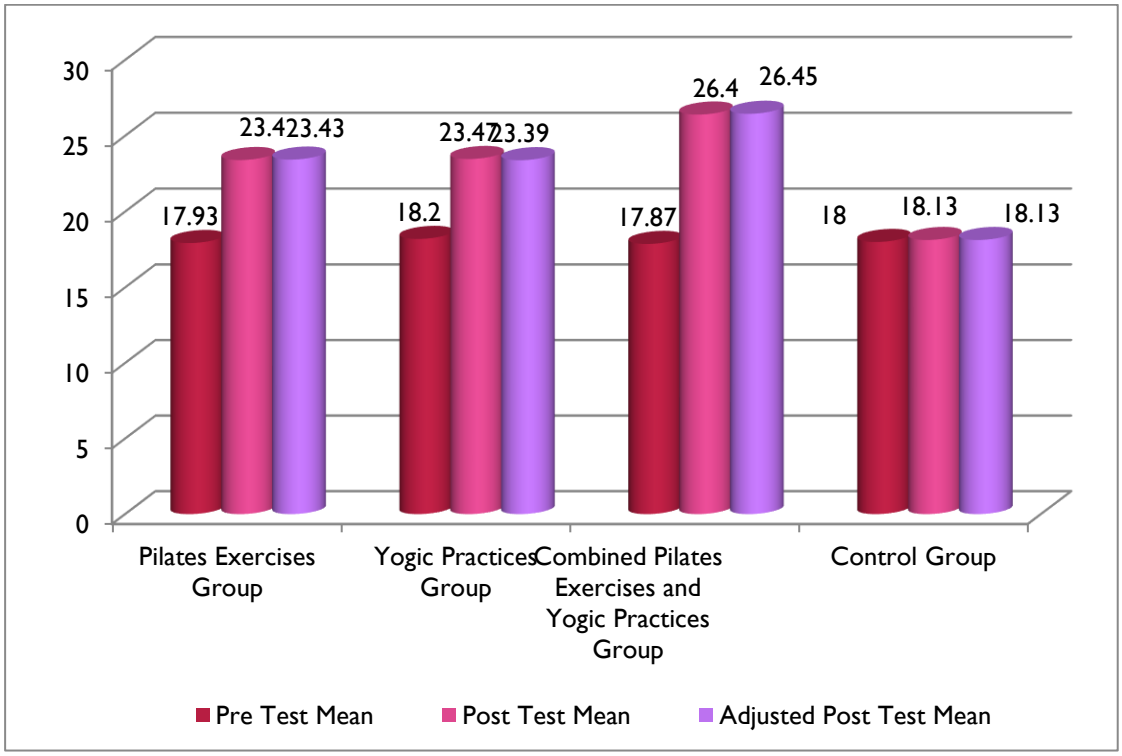
The results of the study have revealed that there is a significant difference in Flexibility between the adjusted posttest means of Pilates Exercises group and Combined Pilates Exercises and Yogic Practices group, Pilates Exercises group and Control group, Yogic Practices group and Combined Pilates Exercises and Yogic Practices group, Yogic Practices group and Control group, Combined Pilates Exercises and Yogic Practices group and Control group. Further The results of the study further have revealed that there is no significant difference in Flexibility between the adjusted posttest means of Pilates Exercises group and Yogic Practices group on Flexibility.

However, the increase in Flexibility was significantly higher for Combined Pilates Exercises and Yogic Practices group than other Experimental groups.

It may be concluded that the Combined Pilates Exercises and Yogic Practices group has exhibited better than the other experimental groups in decreasing Flexibility.

The mean value of experimental groups on Flexibility is graphically represented in the Figure -2.

Figure-2 Bar diagram on ordered means of Flexibility



3. DISCUSSION

The purpose of this study was to assess how certain physical fitness variables among female college students were affected by Pilates exercises, yoga, and a combination of these practices. The combined Pilates and yoga exercises group significantly improved on all measures, including agility and flexibility, from the pretest to the posttest, according to the results. The current study's goal was to assess how certain physical fitness variables among female college students were affected by Pilates exercises, yoga, and a combination of these practices. This study examines how college female students' physical performance traits during the preseason are affected by a combination of yoga and Pilates exercises. To measure various parameters, the researchers used a variety of tests, including the sit-and-reach test and a 4x10-meter shuttle run.

The results of the study indicate that all tested physical performance characteristics significantly improved after a twelve-week program of Pilates exercises, yoga, and combined yoga and Pilates exercises ($p < 0.05$). Between the first and last assessments, there was a noticeable increase in agility and flexibility. The control group (CG) surprisingly showed no discernible changes from the pre-test to the post-test on any of the measures. According to research by John Parthiban (2021), Gonul Babayigit Irez et al. (2011), Hyun, Kak Hwangbo (2014), John Walsakom et al. (2010), and Magdolna Vécseyne Kovách and Judit Kopka (2014), engaging in Pilates exercises, yoga, and a combination of these activities can significantly enhance physical fitness components. The findings align with the positive patterns noted in the present investigation.

4. CONCLUSIONS

Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group, and control group in anxiety all showed significant differences in achievement. Agility and flexibility were considerably lower in the experimental groups—Pilate's exercises group, yoga practice group, combined Pilate's exercises and yoga practice group, and control group.

In terms of increasing agility and flexibility, the combined Pilate's exercises and yoga practices group outperformed the Pilate's exercises group, the yoga practices group, and the control group.

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