Effect of Pilates Exercises, Yogic Practices and Combined Pilates Exercises and Yogic Practices on Resting Pulse Rate among College Female Students

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Abstract

The present study was designed to find out the effect of Pilates exercises, yogic practices and combined Pilates exercises and yogic practices on Resting Pulse Rate among college female students. 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 were 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. Resting Pulse Rate was selected as dependent variable and it was assessed by pulse rate monitor. All the subjects were tested prior to and immediately after the training for the entire selected variable. The data obtained from the experimental groups before and after the experimental period were statistically analyzed with dependent't'-test and Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post test 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. The results of the study showed that there was a significant difference was found among all the experimental groups namely Pilates exercises, yogic practices, combined Pilates exercises and yogic practices groups had significantly increase in Resting Pulse Rate. 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 Resting Pulse Rate.

Keywords: Pilates Exercises, Yogic Practices, Combined Pilates Exercises and Yogic Practices, Resting Pulse Rate

1. Introduction

Pilates is a less severe exercise than other aerobic and dance exercises, it is a very important type of exercise for a healthy body with concentration, control, centering, flowing movement rhythm, precision of movement and breathing technique during the exercise. Some studies have shown that pilates exercises reduce the risk of heart disease, prevent osteoporosis, shape the body, improve balance, flexibility and strength(Robinson & Hunter, 2003).

Pilates is one of the training methods which are very popular, they have lower intensity compared to aerobic exercises, and has very positive effects on health such as decreasing cardiovascular risk, practice of pilates showed an improvement in body composition in healthy people (Wolkodoff, 2013).

Pilates Exercise is not just exercise, pilates is not just a random choice of particular movements. Pilates is a system of physical and mental conditioning that can enhance ones physical strength, flexibility and co- ordination as well as reduce stress, improve mental focus, and foster an improved sense of well-being. Pilates can be for anyone and everyone. Pilates is an exercise system based on yoga principles with Germanic overtones embedded within it. It which mainly focuses on improving endurance and flexibility of the abdomen, lower back and hips. This exercise developed by the late Joseph Pilates in the 1920s was used as a method of rehabilitation from chronic diseases such as asthma. Its original idea includes growing muscle strength, endurance, and flexibility while maintaining spine stabilization. Pilates is a very effective exercise that combines both eastern and western concepts by including yoga (a mind body method), breath, flexibility, relaxation, strength and endurance (Gowtham and Chandrasekaran, 2021).

Change in the lifestyle, increased in facilities, more consumption of junk food and increased stress has raised chances of cardiovascular diseases. Aerobic exercises, sports and others tend to bring about sympathetic stimulation. But regular practice of yoga increases vagal tone and tends to reduce sympathetic responses. So in this study, we tried to see the effects of yoga on cardiovascular parameters like pulse rate, systolic blood pressure, and diastolic blood pressure(Pandya et al., 2020).

Yoga is an art and science originated in India thousands of years ago. The word yoga is derived from the Sanskrit word 'Yuj' means 'yoke' or unite. Yoga is not only physical or mental exercise to be healthy but it is a practice that unites the soul with the universal consciousness or supreme self. Yoga along with providing physical and mental health, in advanced state makes one experience union of body, mind and internal energy to the universal energy that provides better physical health, mental control, and self-realization.

Yogic exercises are different from aerobics, sports, gymnastics workouts which increase heart rate, achieve cardiovascular workout, leave a person sweat more, exhausted & more breath out. Yoga instead of giving tiredness makes a person feel physically and mentally relaxed. The main aim of yoga is to promote wellness, good health, and the well being of mind, body, and spirit (Nagarathna and Nagendra, 2008).

2. Methodology

The study was conducted on 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 were 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. Resting Pulse Rate was selected as dependent variable and it was assessed by pulse rate monitor. The data obtained from the experimental groups before and after the experimental period were statistically analyzed with dependent 't'-test and Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post test 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.

3. Results and Discussions

The analysis of dependent 't'-test on the data obtained Resting Pulse Rate of the subjects in the Pre-test and Post-test of experimental groups and control group have been presented in table-1.

Table – 1

Summary of Mean and Dependent 't' Test for the Pre and Post Tests on Resting Pulse Rate of Experimental Groups and Control Group (Measures in Centimeters)

Mean	Pilates Exercises Group	Yogic Practices Group	Combined Pilates Exercises and Yogic Practices Group	Control Group
Pre- test mean	74.47	74.67	74.60	74.07
Post-test mean	72.20	72.07	72.00	74.33
't'-test	4.16*	6.66*	16.48*	0.33

* Significant at 0.05 level.
(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

Table -1 shows that the pre-test mean on Resting Pulse Rate for Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and control group are 174.47, 74.67, 74.60 and 74.07 respectively. The post-test mean are 72.20, 72.07, 72.00 and 74.33 respectively. The obtained dependent t-ratio values between the pre and post test means on Resting Pulse Rate for Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and control group are 4.16, 6.66, 16.48 and 0.33 respectively.

The table value required for significant difference with df 14 at 0.05 level is 2.15. It was concluded that experimental groups such as Pilate's exercises group, yogic practices group and combined Pilate's exercises and yogic practices group had registered significant improvement in Resting Pulse Rate.

The results of the Analysis of Covariance on Resting Pulse Rate of the pre, post, and adjusted test scores of Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and Control group are presented in table –2.

Table – 2

Values of Analysis of Covariance for Experimental Groups and Control Group on Resting Pulse Rate (Measures in Beats per Minute)

Test	Pilates Exercises Group	Yogic Practices Group	Combined Pilates Exercises and Yogic Practices Group	Control Group	SV	SS	df	MS	F-ratio
Pre-Test Mean	74.47	74.67	74.60	74.07	BG	3.25	3	1.08	1.81
					WG	33.60	56	0.60	
Post-Test Mean	72.20	72.07	72.00	74.33	BG	56.98	3	18.99	43.12*
					WG	24.67	56	0.44	
Adjusted Post-Test Mean	72.19	71.94	71.91	74.56	BS	67.29	3	22.43	93.22*
					WS	13.23	55	0.24	

SV- Source of Variance, SS- Sum of Squares, df- degree of freedom, MS-Mean Squares, BG- Between Groups, WG-Within Groups, BS- Between Sets, WS-within Sets, * Significant at 0.05 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

The table-1 shows that the obtained 'F' ratio of 1.81 for the pre test mean is lesser than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Resting Pulse Rate. The obtained 'F' ratio of 43.12 for the post test mean is greater than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Resting Pulse Rate.

The adjusted post test mean values of Resting Pulse Rate for Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and control group is 72.19, 71.94, 71.91 and 74.56 respectively. The obtained 'F' ratio of 93.22 for the adjusted post test mean is greater than the table value of 2.78 for degrees of freedom 3 and 55 required for significance at 0.05 level of confidence on Resting Pulse Rate.

The analysis of the study indicated that there was a significant difference between the adjusted post-test means of Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and control group on Resting Pulse Rate.

Pair wise comparisons of Scheffe's Post Hoc test results are presented in table – 3.

Table - 3

The Scheffe's test for the differences between the adjusted post tests paired means on Resting Pulse Rate (Measures in Beats per Minute)

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		
Resting Pulse Rate	72.19	71.94			0.25	0.52
	72.19		71.91		0.28	0.52
	72.19			74.56	2.37*	0.52
		71.94	71.91		0.03	0.52
		71.94		74.56	2.62*	0.52
			71.91	74.56	2.64*	0.52

* Significant at.05 level of confidence

Table-2 shows that the adjusted post test mean differences on Resting Pulse Rate between Pilate's exercises group and control group, yogic practices group and control group, combined Pilate's exercises & yogic practices group and control group are 2.37, 2.62 and 2.64 respectively and they are greater than the confidence interval value 0.52, which shows significant differences at 0.05 level of confidence.

Further the table-2 shows that the adjusted post test mean differences on Resting Pulse Rate between Pilate's exercises group and yogic practices group Pilate's exercises group and combined Pilate's exercises and yogic practices group, yogic practices group and combined Pilate's exercises and yogic practices group are 0.25, 0.28 and 0.03 respectively. The value is lesser than the confidence interval value 0.52, which shows no significant differences at 0.05 level of confidence.

The results of the study further have revealed that there is a significant difference in Resting Pulse Rate between the adjusted post test means of Pilate's exercises group and control group, yogic practices group and control group, combined Pilate's exercises & yogic practices group and control group. Further the results of the study revealed that there is no significant difference in Resting Pulse Rate between Pilate's exercises group and yogic practices group Pilate's exercises group and combined Pilate's exercises and yogic practices group, yogic practices group and combined Pilate's exercises and yogic practices group.

However, the increase in Resting Pulse Rate was significantly higher for combined Pilate's exercises and yogic practices group than other experimental groups.

It may be concluded that the combined Pilate's exercises and yogic practices group has exhibited better than the other experimental groups in increasing Resting Pulse Rate.

The pre and post test mean value of experimental groups on Resting Pulse Rate is graphically represented in the Figure -1.

The adjusted post test mean value of experimental groups on Resting Pulse Rate is graphically represented in the Figure -2.

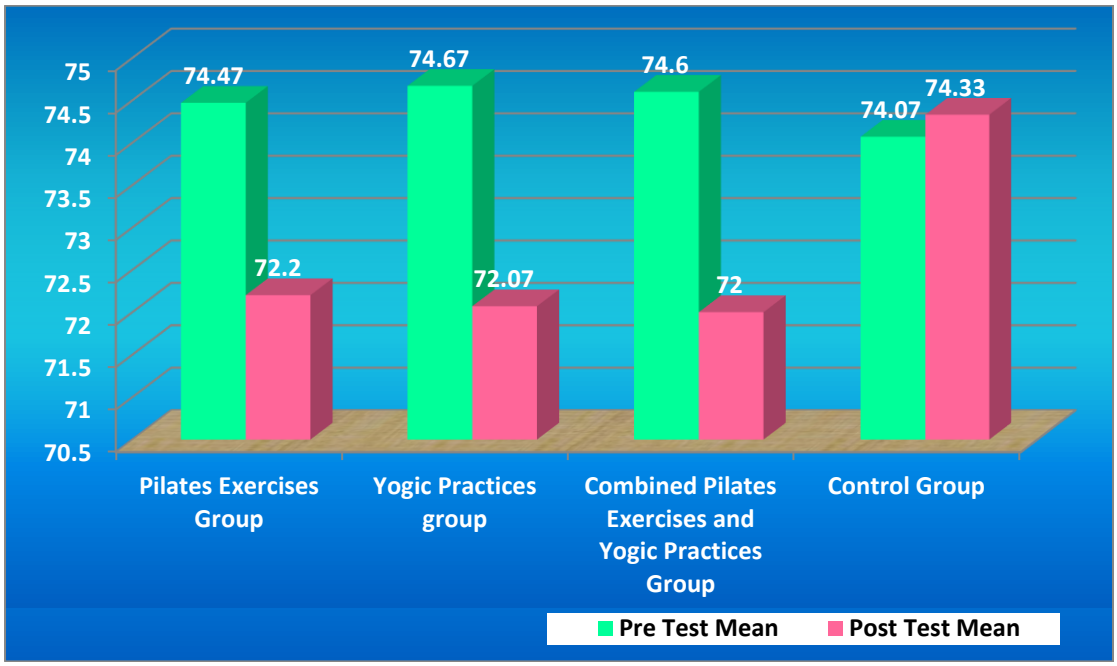

Fig-1: Diagram on ordered pre and post test means of Resting Pulse Rate (Units in Beats per Minute)

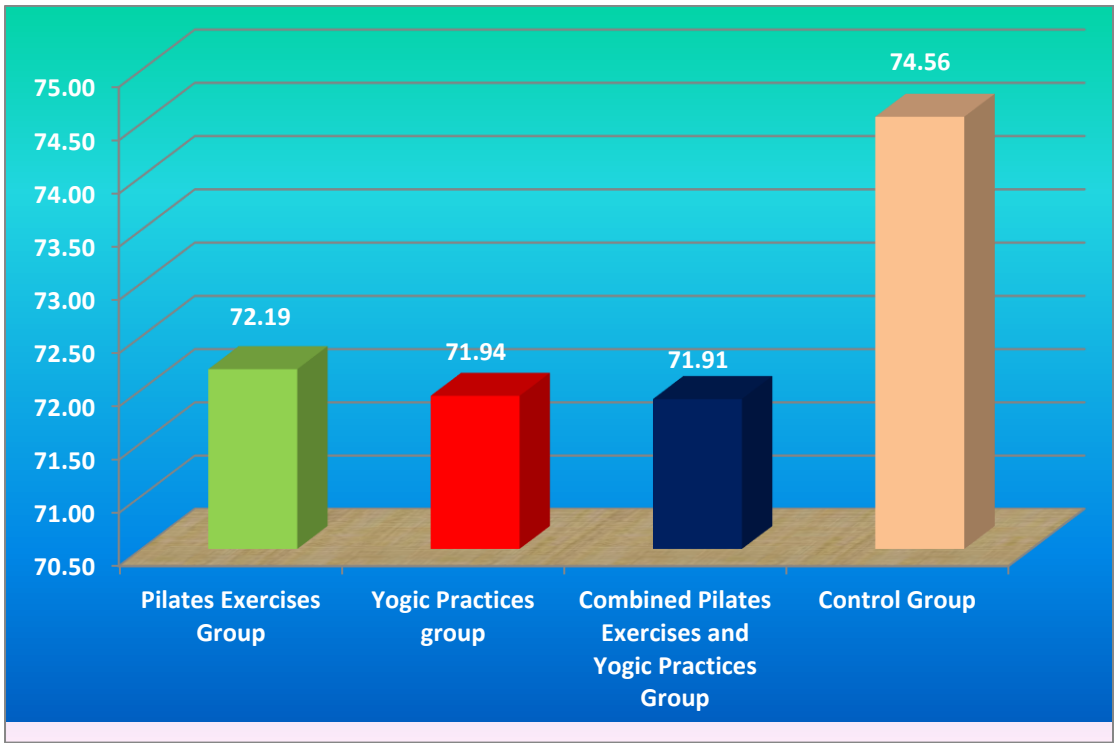

Fig-2: Diagram on ordered adjusted means of Resting Pulse Rate (Units in Beats per Minute)

4. Conclusions

Significant differences in achievement were found between Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and control group in Resting Pulse Rate. The experimental groups namely, Pilate's exercises group, yogic practices group, combined Pilate's exercises and yogic practices group and control group had significantly increased in Resting Pulse Rate.

The combined Pilate's exercises and yogic practices group was found to be better than the Pilate's exercises group, yogic practices group and control group in decreasing Resting Pulse Rate.

5. References

Gowtham. B and K.Chandrasekaran, (2021), Effect of Pilates and Suspension Training on Selected Physiological Variable among College Men Footballers , Journal of Emerging Technologies and Innovative Research, November, Volume 8, Issue 11.

Nagarathna R, Nagendra HR (2008), Yoga for promotion of positive health. In: Swami Vivekananda Yoga Prakashana. 4th ed. Bangalore.

Pandya N H, Goswami T, Trivedi R S(2020), Effect of yoga on pulse rate and blood pressure. Indian J Clin Anat Physiol, 7(1):12-15.

Robinson, L., & Hunter, F (2003), Pilates plus diet (1st ed.). London: Pan Books.

Wolkodoff N (2013), The physiological and health effect of a Pilates program combined with nutritional intervention on subjects with metabolic syndrome, J. Fitness. Res., 2: 17-29.