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EFFECTS OF YOGASANA AND CIRCUIT TRAINING ON SELECTED PHYSICAL AND PHYSIOLOGICAL VARIABLES AMONG COLLEGE WOMEN

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Abstract
The purpose of the study was to find out the effect of Yogasana and circuit training on selected physical and physiological variables among college women. To archive this purpose of the study forty five college women from Sengundar College of engineering and technology, Thiruchengodu, were randomly selected as subjects.. The experimental group – 1 (n=15) underwent Yogasana, the experimental group – 2 (n = 15) underwent circuit training and control group-3 (n= 15) did not participate in any special training programme apart from their regular activities. All the subjects of three groups were tested on selected criterion variables such as speed and resting heart rate at prior to immediately after the training programme by using 50 yards dash and pulse monitor respectively. Data for the selected variables were taken at the beginning (pre-test) and at the end of the experimental period (post-test). On the basis of the results the impact of yogasana and circuit training has significantly contributed to improve the selected Variables such as speed and resting heart rate. Significant improvements on selected criterion variables were also noticed due to yogasana and circuit training.

Key Words: Yogasana, Circuit Training, Speed, Resting Heart Rate and College Women.

INTRODUCTION

Circuit training was developed by Morgan and Anderson in 1953 at the University of Leeds in England (Sorani, 1966). The term circuit refers to a number of carefully selected exercises arranged consecutively. In the original format, 9 to 12 stations comprised the circuit. This number may vary according to the design of the circuit. Each participant moves from one station to the next with little (15 to 30 seconds) or no rest, performing a 15- to 45-second work out of 8 to 20 repetitions at each station (using a resistance of about 40% to 60% of one-repetition maximum). The program may be performed with exercise machines, hand-held weights, elastic resistance, calisthenics or any combination. By adding a 30-second to 3-minute (or longer) aerobics station between each station, referred to as aerobic circuit training, the method attempts to improve cardio respiratory endurance as well. (Kravitz 1996; Taşkin, 2009)

BENEFITS OF CIRCUIT TRAINING (Kravitz, 1996)

Numerous investigations have been completed measuring the physiological benefits of circuit weight training. Circuit weight training has been shown to increase muscular strength from 7% to 32% while decreasing the percent of fat from 0.8% to 2.9% (Gettman & Pollock, 1981). Gettman and Pollock's review of the literature also showed an increase of fat-free weight (1 to 3.2 kg) with no subsequent change in body weight. Kilocalorie expenditure has been estimated to be approximately 5 - 6 kcal per minute for women and 8 - 9 kcal per minute for men (Hempel & Wells, 1985; Wilmore, Parr, & Ward, 1978). In terms of cardiovascular function, studies have shown little to mild improvement in aerobic capacity (5% to 9.5%) from participation in circuit weight training as compared to other aerobic modalities (5% to 25%) (Kass & Castriotta, 1994; Peterson, Miller, Quinney, & Wenger, 1988). Kass and Castriotta support the contention that the mild increases in aerobic capacity are due primarily to increases in fat-free mass from the circuit weight training, and not changes from the main factors affecting aerobic capacity: cardiac output (heart rate x stroke volume) or arterial-venous oxygen difference (exchange of oxygen and carbon dioxide at the cellular level).

The word asana literally means a posture (Farhi 2000). Out of the innumerable saunas a body can assume, 84 Yogasana (Swami Muktibodhananda, 1993), through which one can transform the body and mind into a possibility for ultimate well-being (Farhi, 2000). In Asanas, body is subjected to different stretches, bends, twists, inversions and strains (Swenson, 1999). Maintain the posture in a relaxed manner builds the strength and stamina. Especially various muscles are strengthened, which is the support for all other systems. Functioning and efficiency of the internal organs is improved. This affects all other parts of the body in positive manner (Sturgess, 1997).

Other benefits of the Yoga poses include increasing flexibility, stamina, and endurance of various body parts. Yoga poses increase the efficiency of respiratory system and makes it more efficient promoting abdominal and relaxed breathing. Asanas also have positive effect on reproductive system, excretory system. Most important factor is Asanas balance nervous system and hormones. Nervous system and hormonal balance is important in overall health (Sivananda Yoga Vedanta Centre, 1996)

METHODOLOGY

The purpose of the study was to find out the effect of Yogasana and circuit training on selected physical and physiological variables among college women. To archive this purpose of the study forty five college women from Sengundar College of engineering and technology, Thiruchengodu, were randomly selected as subjects. The age of the subjects ranged between 21 to 25 years. The selected subjects were divided into three equal groups of fifteen subjects each. The experimental group – 1(n=15) underwent Yogasana, the experimental group – 2 (n = 15) underwent circuit training and control group-3 (n= 15) did not participate in any special training programme apart from their regular activities. The experimental groups were subjected to the training during morning hours for five days for six weeks. The Yogasana and Circuit training was selected as independent variables and the selected criterion variables such as speed and resting heart rate at prior to immediately after the training programme by using 50 yards dash and pulse monitor respectively. The experimental design selected for this study was pre and post test randomized design. The data were collected from each subject before and after the training period and statistically analyzed by using analysis of covariance (ANCOVA).

ANALYSIS OF DATA

The influence of Yogasana and Circuit training on each variable was analyzed separately and presented below.

COMPUTATION ON ANALYSIS OF COVARIANCE AND POST HOC TEST

RESULTS ON SPEED

The statistical analysis of covariance on speed with respect to experimental group I, experimental group II and control group were analyzed and presented in table-1

Table 1 showed that the pre-test mean values on speed for experimental group I, experimental group II and control group were 15.15, 15.40 and 15.05 respectively. The obtained 'F' ratio value of 0.19 for pretest scores on speed was less than the required table value of 3.22 with df of 2 and 42 at.05 level of confidence it was found to be statistically insignificant.The post-test mean values on speed for experimental group I, experimental group II and control group were 14.38, 13.22 and 14.95 respectively. The obtained 'F' ratio value of 8.18 for post test scores on speed was greater than the required table value of 3.22 with df of 2 and 42 at.05 level of confidence it was found to be statistically significant.

Table 1, Computation of Analysis of Covariance on Speed among College Women (Scores in Seconds)

Mean	Experimental Group-I	Experimental Group-II	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	'F' Ratio
Pre Test mean	15.15	15.40	15.05	Between	0.96	2	0.478	0.19
				Within	103.59	42	2.47	
Post Test mean	14.38	13.22	14.95	Between	23.33	2	11.66	8.18*
				Within	59.89	42	1.43	
Adjusted posttest mean	14.40	13.15	15.01	Between	28.72	2	13.36	12.01*
				Within	45.60	41	1.11	
Mean Difference	0.77	2.18	0.10					

* Significant at 0.05 level of confidence.

Table 2 shows that the adjusted post-test mean difference in speed between yogic group and control group is 0.61 hence it is significant at 0.05 level of confidence and proved there was no significant improvement. The adjusted post-test mean difference between circuit training group and control group is 1.86 which is significant at 0.05 level of confidence and proved there was significant improvement. The adjusted post-test mean difference in speed between yogic practices and circuit training group is 1.25 at 0.05 level of confidence and proved there was significant improvement on circuit training than the yogic group. It is concluded that circuit training is better than the yogic training on the development of speed.

Table 2, Ordered Scheffe's Post Hoc Test on Speed among College Women

Experimental Group-I	Experimental Group-II	Control Group	Mean Difference	CI
14.40	-	15.01	0.61	0.96
-	13.15	15.01	1.86*	0.96
14.40	13.15	-	1.25*	0.96

***** Significant at 0.05 level of confidence.

RESULTS ON RESTING HEART RATE

The statistical analysis of covariance on pulse rate with respect to experimental group I, experimental group II and control group were analyzed and presented in table- 3

Table – 3, Computation of Analysis of Covariance on Resting Heart Rate among College Women (Pulse/Minute)

Mean	Experimental Group-I	Experimental Group-II	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	'F' Ratio
Pre Test mean	69.27	69.20	69.20	Between	0.04	2	0.22	0.02
				Within	61.73	42	1.47	
Post Test mean	67.31	68.46	69.27	Between	62.98	2	31.49	16.48*
				Within	80.27	42	1.91	
Adjusted posttest mean	66.37	67.48	67.28	Between	64.89	2	32.45	4.72*
				Within	47.17	41	1.15	
Mean Difference	1.96	1.74	0.07					

* Significant at 0.05 level of confidence.

Table 3 showed that the pre-test mean values on resting heart rate for experimental group I, experimental group II and control group were 69.27, 69.20 and 69.20 respectively. The obtained 'F' ratio value of 0.02 for pre-test scores on pulse rate was less than the required table value of 3.22 with df of 2 and 42 at.05 level of confidence it was found to be statistically insignificant. The post-test mean values on pulse rate for experimental group I, experimental group II and control group were 67.31, 68.46 and 69.27 respectively. The obtained 'F' ratio value of 16.48 for post test scores on pulse rate was greater than the required table value of 3.23 for significant with df of 2 and 42 at.05 level of confidence it was found to be statistically significant.

Table 4 shows that the adjusted post-test mean difference in resting heart rate between yogic group and control group is 1.91. Hence it is significant at 0.05 level of confidence and proved there was significant improvement. Circuit training and control group is 0.02 It is proved that there was no significant improvement. The adjusted post-test mean difference between yogic group and circuit training group is 1.11 at 0.05 level of confidence and proved there was significant improvement on circuit training than the yogic group. It is concluded that circuit training is better than the yogic training on the decreasing the resting heart rate.

Table 4, Ordered Scheffe's Post Hoc Test on Resting Heart Rate among College Women

Experimental Group-I	Experimental Group-II	Control Group	Mean Difference	CI
66.37	-	67.28	1.91*	0.98
-	67.48	67.28	0.02	0.98
66.37	67.48	-	1.11*	0.98

***** Significant at 0.05 level of confidence.

CONCLUSIONS

Circuit training improves speed significantly, whereas Yogasana is not improving speed. However both Yogasana and circuit training improves resting pulse rate significantly. Hence to improve cardio respiratory endurance both circuit training and Yogasana training may be employed. To improve speed it is recommended to use circuit training.

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