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Effect of aerobic and yogic exercises on cardiovascular endurance of badminton players

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Abstract
The purpose of the study was to determine the effect of aerobic and yogic exercises on Cardiovascular Endurance of Badminton players. To achieve the purpose of the study, Forty five (45) intercollegiate Badminton players of Government degree colleges affiliated to Vijayanagara Sri Kirshnadevaraya University, Bellary State were selected randomly as subjects. Their age ranged from 18 to 24 years. The subjects were randomly assigned to three equal groups of 15 intercollegiate Badminton players. The study was confined to Cardiovascular Endurance. The cardiovascular endurance was tested with Cooper's 12 Minutes Run/Walk recorded in meters. To find out the variance in the endurance due to the application of treatment, Analysis of Covariance (ANCOVA) was applied and the level of significance was set at 0.01 level. The result indicated that experimental groups (Aerobic and Yogic exercises groups) were significantly improved the cardiovascular endurance when compared with the control group. The study concludes that yoga group had significantly improved the cardiovascular endurance than aerobic exercises group. The study suggested that the results would provide a scientific base and control to the coaches and physical educationists to design endurance training programme for sportsperson especially for Badminton players.

Keywords: aerobic, yogic, intercollegiate, badminton, cardiovascular endurance

Introduction

Sports play a very prominent role in the modern society and it is important to an individual. The world of sport has a popular appeal among people of all ages and both gender. Much of the attraction of sports comes from the wide variety of experience and feelings that ranges from participation, joy, failure, exhaustion, pain, relief and a feeling of belongingness. Sports can bring money, glory and good will. Sports performance was measured by the motor fitness components like strength, speed, agility and endurance. These components are performance oriented and are dependent upon functioning of different systems of the body in an integral manner in which sports participation is measured.

Badminton is a popular fast-paced indoor sport. To be successful in badminton game players need excellent court speed and agility, with a good background of endurance. The fitness training for badminton should focus on speed, agility and endurance.

Cardiovascular endurance is the ability of the body's circulatory and respiratory systems to supply fuel during sustained physical activity. The functional capacity of the cardio respiratory system, heart, lungs and blood vessels are described through aerobic capacity of an individual. Cardiovascular fitness recognized as an important element of health and it may be important for the performance of functional activities and eminence of life.

Endurance is a very important component of fitness for badminton. Badminton players cover a lot of ground during a match with little rest. Not only is aerobic fitness important for court play, but you need to be fit for long technical training sessions and to recover well between games during extended tournament play. Badminton players need to be fit in that the time the ball remain in play, average length of rallies and distance traveled by players during the game are all significantly higher in badminton. In other words, the endurance level of badminton players should be very high. Yoga and aerobic exercises are the exercises using for develop endurance among the athletes.

Yoga helps to athletes in developing fitness. Many scientists, doctors, psycholinguists etc., all over the world are extensively studying the beneficial aspects of yoga which encourages us to attain positive health through yoga and improve endurance. Aerobic exercise is a non-specific activity that improves physical capacities. It is simple to carry out and includes jogging in place, knee ups, short kick, running, marching and so on (Gody *et al.* 2006) [1].

Gaurav (2011) [9] aimed of the study was to determine the effects of hatha yoga traning on Cardiovascular Endurance. Results indicated that non-significant improvement found in experimental group for cardiovascular endurance. Ramesh and Subramaniam (2011) [6] studied on the effect of aerobic exercise on cardio respiratory endurance of obese adolescents. The result of this study indicated that cardio respiratory endurance was significantly improved. Cinthuja *et al* (2015) [4] determined a study on cardiovascular endurance of school badminton players in Kandy district. The performance of badminton players could be enhanced by maintaining a proper body mass index. Badminton specific skills could be improved by increasing the duration of practiced. Involvement in other sports does not give an added advantage to badminton players to improve their performance. Murugesan and Alexandar (2015) [5] examined the effect of yoga training on cardiovascular endurance among College Handball Players. The results reveal that the yoga training group showed significant improvement on cardiovascular endurance among men College Hand ball players.

Good Physical Education programmes in our nation's colleges are essential in developing motor skills and understanding of

concepts that foster lifelong healthy lifestyles. The continuous, systematic and regular practice of yogic and aerobic exercises is an effective tool to improve endurance. Hence, the present study is to find out the effect of aerobic and yogic exercises on cardiovascular endurance of intercollegiate badminton players.

Statement of the Problem

The purpose of the study was to find out the effect of aerobic and yogic exercises on Cardiovascular Endurance of intercollegiate level Badminton players.

Statement of Hypothesis

It was hypothesized that 12 weeks of aerobic yogic exercises training will have significant improvement on Endurance of the subjects.

Methodology

The subjects (n=45) were randomly assigned to three equal groups of 15 intercollegiate Badminton players and their age between 18-24 years. The groups were assigned as Experimental Groups I, II and Group-III (control group). Pretest (initial) scores were conducted for all the subjects on Cardiovascular Endurance. The endurance was tested with Cooper's 12 Minutes Run/Walk recorded in meters. Group-I participated in yogic exercises and experimental Group-II participated in aerobic exercises done for a period of 12 weeks. The post test scores were conducted on the above said criterion variable after experimental period. The differences between initial and final mean scores on selected variables were considered as the effect of experimental treatments. Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA) was used to determine the significance of the means for each variable. Post hoc analysis was made using LSD test when obtained F value was significant. In all cases 0.05 level and 0.01 levels was fixed to test the hypothesis.

Results and Discussion

Analysis of the treatment effects, namely Yogic Exercises Training Group (YETG) Aerobic Exercises Training Group (AETG) and Control Group (CG) on Cardiovascular Endurance was presented in the following tables.

Table 1: Analysis of Covariance on Cardiovascular Endurance among CG, YETG and AETG.

Mean	CG	YETG	AETG	Sources of Variance	Sum of Squares	df	Mean Squares	Obtained F value
Pre Test	2560.666	2533.333	2573.333	Between	12537.778	2	6268.889	0.962^{NS} (P=0.390)
				Within	273560.000	42	6513.333	
Post Test	2763.333	3240.000	3183.333	Between	2034111.100	2	1017055.556	30.917** (0.000)
				Within	1381666.700	42	32896.825	
Adjusted Post Test	2759.943	3255.564	3171.159	Between	2097324.300	2	1048662.141	34.393** (0.000)
				Within	1250119.300	41	30490.715	

^{NS} Not Significant; (df) 2; *Significant at 0.05 F 42 is 3.23. **Significant at 0.01 F 42 is 5.18

Since significant F ratio was obtained, the results were further subjected to post hoc analysis using LSD test and results presented in Table-2.

Table 2: LSD Confidence Interval (CI) Test scores on Cardiovascular Endurance

Groups			Mean Difference	Required C.I.
CG	YETG	AETG		
2759.943	3255.564	-	495.621*	125.609
-	3255.564	3171.159	84.405	
2759.943	-	3171.159	411.216*	

The results of this study proved that Cardiovascular Endurance of the badminton players was significantly improved due to 12 weeks of yogic and aerobic training as the obtained F value of 34.393 on adjusted means was greater than the required table F value of 5.18 at 0.01 level. The post hoc analysis proved that there was significant difference between YETG & CG; and AETG & CG. The both experimental groups were found similar improvement in developing cardiovascular Endurance of badminton players. But from the mean scores YETG was better than AETG in improving endurance of badminton players. Hence, the stated hypothesis was accepted for the said criterion variable that is Cardiovascular Endurance.

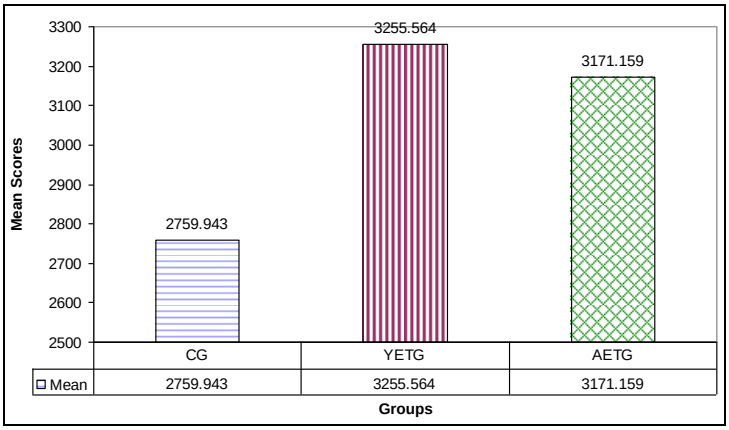

Fig 1: Bar diagraph shows comparison of adjusted mean scores of Cardiovascular Endurance among groups

Conclusion

It was concludes that both yogic and aerobic exercises groups significantly improved Cardiovascular Endurance of badminton players. The results suggested that physical exercises such as yogic and aerobic exercises as an appropriate, easy and affordable approach for increasing Cardiovascular Endurance among the Badminton players. The similar results concurred with previous studies conducted by Gaurav (2011) [9], Subramaniam (2011), Murugesan and Alexandar (2015) [5] and Cinthuja *et al* (2015) [4]. The present study would provide a scientific base and guidance to the coaches to design the training programme for athletes for development of endurance.

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