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## **Effect of SAQ training and circuit training on cardio vascular endurance among men kho- kho players**

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### **Abstract**

The present study explores the impact of 12 weeks SAQ training and Circuit training on Cardio vascular endurance among kho kho players. district, state, inter collegiate, inter university and national level and international participated male kho kho players chosen from kho kho academy at J Panguluru, Inkollu Mandal, Prakasam district, Andhra Pradesh, India. The chosen N=33 kho kho player's age ranged from 17-24 years as per their academy record. The chosen male kho kho players randomly and equally distributed n=11 into 3-groups namely speed agility and quickness training group [SAQTG=11], circuit training group [CTG=11] and control group [CONG=11]. All the three groups' kho kho players' measurement on Cardio vascular endurance parameter score were collected in the beginning and after the 12-weeks of Speed agility and quickness [SAQ] training and circuit training. The collected measurement of Cardio vascular endurance parameter was analyzed by analysis of covariance to find the significant in pre test and post test mean and adjusted post test means found significant post hoc pair wise comparison was applied by scheffe's post hoc test at 0.05 fixed level of confidence by used statistical package of the social science. The study discovered that the treatment groups namely SAQ training and Circuit training group kho kho players run greater distance in 12- minutes run/walk cooper test when comparison between pre score and post score. Further it was declared that Circuit training group kho kho players shown better Cardio vascular endurance performance and run more distance when comparison with SAQ training group kho kho players and CONG [Control group] kho kho players.

**Keywords:** cardio vascular endurance, agility, quickness, circuit training and kho kho players

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### **Introduction**

The main foundation of physical education was discovered in ancient Greece. The philosophers like Socrates, Aristotle and Plato were in stated that physical training is a must for youth. Even in India, Physical activities were essential part of life in ancient times. The term physical education consists of two very significant words that physical means relating to the physical abilities like speed, strength, endurance, flexibility, agility and functioning of various organs of a human body and Education means getting knowledge of various things, which helps us to achieve our target or change the way we look this world.

SAQ training train athletes to improve speed, agility and quickness. The main stress of SAQ training to increase speed, strength, maximal forces, high speed movements, muscular power, motor skill, reaction time, brain signal efficiency, acceleration, kinaesthetic awareness. In kho kho game kho kho players involve in straight run, turning and zig zag run [Gurvir and Baljeet 2017]. Santosh and Basant (2014) described that SAQ training cover the complete area from low intensity to high intensity level during training and removes the mental bocks to improve control, balance and exert maximal force during movement pattern. Agility exercises program develop balance by shifting body centre of gravity during postural deviation and also coordination.

The sports scientist R.E. Morgan and G.T. Adamson invented circuit training in the year 1953. Circuit training exercises designed to develop muscular strength, muscular endurance,

muscular power, coordination, speed and agility, cardiovascular endurance and flexibility of the players. In circuit training usually six to twelve exercises station were planned. The athlete's perform each exercise as per the fix repetition and time before moving to the next station of exercises and idea of the athletes to move next station as fast as possible. The advantages of circuit training method develop total physical fitness of the players, exercises in the circuit can be modify as per the needs of the athletes, large number of students can be involve circuit training in groups with low expenses.

### **Cardio vascular endurance**

Cardio mean heart and vascular mean vessels.

It's the ability of the kho kho players to run for longer distance or to perform work outs for longer duration without getting fully tried because your heart lungs and blood vessels are healthy

### **Method and Procedure**

To achieve the purpose of this research the investigator chosen total N=33 district, state, inter collegiate, inter university and national level and international participated male kho kho players chosen from kho kho academy at J Panguluru, Inkollu Mandal, Prakasam district, Andhra Pradesh, India. The chosen kho kho player's age ranged from 17-24 years as per their academy record. Total N=33 kho kho players selected randomly and distributed into 3-groups equally n=11. Treatment group 'A' treated with

speed agility and quickness training [SAGTG=11 kho kho players], treatment group ‘B’ treated with circuit training [CTG=11 kho kho players] and control group [CONG=11 kho kho players] participated only their regular activities.

The twelve weeks training schedule planned on the base of progressive load method. Every fourth week load has increased in total time duration, number of exercises, repetitions and sets. Total time duration of each day training session minimum 90 minutes to maximum 120 minutes. SAQ training and circuit training applied on alternative days in a week. If any kho kho players feel uncomfortable and injuries during any training sessions are free to quit from that training session. The twelve week training schedule of SAQ training and circuit training schedule plan for chosen kho kho players. Run greater distance in 12- minutes run/walk cooper test this event measures the Cardio vascular endurance of the kho kho players.

**Cooper 12 minutes run /walk test:** The kho kho player has to run or walk around 400 meters track for 12 minutes continuously without break. The score measure in meters the distance covered by each kho kho players in 12 minutes for each kho kho players. The score were collected from three groups kho kho players namely SAQ training group, circuit training group [CTG] and no training group [CONG] on Cardio vascular endurance parameter of men kho kho players beginning and after the end of 12-weeks SAQ training and circuit training. During the treatment period the

three group’s kho kho players not allowed to participate in any specific training apart from their regular exercises program. The collected score from SAQ [speed agility and quickness] training group, circuit training group and control group kho kho players beginning and after the treatment period were statistically analyzed by analysis of covariance [ANCOVA] with the software SPSS to find the significant. Where ever the adjusted post test mean ‘F’ value found significant, Scheffe’s post hoc test formula applied to find the significant changes between three groups speed agility and quickness training group, circuit training group and control group.

**Data Analysis and Results**

The result of the scores obtain from analysis of covariance, scheffe’s test, discussion on hypothesis regarding acceptance and rejection of hypothesis and discussion on result attached with studies related to the independent and dependent variables. To achieve the purpose of this study researcher investigated the influence of 12-weeks speed agility and quickness [SAQ] training and circuit training on Cardio vascular endurance parameter of kho kho players. The collected measurement of Cardio vascular endurance parameter was analyzed by analysis of covariance to find the significant in pretest and post test mean. If the adjusted post test means found significant post hoc pair wise comparison was applied by scheffe’s post hoc test at 0.05 fixed level of confidence. The calculations of Cardio vascular endurance parameters analysis by statistical package of the social science.

**Table 1:** Analysis of covariance for pre-test post-test and adjusted post-test score of SAQTG CTG and cong on cardio vascular endurance [In meters]

Tests	SAQTG	CTG	CONG	Source of variance	Sum of Squares	df	Mean Squares	‘F’ Ratio
Pre Test								
Mean	2618.18	2679.09	2683.63	B	29387.88	2	14693.94	1.17
SD	87.38	128.09	115.52	W	373909.10	30	12463.64	
Post Test								
Mean	2760.90	2881.81	2563.63	B	567509.10	2	283754.50	37.02*
SD	85.49	56.00	122.00	W	229909.10	30	7663.63	
Adjusted Post Test								
Mean	2763.69	2884.94	2554.07	B	614037.78	2	387018.89	48.38*
				W	266706.24	29	8334.57	

\*Significant at 0.05 level of confidence (Required table value at 0.05 level of significant with df 2 and 30 is 3.31 and df 2 and 29 is 3.32).

The above table display the pre-test, post-test and adjusted post-test mean values and ‘F’ values of SAQTG[Speed, Agility and Quickness training group kho kho players], CTG [Circuit training group kho kho players] and CONG[ Control group kho kho players] on cardiovascular endurance [In meters]

The pre-test mean values of SAQTG, CTG and CONG kho kho players on cardio vascular endurance are 2618.18, 2679.09 and 2683.63 respectively. The calculated F-value for pre-test score on cardiovascular endurance was 1.17 which is lesser than the table value 3.31 with df 2 and 29 at 0.05 level of confidence. This indicate that there is no significant differences between the SAQTG, CTG and CONG kho kho players in mean values on cardiovascular endurance.

The post-test mean values of SAQTG, CTG and CONG kho kho players on cardiovascular endurance were 2760.90, 2881.81 and 2563.63 respectively. The calculated F-value for post-test score on cardiovascular endurance was 37.02 which are greater than the table value 3.31 with df 2 and 29 at 0.05 level of confidence. This

indicate that there is significant differences between the SAQTG, CTG and CONG kho kho players in mean values on on cardiovascular endurance.

The adjusted post-test mean values of SAQTG, CTG and CONG kho kho players on cardiovascular endurance were 2763.69, 2884.94 and 2554.07 respectively. The calculated F-value for adjusted post-test score was 48.38 which is greater than the table value 3.32 with df 2 and 29 at 0.05 level of confidence. This indicate that there is significant differences between the SAQTG, CTG and CONG kho kho players in mean values on cardiovascular endurance. The result of this study proved that two treatment groups namely SAQTG and CTG kho kho players cooper test [cardiovascular endurance] significantly run greater distance with the specific experimental treatment [SAQ training and circuit training].

This indicates that significant differences exist in mean values of adjusted post-test among three group’s kho kho y players. Therefore scheffe’s post hoc test was applied to find the result of

significant differences among three groups on cardiovascular endurance presented in the table

**Table 2:** Scheffe’s test for paired adjusted final mean differences between SAQTG, CTG and CONG on cardiovascular endurance [In meters]

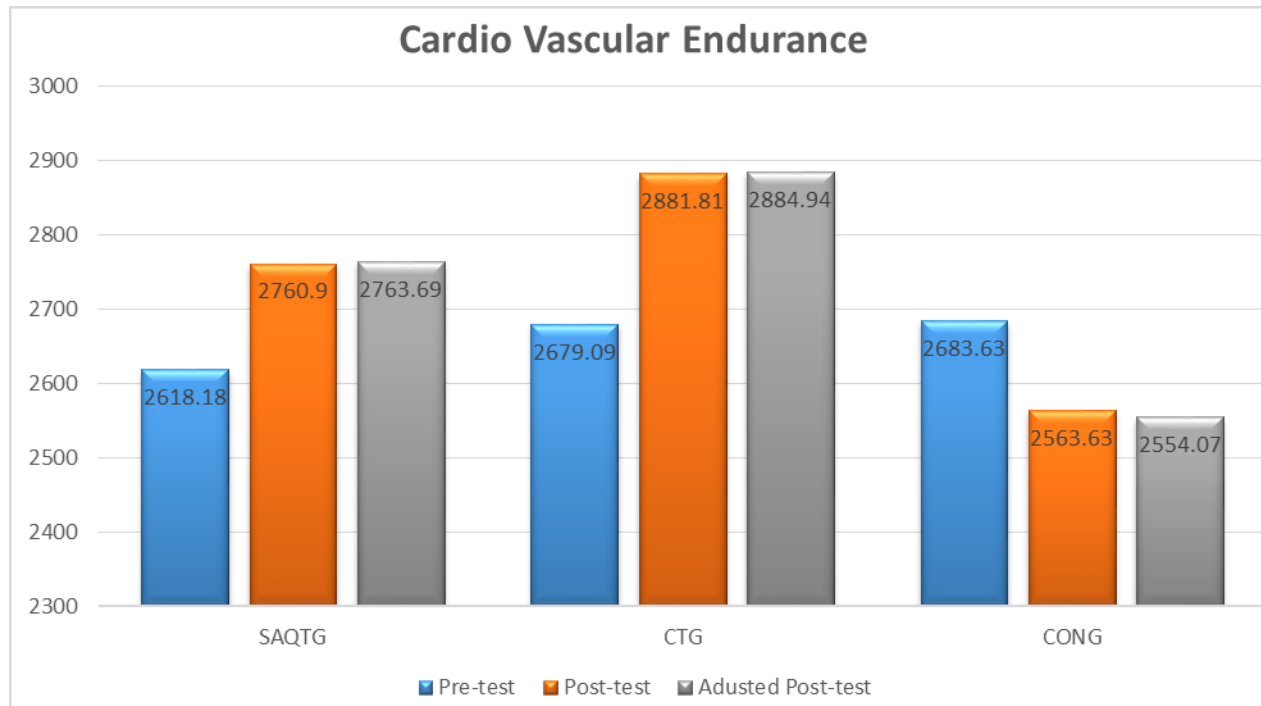
Mean Values			Mean difference	CI
SAQTG	CTG	CONG		
2763.69	2884.94	-	121.25*	54.08
2763.69	-	2554.07	209.62*	
-	2884.94	2554.07	330.87*	

\*Significant at 0.05 level of confidence

The above table indicated the paired adjusted final mean differences between SAQTG [Speed, Agility and Quickness training group kho kho players], CTG [Circuit training group kho kho players] and CONG [Control group kho kho players] on cardiovascular endurance [In meters] are 121.25, 209.62 and 330.87 which is higher than the critical difference value 55.08 required for significant at 0.05 level of confidence.

The result on cardiovascular endurance found that CTG kho kho players training program is more effective to run more distance in 12 minutes when comparison with SAQTG kho kho players training program and CONG kho kho players.

The pre-test, post-test and adjusted post-test mean values of cardiovascular endurance are presented in line graph figure



**Fig 1:** The graphical illustration of Pre-test, Post-test and Adjusted Post-test mean values on Cardiovascular endurance [In meters] for SAQTG, CTG and CONG kho kho players.

**Discussion**

This study confirmed that kho kho players run greater distance in 12-minutes cooper run/walk test with treatment of SAQ training and Circuit training. The studies connected related to cardio vascular endurance were Kiran and Srinivasa (2016) study proved that run more distance in 12 minutes due to the effect of circuit training. Afework (2018) suggested that combined interval and circuit training is more beneficial to improve the performance level of cardio respiratory endurance of soccer player. Sunita and Ashok (2017) study discovered that circuit training is effective in improving cardiovascular endurance of sports man. Somappa and Bhairaddy (2017) study proved that aerobic exercises and yoga practice increased the cardio vascular endurance performance level of badminton players.

**Conclusion**

The study discovered that the treatment groups namely SAQ training and Circuit training group kho kho players run greater distance in 12- minutes run/walk cooper test when comparison between pre score and post score. Further it was declared that

circuit training group kho kho players shown better performance and run more distance when comparison with SAQ training group kho kho players and CONG [Control group] kho kho players.

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