EFFECT OF CIRCUIT TRAINING AND INTERVAL TRAINING ON SELECTED PHYSIOLOGICAL VARIABLE OF VITAL CAPACITY ON COLLEGE

MEN KABADDI PLAYERS

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Abstract:- The present study was designed to evaluate the effect of circuit training and interval training on change of **Vital capacity** in men Kabaddi players. The investigator has to obtain a sample of selected 60 college men Kabaddi players in Kerala state for this study (two training group and one control group). The population would represent in all relevant aspects and methodology used in this research involves the choice of a specified group of subjects, selection of variable, administering of standard test, using of the relevant tool obtaining pre determined information in the certain chosen factors and subjecting them for a statistical analysis.

Introduction

Kabaddi is one of the most popular games in India and its unique origin can be traceable in the early Indian history. In 1961, the Indian University Sports Control Board (IUSCB) included the game of Kabaddi in its curriculum, as a prime sports discipline for the students. This raised the status of Kabaddi as a game in India, further. Thereafter, the game was introduced as one of the important games in the school by the School Games Federation of India (SGFI) in 1962. This decision played the vital role in urging the school going children to participate in state and national level competitions for the game, organized by the SGFI. Another development in the history of Kabaddi in India took shape in 1971, when the National Institute of Sports (NIS) included Kabaddi in the curriculum of Regular Diploma courses.

In the case of Kabaddi, the basic skills like holding, riding, blocking, and breath holding are highly needed. It is true that these skills are basic abilities for all Kabaddi players, but the performance potential depends on specific variables. The coaches and trainees may not be able to determine them by their subjective observations of performances alone. A scientific analysis of the player's performance with respect to their skills might help in a much more positive way. This will enable not only the right type of selection based on scientific data but also help in maximizing the player's potentials by regrouping and synchronizing the team talents that are available.

Physical fitness

Physical fitness is the ability to do the body to perform strenuous exercise too. It is the relation of one's ability to work or play with vigour and pleasure without undue fatigue and with sufficient energy for unforeseen emergencies. Physical fitness is the ability to last, to bear up and to preserve under difficult circumstances where an unfit person would give up.

In sports, successful performance in competition depends substantially on the physical and physiological fitness, body composition, muscular performance, neuromuscular capability and mental ability of the players.

Circuit training

Keinth Nicholis defined that "Circuit training simply involves a series of exercise which must be performed in a specific order until a specified number of circuits have been completed. Each exercise must be, done a particular number of times depending on the maximum number of the individual."

Interval training

Interval training involves intervals if intensive exercise interspersed with intervals of relatively light exercise or exercise is done at relatively higher intensity with intervals of incomplete recovery.

The last few decades has seen the introduction of interval training which has considerable influence on sports conditioning. Interval training involves alternating periods of work and rest during a training session. It is a program that varies the intensity within the training session by interspersing a workout of a higher intensity with a rest period of lower intensity; then another workout is completed, once again followed by a rest period, and so on through the workout.

Vital capacity

The maximum volume of air that can be exhaled from the lungs, following a maximum of inhalation (Astrand and Rodhal, 1970). Vital capacity (VC) is the maximum amount of air that a person can exhale from the lungs after first filling the lungs to their maximum extent; it equivalent to the inspiratory reserve volume (IRV) plus the tidal volume (TV).

Methodology in brief

The experimental method was adopted for this study. The investigator defined the population for the study as 60 college men Kabaddi players in Kerala state. The investigator has to obtain a sample which would represent the population in all relevant aspects.

The methodology used in this research involves the choice of a specified group of subjects, selection of variables, administering of standard tests, using of the relevant tools, obtaining predetermined information in the certain chosen factors and subjecting them for a statistical analysis.

Experimental design

An equated group design was chosen for this study. The subjects were divided into 3 groups A, B and C. Group ‘A’ acted as control group ‘B’ was trained with circuit training and C was interval training group. The training programme was carried out thrice in a week [ie; monday, wednesday and friday (group B) and tuesday, thursday and saturday (group C) in circuit training and interval training group respectively] for 10 weeks. All subjects were treated before and after the entire training period in selected test conducted.

Physiological variable and their respective tests for the study

Standard tests were conducted to measure the selected physiological variable of this study. The selected variable and its respective tests are presented below

The selected physiological variable Vital capacity and its respective test for the study

Sl.no	Variable	Test
1.	Vital capacity	Volume of air in lungs

Test selected to assess the dependent variable and the units of measurement of the study

Sl.no	Criterion variable	Test item	Unit of measurement
1	Vital capacity	Wet Spiro meter test	Cubic centimeters

The criterion measures for the selected variable used

1. Vital capacity recorded in cubic centimeters through wet Spiro meter.

Test re-test reliability coefficient on the selected test for physiological variable for the study

Sl.no	Variable	Coefficient correlation
1	Vital capacity	0.90*

*Significant at 0.01 level of confidence

Table value required for significance at 0.01 level of confidence is 0.77. Since the obtained 'r' value s were much higher than the required value. The data were accepted in terms of instrument, tester and subjects.

Statistical techniques used for the study

1. Percentage analysis
2. Means
3. Standard deviation
4. 'F'test (ANOVA & ANCOVA)
5. 't'-test
6. Correlation

Vital capacity

Purpose

The purpose of this test was to find out the maximum quantity of air that can be exhaled after a deepest inspiration.

Facilities and equipments

Rest room, wet spiro meter, mouth pieces and nose clips

Procedure

A wet spirometer is a medical device used to measure the maximum amount of air a person can exhale, which is known as vital capacity. The wet spirometer has a breathing tube attached to a chamber inside the machine that is suspended in water. When the student breathes into the tube, the chamber rises. Ask the student to sit, relax and breathe normally while you prepare the wet spirometer by attaching a disposable mouthpiece to the machine's valve. Clamp the student's nose closed so he can only breathe through his mouth. Ask him to inhale normally and exhale into the mouthpiece. Record the volume displayed on the machine. This is the baseline measurement known as the tidal volume. It is the volume of air the exhales in a normal breath. Instruct the student to take the deepest breath he possibly can and exhale into the tube. Try not to let any of the breath escape the tube or your reading won't be accurate. Record the volume displayed on the machine. This is the student's vital capacity. Repeat the test and average the results. Compare the student's vital capacity measurement to measurements taken at previous and after the training to determine whether improving or not.

Features

A wet spyrometer consists of two chambers. One chamber has a breathing tube attached to it and contains water. A second smaller chamber, within the first chamber, is inverted and suspended in the water. It is weighted and has an indicator.

Function

As the subject blows air into the breathing hose, the smaller chamber rises. This causes the indicator to move along a scale.

Safety

A wet spirometer poses no risk to the patient if it is used properly. Never inhale from the breathing hose, as this could cause water to enter the lungs.

Scoring

The distance the indicator travels represents the lung volume. The scale is calibrated in liters.

Vital capacity

The pre-test and post-test scores among control group, circuit training group and interval training group of college men Kabaddi players in Kerala with respect to vital capacity is given below

Level of vital capacity of college men of different group Kabaddi players in Kerala

Test	Level	Control group		Circuit group		Interval group	
		N	%	N	%	N	%
Pre-test	Low	7	35.0	7	35.0	7	35.0
	Average	8	40.0*	8	40.0*	8	40.0*
	High	5	25.0	5	25.0	5	25.0
Post-test	Low	7	35.0	5	25.0	5	25.0
	Average	8	40.0*	10	50.0*	9	45.0*
	High	5	25.0	5	25.0	6	30.0

* indicates the level of vital capacity

From the above table it is clear that in the post-test the level of vital capacity is higher in circuit group (50%) than the control and interval group.

Effectiveness of circuit training and interval training on vital capacity of college men Kabaddi players.

The pre-test and post-test scores of the control, circuit and interval groups were subjected to the statistical technique, analysis of co-variance to Find out the effectiveness of circuit and interval training on vital capacity of college men Kabaddi players in Kerala. The summary of analysis of variance over pre-test(x) and post-test (y) scores of players in the control, circuit and interval groups taken separately is given below

Summary of analysis of variance of pre-test and post-test scores on vital capacity among the control, circuit and interval group

Source of variance	df	SS_x	SS_y	$MS_x(V_x)$	$MS_y(V_y)$	F_x	F_y
Among group mean	2	30140.03	710765.23	15070.02	355382.62	0.24	5.94
Within group mean	57	3553405.30	3410705.75	62340.44	59836.94		
Total	59	3583545.33	4121470.98				

From table of F ratio, for df (2/57);

F at 0.05 level = 3. 16

F at 0.01 level = 5.00

The F ratio for the pre-test and post-test scores was tested for significance. F_x value obtained 0. 24 (F_x = 0.24). it is less than F at 0.05 level(i.e, 3.16). So it can be interpreted that the experimental groups (circuit and interval) and control group do not differ significantly with regard to pre-testin vital capacity. The three groups are more or less equal with regard to pre-test scores of vital capacity.

The obtained value of F_y is 5.94 (F_y = 5.94). It is greater than F at 0.01 level (i.e, 5.00).Hence it can be interpreted that the experimental groups (circuit and interval) and control group differ significantly with regard to post-test vital capacity.

The summary of analysis of co-variance of pre-test and post-test scores of players in experimental (circuit and interval) and control groups is given below

Summary of analysis of co-variance of pre-test and post-test scores on vital capacity among players in experimental (circuit and interval) and control groups (ANCOVA).

Source of variance	df	SS_x	SS_y	SS_{xy}	SS_{yx}	$MS_y(V_{yx})$	F_{yx}	SD_{yx}
Among group mean	2	30140.03	710765.23	93890.57	557314.33	278657.17	105.80	
Within group mean	56	3553405.30	3410705.75	3405221.10	147489.27	2633.74		51.32
Total	58	3583545.33	4121470.98	3499111.67	704803.60			

From table of F ratio, for df (2/56);

F at 0.05 level = 3. 16

F at 0.01 level = 5.00

F_{yx} = 105.80

The obtained value of F is 105.80(F_{yx}=105.80). It is greater than the table value at 0.01 level (i.e,=5.00) this shows that the final mean scores of treatment groups differ significantly after they have been adjusted for differences in the post-test scores of vital capacity.

The data for adjusted means of post-test scores of players in experimental and control groups is given below

Data for adjusted means of post-test scores in experimental and control groups

Group	N	M_X	M_Y	Adjusted Y Mean M_{YX}(adj)
Control	20	2162.55	2213.00	2231.95
Circuit	20	2202.10	2478.05	2459.10
Interval	20	2149.35	2370.40	2402.00
Group means	20	2182.33	2345.53	

From table 't' for df=56,
't' at 0.05=2.005;
't' at 0.01=2.67
Minimum significant difference required at 0 .01 =43.33
Minimum significant difference required at 0.05 =32.54

The difference between adjusted means (M_{yx}) of post-test scores of players in experimental (circuit and interval) and control groups is given below

Difference between adjusted means (M_{yx}) of experimental (circuit and interval) and control groups

	M_{YX}(adj)	Difference	RM
Control	2231.95	227.15	Sig
Circuit	2459.10		
Control	2231.95	170.05	Sig
Interval	2402.00		
Circuit	2459.10	57.10	Sig
Interval	2402.00		

Difference between adjusted means (M_{yx}) of control and circuit training groups =227.15 which is greater than 43.33 implies that the both the groups differ significantly at 0.01 level. Difference between adjusted means (M_{yx}) of control and interval training groups =170.05 which is greater than 43.33 implies that the both the groups differ significantly at 0.01 level and difference between adjusted means (M_{yx}) circuit and interval training groups =57.10 which is greater than 43.33 implies that the both the groups differ significantly at 0.01 level.

It can be interpreted from the analysis of co-variance among adjusted means of experimental and control groups that there is significant difference between experimental and control groups with respect to vital capacity i.e., circuit training group(M_{yx} =2459.1) is significantly superior to control (M_{yx} = 2231.95) and interval training group (M_{yx} = 2402.0) with regard to their post-test scores.

Comparison of pre-test and post-test scores of vital capacity among the control, circuit and interval group Kabaddi players

In order to Find out the significance difference between pre-test and post-test means of experimental and control groups, the critical ratio of the pre-test and post-test scores were calculated. For this, the mean and standard deviation of the groups were calculated. The data and the result of the test of significance are given below

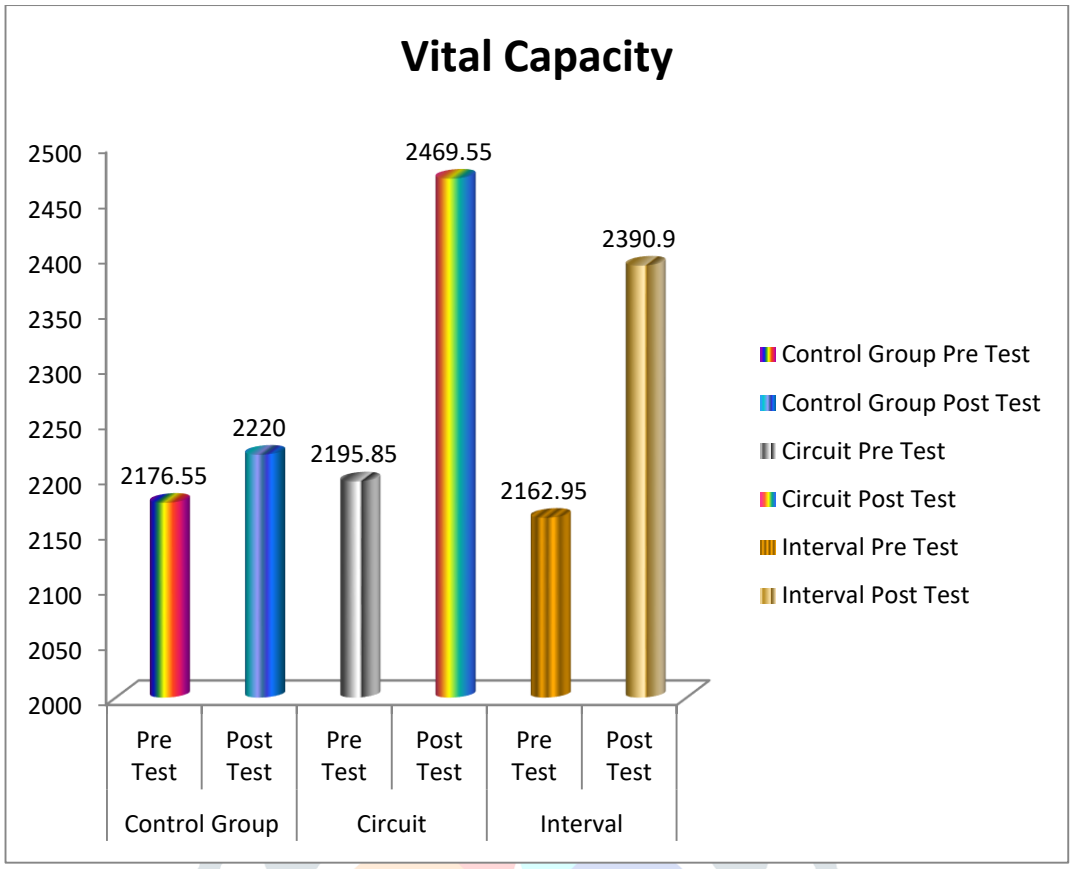
Comparison of pre-test and post-test scores of vital capacity among the control, circuit and interval group Kabaddi players

Group	Test	Mean	S.D	r Value	Calculated 't' value	P Value
Control	Pre-test	2176.55	235.07	0.99	14.07	0.00
	Post-test	2220.00	238.19			
Circuit	Pre-test	2195.85	255.43	0.96	17.88	0.00
	Post-test	2469.55	237.55			
Interval	Pre-test	2162.95	242.02	0.97	17.05	0.00
	Post-test	2390.90	251.31			

$p<0.01$ indicates significant at 1% level

As the *p* value of the table is less than 0.05, there is significant difference between pre-test and post-test scores of vital capacity among the control group, circuit and interval group Kabaddi men players of Kerala. From the mean value it is clear that all the groups seem to perform better in their post-test. This is illustrated below.

Difference between pre-test and post-test scores of vital capacity among the control, circuit and interval group Kabaddi players



From the figure above it is found that the physiological variable vital capacity had improved on both experimental groups, in comparison to control group after a 10 weeks training programme and the circuit training group showed significant improvement in vital capacity as compared to interval training group.

Correlation between circuit group and interval group in vital capacity

In order to find out the correlation between circuit group and interval group in vital capacity, the mean and standard deviation of the data were calculated and the correlation were computed to see whether there is any relationship between them.The result and correlation coefficient are shown below.

Relationship between circuit group and interval group in vital capacity of pre-test and post-test

Test	Group	No	Mean	S.D	'r' value	'P' Value
Pre-test	Circuit	20	2195.85	255.43	0.25	0.27
	Interval	20	2162.95	242.02		
Post-test	Circuit	20	2469.55	237.55	0.41	0.07
	Interval	20	2390.90	251.31		

$p<0.01$ indicates significant at 1% level

As the 'r' value of the table above is positive, the proposed hypothesis i.e, the circuit and interval training will have a positive correlation with variable- vital capacity is **accepted.**

Objectives of the study

To find the effectiveness of circuit and interval training on selected physiological variable of the college men Kabaddi players in Kerala state.

To compare the effectiveness of circuit training and interval training on vital capacity of the college men Kabaddi players in Kerala state.

Conclusions

The objectives of the study are the following:

1.To find the effectiveness of circuit and interval training on selected physiological variable of the college men Kabaddi players.

2.The study found that the physiological variables like resting heart rate and vital capacity had improved on both experimental groups, in comparison to control group after a 10 weeks training programme and the circuit training group showed significant improvement in the above physiological variable as compared to interval training group. Thus the hypothesis regarding this area is being **accepted.**

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