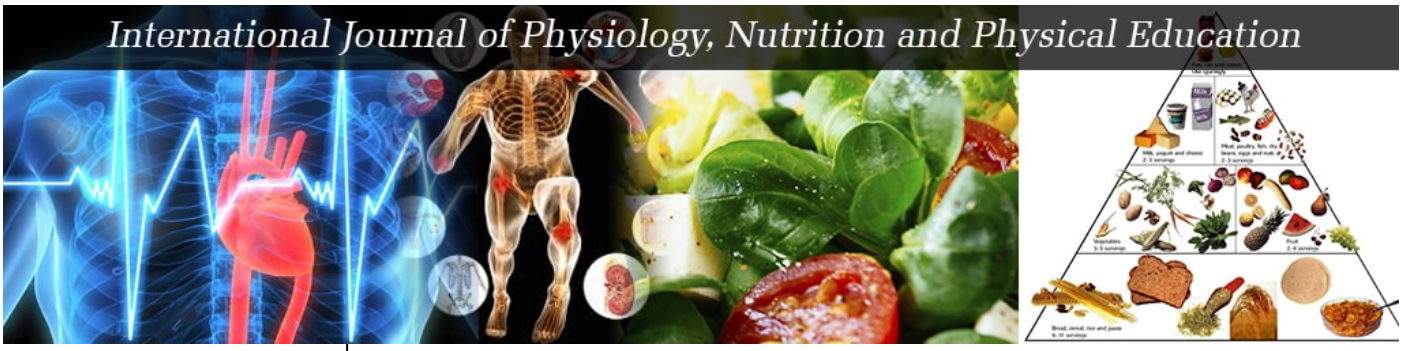


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# The Effect of different training methods on resting heart rate of Kabaddi players

## Dr. Bovas J

**Abstract**
The present study was designed to evaluate the effect of circuit training and interval training on change of resting heart rate 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.

**Keywords:** Kabaddi players, training, organized participation, individuals, fundamental

### Introduction
Sport is all forms of physical activity which, through casual or organized participation, aim to use, maintain or improve physical fitness and provide entertainment to participants. Sport may be competitive, where a winner or winners can be identified by objective means, and may require a degree of skill, especially at higher levels. Hundreds of sports exist, including those for a single participant, through to those with hundreds of simultaneous participants, either in teams or competing as individuals.
In the modern times, Kabaddi was given the national status of a game in India in 1918. Consequently, a standard set of rules and regulations for the game were formulated in the same year. However, the rules and regulations were brought to print in 1923. During the same year, an All India Tournament for Kabaddi was organized at Baroda, wherein the players strictly followed the rules and regulations formulated for the game. Since then, the game has come a long way. Its popularity increased and a number of tournaments were organized at national level, throughout the country. In 1938 the game was introduced Indian Olympic Games held at Calcutta, which fetched it international recognition.

### Importance of this study
The changing nature of the game Kabaddi, demands the right type of physiological ability on the part of a player. Today with the adventure of modern scientific equipment's for training and selection of the players, it has been now made possible to measure the fundamental performance characteristics which contribute to a player's success. What is recommended for the case of high school Kabaddi players are applicable to the university Kabaddi players too.

### 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.

'Fit people make a fit nation' the term fitness includes physical fitness, physiological fitness, mental fitness, social and spiritual fitness. Physically fit people are able to do without fatigue for longer periods and are better equipped to tolerate physical stress.

**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.

**Resting heart rate**

Measurements of resting heart rate when an organism under physical and mental rest can be termed as resting heart rate.

**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 [i.e. 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 test is presented below

**Table 1:** The list of selected physiological variable and its respective test for the study

| Sl.no | Variable | Test |
|---|---|---|
| 1. | Resting heart rate | Number of resting heart beat/minute |

**Table 2:** 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 | Resting heart rate | Stethoscope | Recorded in numbers/minute |

**The criterion measures for the selected variable used**

1. Heart rate was recorded in numbers/minute through stethoscope.

**Table 3:** Test re-test reliability coefficient on the selected test physiological variable for the study

| Sl.no | Variable | Coefficient correlation |
|---|---|---|
| 1 | Resting heart rate | 0.94* |

*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

**Physiological variable**

**Resting heart rate**

**Purpose**

To measure the resting heart rate of the subjects

**Facilities and equipment's**

Rest room, gymnastic mats, stop watch, whistle and stethoscope.

**Procedure**

The resting heart rate of the subject were recorded in their sitting position after, a relax session of 30 minutes. The measurement was taken at the subjects to use the stethoscope. The resting heart rate was counted for 60 seconds and recorded.

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 the level of resting heart rate is given below.

**Table 3:** Level of resting heart rate of college men of different group Kabaddi players in Kerala

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

* indicates the level of resting heart rate

Table shows that in the post-test the level of resting heart rate is higher in circuit group (40%) than the control and interval group.

**Effectiveness of circuit training and interval training on resting heart rate 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 resting heart rate 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.

**Table 4:** Summary of analysis of variance of pre-test and post-test scores on resting heart rate 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 | 2.63 | 328.03 | 1.32 | 164.02 | 0.21 | 25.20 |
| Within group mean | 57 | 362.35 | 370.95 | 6.36 | 6.51 | | |
| Total | 59 | 364.98 | 698.98 | | | | |

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 0.21 ($F_x$ = 0.21). 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-test in resting heart rate. The three groups are more or less equal with regard to pre-test scores of resting heart rate.

The obtained value of $F_y$ is 25.20 ($F_y$ = 25.20). 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 in resting heart rate.

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.

**Table 5:** Summary of analysis of co-variance of pre-test and post-test scores on resting heart rate 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 | 2.63 | 328.03 | -29.28 | 381.90 | 190.95 | | |
| Within group mean | 56 | 362.35 | 370.95 | 336.30 | 58.83 | 1.05 | 181.77 | 1.02 |
| Total | 58 | 364.98 | 698.98 | 307.02 | 440.73 | | | |

From table of F ratio, for df (2/56);
F at 0.05 level = 3. 16
F at 0.01 level = 5.00
$F_{yx}$ = 181.77

The obtained value of F is 181.77 ($F_{yx}$=181.77). 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 resting heart rate.

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

**Table 6:** 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 | 68.40 | 67.55 | 67.78 |
| Circuit | 20 | 68.90 | 62.10 | 61.87 |
| Interval | 20 | 68.75 | 63.30 | 63.21 |
| Group means | 20 | 68.65 | 64.83 | |

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 =0.865
Minimum significant difference required at 0.05 =0.650

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

**Table 7:** Difference between adjusted means ($M_{yx}$) of experimental (circuit and interval) and control groups

| | $M_{YX}$ (ADJ) | Difference | RM |
|---|---|---|---|
| Control | 67.78 | 5.91 | Sig |
| Circuit | 61.87 | | |
| Control | 67.78 | 4.57 | Sig |
| Interval | 63.21 | | |
| Circuit | 61.87 | 1.34 | Sig |
| Interval | 63.21 | | |

Difference between adjusted means ($M_{yx}$) of control and circuit training groups =5.91 which is greater than 0.865 implies that the both the groups differ significantly at 0.01 level. Difference between adjusted means ($M_{yx}$) of control and interval training groups =4.57 which is greater than 0.865 implies that the both the groups differ significantly at 0.01 level and difference between adjusted means ($M_{yx}$) circuit and interval training groups =1.34 which is greater than 0.865 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 resting heart rate i.e, circuit training group ($M_{yx}$=61.87) is significantly superior to control ($M_{yx}$ = 67.78) and interval training group ($M_{yx}$ = 63.21) with regard

to their post-test scores.

**Comparison of pre-test and post-test scores of resting heart rate 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.

**Table 8:** Comparison of pre-test and post-test scores of resting heart rate among the control, circuit and interval group Kabaddi players

| Group | Test | Mean | S.D | r Value | Calculated 't' value | P Value |
|---|---|---|---|---|---|---|
| Control | Pre-test | 68.00 | 2.27 | 0.96 | 5.81 | 0.00 |
| | Post-test | 67.20 | 2.28 | | | |
| Circuit | Pre-test | 68.50 | 2.72 | 0.95 | 31.09 | 0.00 |
| | Post-test | 62.30 | 2.49 | | | |
| Interval | Pre-test | 68.45 | 2.60 | 0.93 | 27.83 | 0.00 |
| | Post-test | 62.85 | 2.83 | | | |

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 resting heart rate 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.

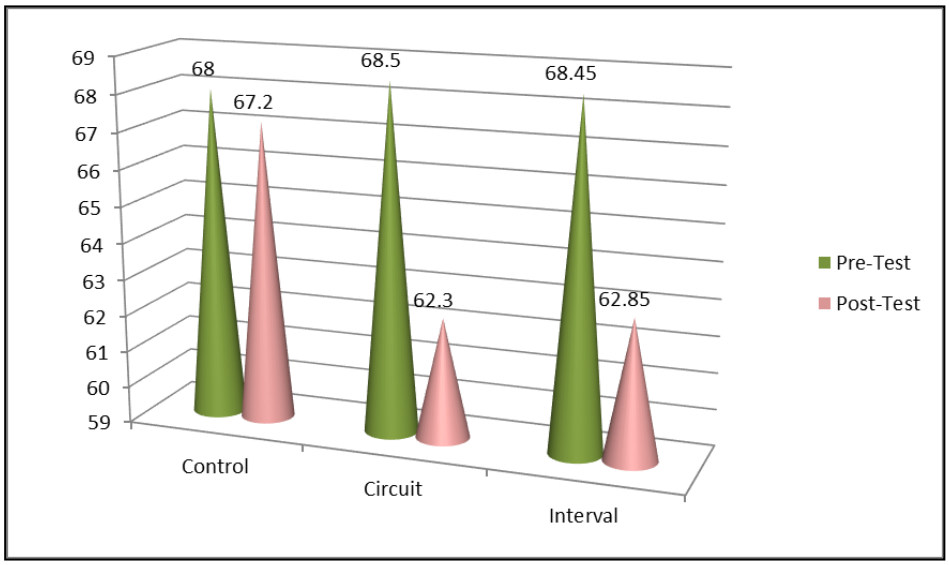


**Fig 1:** Difference between pre-test and post-test scores of resting heart rate among the control, circuit and interval group Kabaddi players

From the figure it is found that the physiological variable resting heart rate 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 resting heart rate as compared to interval training group.

**Correlation between circuit group and interval group in resting heart rate**

In order to find out the correlation between circuit group and interval group in resting heart rate, 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 in the below.

**Table 9:** Relationship between circuit group and interval group in resting heart rate of pre-test and post-test

| Test | Group | No | Mean | S.D | 'r' value | 'P' Value |
|---|---|---|---|---|---|---|
| Pre-test | Circuit | 20 | 68.50 | 2.72 | 0.42 | 0.06 |
| | Interval | 20 | 68.45 | 2.60 | | |
| Post-test | Circuit | 20 | 62.30 | 2.49 | 0.37 | 0.11 |
| | Interval | 20 | 62.85 | 2.83 | | |

p<0.01 indicates significant at 1% level

As the r value of the table is positive, the proposed hypothesis i.e., the circuit and interval training will have a positive correlation with variable- resting heart rate 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 resting heart rate 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 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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