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Research Paper

Influence Of Circadian Rhythms On Selected Physiological Variables Among College Trained And Untrained Male Kabaddi Players

Physical Education

KEYWORDS : Circadian Rhythm, Physiology, Body Temperature, Resting Heart Rate and Bio-monitor..

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ABSTRACT

The purpose of the study was to find out the influence of circadian rhythm on selected physiological variables. Ten male kabaddi players studying Masters Degree in physical education at Alagappa University College of physical education, Karaikudi Tamilnadu, India were selected as trained subjects. They were in good state of fitness and regularly took part in physical activities both morning and evening as per their curriculum. Ten male kabaddi players studying Masters Degree in arts science at Alagappa government Arts College, Karaikudi, Tamilnadu, India were selected as untrained subjects. The dependent variables namely Body temperature measured by Bio-monitor in Celsius and Resting heart rate measured by Bio-monitor in Beats per minutes. The experimental design used was static group factorial design. The first factor consisted of training status as trained and untrained kabaddi players, second factor consisted of circadian variation measured at six different times of the day (02:00, 06:00, 10:00, 14:00, 18:00, 22:00 hours) The Data were collected at different times of a day and statistically analyzed by using Two factor analysis of variance with second factor repeated (2 x 6 ANOVA) measures was used to find out the influence of each of the factor independently and also their combined influence on each of the selected physiological variables of college men students.0.05 level of significance was fixed to find out that there was an any significant improvement on circadian rhythm of selected physiological variables.

INTRODUCTION

Success in sports, as measured by competitive performance, is dependent upon a number of significant mental and physical components. Somatic type, motor skills, age, nutritional status, physiology, psychology, training level, genetic endowment and injury risk are the major variables influencing performance of sports persons. One such biological phenomenon influencing sports performance is "Circadian rhythm ".

When we are having a bad day we should not be too quick to blame our spouse, a mysterious virus or our unhappy childhood. We may simply feel out of sports because we are trying to 'tick' when our body wants to 'tock'. In other words, one of our biological clocks may be out of synch with the others or with our surroundings.

We all have a complex system of hundred or more internal clocks that regulate everything from our heart rate and body temperature to reaction time and memory. Each clock runs on its own cycle creating an inner symphony of biological rhythms that help us to adopt to a world that is itself constantly changing from day to night and season to season.

Many human performance measures tend to follow closely the circadian rhythm in body temperatures. If we trace the world record in athletics for the past 50 years, most of them are set in the late afternoon or evening. For example, world record performance by British athletes in track, distance races between 800mts to 5000mts took place between 19:00 and 23:00 hours that is when the ambient temperature and body temperature are at their peak. Also athletes tend to prefer evening contents and consistently achieve their top performance at this time of day. The fact that freely chosen level of exercise is highest at the time the body temperature rhythm reaches a peak has important implications for training as well as for certain competitive sports.

STATEMENT OF THE PROBLEM

The purpose of the study was to analyze the influence of circadian rhythm on selected physiological variables of trained and untrained male kabaddi players.

HYPOTHESIS

1. It was hypothesized that there would be a significant difference on selected physiological variables between trained and untrained male kabaddi players irrespective of different times of the day.
2. It was hypothesized that there would be a significant difference on selected physiological variables between different times of the day irrespective of training status.

METHODOLOGY

The purpose of the study was to find out the influence of circadian rhythm on selected physiological variables. Ten male kabaddi players studying Masters Degree in physical education at Alagappa University College of physical education, Karaikudi Tamilnadu, India were selected as trained subjects. They were in good state of fitness and regularly took part in physical activities both morning and evening as per their curriculum. Ten male kabaddi players studying Masters Degree in arts science at Alagappa government Arts College, Karaikudi, Tamilnadu, India were selected as untrained subjects. The dependent variables namely Body temperature measured by Bio-monitor in Celsius and Resting heart rate measured by Bio-monitor in Beats per minutes. The experimental design used was static group factorial design. The first factor consisted of training status as trained and untrained kabaddi players, second factor consisted of circadian variation measured at six different times of the day (02:00, 06:00, 10:00, 14:00, 18:00, 22:00 hours) The Data were collected at different times of a day and statistically analyzed by using Two factor analysis of variance with second factor repeated (2 x 6 ANOVA) measures was used to find out the influence of each of the factor independently and also their combined influence on each of the selected physiological variables of college men students.0.05 level of significance was fixed to find out that there was an any significant improvement on circadian rhythm of selected physiological variables.

ANALYSIS OF THE DATA

The collected data on selected physiological variables are body temperature and resting heart rate of trained and untrained male kabaddi players at different times of the day were statistically analyzed and discussed are presented below. The mean and standard deviation of body temperature of trained and untrained male kabaddi players at six different times of the day are presented in table-I

TABLE-I

MEAN AND STANDARD DEVIATION OF BODY TEMPERATURE OF TRAINED AND UNTRAINED KABADDI PLAYERS AT SIX DIFFERENT TIMES OF THE DAY

Status 02:00		Times of the day						Mx
		06:00	10:00	14:00	18:00	22:00		
Trained group	Mean	36.76	37.00	37.24	37.52	37.82	37.38	37.29
	SD	0.11	0.12	0.12	0.06	0.10	0.13	

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Untrained group	Mean	36.56	36.72	36.88	37.04	37.28	37.14	36.94
	SD	0.10	0.11	0.09	0.11	0.11	0.18	
	My	36.66	36.86	37.06	37.28	37.55	37.26	

Body Temperature expressed in Celsius.

Mx – Combined mean of trained and untrained kabaddi players irrespective of different times of the day.

My - Combined mean of times of the day irrespective of trained and untrained kabaddi players. The data of body temperature have been analyzed by two factors ANOVA with repeated measures on the second factor and the results obtained are presented in table-II

TABLE-II
TWO FACTOR ANOVA WITH REPEATED MEASURES ON THE SECOND FACTOR ON BODY TEMPATURE OF TRAINED AND UNTRAINED KABADDI PLAYERS AT DIFFERENT TIMES OF THE DAY

Source of variance	Sum of squares	df	Mean of Squares	F-ratio
Trained and untrained players	3.68	1	3.68	73.6*
Error I	0.83	18	0.05	
Different Times of the Day	10.25	5	2.05	205.0*
Interaction(Training and Time)	0.46	5	0.09	9.0*
Error II	0.74	90	0.01	

*significant at .05 level of confidence. (Table values required for significance at .05 level for df (1, 18) and (5, 90) are 4, 41 and 2.32 respectively.)

Table –II shows that the F-ratio for Factor-A(trained and untrained kabaddi players) is 73.6 and it is significant at .05 level of confidence as the required table value for significance is 4.41 (df 1 and 18). The F-ratio for Factor-B (different times of the day) is 205.0 and it is significant at .05 level of confidence as the required table value for significance is 2.32 (df 5 and 90).

The interaction F-ratio for Factor-A x B (training status and different times of the day) is 9.0 and it is significant at .05 level of confidence as the required table value for significance is 2.32 (df 5 and 90).

Since the obtained F-ratio for trained and untrained kabaddi players is significant, it is concluded that there is a significant difference in body temperature between trained and untrained kabaddi players. The body temperature of trained kabaddi players (37.29c) is higher than untrained kabaddi players (36.94c). Trained kabaddi players have 0.35c (0.95%) higher body temperature than the untrained kabaddi players.

The obtained F-ratio for significant six different times of the day is significant, it is therefore concluded that there is a significant difference in Body temperature among six different times of the day.

The mean and standard deviation of resting heart rate of trained and untrained kabaddi players at six different times of the day are presented in table-III

TABLE-III
MEAN AND STANDARD DEVIATION OF RESTING HEART RATE OF TRAINED AND UNTRAINED KABADDI PLAYERS AT SIX DIFFERENT TIMES OF THE DAY

Status 02:00		Times of the day						Mx
		06:00	10:00	14:00	18:00	22:00		
Trained group	Mean	58.00	64.80	69.80	74.00	80.00	72.60	69.87
	SD	2.97	2.99	2.75	1.55	1.79	2.69	
Untrained group	Mean	72.00	74.20	78.40	83.40	87.80	80.60	79.40
	SD	1.89	1.89	2.50	3.55	3.40	3.11	
	My	65.00	69.50	74.10	78.70	83.90	76.60	

Resting heart rate expressed in beats per minutes.

Mx – Combined mean of trained and untrained kabaddi players irrespective of different times of the day.

My - Combined mean of times of the day irrespective of trained and untrained kabaddi players.

The data of resting heart rate have been analyzed by two factors ANOVA with repeated measures on the second factor and the results obtained are presented in table-IV

TABLE-IV
TWO FACTOR ANOVA WITH REPEATED MEASURES ON THE SECOND FACTOR ON RESTING HEART RATE OF TRAINED AND UNTRAINED KABADDI PLAYERS AT DIFFERENT TIMES OF THE DAY

Source of variance	Sum of squares	df	Mean of Squares	F-ratio
Trained and untrained players	2726.53	1	2726.53	107.73*
Error I	455.53	18	25.31	
Different Times of the Day	4514.27	5	902.85	211.44*
Interaction(Training and Time)	131.07	5	26.21	6.14*
Error II	384.07	90	4.27	

*significant at .05 level of confidence. (Table values required for significance at .05 level for df (1, 18) and (5, 90) are 4, 41 and 2.32 respectively.)

Table –IV shows that the F-ratio for Factor-A(trained and untrained kabaddi players) is 107.73 and it is significant at .05 level of confidence as the required table value for significance is 4.41 (df 1 and 18). The F-ratio for Factor-B (different times of the day) is 211.44 and it is significant at .05 level of confidence as the required table value for significance is 2.32 (df 5 and 90).

The interaction F-ratio for Factor-A x B (training status and untrained kabaddi players and different times of the day) is 6.14 and it is significant at .05 level of confidence as the required table value for significance is 2.32 (df 5 and 90).

Since the obtained F-ratio for trained and untrained kabaddi players is significant, it is concluded that there is a significant difference in resting heart rate between trained and untrained kabaddi players. The resting heart rate of trained kabaddi players (69.87) is lower than untrained kabaddi players (79.40). Trained kabaddi players have 9.53 beats (12%) lesser Resting heart rate than the untrained kabaddi players.

The obtained F-ratio for significant six different times of the day is significant, it is therefore concluded that there is a significant difference in resting heart rate among six different times of the day.

CONCLUSIONS

1. This study shows that there is a significant difference in Body temperature and Resting Heart Rate between Trained and Untrained male kabaddi players irrespective of different times of the day.
2. The study also reveals that there is a significant difference in Body temperature and Resting heart rate among six different times of the day irrespective of training status

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