

A Study on Circadian Rhythm and Seasonal Variance on Speed of Cricket Players

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Abstract

Purpose of present study was to find out the effect of circadian rhythm and seasonal variance on speed of cricket players. To achieve the objectives of present study hundred male national level cricket players of 18-27 years of age group were selected from Punjab. All players were the members of the cricket match practice group. These subjects were selected randomly from the cricket match practice group. 30 yard dash test was used to measure the speed of subjects and timing was recorded in seconds. To find the effect of circadian rhythm and Sessional variance on speed of cricketers 2×3 factorial group design was used. To find the effect and interaction of independent variable i. e. circadian rhythm and sessional variance on speed Two-Way Repeated ANOVA was used. Findings of the study reveal that circadian rhythm has significant effect on speed of cricketers as obtained 'F' 33.906 is significant at 0.00 level of significance, while there was no significant effect of Sessional variance on speed. Findings also suggest that Sessional variance and circadian rhythm both has combined effect on speed of cricket player speed. Hence while preparing training for cricket players to improve their speed ability circadian rhythm and seasonal variance should be considered as important factors to regulate.

Key Words: Circadian rhythm, Sessional variance

Introduction: Circadian rhythm the repeated 24-hour period of human organic activity. Within the circadian (24-hour) cycle, a person usually snoozes in to regulate of 8 hours and is awake 16. During the wakeful hours, rational and physical functions are most active and tissue cell growth increases. During sleep, voluntary muscle behavior nearly disappear and here is a decrease in metabolic rate, respiration, heart rate, body temperature, and blood pressure. The action of the digestive system increases during the resting period, other than the urinary system decreases. Hormones secreted by the body, such as the tonic epinephrine (adrenaline), are released in maximal amounts.

Cricket is an excellent all round team sport, which is highly competitive and has its basis in high degree of physical fitness neuro-muscular co-ordination and skill. The variation in temperature due to seasonal changes may disturb. The each day rhythm, which is a key source of inconsistency in performance. Thus training of the athletic performance seems to be an important factor which needs careful investigation. Some study finding indicates that the each day rhythmically oscillations occur in a figure of physiological and behavioral functions that contribute to athletic performance. These functions include resting level of sensory motor, psychomotor and perceptual variables. Research also point out the daily rhythmicity in components of athletics performance can be modulated by work load, physiological stresses, motivation arousal level. "Morning category / Evening category, differences enlightenment sleep turbulence, and balance lunch dip phenomenon etc.

Modern cricket is an energetic fast game requiring high level of strength like explosive strength, endurance, speed and coordinative abilities to sustain skilled play for 90 minute. So this game required to emphasis on the development of fundamental skills because of the fact that in this game a player is required to play in all position during the match. At a time a player can be defender and becomes attacker in the next movement. Therefore a different variety of techniques is required for the players as per the requirement of different game situations. As a consequence, a cricket player is expected to work as a wide ranging programme designed to improve his speed, strength, flexibility, endurance, etc. are the underlying factors of improve technique coordination and further because of this reason the various coordinative abilities have their specific and key role to play in this game specially.

Objectives of the study:

- To find out the effect of circadian rhythm on speed of cricket players
- To find out the effect of sessional variance on speed of cricket players
- To find out the interaction effect of circadian rhythm and sessional variance on speed of cricket players.

Methodology: The purpose of this study is to determine the Study of Circadian Rhythm and Seasonal Variation on speed of cricket players. To achieve the objectives of present study hundred male national level cricket players of 18-27 years of age group were selected from Punjab. All players were the members of the cricket match practice group. These subjects were selected randomly from the cricket match practice group. **30 yard dash test** was used to measure the speed of subjects and timing was recorded in seconds. The test was administered after giving them a good warm up of same duration and of same sequence every time. The subjects were tested three times in both the season in the following way.

The timing for summer and winter was the same as given below:-

Between 7.00 AM to 9.00 AM

Between 11:30 A.M. to 12:30 P.M

Between 5.00 PM to 7.00 PM.

Experimental Design: As researcher was investigating effect of circadian rhythm and sessional variation on speed of cricket players. In the study there were two factors i. e. sessional variation and circadian rhythm and both having different levels. Hence researcher used 2×3 factorial group design to find out the effect of circadian rhythm, Sessional variation and interaction effect of circadian rhythm and Sessional variation on speed of cricket players.

Sessional Variance	Circadian Rhythm		
Summer	Morning	Afternoon	Evening
Winter	Morning	Afternoon	Evening

Statistical Procedure: In order to find out the Effect of Circadian Rhythm and Seasonal Variation on speed ability of Cricket Players, Two-Way Repeated-Measures ANOVA was employed. The level of significance chosen to test the hypothesis was 0.05.

Findings**Table: I**

Descriptive Statistics of Circadian Rhythm in both the Seasons on speed of of the Cricket Players.

	Season	Mean	Std. Deviation	N
Morning	Summer	5.6090	.04871	100
	Winter	5.6460	.03872	100
	Total	5.6275	.04765	200
Afternoon	Summer	5.7420	.31886	100
	Winter	5.6240	.04544	100
	Total	5.6830	.23475	200
Evening	Summer	5.5620	.04399	100
	Winter	5.5930	.04629	100
	Total	5.5775	.04765	200

To begin with the analysis of data, the descriptive statistics of the sample in the two seasons and circadian rhythm on speed is presented in table I. The table is self-explanatory and it indicates the mean and SD of Cricket players in both the seasons as well as circadian rhythm on speed.

Table: II

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	Df	Mean Square	F	Sig.
Season	Sphericity Assumed	.042	1	.042	2.828	.094
	Greenhouse-Geisser	.042	1.000	.042	2.828	.094
	Huynh-Feldt	.042	1.000	.042	2.828	.094
	Lower-bound	.042	1.000	.042	2.828	.094
Circadian Rhythm	Sphericity Assumed	1.114	2	.557	33.906	.000
	Greenhouse-Geisser	1.114	1.018	1.094	33.906	.000
	Huynh-Feldt	1.114	1.024	1.088	33.906	.000
	Lower-bound	1.114	1.000	1.114	33.906	.000

Circadian Rhythm × Season	Sphericity Assumed	.771	2	.386	23.467	.000
	Greenhouse-Geisser	.771	1.018	.757	23.467	.000
	Huynh-Feldt	.771	1.024	.753	23.467	.000
	Lower-bound	.771	1.000	.771	23.467	.000

Table: II shows three different analysis computed by Two Way repeated measure ANOVA i.e. two main effects i.e. one interaction effect (influence of season on speed and influence of Circadian Rhythm on speed) and other interaction effect (interaction effect of season and Circadian Rhythm on speed). The f-values are 2.828, 33.906 and 23.467 ($p=.000$) significant at 0.05 level of significance.

Table: III
Pairwise Comparisons of Circadian Rhythm on the speed of Cricket Players.

(I)Circadian Rhythm	(J)Circadian Rhythm	Mean Difference (I-J)	Std. Error	Sig.
Morning	Afternoon	-.056	.016	.001*
	Evening	.050	.002	.000*
Afternoon	Morning	.056	.016	.001*
	Evening	.106	.016	.000*
Evening	Morning	-.050	.002	.000*
	Afternoon	-.106	.016	.000*

Table: III reveals that there is significant difference in the mean difference of the Cricket players on speed in all the three periods of circadian rhythm i.e., morning, afternoon and evening. The mean difference of the Cricket players on speed between morning and afternoon is -.056, mean difference of the Cricket players on speed between morning and evening is .050 and mean difference of the Cricket players on speed between afternoon and evening is .106. Their for Pairwise Comparisons of Circadian Rhythm on the speed of Cricket Players showed significance difference at the level of .05 significance.

Discussion of Findings: Vitosevic discussed the importance of circadian clock in managing of key muscle physiological processes, and therefore the impact on athletic performance is well studied. Specifically chronobiology examines the mechanisms of the biological clock and the consequences of disrupting its rhythm. Although a body of literature indicates that the peak performance of notable indicators of athletic performance exerts mainly in the afternoon and evening hours which is attributed to increased temperature of the body, certain variables such as vigilance, alertness and cognitive domains can influence the shift of the peak performance during the day. In addition, athletes face issues of desynchronization of their circadian rhythm during frequent transcontinental travels, since their performance is reduced and the adjustment of the biological clock requires some recommendations in the training process and behavioral approach. This review focuses on some current studies on endogenous and exogenous factors which affect the circadian rhythm in order to achieve better sport results, evaluation of the impact chronotype through chronometric tests and revising more valuable determinants of sport performance, as well as the application of new mathematical models in individual treatment of recovery of athletes in the phase of resynchronization.

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