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CHRONOTYPE AND ATHLETIC PERFORMANCE IN DIFFERENT TIME OF DAY

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ABSTRACT

For this study, total of 26 (13 male and 13 female) subjects were selected from the Department of Physical Education, Central University of Kashmir, age ranged between 23 to 27 years. Non-Probability sampling such as purposive sampling was used in the present study. In the present study chronotype was selected as the Independent Variable whereas Speed, Agility and Lower body explosive strength was considered as the dependent variables. Chronotype is understood to reflect a spectrum of behaviors ranging from an extreme preference for morning activity to an extreme preference for evening activity. Horneostberg, (1976) morning - evening question was used to find out the chronotype of the athletes. All the tests were conducted and administered at different times in a day. i.e., morning from 9.30 AM to 10:30 AM and evening between 03:00 pm to 04:00 pm. The obtained data was analyzed by applying the descriptive statistics and paired "t" were worked out and the results have been presented in different tables. . Therefore, it was concluded that mean differences in the explosive strength and agility in morning and evening was statistically significant and it was also concluded that mean differences in the morning 50m sprint and evening 50m sprint were not statistically significant.

Keywords: Chronotype, Athletic Performance, Time of Day, Speed, Agility and Explosive Strength

1. INTRODUCTION

Individuals with a morning-type chronotype typically wake earlier in the morning, are more alert in the earlier part of the day and choose earlier bedtimes. Evening-types on the other hand prefer later rising times, are more alert in the evening or night and have later bedtimes. Forrester, J.M. (1985) the fluctuation of circadian rhythm seems to enable organism to adapt in advance to circumstances that will ensure in a consistently cycling environment. Information relating alternations of circadian rhythms to physical and mental performance can be obtained under relatively natural performance and circumstances in man before and after time-zone changes, or during a shift in working hours. Human physical performance is determined by a combination of several anatomical, physiological, and psychological factors. The relative importance of each of these depends on the nature of the exercise. Various physical, psychological and physiological functions have been shown to undergo changes related to the time of the solar day. These variations are known as circadian or diurnal rhythms. These functions exhibit peaks and troughs of maximum and minimum function at specific times of the day. (Adam, 2008). Organic elements rhythms of man's nature and environment play a vital position in athletic overall performance. Essential sports contests are not frivolously distributed over a sufficiently wide

span of the day to yield conclusions approximately the optimal time for competing. Patton et.al, (1989). Therefore, the findings of this have a look at will actually help to apprehend the importance of circadian variations in physiological parameters bodily and gambling capacity in particular in Indian situations. So the rationale of the study was effects of circadian rhythm on selected factors related to sports performance of late chronotype athletes.

2. SELECTION OF SUBJECTS

For this study, total of 26 (13 male and 13 female) subjects were selected from the Department of Physical Education, Central University of Kashmir, age ranged between 23 to 27 years. Non-Probability sampling such as purposive sampling was used in the present study.

3. SELECTION OF VARIABLES

In the present study chronotype was selected as the Independent Variable whereas Speed, Agility and Lower body explosive strength was considered as the dependent variables.

4. ADMINISTRATION OF THE TEST ITEMS

Chronotype is understood to reflect a spectrum of behaviors ranging from an extreme preference for morning activity to an extreme preference for evening activity. HORNEOSTBERG,(1976) morning -eveningess question was used to find out the chronotype of the athletes. All the tests were conducted and administered at different times in a day. i.e., morning from 9.30 am to 10:30 am and evening between 03:00 pm to 04:00 pm.

Speed was measured with 50-Meter Dash, The test involves running a single maximum sprint over 50 meters, with the time recorded. A thorough warm up was given, including some practice starts and accelerations. The subjects were asked to start from a stationary standing position (hands cannot touch the ground), with one foot in front of the other. The front foot must be behind the starting line. Once the subject is ready and motionless, the starter gives the instructions or command "go.", the time taken by the subject to cover the distance was recorded as the score of the test.

Agility was measured with 4 x 10 yards Shuttle Run Test, in which two lines 10 meters apart using marking tape or cones were marked. The two blocks were placed on the line opposite the line they are going to start at. On the signal "ready" , the participant places their front foot behind the starting line. On the signal, "got" the participant sprints to the opposite line, picks up a block of wood, runs back and places it on or beyond the starting line. Then turning without a rest, they run back to retrieve the second block and carry it back across the finish line- Two trials were performed. Time to complete the test in seconds to the nearest one decimal place was recorded.

Explosive Leg Strength was measured with the standing Broad Jump, in which A take-off line was marked on the ground. Subjects stands just behind the line with the feet several inches apart. The subject swings the arms and bends the knees to take a jump. Landing should be on both legs. Three trails were given to the subject. The distance was measured from the take-off line to the heel or other part of body that touches the ground nearest to the take-off line. Best of three was counted. The measurement was taken from take-off line to the nearest point of contact on the landing (back of the heels).

5. QUESTIONNAIRE

Horneostberg, (1976) Morning and Eveningness questionnaire Self-Assessment Version (Meq-SA) was used to collect the data.

Procedure

To make a clear view of the researcher's theory seasons were conducted on university grounds to make the subjects understand the study and the procedure of the test. Further questionnaire was distributed to the subjects and asked to fill in the appropriate answer as per the question. The researcher collected all the questionnaires and found out the score based on the questionnaire key.

Scoring

Scores can range from 16-86. Scores of 41 and below indicate "evening types." Scores of 59 and above indicate "morning types." Scores between 42-58 indicate intermediate types.

Statistical Technique

Descriptive statistics and t-test were used to test the hypothesis at 0.05 level of significance. The obtained data was analyzed by applying the descriptive statistics and paired "t" were worked out and the results have been presented in a different table as given below:

Table No: 01 Descriptive Statistics of the Chronotype and athletic performance in different time of day

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
MBJ	13	1.78	0.40	.297	.512	-1.120	.992
EBJ	13	1.85	0.44	.253	.512	-1.241	.992
MA	13	20.73	1.83	1.579	.512	4.633	.992
EA	13	19.83	2.00	.984	.512	0.312	.992
MS	13	8.62	1.07	.407	.512	-.622	.992
ES	13	8.07	1.17	.458	.512	-.903	.992

Table 01 Revealed that the mean and SD of morning and evening broad jump, agility and Speed i.e. 1.78±.40, 1.85 ±.44, 20.73 1.83, 19.83 2.00, 8.62 1.07, 8.07 1.17 respectively. To see the significance of the mean difference between morning broad jump and evening broad jump paired "t" test was applied and the result has been presented in table no 02.

Table No: 02 Paired Samples Test of Chronotype and athletic performance in different time of day

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Ex. Strngth	MBJ EBJ	.07	.16	.037	-.15	.00	3.54	12	.031
Agility	MA EA	.89	1.62	.36	.14	1.65	2.483	12	.023
Speed	MS ES	.55	1.79	.40	-.29	1.39	1.368	12	.187

It was evident from **table 02** that there were significant differences between morning broad jump and evening broad jump as the value of "t" = 3.54 with a "p-value" of .031 which was less than .05. There it was concluded that mean differences in the morning legs power and evening broad jump were statistically significant at level of significance .05.

Also a significant difference was found in the morning and evening agility as the p value was found 0.023 which is also less than 0.05 whereas an insignificant difference was found in the morning and evening speed of the athletes as the p valve was found to be higher than 0.187 at level of significance 0.05. Therefore, it was concluded that mean differences in the explosive strength and agility in morning and evening was statistically significant and it was also concluded that mean differences in the morning 50m sprint and evening 50m sprint were not statistically significant.

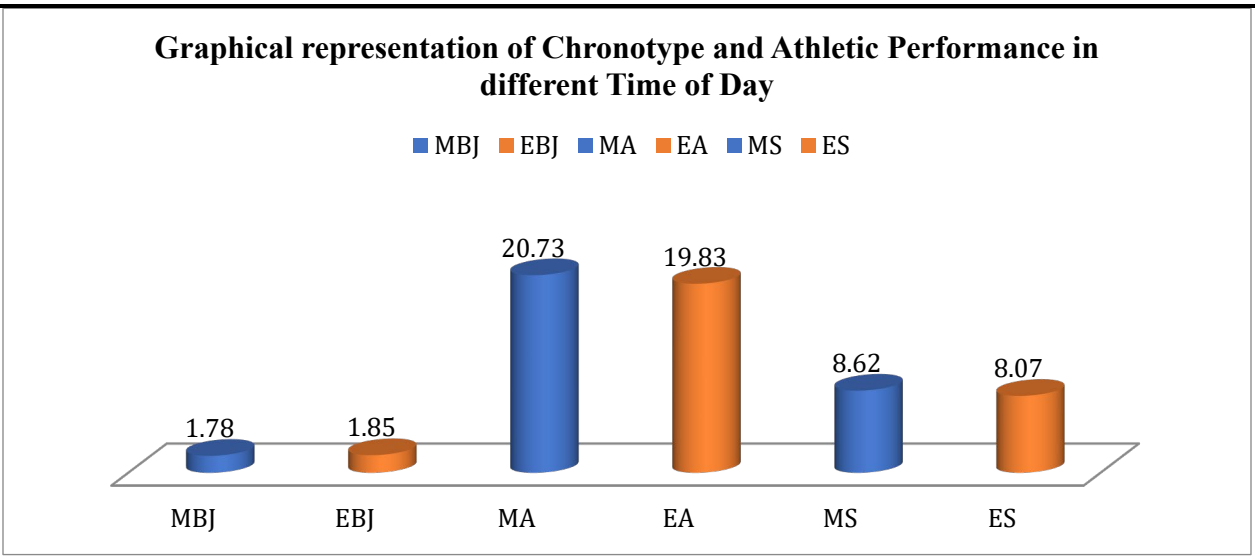

Fig. No. 01 Graphical representation of Chronotype and athletic performance in different time of day

6. DISCUSSION OF FINDINGS

For this study, total of 26 (13 male and 13 female) subjects were selected from the Department of Physical Education, Central University of Kashmir, age ranged between 23 to 27 years. The obtained data was analyzed by applying the descriptive statistics and paired "t" were worked out and the results have been presented as It has been observed from the results that there were significant differences in morning and evening performance of different physical variables (explosive strength and agility) in respect of chronotype athletes. These differences may be because of the good response of the body because in agility presence of good mental ability with physical potential is required to understand the procedure of test battery to cover the distance. Whereas agility is an ability to change the body position quickly and requires the integration of isolated movement skills using a combination of balance, coordination, speed, reflex, and endurance. Whereas as insignificant difference was found in the speed performance of morning and evening. It may be because an athlete has the same potential to perform in any circumstances. Further, they were mentally prepared for both the time, and maybe athletes are trained for both the time morning and evening during their training season which may be the reason behind the findings.

A number of studies have measured the response to exercise at different times of day and found that diurnal variation is specific to chronotype. For example, evening-types reached higher VO2max values, which had higher cortical and spinal excitability levels and generated more torque in the evening compared with morning and had slower heart rate recoveries in the morning than in the evening.

Further the results were also in line with the Atkinson and Reilly (1996) discussed circadian variant in sports activities and Overall performance.

Elise R., Sophie Boiling and George (2018) who investigated the impact of chronotype on indices of cognitive and physical performance at different times of the day and found significantly different diurnal variation profiles between ECT & LCT for day time sleepiness, psychomotor vigilance, executive function and isometric grip strength. LCTs were significantly impaired in all measures in the morning compared to ECT.

Jacopo Antonino vitale and Adni weydhal (2017) M-types perceived less effort while performing a sub maximal physical task in the morning than did N & E type. In addition, M type generally showed better athletic performances, as measured by race time in the morning than did N and E types.

Anette Harris, Stale Pallesen Sleep medicine (2015) Sleep deprivation and time of day are both known to influence performance. A growing body of research has focused on how sleep and circadian rhythms impact athletic performance.

CONFLICT OF INTERESTS

None.

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