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Effect of Yoga Practice on Circadian Rhythms in Selected Biochemical Variables

Dr. K. Sivakumar*

M.P.E.S., Ph.D., Associate Professor, Department of Physical Education and Sports Sciences, Annamalai University, Annamalai Nagar, Chidambaram, Tamilnadu

Abstract – All living organisms exhibit rhythmic variation in responses to the light and dark cycles in the environment. These biological rhythms have a period of twenty four synchronizing with the light and dark cycles. Biological rhythms are ubiquitous and found to occur from unicellular to man and these have been organized at all levels of organizations the organ, tissue, cell and the cellular organelles. Regular and systematic excise will cause modification in various systems of the body. Such changes may be beneficial to those who receive training. Biochemical variables, which are often involved in such changes not only contribute to better performance but also to ones health and fitness. To asses the circadian rhythms in selected biochemical measures from yogic and non yogic groups. There would be fluctuations of biochemical variables between two groups.

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INTRODUCTION

Circadian

Circadian (About a day) rhythms planets and animals have been recognized from earliest times. Rhythms in the various physiological parameters approximating period of the earth's rotation with the period of approximately 24 hours, were first termed 'Circadian' by Hal berg in 1959 from Latin 'Circa' mean 'About' and 'Dies' mean 'Day'. The prefix 'Circa' has also been applied to other biological rhythms that synchronize with various other geophysical cycle for example circadian, circa lunar and circannual referring to the cycle of the tidal waves the phases of the moon and the season in a year respectively. Yoga is derived from the Sanskrit root 'yuj' meaning 'Unite', to integrate or to coherence and is this taken to represent the highest state of union. Yogic Group, Subjects who had undergone systematic programe of conditioning or training and represent to Annamalai University in yoga competition were considered as yogic group. Non Yogic Group, Subjects who have not represent their School/College/University in any of the yogic practice and those who have not undergone systematic physical conditioning or training but undergone post graduate course other than Physical Education at Annamalai University were considered as non yogic group. Blood is a tissue which circulates in what is virtually a closed system of blood vessel. It consists of solid elements the red and white blood cells and the platelets suspended in a liquid medium the plasma. Serum is the fluid exuded from the clotted blood. Regular rhythms growth of activity that occur on an approximately 24 hours cycle. Protein, A chain of amino acids joined by peptides bonds, a protein typically contains over 100 amino acids and may be composed of more than one poly peptide.

Statement of the Problem

The purpose of the study was to asses the circadian rhythms in selected biochemical measures non yogic and yogic groups. The present study analysis the following factors,

1) To understand the circadian rhythms in biochemical parameter of non-yogic group.

2) To find out the circadian rhythms in biochemical parameter of yogic group.

3) To compare the circadian rhythms in biochemical parameter among non yogic group and yogic group.

METHODOLOGY

Selection of subjects

Ten subjects from yogic group and ten subjects from non-yogic group

Experimental Variables

In the present study non yogic and yogic subjects were selected as one of the categorical variables for this study. Circadian rhythms usually form sinusoid within a period about 24 hour. The change can also reflect the sharp contrast between day and night. So six different times of a day (08:00, 12:00, 16:00,

20:00, 24:00 and 04:00 hour) were selected as a another categorical variables. The protein was taken as depended variable because of its close association with circadian rhythms.

Collection of Blood Samples

Six different times of a day (08:00, 12:00, 16:00, 20:00, 24:00 and 04:00 hour) and it has been done an post digestive period.

Estimation of the Protein

Serum protein was estimated by biuret method of welchselbaum (1940) using bushranger Mannheim reagent kit. Protein forms a colored complex with cupric ions in alkaline medium.

Analysis of Data

Six different times of a day (08:00, 12:00, 16:00, 20:00, 24:00 and 04:00 hour)

Statistically analyzed for significance using 2 X 6 factorial design with repeated measures on the second factor and student "t" test.

The Mean and Standard Deviation value of Protein of Non Yogic Group and Yogic Group at Six Different Times of the Day are presented in table Ia.

Table – Ia

The Mean and Standard Deviation value of Protein of Non Yogic Group and Yogic Group at Six Different Times of the Day

	Mean± SD						
Categories	**08:00**	**12:00**	**16:00**	**20:00**	**24:00**	**04:00**	**Mx**
Non Yogic Group	7.01 ±0.34	6.93 ±0.56	7.48 ±0.39	7.56 ±0.36	7.0 ±0.38	6.96 ±0.21	**7.16**
Yogic Group	6.83 ±0.28	7.11 ±0.48	7.37 ±0.39	7.43 ±0.37	6.93 ±0.27	6.59 ±0.33	**6.68**
My	**6.92**	**7.02**	**7.42**	**7.49**	**6.96**	**6.77**	

Protein expressed in g/dl

Mx- combined mean of non yogic group and yogic group irrespective of different times of the day.

My- combined mean of times of the day irrespective of non yogic group and yogic group.

The date of protein has been analyzed by two-way ANOVA and the obtained results are presented in table Ib.

Table – Ib

Two way factorial analysis of variance repeated measure on the second factor on protein of Non Yogic Group and Yogic Group at Six Different Times of the Day

Source of Variance	SS	DF	MS	F
Between	9.43	19	-	-
Non Yogic Group	0.78	1	0.78	**1.63**
Error	8.65	18	0.48	-
Within	22.90	100	-	-
Different Times of the Day	8.01	5	1.60	**10.68**
Interaction	1.05	5	0.21	**1.41**
Error	13.26	90	0.15	-

*Significant at .05 level of confidence

Table value required for significance at .05 level for dt(1, 18) is 4.41 and df(1,90) is 2.32

Table II shows that the F-ratio for factor A (Non Yogic Group and Yogic Group) is 1.63 and it is not significant at .05 level of confidence as the required table value for significance is 4.41 df(1,90) is 2.32 and dt(1, 18). The F-ratio for factor B (different times of the day) is 11.98 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 (Non Yogic Group and Yogic Group and different times of the day) is 1.11 and it is not significant at .05 level of confidence as the required table value for significance is 2.32 (df 5 and 90).

The obtained F-ratio for six different times of the day is significant, if is therefore concluded that there is significant difference in protein among six different times of the day.

The different between times of the day in protein is presented in table Ic.

Table – Ic

Scheffe's Test for Difference between the Paired Means of Protein at Six Different Times of the Day Irrespective of Non Yogic Group and Yogic Group

08:00	12:00	16:00	20:00	24:00	04:00	Mean Difference
6.92	7.02					0.1
6.92		7.42				**0.5***
6.92			7.49			**0.57***
6.92				6.96		0.04
6.92					6.77	0.15
	7.02	7.42				0.40
	7.02		7.49			**0.47***
	7.02			6.96		0.06
	7.02				6.77	0.25
		7.42	7.49			0.07
		7.42		6.96		**0.46***
		7.42			6.77	**0.65***
			7.49	6.96		**0.53***
			7.49		6.77	**0.72***
				6.96	6.77	0.19

*Significant at .05 level of confidence

Confidence interval required for significance at .05 level is 0.41.

The result of the study clearly shows that the protein increases as the time of the day increase and this increase in protein was found to be significant in 8 paired means out of compared 15 paired means.

The difference in protein between 08:00 and 16:00, 08:00 and 20:00, 12:00 and 16:00, 12:00 and 20:00, 16:00 and 24:00, 20:00 and 04:00 hour were significant at .05 level of confidence.

The obtained F-ratio for interaction was 1.11 and it was significant at .05 level of confidence. It means that the protein level of non yogic and different times of the day was in significant.

Table II

Acrophase changes between Non Yogic Group and Yogic Group

Biochemical Parameter	Period		Acrophase		Magnitude of Changes
	Non Yogic Group	Yogic Group	Non Yogic Group	Yogic Group	
Protein	24	24	20:00	20:00	No changes

Protein rhythms showed on acrophase at 20:00 and low at 04:00 in non yogic group (fig).In yogic group the acrophase is not changed. The protein levels are minimum at 04:00 Table II

Figure - I

Temporal oscillation of protein at 4 hr intervals for a period of 24 hr of Non Yogic Group and Yogic Group

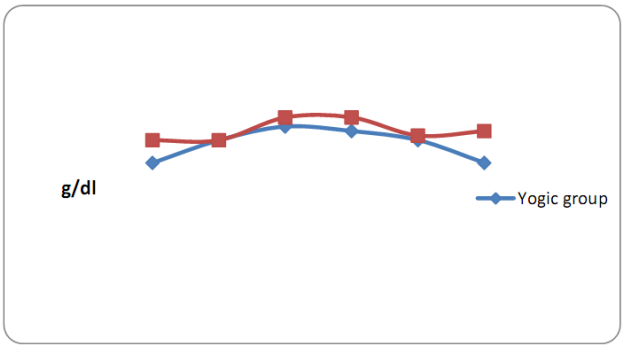


Table - III

Amplitude changes between Non Yogic Group and Yogic Group

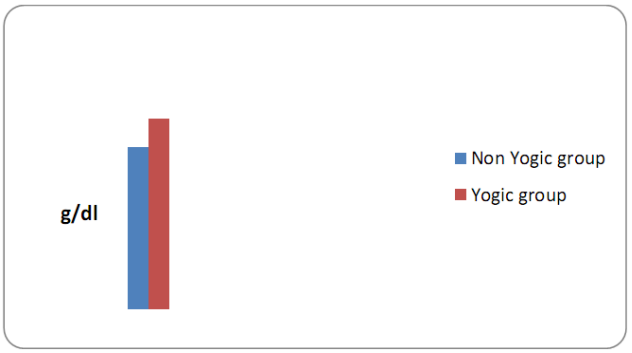
Biochemical variable	Range±SD		Value	
	Non Yogic Group	Yogic Group	t	p
Protein	0.57±0.24	0.64±0.27	1.67	NS

NS – not significant at .05 level.

The amplitude of protein for non yogic group was 0.57 and for yogic group 0.64, resulted with a't' ratio of 1.67, which was not significant at .05 level. This shows that there was variation in protein but it has no greater significant variations for non yogic group when compared to yogic group table - III.

Figure – II

The Amplitude of Protein between Non Yogic Group and Yogic Group



CONCLUSION

Based on the result of the study the following conclusions were drawn

1) The circadian rhythms had no significant influence on the biochemical parameters among non yogic group and yogic group at different times of the day.

2) The result of the study indicates that, in acrophase there was no change in protein rhythms between non yogic group and yogic group.

3) The result of the amplitude indicate that, there was a statistical significant, but it fails to obtain statistical significant difference for protein between non yogic group and yogic group.

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Corresponding Author

Dr. K. Sivakumar*

M.P.E.S., Ph.D., Associate Professor, Department of Physical Education and Sports Sciences, Annamalai University, Annamalai Nagar, Chidambaram, Tamilnadu

E-Mail – shivameyy@gmail.com