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Effect of Circadian Oscillation during Food Deprivation on Speed in Obese Men

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Abstract

The purpose of the study was to find out the effect of circadian oscillation during food deprivation on speed among obese men. To achieve the purpose of the present study, sixty obese men from Islamiah College, Vaniyambadi, Tamilnadu, India were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects were divided into four equal groups of fifteen subjects each. Group I acted as Experimental Group I (Food Deprivation Training), Group II acted as Experimental Group II (Physical training), Group III acted as Experimental Group III (Food Deprivation & Physical training) and Group IV acted as Control Group. The requirement of the experiment procedures, testing as well as training schedule was explained to the subjects so as to get full co-operation of the effort required on their part and prior to the administration of the study. Speed was assessed by 50 metres run. Experimental Group I was exposed to food deprivation training, Experimental Group II was exposed to physical training, Experimental Group III was exposed to food deprivation & physical training and Control Group was not exposed to any experimental training other than their regular daily activities. The duration of experimental period was 120 days. After the experimental treatment, all the sixty subjects were tested on speed. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, Scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses. The findings of the study showed that the combined food deprivation and physical training group showed changes in speed than the other experimental and control groups.

Keywords: Circadian Rhythm, Obese, Men, Speed.

Introduction

A circadian rhythm is a roughly 24 hour cycle in the physiological processes of living beings, including plants, animals, fungi and cyanobacteria. In a strict sense, circadian rhythms are endogenously generated, although they can be modulated by external cues such as sunlight and temperature. Circadian rhythms are important in determining the sleeping and feeding patterns of all animals, including human beings. 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 parameters 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. Many components related to athletic or games performance has been shown to possess these circadian rhythms.

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Circadian rhythms continue to persist under constant conditions. This phenomenon is called free running and rhythms exhibit period (FR) that is slightly greater or shorter than 24 h. The endogenous period is temperature compensated within the physiological range; it means that at different ambient temperature the period length of the clock remains the same with Q10 equals to 1.0.3. They are under genetic control. It has been documented that single mutation can profoundly affect the period length of biological clocks. Mutation in gene causes shortening or lengthening of circadian period in fruit fly to become arrhythmic. Biological clocks are entrained to an exact period by environmental time cues or zeitgebers. The circadian rhythms also provide temporal organization and ensure that internal changes take place in synchronization with one another. Desynchronization of the internal temporal organization with external environmental rhythms might produce health problems in an individual, such as those associated with jet lag and shift work (Amita, 2004). A number of diseases and their symptoms appear periodically that have remarkable circadian connotation.

Obesity is a chronic state of being overweight. It's a life threatening condition and current research has shown that obesity is the leading cause for the increased

health threats those persons of the developed world. What worse is the over two third of the industrialized world's population is suffering from obesity and that's putting them in greater health dangers. Everyone desires good health and it is the ultimate objective of all those who want happiness in life. Each and every one has to follow good health practices in the routine life. Minor health disorders are quite common to all. In the case of major health problems, the precautionary measures are plenty. Some people control their diseases like blood pressure, diabetes, acidity, asthma etc., by taking medicines regularly. But such practice does not in any way completely eliminate the health disorders on the other hand; it leads to several other adverse health problems.

Methodology

The purpose of the study was to find out the effect of circadian oscillation during food deprivation on speed among obese men. To achieve the purpose of the present study, sixty obese men from Islamiah College, Vaniyambadi, Tamilnadu, India were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects were divided into four equal groups of fifteen subjects each. Group I acted as Experimental Group I (Food Deprivation Training), Group II acted as Experimental Group II (Physical training), Group III acted as Experimental Group III (Food Deprivation & Physical training) and Group IV acted as Control Group. The requirement of the experiment procedures, testing as well as training schedule was explained to the subjects so as to get full co-operation of the effort required on their part and prior to the administration of the study. Speed was assessed by 50 metres run. Experimental Group I was exposed to food deprivation training, Experimental Group II was exposed to physical training, Experimental Group III was exposed to food deprivation & physical training and Control Group was not exposed to any experimental training other than their regular daily activities. The duration of experimental period was 120 days. After the experimental treatment, all the sixty subjects were tested on speed. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, Scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses.

Results

Table I. Computation of analysis of covariance of food deprivation, physical training, combined food deprivation and physical training and control groups on speed at 6.00 am

	FDG	PTG	CFDPTG	CG	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	9.69	9.66	9.65	9.64	**BG**	0.15	3	0.05	0.95
					WG	2.95	56	0.05	
Post-Test Means	9.26	9.24	8.59	9.54	**BG**	7.24	3	2.41	63.37*
					WG	2.13	56	0.03	
Adjusted Post-Test Means	9.25	9.24	8.59	9.56	**BG**	7.35	3	2.45	66.77*
					WG	2.02	55	0.03	

Table – I reveals that the indicated that the obtained 'F'-ratio for the pre-test means among the groups on speed were 9.69 for experimental group – I, 9.66 for experimental group - II, 9.65 for experimental group - III and 9.64 for control group. The obtained 'F'-ratio 0.95 was lesser than the table 'F'-ratio 2.76. Hence the pre-test mean 'F'-ratio was insignificant at 0.05 level of confidence for the degree of freedom 3 and 56. The post-test means were 9.26 for experimental group – I, 9.24 for experimental group – II, 8.59 for experimental group - III and 9.54 for control group. The obtained 'F'-ratio 63.37 was higher than the table 'F'-ratio 2.76. Hence the post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 56. The adjusted post-test means were 9.25 for experimental group – I, 9.24 for experimental group – II, 8.59 for experimental group - III and 9.56 for control group. The obtained 'F'-ratio 66.77 was higher than the table 'F'-ratio 2.77. Hence the adjusted post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 55.

Table II. The scheffe's test for the differences between the adjusted post test means on speed at 6.00 am

Adjusted Post-Test Means				Mean Difference	Confidence Interval
FDG	PTG	CFDPTG	CG		
9.25	9.24	---	---	0.01	0.18
9.25	---	8.59	---	0.66*	
9.25	---	---	9.56	0.31*	
---	9.24	8.59	---	0.65*	
---	9.24	---	9.56	0.32*	
---	---	8.59	9.56	0.97*	

**** Significant at 0.05 level of confidence***

Table II shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.18. It was observed that the combined food deprivation and physical activity group significantly increased speed better than the food deprivation, physical activity and control group. The physical activity group significantly increased speed better than the control group. The food deprivation group significantly increased speed better than the control group. The pre, post and adjusted means on speed were presented through bar diagram for better understanding of the results of this study in Figure-I.

Figure I. Pre, post and adjusted post test differences of the experimental and control groups on speed at 6.00 am

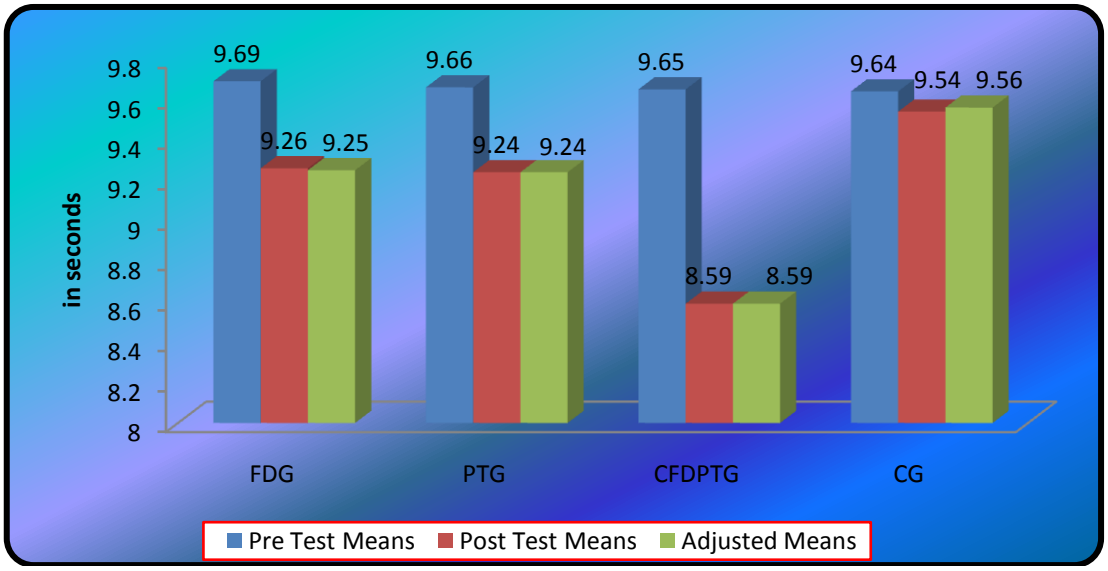


Table III. Computation of analysis of covariance of food deprivation, physical training, combined food deprivation and physical training and control groups on speed at 8.00 am

	FDG	PTG	CFDPTG	CG	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	9.70	9.71	9.68	9.69	**BG**	0.007	3	0.002	0.05
					WG	2.70	56	0.04	
Post-Test Means	9.10	9.02	8.24	9.68	**BG**	15.65	3	5.21	128.22*
					WG	2.27	56	0.04	
Adjusted Post-Test Means	9.10	9.02	8.24	9.68	**BG**	15.66	3	5.22	127.06*
					WG	2.26	55	0.04	

Table – III reveals that the indicated that the obtained 'F'-ratio for the pre-test means among the groups on speed were 9.70 for experimental group – I, 9.71 for experimental group - II, 9.68 for experimental group - III and 9.69 for control group. The obtained 'F'-ratio 0.05 was lesser than the table 'F'-ratio 2.76. Hence the pre-test mean 'F'-ratio was insignificant at 0.05 level of confidence for the degree of freedom 3 and 56. The post-test means were 9.10 for experimental group – I, 9.02 for experimental group – II, 8.24 for experimental group - III and 9.68 for control group. The obtained 'F'-ratio 128.22 was greater than the table 'F'-ratio 2.76. Hence the post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 56. The adjusted post-test means were 9.10 for experimental group – I, 9.02 for experimental group – II, 8.24 for experimental group - III and 9.68 for control group. The obtained 'F'-ratio 127.06 was greater than the table 'F'-ratio 2.77. Hence the adjusted post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 55.

Table IV. The scheffe's test for the differences between the adjusted post test means on speed at 8.00 am

Adjusted Post-Test Means				Mean Difference	Confidence Interval
FDG	PTG	CFDPTG	CG		
9.10	9.02	---	---	0.08	0.21
9.10	---	8.24	---	0.86*	
9.10	---	---	9.68	0.58*	
---	9.02	8.24	---	0.78*	
---	9.02	---	9.68	0.66*	
---	---	8.24	9.68	1.44*	

**** Significant at 0.05 level of confidence***

Table IV shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.21. It was observed that the combined food deprivation and physical activity group significantly increased speed better than the food deprivation, physical activity and control group. The physical activity group significantly increased speed better than the control group. The food deprivation group significantly increased speed better than the control group. The pre, post and adjusted means on speed were presented through bar diagram for better understanding of the results of this study in Figure-II.

Figure II. Pre, post and adjusted post test differences of the experimental and control groups on speed at 8.00 am

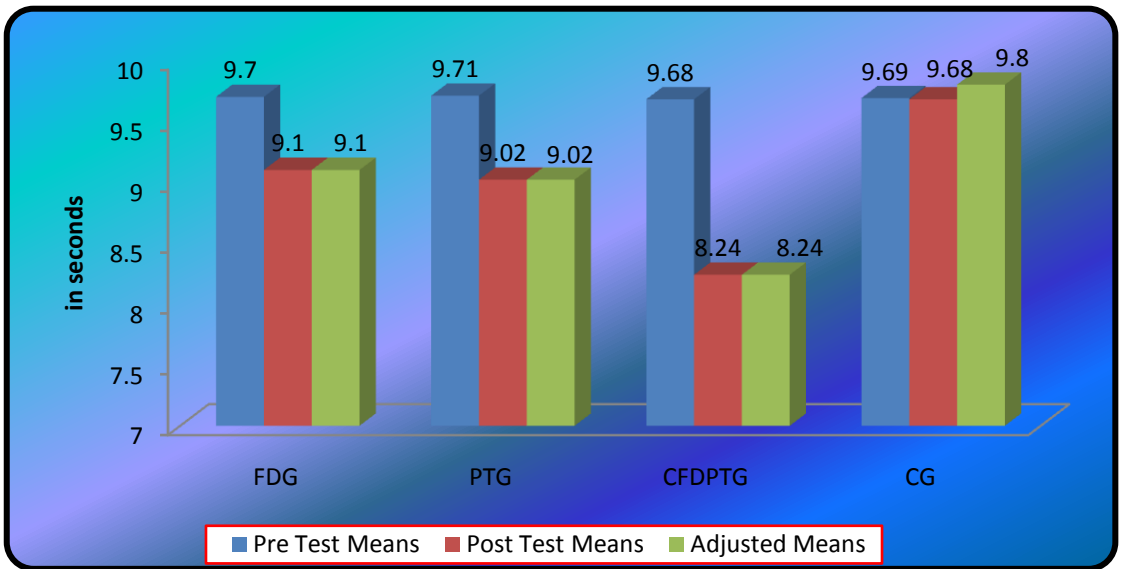


Table V. Computation of analysis of covariance of food deprivation, physical training, combined food deprivation and physical training and control groups on speed at 4.00 pm

	FDG	PTG	CFDPTG	CG	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	9.67	9.80	9.65	9.69	**BG**	0.18	3	0.06	0.93
					WG	3.77	56	0.06	
Post-Test Means	9.00	8.63	8.32	9.68	**BG**	15.27	3	5.09	95.83*
					WG	2.97	56	0.05	
Adjusted Post-Test Means	8.99	8.63	8.32	9.68	**BG**	15.26	3	5.08	94.57*
					WG	2.95	55	0.05	

Table – V reveals that the indicated that the obtained 'F'-ratio for the pre-test means among the groups on speed were 9.67 for experimental group – I, 9.80 for experimental group - II, 9.65 for experimental group - III and 9.69 for control group. The obtained 'F'-ratio 0.93 was lesser than the table 'F'-ratio 2.76. Hence the pre-test mean 'F'-ratio was insignificant at 0.05 level of confidence for the degree of freedom 3 and 56. The post-test means were 9.00 for experimental group – I, 8.63 for experimental group – II, 8.32 for experimental group - III and 9.68 for control group. The obtained 'F'-ratio 95.83 was higher than the table 'F'-ratio 2.76. Hence the post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 56. The adjusted post-test means were 8.99 for experimental group – I, 8.63 for experimental group – II, 8.32 for experimental group - III and 9.68 for control group. The obtained 'F'-ratio 94.57 was higher than the table 'F'-ratio 2.77. Hence the adjusted post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 55.

Table VI. The scheffe's test for the differences between the adjusted post test means on speed at 4.00 pm

Adjusted Post-Test Means				Mean Difference	Confidence Interval
FDG	**PTG**	**CFDPTG**	**CG**		
8.99	8.63	---	---	0.36*	0.23
8.99	---	8.32	---	0.67*	
8.99	---	---	9.68	0.69*	
---	8.63	8.32	---	0.31*	
---	8.63	---	9.68	1.05*	
---	---	8.32	9.68	1.36*	

**** Significant at 0.05 level of confidence***

Table VI shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.23. It was observed that the combined food deprivation and physical activity group significantly increased speed better than the food deprivation group, physical activity group and control group. The physical activity group significantly increased speed better than the food deprivation group and control group. The food deprivation group significantly increased speed better than the control group. The pre, post and adjusted means on speed were presented through bar diagram for better understanding of the results of this study in Figure-III.

Figure III. Pre, post and adjusted post test differences of the experimental and control groups on speed at 4.00 pm

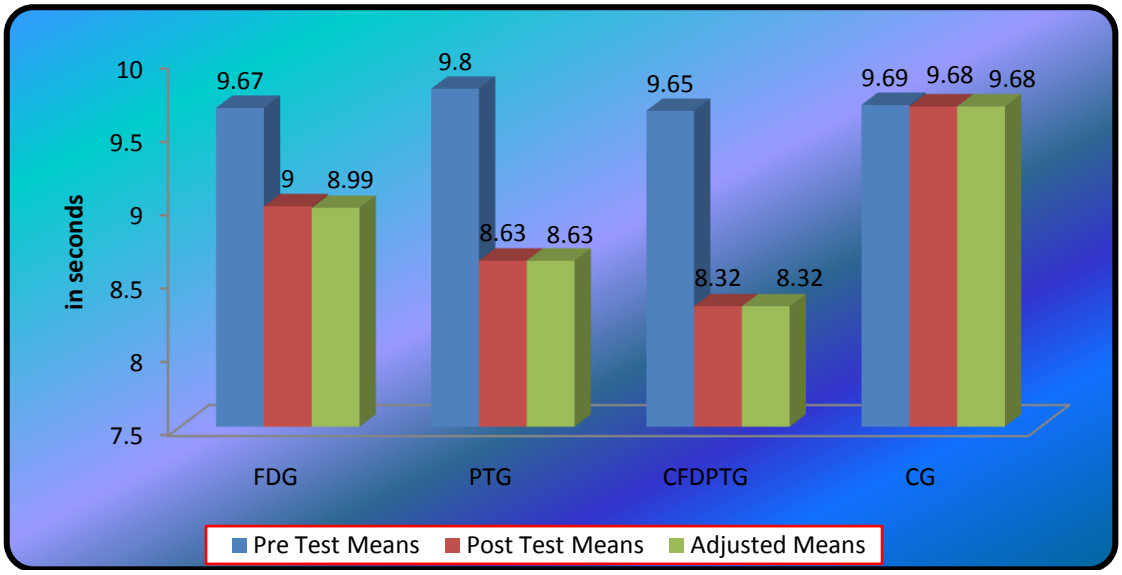


Table VII. Computation of analysis of covariance of food deprivation, physical training, combined food deprivation and physical training and control groups on speed at 6.00 pm

	FDG	PTG	CFDPTG	CG	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	9.64	9.62	9.70	9.68	**BG**	0.05	3	0.01	0.27
					WG	3.90	56	0.07	
Post-Test Means	8.98	8.67	8.26	9.66	**BG**	15.76	3	5.25	80.93*
					WG	3.63	56	0.06	
Adjusted Post-Test Means	8.99	8.68	8.25	9.66	**BG**	15.78	3	5.26	85.73*
					WG	3.37	55	0.06	

Table – VII reveals that the indicated that the obtained 'F'-ratio for the pre-test means among the groups on speed were 9.64 for experimental group – I, 9.62 for experimental group - II, 9.70 for experimental group - III and 9.68 for control group. The obtained 'F'-ratio 0.27 was lesser than the table 'F'-ratio 2.76. Hence the pre-test mean 'F'-ratio was insignificant at 0.05 level of confidence for the degree of freedom 3 and 56. The post-test means were 8.98 for experimental group – I, 8.67 for experimental group – II, 8.26 for experimental group - III and 9.66 for control group. The obtained 'F'-ratio 80.93 was higher than the table 'F'-ratio 2.76. Hence the post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 56. The adjusted post-test means were 8.99 for experimental group – I, 8.68 for experimental group – II, 8.25 for experimental group - III and 9.66 for control group. The obtained 'F'-ratio 85.73 was higher than the table 'F'-ratio 2.77. Hence the adjusted post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 3 and 55.

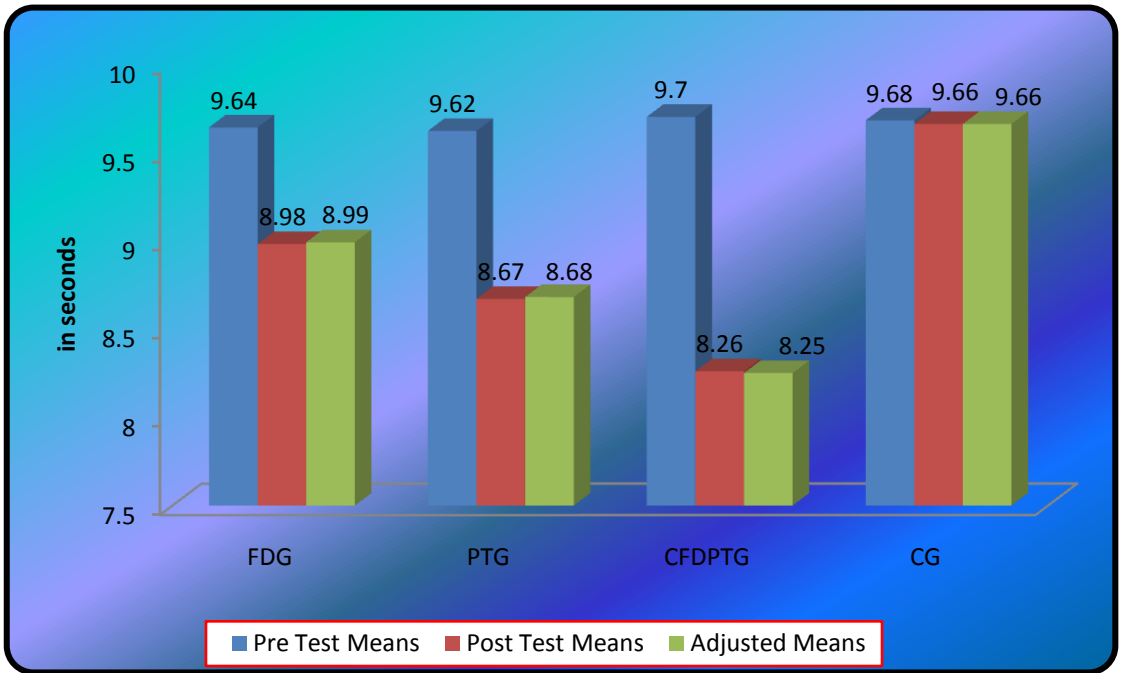
Table VIII. The scheffe's test for the differences between the adjusted post test means on speed at 6.00 pm

Adjusted Post-Test Means				Mean Difference	Confidence Interval
FDG	PTG	CFDPTG	CG		
8.99	8.68	---	---	0.31*	0.25
8.99	---	8.25	---	0.74*	
8.99	---	---	9.66	0.67*	
---	8.68	8.25	---	0.43*	
---	8.68	---	9.66	0.98*	
---	---	8.25	9.66	1.41*	

**** Significant at 0.05 level of confidence***

Table VIII shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.25. It was observed that the combined food deprivation and physical activity group significantly increased speed better than the food deprivation group, physical activity group and control group. The physical activity group significantly increased speed better than the food deprivation group and control group. The food deprivation group significantly increased speed better than the control group. The pre, post and adjusted means on speed were presented through bar diagram for better understanding of the results of this study in Figure-IV.

Figure IV. Pre post and adjusted post test differences of the experimental and control groups on speed at 6.00 pm



Conclusions

From the analysis of the data, the following conclusions were drawn:

1. The findings of the study showed that there were significant changes in speed due to influence of physical training at 6.00 am, 8.00 am, 4.00 pm and 8.00 pm respectively.
2. The findings of the study showed that there were significant changes in speed due to influence of physical training at 6.00 am, 8.00 am, 4.00 pm and 8.00 pm respectively.
3. The findings of the study showed that there were significant changes in speed due to influence of combined food deprivation and physical training at 6.00 am, 8.00 am, 4.00 pm and 8.00 pm respectively.
4. The findings of the study showed that the combined food deprivation and physical training group showed changes in speed than the other experimental and control groups.

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