International Journal of Physical Education and Sports Sciences

Vol. VII, Issue No. XIII, July-2014, ISSN 2231-3745

IMPACT OF DIFFERENT DURATIONS OF SLEEP DEPRIVATION ON COORDINATION

AN INTERNATIONALLY INDEXED PEER REVIEWED & REFEREED JOURNAL

www.ignited.in

International Journal of Physical Education and Sports Sciences
Vol. VII, Issue No. XIII, July-2014, ISSN 2231-3745

Impact of Different Durations of Sleep Deprivation on Coordination

Pramod Singh Narwariya[1]* Prof. Vivek Pandey[2]

[1] PhD Scholar, LNIPE, Gwalior

[2] Faculty, LNIPE, Gwalior

Abstract – The purpose of the study was to see the impact of different durations of sleep deprivation on coordination. A total ten male subjects from Lakshmibai National Institute of Physical Education, Gwalior were selected. The age of subjects was ranging between 19 to 23 years with (Mean ¬¬+ S.D; Age 20.80 + 1.47 years, Height 170.8 + 3.32 cms, weight 65.70 + 3.71 kgs). The subjects were instructed to take sleep for 08 hours before the day of testing. The selected subjects were deprived from sleep for selected time in hour's 20 hours, 22 hour, and 24 hours. The pre data and post data was collected on the variables. The testing timing was in morning 06 A.M again data was collected on after 20 hours, 22 hour, and 24 hours i.e. 02.00 A.M, 04.00 A.M and 06.00 A.M. in order to study to see the impact of different durations of sleep deprivation on coordination, one way repeated measure ANOVA was employed at 0.05 level of significance. Bonferroni correction was employed in case of only significant effect result for pair wise comparison to find the mean difference among the durations. Finding of the study showed significant impact on coordination.

Keywords: Sleep Deprivation, Coordination.

----------♦----------

INTRODUCTION

Sleep is a naturally recurring state characterized by altered consciousness, relatively inhibited sensory activity, and inhibition of nearly all voluntary muscles. It is distinguished from wakefulness by a decreased ability to react to stimuli, and it is more easily reversible than being in hibernation or a coma. During sleep, most systems in an animal are in a heightened anabolic state, accentuating the growth and rejuvenation of the immune, nervous, skeletal and muscular systems etc. It is observed in mammals, birds, reptiles, amphibians and fish, and (in some form) in insects and even simpler animals such as nematodes.

In the hurry of modern life for the struggle for existence, people are neglecting to get enough sleep. They are "burning the candle at both ends" over indulging in activity and reducing the hour of rest and sleep. The human organism is made in such a way that it will stand considerable abuse without showing injurious effects, but neglect of the fundamental principles of exercise and rest will sooner or later demands its toll.

Experiment has shown that lack of sleep, which actually had little effect on the body if there has been adequate rest, seriously disturbs the mental processes. After 30 to 60 hours of continuous sleeplessness, such reaction as irritation, loss of memory and even symptoms of schizophrenia may begin to appear. In laboratory experiments deprivation of REM (Rapid eye movement) sleep and consequently of dreaming leads to irritability, anxiety, poor motor coordination and difficulty to concentrate and remember.

METHODOLOGY

Selection of Subjects

Ten male subjects from Lakshmibai National Institute of Physical Education, Gwalior were selected. The age of subjects was ranging between 19 to 23 years with (Mean ± SD; Age 20.80± 1.47 years, Height 170.8 ± 3.32 cms, Weight 65.70 ± 3.71 kgs, Subjects were asked to provide written or voluntary consent prior to participation. The subjects were studying in Bachelor Degree in Physical Education. The subjects were informed about the purpose of the study. Further, they were also informed that the data will remain confidential and will not be used beyond any academic purpose. Each subject underwent each treatment of sleep deprivation.

www.ignited.in

Criterion Measures

Coordination	Mirror tracking device

STATISTICAL TECHNIQUE

In order to examine the hypotheses of the study, descriptive statistics such as mean, standard deviation, was used.

In order to see the impact of different duration of sleep deprivation on coordination one way repeated measure ANOVA was employed. In case of only significant main effect result, Bonferroni correction was employed for pair-wise comparisons to find the mean difference among the durations.

RESULTS AND FINDINGS

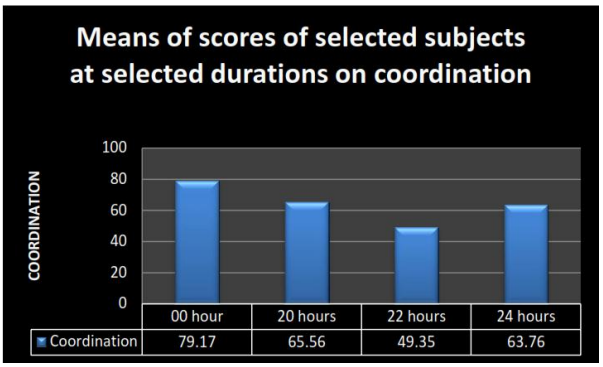
Descriptive Statistics of the Scores of Selected Subjects at Selected Durations on Coordination

Descriptive Statistics

TIME	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
00 hour	10	39.00	120.30	79.17	25.43	647.11	-.34	.68	-.23	1.33
20 hours	10	38.30	89.30	65.56	13.27	176.17	-.37	.68	1.99	1.33
22 hours	10	32.20	74.40	49.35	12.45	155.16	.78	.68	.47	1.33
24 hours	10	39.00	78.30	63.76	14.69	215.91	-.65	.68	-1.07	1.33
Valid N (listwise)	10									

Table 2 reveals the descriptive statistics of the coordination at various durations i.e. 00 hour, 20 hours, 22 hours, and 24 hours The mean and standard deviation of coordination at 00 hour, 20 hours, 22 hours, and 24 hours are 79.1 ± 25.43, 65.5 ± 13.27, 49.3 ± 12.45, 63.7 ± 14.69 respectively. The mean scores indicated that coordination were higher in the duration of '0 hour' followed by '20 hours', '24 hours' and at last, '22 hours'. The variance of the data on coordination at 00hour, 20 hours, 22 hours, and 24 hours was found to be 647.1, 176.1, 155.1, and 215.9 respectively. The skewness of the data on coordination at 00hour, 20 hours, 22 hours, and 24 hours was found to be -.34, -.37, .78, and -.65 respectively. The kurtosis of the data on coordination at 00hour, 20 hours, 22 hours, and 24 hours was found to be .23, 1.99, .47, and-1.07 respectively. The data sets were found normal in the variable of coordination for all the durations because none of the data set has significant skewness or kurtosis.

For the graphical representation of the mean scores of the selected subjects at selected durations on coordination has been represented in the figure.



Graphical Representation of the Means Scores of Selected Subjects at Selected Durations on Coordination

Figure shows that value of coordination was highest at 00 hour and 20 hours whereas lowest value of coordination found at 22 hours of sleep deprivation.

Mauchly's Test of Sphericity for Coordination at Different Durations of Sleep Deprivation

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	p-value	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
TIME	.16	14.13	5	.01	.61	.77	.33

To test the assumption of sphericitymauchleys test was applied and the results revealed that the assumption of sphericity was not fulfilled as the p value is lessthan 0.05 level of significance.

Tests of Within-Subjects Effects for Coordination at Different Durations of Sleep Deprivation

Source		Type III Sum of Squares	df	Mean Square	F	p-value	Partial Eta Squared
TIME	Sphericity Assumed	4463.96	3	1487.98	7.03	.00	.43
	Greenhouse-Geisser	4463.96	1.85	2408.11	7.03	.00	.43
	Huynh-Feldt	4463.96	2.31	1929.03	7.03	.00	.43
	Lower-bound	4463.96	1.00	4463.96	7.03	.02	.43
Error(TIME)	Sphericity Assumed	5710.21	27	211.49			
	Greenhouse-Geisser	5710.21	16.68	342.26			
	Huynh-Feldt	5710.21	20.82	274.17			
	Lower-bound	5710.21	9.00	634.46			

Table shows the results of test of within subject effects. It was observed that there is a significant difference among the various measures of coordination as the p value is less than 0.05 level of significance. So to know where exactly the difference lies, pairwise comparison with bonferroni post hoc comparison was applied.

Pairwise Comparisons for the Different Durations of Sleep Deprivation on Coordination

(I) TIME	(J) TIME	Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
00hour	20hours	13.61	5.55	.22	-5.08	32.30
	22hours	29.82*	7.58	.02	4.30	55.33
	24hours	15.41	9.11	.75	-15.25	46.07
20hours	00hour	-13.61	5.55	.22	-32.30	5.08
	22hours	16.21*	3.17	.00	5.53	26.88
	24hours	1.80	5.52	1.00	-16.77	20.37
22hours	00hour	-29.82*	7.58	.02	-55.33	-4.30
	20hours	-16.21*	3.17	.00	-26.88	-5.53
	24hours	-14.41	6.46	.31	-36.14	7.32
24hours	00hour	-15.41	9.11	.75	-46.07	15.25
	20hours	-1.80	5.52	1.00	-20.37	16.77
	22hours	14.41	6.46	.31	-7.32	36.14

*The mean difference is significant at the 0.05 level

Pairwise comparison of coordination among different durations reveals that there is a significant difference between 00 hour and 22 hours, 20 hours and 22 hours as the p-value is less than 0.05 level of significance. There is insignificant difference between 00 hour and 20 hours, 00 hour and 24 hours as the p value is more than 0.05 level of significance. Insignificant differences were also found between 22 hours and 24 hours as p value is more than 0.05 level of significance.

DISCUSSION AND CONCLUSION

Coordination was also selected as a psychomotor variable which was taken into the study and analyzed. The within-within subjects effects was found significant which means coordination in different durations were compared. The researcher has employed pairwise comparison in which coordination was found differ in between 00 hours and 22 hour and 20 hours and 24 hours, which shows a significant difference in coordination during these durations. This result shows that due to sleep coordination becomes reduced at those durations. The coordination factor decreases after sleep deprivation but has shown an inconclusive result as its value increases and decreases with the increase in the time of sleep deprivation.

REFERENCES

1. Silber. MH, Ancoli-Israel, S. Bonnet, C (March 2007). The visual scoring of sleep in adults. Journal of Clinical Sleep Medicine, 3(2), pp.121–31.

2. Alhola.Paula, Paivi Polo-Kantola. (October 2007). Sleep deprivation: Impact on cognitive performance. NeuropsychiatrDisTreat. 3 (5), pp. 553–567.

3. H.O. Lispera, H. Laurella J. Van Loona. (1986). Relation between time to falling asleep behind the wheel on a closed track and changes in subsidiary reaction time during prolonged driving on a motorway. Ergonomics, 29(3), pp. 445-53.

4. Ayalon.D Roy, Jr. Friedman Frederick. (2008). The effect of sleep deprivation on fine motor coordination in obstetrics and gynecology residents. American Journal of Obstetrics and Gynecology, 199(5), pp. 576.e1–576.e5.

5. Avram Goldstein, Sophia kaizer, Richard Warren. (1965). Psychotropic effects of caffeine in man. Ii. Alertness, psychomotor coordination, and mood. The journal of pharmacology and experimental therapeutics, 150(1), pp. 146-151.

Corresponding Author

Pramod Singh Narwariya*

PhD Scholar, LNIPE, Gwalior