

12 IMPACT OF ACUTE PARTIAL SLEEP DEPRIVATION ON S.L.C.T. AS A TEST FOR ATTENTION SCORE ON MEDICAL STUDENTS: a comparative study

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Abbreviation: SLCT =single letter cancellation test

ABSTRACT

INTRODUCTION: sleep is an essential function of brain and help to maintain of attention and concentration. Sleep deprivation lead to difficulty in maintaining attention and concentration. Some medical students study hard at cost of sleep to the extent that is from few hours to total loss of sleep and may lead to many consequences and problems .The medical examination is a complex task and require due attention , concentration complex sensory motor and cognitive coordination, and sleep deprivation is hazardous.

OBJECTIVE: The goal of our study was to evaluate the impact of sleep deprivation on attention task studied by **single letter cancellation test (SLCT)** amongst the sleep deprived first MBBS students compared to students who had taken adequate sleep.

METHOD: In laboratory set up, two groups of students Group n1=25 students of Normal sleep group (19 males, 6 females;) of mean age 18 ± 1.43 ,and group n2=23, sleep deprived group (19 males, 4 females;) of mean age 18 ± 1.53 years were chosen randomly. On the day one preliminary examination after taking history of sleep deprivation and drug history ,caffeine consumption and consent, subjects were instructed to conduction **single letter cancellation test (SLCT)**..The score of the test were compared among both the group and statistical t-test was carried to know the significant of difference in test score .

RESULTS: The results indicated that Group n2 23 subjects [sleep deprived group], performed inferior to group n1 25 Normal sleep group. This suggest that attention, concentration and visual signal interpretation, speed, spatial orientation was significantly affected by sleep deprivation studied by SLCT.

CONCLUSIONS: Sleep deprivation leads to poor outcome of test of ability to focus selectively by SLCT. Sleep deprivation significantly influence attention parameter i.e. studied by **single letter cancellation test (SLCT)** and reduce the attention modality. The attention and concentration are essential parameter for good outcome of medical examination especially practical examination performance. Thus, it is recommended that in workplace/college i.e. medical students should be strongly recommended to avoid sleep deprivation and take adequate sleep for healthy performance in practical examination. Sleep hygiene can taught to avoid sleep deprivation. Yoga, relaxation and breathing techniques good alternative for stress management in such set up.

KEY WORDS: *sleep, deprivation attention and concentration,,* **SLCT, medical students**

Introduction:

Irregular sleep schedules are highly prevalent among medical college students, As per one report as up to 70% of the students attain insufficient sleep. The consequences of sleep deprivation can result in increased risk of academic failure, compromised learning, impaired mood, and increased risk of motor vehicle accidents including depression,. This article reviews the current prevalence of sleep deprivation among first MBBS students and compare the impact of sleep deprivation on single letter cancellation test.

Because of complexity of sleep, reducing sleep hour due to internet, TV, Media sleep research demand due attention to physiology laboratory. Objective assessment of impact of sleep on attention parameter is a also a complex. Large number of tests are available neuropsychology and neurology to assess attention. Tests of attention usually depends on three sources of information: 1) psychometric tests designed to measure other cognitive functions, which provide indirect information about attention; (2) specific neuropsychological tests of attention; and (3) direct behavioral observation and measurement to assess attention. The measure of concentration is the span of time in which focus on a single task can be maintained. In this study, attention was assessed by single letter cancellation test and compared amongst group of student have normal sleep of 6-8 hour and Sleep deprived group of students. "Everyone knows what attention is," wrote William James in his Principles of Psychology (1890). "It is the taking possession by the mind in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought...It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state." Attention is important to learning. Learning is most efficient when a person is paying attention.

MATERIALS AND METHODS:

The present study comprises of 25 subjects of normal sleep group n1 and 23 subjects of sleep deprived group n2 First MBBS students .N1 group of student who slept normal sleep ≥ 6 hours and second group sleep deprived who slept (0 to ≤ 3 hours) in night.

STUDY DESIGN

- Selection Criteria

[1] Inclusion Criteria

- a) Individuals of either sex and of first MBBS students willing to participate in study
- b) Healthy individuals without any known disease or history of any medication or drug ,or tobacco or alcohol. Student were instructed to avoid caffeinated drink on the day of study

[2] Exclusion Criteria.

- a) History of any medication or drug ,or tobacco. Student were can not avoid caffeinated drink i.e. tea coffee on the day of study
- b) Unable to cooperate to undergo the study design.

The single-letter cancellation task (SLCT) consists of a sheet of 22 rows \times 14 columns of randomly arranged letters of the alphabet. Subjects are told to cancel target letter at a time. It is also suggested that, according to their own choice, they follow horizontal, paths on the test sheet. They are told to cancel as many target letters as possible in the test time of 90 secs. Test was supervised with a standard stopwatch. . The total number of correct responses the time taken to complete the task was recorded for every subject. Scoring for test counts total correct cancellations attempted. Mean Score was obtained among both the groups and compared by students t –test with the help of statistician .

Results :

Study documented the fact that there group n1 =25 Normal sleep group [Male 19,female 6] performed significantly better than Group n2 =23 subjects sleep deprived group[Male 19,female4].

The difference was statistically significant [$P \leq 0.001$]

Statistical test : standard manual t –test was done .

Group n1 25 students Normal sleep group (19 males, 6 females;) of mean age 18 ±1.43

,and group n2 sleep deprived group (19 males, 4 females;) of mean age 18 ±1.53 years group n=23 (statistically insignificant)

Mean score n1= 65.01 ,n2=59.91

95% **CI**: 5.25 to 10.92

t=5.7311

DF=46

St error of difference :1.409

Table-1: Impact of sleep deprivation on SLCT score

	Group n1	Group n2
	Normal sleep[6-8 hours]	Sleep deprived[2-4 hours]
Mean score	65.01	59.91
Standard deviation	4.92	4.82
SEM	0.98	1.01
N	25	23

P<0.001

Amongst the group n2 sleep deprived group male were significantly more than females.

DISCUSSION:

Out of 150 student 23 students [15.33 %] preferred sleep deprivation method to carry out additional stress of examination while remaining students preferred to sleep normally .The study documented the fact that sleep deprivation is associated with poor out come with SLCT means decreased attention function . Similar result was observed with study of Dixit et al . More than females students preferred sleep deprivation in nights in the hope of securing better score in examination . But SLCT show inferior

performance with sleep deprivation compared to normal sleep group .so deprivation of sleep can compromise their performance examination also. But due to our limitation, study we did not published examination performance correlation. The study evaluated the performance by SLCT and Reactivity by simple paper-pencil tasks in order to address this issue .The SLCT with paper-pencil tasks are easy to administer and inexpensive, suitable for any operational settings .The validity is tested in many experimental set up. *Sleep deprivation brings about decreased score and increase errors decrease in vigilance and performance in SLCL. This suggests that this can lead to unfavorable outcomes in examination performance.* Vigilance tasks with SLCT .*The effect of sleep fragmentation on cognitive abilities is also studied and result suggests that generally sleep fragmentation has less pronounced than effects of sleep deprivation and effects are at least partly mediated by decreased arousal and increased sleep pressure leading to inconsistent performance (poor attention tests).* Insufficient sleep leads to a general slowing of response speed and increased variability in performance, particularly for simple measures of alertness, attention and vigilance. Emerging evidence suggests that some aspects of higher level cognitive capacities remain degraded by sleep deprivation despite restoration of alertness and vigilance with stimulant countermeasures, suggesting that sleep loss may affect specific cognitive systems above and beyond the effects produced by global cognitive declines or impaired attention processes.

CONCLUSION. The study documented the fact that sleep deprivation is associated with poor out come with SLCT means decreased attention function . The results indicated that Group n2 23 subjects [sleep deprived group], performed was inferior to group n1 25 Normal sleep group. This suggest that attention, concentration and visual signal interpretation, speed, spatial orientation was significantly affected by sleep deprivation. Medical college policies and class schedules that encourage healthy and adequate sleep could have a positive impact on attention and concentration in academic sessions and evaluation period, learning, and health of medical college students. This also promote abstinence of misuse of drugs, tobacco and caffeine . Future research to investigate effective and feasible interventions, which disseminate both sleep

knowledge and encouragement of healthy sleep habits sleep hygiene's to medical college students in a time and cost effective manner, is today priority.

Limitation and Scope of the study:

Increasing number of subjects, Including subjects from different faculties and age groups, testing impact of other factor like physical and mental stress on attention parameters, assessing electrical i.e EEG and biochemical parameters and endocrine parameter of sleep,more helpful research may include trying to better ascertain the contributions of other neural systems that may impact on vigilance, including stress, motivation, and novelty including objective parameters sleep duration.

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