A STUDY TO ASSESS THE ASSOCIATION BETWEEN HEAVY ACADEMIC WORKLOAD AND SLEEP DEPRIVATION AMONG HIGH SCHOOLSTUDENTS

Roselin Jennifer and Nishanthi.R

Research Article

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Roselin Jennifer[1] and Nishanthi.R[2]

[1]Staff Nurse, Apollo Hospitals, Chennai
[2]SRM College of Nursing, SRM University, Kattankulathur

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ABSTRACT

Sleep deprivation frequently results from not sleeping for long enough duration to ensure normal daytime functioning without sleepiness. It can also occur when sleep is fragmented or disturbed due to an untreated sleep or health disorder or lifestyle factors. The study aimed to find out the association between heavy academic workload and sleep deprivation among high school students. Quantitative research approach was adopted. Non probability convenient sampling technique was used to select the samples. Totally 100 samples were selected from 9th to 12th standard students, Government Girl's higher secondary school, Guduvancheri. The structured questionnaire consist of 26 multiple choice questions regarding the demographic variables, sleeping, academic and extracurricular activity questions. Descriptive and inferential statistics were used for data analysis. The study results suggest that out of 100 samples 54% of students were sleep deprived 46% of students have no sleep deprivation and regarding academic workload 38% students have heavy academic workload, 62% students have no academic workload. There is a significant association found between sleep deprivation and additional courses like computer classes and coaching classes at P= 0.01 level.

INTRODUCTION

Sleep duration affects the health of children and adolescents. Shorter sleep durations have been associated with poorer academic performance, unintentional injuries, and obesity in adolescents. This study extends our understanding of how adolescents perceive and deal with their sleep issues. Inadequate sleep time may be contributing to adolescent health problems such as increased stress and obesity. (Noland H, *et al, 2009)*

High school students are reported to be excessively sleepy, resulting in decreased academic performance, increased psycho-social problems and increased risk of morbidity and mortality from accidents. Early school start times have been noted to contribute to this problem. This report attempts to confirm the relationship of early school start times with decreased sleep and increased sleepiness. (Dexter D, *et al 2003*). Hansen M, *et al, 2005* stated that current high school start times contribute to sleep deprivation among adolescents. Consistent with a delay in circadian sleep phase, students performed better later in the day than in the early morning. However, exposure to bright light in the morning did not change the sleep/wake cycle or improve daytime performance during weekdays. Both short-term and long-term strategies that address the epidemic of sleep deprivation among adolescents will be necessary to improve health and maximize school performance. Wolfson AR, *et al* (2003) reviewed the relation between sleep patterns, sleep quality, and school performance of adolescents attending middle school, high school, and/or college. The result found that self-reported shortened total sleep time, erratic sleep/wake schedules, late bed and rise times, and poor sleep quality are negatively associated with academic performance for adolescents from middle school through the college years. Limitations of the current published studies are also discussed in detail in this review.

Eaton DK, *et al* (2007) described the prevalence of insufficient, borderline, and optimal sleep hours among U.S. high school students on an average school night. Most students (68.9%) reported insufficient sleep, whereas few (7.6%) reported optimal sleep. The prevalence of insufficient sleep was highest among female and black students, and students in grades 11 and 12. Gupta R, *et al* (2008) found that Adolescents of higher Grades had lesser sleep time, and frequent awakenings; suffered daytime leg pain, and felt sleepy during the day. These factors suggest increasing sleep deprivation among higher Graders. Almost one-third of Canadian children and

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Corresponding author: **Roselin Jennifer**
Staff Nurse, Apollo Hospitals, Chennai

adolescents sleep less than the recommended amount. (Chaput JP, *et al* 2016)

Maturation is associated with delays of the endogenous circadian phase. Consequently, early school schedules may lead to a mismatch between internal and external time, which can be detrimental to adolescent sleep and health. In parallel, chronotype is known to play a role in adolescent health; evening chronotype adolescents are at higher risk for sleep problems and lower academic achievement. No difference was found between morning and afternoon schedule students with regard to academic achievement, psychological distress, social rhythms, school satisfaction, and alcohol consumption. (Martin JS, *et al*, 2016)

The level of sleepiness among students in high school, to identify factors to explain it, and to determine the association between sleepiness and performance in both academic and extracurricular activities. The result concluded that Sleep deprivation and excessive daytime sleepiness were common in two samples of Ontario high school students and were associated with a decrease in academic achievement and extracurricular activity. There is a need to increase awareness of this problem in the education and health communities and to translate knowledge already available to strategies to address it. (Gibson ES, *et al* 2006)

Sleep deprivation was common in the studied cohort and it was associated with a decrease in Mathematics performance. Excessive sleepiness on rising and sleepiness during third and fourth lessons were associated with poorer grades in Mathematics and English. Excessive daytime sleepiness was reported in 25% of students. Bruxism and snoring were associated with excessive daytime sleepiness. (Ng EP, *et al* 2009)

Lee YJ, *et al* (2015) investigated academic performance among adolescents with behaviorally induced insufficient sleep syndrome (BISS) and attempted to identify independent predictors of academic performance among BISS-related factors. The results found that adolescents with BISS reported poorer academic performance than adolescents without BISS (p = 0.02). Adolescents with BISS also exhibited greater levels of eveningness (p < 0.001), depressive symptoms (p < 0.001), and impulsiveness (p < 0.01). This study concluded BISS among adolescents is associated with poor academic performance and that sleep debt, as represented by weekend oversleep, predicts poorer academic performance independent of depression, impulsiveness, weekday sleep duration, daytime sleepiness, and morningness/eveningness among adolescents with BISS.

Sleep deprivation negatively impact people's health not only physically, but also mentally and socially. (Smaldone, Honi *et al* 2007), Drake, Roehrs, & roth (2013) quoted that unfortunately, this issue is often neglected due to the high expectations and enormous demands of today's society. According to the national sleep foundation (NSF, 2006) a minimum of nine hours of sleep per night is vital for the physical and mental development of adolescents. It showed that the average amount of sleep adolescents received per night was nearly 6-7 hours. Physical and mental development occurs mostly during sleep in teens. Therefore, without sufficient sleep during the night, the body would automatically try to compensate for the death of rest by stimulating the brain to shut down unexpectedly.

Sleep deprivation also results in reduced metabolism of the prefrontal cortex of the cerebrum, the area of the brain responsible for most decisions, Judgments and significantly reduces executive function and reaction time (Killgore, *et al* (2007)

Dong-il seo (2012) investigated the relationship between sleep duration and school performance in Korean adolescents. In 2012, 63 688 adolescents participated in the 8th Korea Youth Risk Behavior Web-Based Survey (KYRBWS-VIII) project. The relationship between sleep duration and school performance was evaluated by multivariate logistic regression analysis after adjustment for covariate variables, including body mass index, age, parental education, economic status, mental stress, smoking, alcohol consumption, breakfast patterns, and three measures of physical activity. The study result found that for boys, but not for girls, 5–6 hours of sleep/night were related to average or better academic performance (OR: 1.094, 95% CI [1.011–1.182], p=0.025) compared to 4 hours/night. For both boys and girls, nine or more hours/night were negatively related to academic performance (boys: 0.657, [0.554–0.779; p<0.001]; girls: >or= 9 hours/ night, 0.664 [0.572-0.77], p<0.001] compared to <or=4 hours/night. Whilst it may appear that five to six hours of sleep are necessary to maintain average or better than average school performance for boys, nine or more hours are detrimental to school performance for both groups. This study was limited by the following factors: data were collected only for weekdays and it is. Other sleep variables, such as quality of sleep and sleepiness, should be investigated for a further understanding of these results.

MATERIAL AND METHODS

The present study aimed to find out the association between heavy academic workload and sleep deprivation among high school students. Quantitative research approach was adopted. The samples were selected from 9th to 12th standard students, government girl's higher secondary school, Guduvancheri. Sample size was 100, from each standard 25 students were selected. Non probability convenient sampling technique was used to select the samples. The structured questionnaire consist of 26 multiple choice questions regarding the demographic variables, sleeping questions, academic questions, extracurricular activity questions. The tool consists of 3 sections. Section A- Structured questionnaire to elicit demographic variables. Section B - Structured questionnaire to elicit sleeping deprivation and Section C - Structured questionnaire to elicit academic workload.

Samples of 10 students were selected from 9th to 12th standard for pilot study. The students were explained about the purpose of the study and obtained their consent. The investigators assessed the heavy academic workload and sleep deprivation among high school students. Approximately 10-15 minutes were spent for completing data collection from each sample. The tool was finalized with concurrence of all experts. It was observed that the tool was feasible and practicable.

Obtained formal consent from head master and permission from class teachers, the students for filling and selection criteria were chosen as sample. The convenient sampling technique was used to select samples. After establishing rapport and a brief introduction about the study and its purpose was explained. Consent was obtained from students. After assuring confidentiality, the students were provided with the questionnaire and were asked to pick up one correct answer from the given choices. Descriptive and inferential statistics were used for data analysis. Frequency and percentage distribution were used to analyze the demographic variables, sleep deprivation and academic workload. Chi square test were used to analyze the association between demographic variables.

RESULTS

Data analysis and the results are tabulated below;

Table 1 shows the distribution of demographic variables of high school students. N=100

Variables	Category	No. of students	Percentage
Age	13-14 yrs	21	21.0%
	14-15 yrs	19	19.0%
	15-16 yrs	33	33.0%
	16-17yrs	27	27.0%
Educational status	9th std	25	25.0%
	10th std	24	25.0%
	11th std	25	25.0%
	12th std	26	25.0%
Father's occupation	Government	41	41.0%
	Private	33	33.0%
	Business	26	26.0%
Mother's occupation	Working	53	53.0%
	house wife	47	47.0%

Table 2 shows the assessment of academic work load of high school students N=100

Academic work load of students	Category	Frequency	Percentage
Additional courses like computer training & others	No	68	68.0%
	Yes	32	32.0%
coaching classes for specific subjects	No	31	31.0%
	Yes	69	69.0%
Regular tuition	yes	100	100.0%
Rank order	1 -5	6	6.0%
	6 -10	39	39.0%
	11 -20	55	55.0%

Table 3 shows the assessment of sleep deprivation of high school students N=100

Sleep deprivation		No. of students	Percentage
Did you sleep adequately	No	54	54.0%
	Yes	46	46.0%
Sleeping hours at night	6 hours	26	26.0%
	7 hours	29	29.0%
	8 hours	45	45.0%
Sleeping hours before each unit test	4 hours	24	24.0%
	5 hours	27	27.0%
	6 hours	25	25.0%
	7 hours	24	24.0%

Table 1 reveals the demographic variables of the high school students that out of 100 samples 33.0% of samples are in age group of 15-16years.The educational status reveals out of 100 samples 25.0% of samples are 9th standard, 25.0% samples are 10th standard, 25.0% samples are 11th standard, 25.0% samples are 12th standard. Regarding the father's occupation, it reveals that majority 41.0% of their fathers were government employees. Considering the mother's occupation majority 53.0% of them were working woman.

Table 2 reveals that 68.0% of students have not taken any additional courses, 32 .0% of students have taken any additional courses. Majority 31.0% of students were not had coaching classes and 69.0% of students had coaching classes for specific subjects. Out of 100 samples 100% of students had regular tuition and regarding the rank order majority 55.0% of them were in 11-20th rank.

The table 3 revels majority 54.0% of students has inadequate sleep and 46.0% students have adequate sleep. Majority 26.0% of students have regular sleep of 6 hours, 29.0% of students have regular sleep of 7 hours and 45.0% of students have regular sleep of 8 hours.

Table 4 & 5 shows that there is significant association between sleep deprivation and additional courses like computer classes and coaching classes with P =0.01 level.

DISCUSSION

The present study results for the academic workload of 100 samples, majority 68.0% of the students were not had any additional courses like computer class. Considering the coaching class's majority 69.0% of the students had coaching classes for specific subjects. Regarding the tuition class all (100%) they had regular tuition and considering the rank order majority 55.0% of them was taken 11-20th rank. The findings for the sleep deprivation reveal that out of 100 samples majority 54.0% of the students were sleep deprived and majority 45.0% of students were slept 8hours/day at night and considering the sleep pattern before each unit test of the subject that majority 27.0% of students were slept 5 hours a day. This findings were supported with the similar study has been conducted by Quishuang Jin (2012) investigated the association between sleep deprivation and additional courses- computer classs and/or coaching classes taken among high school students. Findings indicated the majority of high school students were sleep deprived. Sleep deprivation was significantly associated with additional courses.

Results indicated that additional courses had a greater impact on younger students than older student Compared with no additional course takers, additional course takers slept approximately 20 minutes less per night. Specifically, 9th- and 10th-grade coaching classes' takers slept approximately 1 hour less and 40 minutes less, respectively. In addition, students enrolled in two or more couching classes received 1 hour less and 30 minutes less among 10th and 12th graders, respectively. The present study result suggest there is a significant association found between sleep deprivation and additional courses like computer classes, extra couching classes at P= 0.01.

This findings were compared with this longitudinal study conducted by Cari Gillen-O'neel (2008) examined how nightly variations in adolescents' study and sleep time are associated with academic problems on the following day. Participants ($N = 535$) completed daily diaries every day for 14 days in 9th, 10th, and 12th grades.

Table 4 assessment of association between heavy academic workload and sleep Deprivation
N=100

Sleep assessment		Additional courses		like computer training etc		Total	Chi square test
		No		Yes			
		NO.	%	NO.	%		
Did you sleep adequately	No	44	81.5%	10	18.5%	54	χ2=9.80 p=0.01 DF=1 **significant**
	Yes	24	52.2%	22	47.8%	46	
Sleeping hours at night	6 hours	25	96.2%	1	3.8%	26	
	7 hours	18	62.1%	11	37.9%	29	χ2=13.14 p=0.01 DF=2 **significant**
	8 hours	25	55.6%	20	44.4%	45	
Sleeping hours before each unit test	4 hours	9	37.5%	15	62.5%	24	
	5 hours	21	77.8%	6	22.2%	27	
	6 hours	19	76.0%	6	24.0%	25	χ2=13.55 p=0.01 DF=3 **significant**
	7 hours	19	79.2%	5	20.8%	24	

Table 5 Association between coaching classes and sleep Deprivation
N=100

Sleep assessment		Coaching classes for any specific subjects						Total	Chi square test
		1		2		3			
		NO	%	NO	%	NO	%		
Adequately sleep	No	17	34.7	18	36.7	14	28.6	54	χ2=16.81
	Yes	16	80.0	4	20.0	0	0.0	46	p=0.01 DF=2 **significant**
Sleeping hours at night	6hours	5	19.2	11	42.3	10	38.5	26	χ2=28.70
	7hours	13	56.5	7	30.4	3	13.0	29	p=0.01
	8hours	15	75.0	4	20.0	1	5.0	45	DF=4 **significant**
Sleeping hours before each unit test	4hours	5	20.8	7	29.2	12	50.0	24	χ2=10.69
	5hours	13	50.0	11	42.3	2	7.7	27	p=0.01
	6hours	7	63.6	4	36.4	-	-	25	DF=6
	7hours	8	100	-	-	-	-	24	**Significant**

Results suggest that regardless of how much a student generally studies each day, if that student sacrifices sleep time to study more than usual, he or she will have more trouble understanding material taught in class and be more likely to struggle on an assignment or test the following day. Because students are increasingly likely to sacrifice sleep time for studying in the latter years of high school, this negative dynamic becomes increasingly prevalent over time.

CONCLUSION

High school students face more sleep deprivation due to heavy academic workload and the sleep deprivation also altered the goal of the students in higher studies. It is high time start enhancing a better sleep among the high school students and for tackle the sleep and heavy academic workload.

The study results suggest that out of 100 samples 54% of students were sleep deprived 46% of students have no sleep deprivation and regarding academic workload 38% students have heavy academic workload, 62% students have no academic workload. There is a significant association found between sleep deprivation and additional courses like computer classes and coaching classes at P= 0.01 level.

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Conflict of Interests

The author(s) declare that they have no competing interests

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