

# Sleep pattern and academic performance of undergraduate medical students at universiti Kebangsaan Malaysia

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## ABSTRACT

Sleep is an active, repetitive and reversible state of perceptual disengagement from the environment including unresponsiveness to it. Adequate sleep is extremely important for healthiness. But sleep loss is a remarkable problem in modern society. The objective of this study was to investigate the sleep pattern and its association with students' academic performance. It was a cross sectional study conducted among 4<sup>th</sup> year UKM undergraduate medical students of session 2011-2012. Inclusive of all 234 registered 4<sup>th</sup> year students was selected for this study. A standard questionnaire that contained questions on demography, sleep habits, academic performance and ideal sleep was used to collect data. Out of 234 students, 186 were responded giving a response rate of 79.5% where 73% were female and 69% resided in-campus. Including weekdays and weekends averagely, 56.2% respondents slept for 6-8 hours, 29.1% for <6 hours and 14.7% slept for >8 hours. An average of 53.35% respondents had in-frequent day-nap, 34.9% frequent and 11.75% had no day-nap at all. Respondents who slept >6 hours were observed to have significantly higher academic performance. It is concluded that, people need to understand the role of sleep and have to take adequate sleep of 6-8 hours per day for health and wellbeing.

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## INTRODUCTION

Sleep is an active, repetitive and reversible state of perceptual disengagement from the environment including unresponsiveness to it (Carskadon and Dement, 2005). Children and adolescents require an average sleep time of approximately 9 hours per night (Mercer *et al.*, 1998). Sleep serves several different functions such as growth and repair, learning or memory consolidation and restorative processes and all these occur throughout the brain and body (Krueger, 2003; Benington, 2000; Curcio, 2006). So, adequate amount of sleep is fundamental for the mental and physical health of an individual. (Kazim and Abrar, 2011; Mak *et al.*, 2012). Cognitive functions related to academic such as memory consolidation, learning, decision making and critical thinking are all related with adequate sleep (Gilbert and Weaver, 2010). Studies have shown that sleep deprivation can cause psychiatric disorders and stress as well as dysfunctions such

as decreased work efficiency and learning disability (Abdulghani *et al.*, 2012; Eliasson *et al.*, 2010). Sleep restriction studies on healthy adults by restricting sleep below 7 hours per night suggest deficits in cognitive functions (Durmer and Dinges, 2005).

It is mentioned that the association between sleep and cognitive function is based on the idea that shortness or disruptions of sleep reduces necessary overnight brain activity that is needed for neurocognitive functioning which involves the prefrontal cortex (Dahl, 1996). The consequence of insufficient sleep is the day time sleepiness. Poor sleep quality, insufficient sleep and sleepiness are significantly associated with worse school performance (Dewald *et al.*, 2010).

Wolfson and Carskadon (1998), studied on 3000 high school students showed that students with higher grades reported more total sleep, earlier bedtimes on school nights and reduced weekend delays of sleep schedules than students with lower grades. Another study conducted on 3871 high-school students in Seoul, showed students with poor sleep quality results is consequent sharp increase in daytime sleepiness and it correlates significantly with a decline in academic performance (Shin *et al.*, 2003).

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A significant correlation was seen between sleep qualities with performance decrease reflecting attention deficit and compromised executive control (Dahl, 1996; Jones and Harrison, 2001). Recent studies in molecular genetics, neurophysiology and cognitive and behavioural neurosciences reported that, sleep may play an important role in memory consolidation and learning processes (Siegel 2001; Smith, 2001; Hobson, 2002). Even then, sleep loss is in fact one of the most striking problems of modern society (Bonnet, 2000) and sleep deprivation is a common finding in students' academic life. In Malaysia, there are not many research have been undertaken in the context of sleep pattern and academic performance among the medical students. UKM medical faculty being a leading national university, it is important to investigate the students' sleep pattern and their academic performance for their health and wellbeing. The objective of this study was to determine the relationship between sleep pattern and academic performance of forth year UKM medical students as well as to investigate the student perception about the ideal sleep time necessary for good academic performance.

## MATERIALS AND METHODS

This was a cross sectional study, conducted on 4<sup>th</sup> year UKM undergraduate medical students during June 2011 to May 2012. The study group was selected by universal sampling technique, inclusive of all 234 registered 4<sup>th</sup> year students.

A questionnaire was developed for data collection that contains questions on demography, sleep habits including sleep and wake-up time, total sleep hours, afternoon nap etc., during weekdays and weekends. Their perception on ideal sleep duration required for good academic performance was also recorded. The questionnaire was pre tested by conducting a mini pilot study.

Academic performance was assessed by the cumulative grade point average (CGPA) of semester-1 examination of year-4 students. The CGPA was calculated to a 5.0 scale. Consent was taken from participants to participate in the study as well as to disclose their CGPA. Each participant was asked to answer the questionnaire in online software named survey monkey. All answers were kept confidential. The data was the compiled and analyzed using SPSS 13. Statistical analysis was done using ANOVA and student t test.

## RESULTS

Out of 234 medical students, 186 were responded, giving the response rate of 79.5%. Table - 1 showed the demographic data of the participants. Male participants were 27% whereas female were 73% which is in keeping with the student distribution of the institution. Among the participants, 69% resided in college hostel or in-campus and 31 % resided out-campus.

Table - 2 showed the sleep duration pattern in weekdays and weekends. On weekdays, 37.3% respondents slept <6 hours, 58.8% slept for 6-8 hours and 4% slept >8 hours. Meanwhile, on weekends 20.9% of them slept <6 hours, 53.7% slept for 6-8 hours and 25.4% slept >8 hours. Table - 3 showed the afternoon sleep in

weekdays and weekends. A total of 7.3% respondents did not take afternoon snooze at all, 64.8% reported infrequent nap and 27.9% reported frequent day napping during weekdays. On weekends 16.2% respondents did not take afternoon nap at all, 41.9% infrequent and 41.9% frequently took day nap.

**Table 1:** Number (n) and percent (%) distribution of gender and residency of the respondents, n=186.

Variables		Number (n)	Percent (%)
Gender	Male	50	27
	Female	136	73
Residency	In Campus	128	69
	Out Campus	58	31

**Table 2:** Distribution of respondents based on duration of sleep during weekdays and weekends.

Sleep duration (Hours)	Weekdays n (%)	Weekends n (%)
<6	69 (37.3)	39 (20.9)
6-8	109 (58.8)	100 (53.7)
>8	8 (4.0)	47 (25.4)

**Table 3:** Respondents with day napping habits in weekdays and weekends.

Afternoon nap	Weekdays n (%)	Weekends n (%)
Never	14 (7.3)	30 (16.2)
Infrequent (1-2 x per week)	120 (64.8)	78 (41.9)
Frequent (almost every day)	52 (27.9)	78 (41.9)

**Table 4:** Relationship between sleep duration and mean CGPA  $\pm$  SD.

Sleep duration	CGPA	
	Mean $\pm$ SD	
Weekdays	< 6 hours	3.050 $\pm$ 0.318
	6 - 8 hours	3.084 $\pm$ 0.277
	> 8 hours	3.000 $\pm$ 0.336
Weekends	< 6 hours	2.92 $\pm$ 0.203
	6 - 8 hours	3.09 $\pm$ 0.287
	> 8 hours	3.12 $\pm$ 0.335

$p = 0.033$ , for sleep duration between <6 hours and 6-8 hours in weekends  
 $p = 0.028$ , for sleep duration between <6 hours and >8 hours in weekends

Table - 4 revealed the relationship between sleep duration and CGPA. It is revealed that in weekdays, there was no significant difference in the CGPA score between respondent with sleep <6 hours and respondent with sleep 6-8 hours and between respondents with sleep 6-8 hours and respondent with sleep >8 hours. However, in weekend, there was significant difference of CGPA score between respondent with sleep <6 hours and respondent with sleep 6-8 hours ( $p=0.033$ ) and more than 8 hours ( $p=0.028$ ). However, there was no significant difference between respondent sleep 6-8 hours and more than 8 hours ( $p=0.871$ ).

Table - 5 showed the relationship between day napping and CGPA during weekdays and weekends. During weekdays, no significant difference was found between respondent with never had day napping and with had infrequent ( $p=0.649$ ), and frequent day napping ( $p=0.403$ ); also there was no significant difference between respondent with infrequent day napping and respondent with frequent day napping ( $p=0.696$ ). For weekends also, there was no significant difference observed between respondent with never had day napping and respondent with had infrequent ( $p=0.970$ ), and frequent day napping ( $p=0.883$ ), and there was no significant difference between respondent with infrequent day

napping and respondent with frequent day napping ( $p=0.936$ ). Table - 6 revealed the student's perception about ideal sleep duration for better academic performance. Eighty seven percent respondents reported that 6-8 hours sleep is necessary for better academic performance.

**Table 5:** Relationship between day napping and CGPA  $\pm$  SD during weekdays and weekends.

Day napping	Weekdays	Weekends
	Mean CGPA $\pm$ SD	Mean CGPA $\pm$ SD
Never	2.980 $\pm$ 0.314	3.046 $\pm$ 0.318
Infrequent (1-2 x per week)	3.064 $\pm$ 0.281	3.064 $\pm$ 0.296
Frequent (almost every day)	3.111 $\pm$ 0.316	3.083 $\pm$ 0.285

**Table 6:** Students' perception on necessary sleep duration for better academic performance.

Necessary sleep duration for better academic performance	Responses n (%)
<6 hours	13 (7)
6-8 hours	162 (87)
>8 hours	11 (6)
Total	186 (100)

## DISCUSSION

Optimized sleep pattern improves the neuro-cognitive and academic performance of students (Curcio *et al.*, 2006). But sleep deprivation is a common finding in students' academic life. The sleep-wake cycle of medical students is characterized by insufficient sleep duration, delayed sleep onset, and occurrence of napping episodes during the day (Ng *et al.*, 2009; Sweileh *et al.*, 2011). A local study in Malaysia mentioned that both medical students and young doctors appear to accept that sleep deprivation is norms to their medical training (Zailinawati *et al.*, 2009).

Majority of the respondents in our study were female and resided inside the campus (Table 1) where 37% of them had sleep duration of <6 hours and only 4% students had sleep >8 hours during the week days (Table 2). In general, most of the respondents slept between 6-8 hours; however, there was an increment of respondents who slept >8 hours from 4% on weekdays to 25.4% on weekends (Table 2). This is most probably due to the lack of time spent for sleeping in weekdays as the respondents being busy with assignments and other academic related requirements. Hence, the students tend to sleep more in weekends to compensate their lack of sleep. The college life style and the hostel environment also influences in the sleep pattern on the students.

Sleep deprivation actually can cause day time sleepiness and reduced level of attention affecting performance. Poor sleep also affects performance by increasing depression, decreasing motivation and compromising health (Kazim and Abrar, 2011; Rocha *et al.*, 2010). Twenty eight percent and 42% respondents in this study found to have frequent day napping in weekdays and weekends respectively (Table 3).

The present study indicated that the respondents with sleep <6 hours during weekend have significantly lower CGPA compared to the respondent with sleep 6-8 hours and >8 hours (Table 4). Significant difference was observed between sleep

duration of <6 hours and 6-8 hours ( $p=0.033$ ) and between <6 hours and >8 hours ( $p=0.028$ ) in weekends with academic performance in terms of CGPA (Table 4). However, it was not significant during weekdays. This finding is similar to Curcio (2006), who reported that a poor sleep in quality, quantity, sleep loss and sleep deprivation showed to have relationship with academic performance. A similar finding reported by Wolfson and Carskadon, (1998) stated that student with higher grades reported to had more total sleep and reduced weekend delays of sleep than students with lower grades. Meanwhile, Carskadon (1990), Fallone (2002) and Wolfson (2003) reported that a poor sleeping habit, with an increased sleep fragmentation, later bedtimes and early awakenings, usually tend to have a decreased academic performance and a reduced neurobehavioral functioning. However there are different studies that showed that no firm relationship was found between the sleep duration and academic performance (Kazim and Abrar, 2011). Day napping did not show any significant role in academic performance in our study (Table 5).

Regarding the student perception of duration of ideal sleep for better academic result, 87% student opined that 6-8 hours sleep is necessary for better academic result (Table 6). But in reality, less than 60% students slept 6-8 hours both in weekdays and weekends (Table 2). In our study, more students found to go bed lately during weekdays (Table 2) which is inconsistent with the study done by BaHammam *et al.* (2012) where it was observed that bed time was delayed in weekends. Delayed bed times in weekends could be the expression of the college life style and influence of hostel life. Even it could be related with circadian rhythm disorders in the form of delayed sleep phase syndrome marked by significant delays in sleep/wake cycles which is common among college students (Buboltz, 2001).

Sufficient sleep is important for ones mental and physical health (Kazim and Abrar, 2011). Insufficient sleep is a cause emotional shakiness, memory loss, day time sleepiness and decreased concentration (Kazim and Abrar, 2011; Rocha *et al.*, 2010). Necessities of sleep differ from person to person but 6-8 hours of sleep is considered normal for an adult (Kazim and Abrar, 2011). Lack of adequate sleep affects the academic performance of student (Kazim and Abrar, 2011).

## CONCLUSION

Sleep loss is one of the most remarkable problems in modern society. Sleep is extremely important for ones' mental and physical health and it plays an important role in learning processes and memory consolidation. Lack of adequate sleep is a cause of low academic performance. To achieve a better academic performance, an adequate sleep of 6-8 hours per day is essential. Students and educators need to understand the role of sleep for better academic performance. Educators should pay attention to counsel the students to make them more aware about the role of sleep in their daily performance for academic achievement and health and wellbeing. Further large scale study is suggested to identify the variables of inadequate sleep.

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