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Napping and its effects upon medical students' ability to concentrate

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Abstract: Although many people are aware of how a good night's sleep can benefit them, they do not know how taking a nap can also be advantageous. Napping also has its stigmas and is thought to be a sign of laziness, lack of ambition or only needed in children, the sick and the elderly. Catching a quick nap sometime during the course of the day leaves people feeling more energized. The purpose of this study was to determine the napping pattern of MBBS students in UniKL-RCMP and its influence on student's ability to concentrate. We also sought to determine student's perceptions regarding the advantages of napping. This was a descriptive study regarding napping and its effects on student's ability to concentrate. We performed a questionnaire-based survey of MBBS students in UniKL-RCMP in October 2010. Students were randomly selected using a simple random sampling method. The questionnaire gathered information on napping habits of students, concentration ability after napping, and student's perception regarding the advantages of napping. Almost all UniKL MBBS students nap (86.8%) and the majority of the students who nap are able to concentrate on their studies better after taking a nap (77.1%). The pattern of napping which includes duration of a nap (p = 0.000), frequency of naps per week (p = 0.008), and preference to time of day nap takes place (p = 0.026) positively and significantly influences a student's ability to concentrate. Although most students were of the opinion that napping has no advantages (38.1), students who napped for more than 20 minutes thought napping to be very advantageous (20%). The rest thought napping to be only advantageous. With a p = 0.011, there was a statistically significant difference between duration of nap and advantages of napping. Students who napped for less than 20 minutes and were able to concentrate better after taking a nap could study for another 60 minutes afterwards whereas students who napped for more than 20 minutes could study for another 120 minutes afterwards. Students' perceptions of the advantages and disadvantages of napping were evaluated. This study has shown that napping does have a significant positive effect on student's ability to concentrate.

Introduction

Although many people are aware of how a good night's sleep can benefit them, they do not know how taking a nap can also be advantageous. Napping also has its stigmas and is thought to be a sign of laziness, lack of ambition or only needed in children, the sick and the elderly (1). Catching a quick nap sometime during the course of the day leaves people feeling more energized (2). A nap is defined as 'a short sleep, during the day time', whereas concentration is defined as 'the ability to think carefully about something you are doing and nothing else' (3, 4). Naps can be divided into three categories according to the National Sleep Foundation as

planned napping, emergency napping and habitual napping[1]. Planned naps, also called preparatory napping, are naps taken before an individual feels sleepy. This nap is usually taken to ward off fatigue and tiredness later on in the day. Emergency napping happens when the individual feels very sleepy and tired and they feel they cannot go on with the activity they were carrying out, such as naps taken by drivers when they drive for long periods of time. Habitual napping are naps taken at the same time each day, usually practiced by young children. According to a 2005 "Night Owl Nation" study carried out by the University of Michigan, 30 to 50 percent of college students nap (5). This shows that approximately half of college students admit to taking a nap sometime during the course of the day. Though the reason they do so has not been properly studied, napping has been found to have many benefits to students. While students may claim caffeine as a way fight off sleepiness, napping is found to be a more effective way to do so (6). Napping has also been found to refresh a person's brain which boosts the person's ability to learn and to restore a person's alertness as well as enhance performance (1, 7). Hence, without a nap, a person's ability to learn is somewhat reduced, along with their alertness and performance. Many students tend to fall asleep in lectures, taking naps in between lectures, in the library and even during the brief hour at lunch. Thus, napping seems to be a part of a student's everyday life. Naps have an impact on a student's academic performance in class and its influence on student's concentration ability should be delved in to find out a way for students to concentrate better in class. While it is certain napping has brought about many benefits to students, many people are still unsure of the advantages and disadvantages of a nap. In our study, we aimed to correlate napping and its effects on student's ability to concentrate specifically among medical students in UniKL RCMP 2010. Students' perceptions of the advantages and disadvantages of napping were evaluated.

Materials and methods

This was a descriptive study involving a preset questionnaire filled out by medical students in University Kuala Lumpur Royal College of Medicine Perak (UniKL-RCMP) regarding napping and its effects on student's concentration ability. Questionnaire was developed in accordance to research objectives and on previous reference studies. Participants were chosen by a simple random sampling method. They were assured that their responses would be kept confidential. The questionnaire included socio-demographic characteristics of the subject, pattern of taking nap and its influence on concentration ability.

The sample size for this study was calculated as 205 by using '*Epi-Info*' version 7.5. It was from a total population of 441 students registered under UniKL-RCMP. The expected frequency of factor under study was entered as 50, while the worst acceptable result was entered as 45 and a confidence interval of 95%. A random sampling method was performed by applying 'random number generator' from the website, stattrek.com (StatTrek), to generate random numbers for sampling (8). The numbers were then matched up with the list of MBBS students. The numbers were generated according to academic year in order for the distribution of questionnaires to be fairly equivalent among the MBBS students. The inclusion criteria in student selection were; MBBS students registered under UniKL-RCMP who are fluent in written English? The exclusion criteria were

students other than MBBS programme who are not fluent in written English, supposed not understand well to the questionnaires. The intention was to exclude confounding factors and variables. Participants were then given a participant information sheet to read, informing them of the study and its objectives. Participants were also given a participant consent form which they signed if they agreed to take part in the study. Participants were subsequently given time of approximately ten minutes to answer the questionnaire. All the data and answers were kept confidential.

Data was keyed in the statistical software SPSS version 17.0. Analysis was done by using frequency and cross tabulation of data based on data that was keyed in.

Results

Table 1 shows the socio-demographic characteristics of 205 respondents of which 96 (46.8%) were aged between 18 to 20, 86 (42.0%) were between 21 to 23, 18 (8.8%) aged between 24 to 26 and 5 (2.4%) aged 27 years and above. By gender, 135 (65.9%) were female and 70 (34.1%) were male. By academic year of the respondents, 57 (27.8%) were from 1st year MBBS students, 54 (26.3%) from 2nd, 54 (26.3%) from 3rd and 40 (19.5%) from 4th year. Majority of respondents, 178 (86.8%) were Malay ethnic origin, 13 (6.3%) Chinese, 10 (4.9%) Indian and 4 (2.0%) were other races. By religion, majority of respondents, 180 (87.8%) were Islam, 9 (4.4%) Hindu and 6 (2.9%) were Buddhism. Christianity and others shared the same frequency 5 (2.4%) respondents.

Table 1: Socio-demographic characteristics

Variables	No. (%)
Age	
18-20	96 (46.8)
21-23	86 (42.0)
24-26	18 (8.8)
27 and above	5 (2.4)
Gender	
Male	70 (34.1)
Female	135 (65.9)
Academic year of respondents	
1st Year	57 (27.8)
2nd Year	54 (26.3)
3rd Year	54 (26.3)
4th Year	40 (19.5)
Race of respondents	
Malay	178 (86.8)
Indian	10 (4.9)
Chinese	13 (6.3)
Others	4 (2.0)
Religion of respondents	
Islam	180 (87.8)
Hindu	9 (4.4)
Buddhism	6 (2.9)
Christianity	5 (2.4)
Others	5 (2.4)
Total	205 (100.0)

Table 2 shows the relationship between patterns of napping and time in minutes of respondents being able to concentrate. The pattern of napping was questioned on duration of nap, time prefers to nap and number of times in a week a respondent took a nap. Students who did not take naps (27) were of the opinion that naps did not influence their ability to concentrate. Most students took 11 - 20 min nap (54). The majority of students who took a nap for 1 -10 min (14) were able to concentrate another 60 min on their studies after their nap. Students who took a nap for 11 - 20 min were also able to concentrate on their studies for the same period of time after. However, the majority of students who took

naps for 21 - 30 min (15) and longer than 31 min (15) were able to concentrate up till 120 min after taking a nap. Regarding students preference to nap, most students preferred to nap in the afternoon (115). Students who preferred to nap in the morning (8) were of the opinion that nap did not influence their ability to concentrate. Those who napped in the afternoon (37) were able to concentrate 60 min on their studies after their nap and majority of students who napped in the evening 12 were able to concentrate 120 min on their studies after their nap. Concerning naps taken per week, majority of the students take a nap more than 3 times per week (133) and were able to concentrate 120 min on their studies after taking a nap. There was statistically significant correlation in students ability to concentrate in their studies to the pattern of napping such as duration, preferred time of nap and times nap taken per week; *p* - value 0.000, 0.026 and 0.008 respectively (Table 2).

Table 2: Pattern of napping

Pattern of napping	Minutes able to concentrate on studies after taking a nap					Total n=205 (100%)	p-value
	No influence n (%)	30 minutes n (%)	60 minutes n (%)	90 minutes n (%)	120 Minutes n (%)		
Duration of nap No nap	27 (13.2)	0 (0)	0 (0)	0 (0)	0 (0)	27 (13.2)	0.000
1-10 min	5 (2.4)	6 (2.9)	14 (6.8)	2 (1.0)	9 (4.4)	36 (17.6)	
11-20 min	6 (2.9)	9 (4.4)	17 (8.3)	9 (4.4)	13 (6.3)	54 (26.3)	
21-30 min	5 (2.4)	4 (1.9)	10 (4.9)	11 (5.4)	15 (7.3)	45 (21.9)	
>31 min	4 (1.9)	6 (2.9)	11 (5.4)	7 (3.4)	15 (7.3)	43 (21.0)	
Time when prefer napping morning	8 (4.5)	5 (2.8)	6 (3.4)	2 (1.1)	5 (2.8)	26 (14.6)	0.026
afternoon	9 (5.1)	12 (6.7)	37 (20.8)	22 (12.4)	35 (19.7)	115 (64.6)	
evening	3 (1.7)	8 (4.5)	9 (5.1)	5 (2.8)	12 (6.7)	37 (20.8)	
Times nap taken per week Once	3 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)	3 (1.7)	0.008
Twice	1 (0.6)	1 (0.6)	3 (1.7)	2 (1.1)	5 (2.8)	12 (6.7)	
3 times	3 (1.7)	5 (2.8)	11 (6.2)	5 (2.8)	6 (3.4)	30 (16.9)	
>3 times	13 (7.3)	19 (10.7)	38 (21.3)	22 (12.4)	41 (23.0)	133 (74.7)	

Discussion

Many studies have been carried out on the topic of napping. These studies tended to correlate napping with many variables, such as the advantages of taking a nap, factors affecting napping and academic performance. One recent study showed that high-performing students are more likely to take naps regularly than low-performing students (8). A well-timed nap could have the same beneficial effects as napping is considered a short period of sleep. Although a

study on the effects of napping on concentration ability has yet to be done or tested solely, many other studies have attested the benefits of napping such as cognitive performance, memory, alertness and certain tasks. From a biochemical point of view, taking a nap increases alertness as well as performance in participants who took a 2 hour afternoon. The redistribution of cortisol secretion as well as the prolonged suppression of IL-6, which is considered a sleepiness-mediating inflammatory cytokine was found to be beneficial as an increase in alertness and performance were found in the young healthy participants who experienced a night of sleep loss (10). Naps have also been found to promote declarative memory performance (11).

In this study, participants had their memory tested, with an assessment of their ability to recall a list of words after an hour of napping or waking activity. Superior recall was found in the group of participants that napped in the one hour. Thus, napping improves a person's memory, increases alertness and performance in the individual who naps. College students are said to be the most sleep-deprived age group. Thus it would seem that napping would be most beneficial to them. A study done among college students showed that approximately half of college students take a nap due to daytime sleepiness and insufficient sleep (12). The students' perception on napping was that it enabled them to concentrate better later in the afternoon and had deeper nighttime sleep. This study, although not specifically focusing on concentration ability of students, ascertains that the students themselves perceive that their ability to concentrate is heightened after taking a nap.

Many factors may affect how much an individual may benefit from a nap. Factors such as nap length, time of day nap is taken as well as experience in napping, are important influences of the benefits of napping (13). It verified many benefits of napping in terms of better moods, beneficial to performance in tasks such as logical reasoning and addition as well as decreasing sleepiness and fatigue. Almost all UniKL MBBS students (178 out of 205) from our study nap (86.8%) and the majority of the students who nap (158 out of 205) are able to concentrate on their studies better after taking a nap (77.1%). Most students (54 out of 205) nap for a period of 11 - 20 min (26.3%), 133 out of 178 take a nap more than 3 times a week (74.7%) and 115 out of 178 prefer to nap in the afternoon (64.6%). The majority of students (52 out of 205) who were able to concentrate better on their studies after taking a nap could study for 60 min (25.4%) and 120 min (25.4%) after their nap. Most of the students who took a nap for not longer than 20 min (32 out of 178) were able to concentrate on their studies for another 60 min afterwards (17.4%). Most of the students who took a nap longer than 20 min (30 out of 178) were able to concentrate on their studies for another 120 min afterwards (16.9%). This was in line with other studies showing that 10, 20, and 30 min naps yielded improvements in cognitive performance and alertness whereas the 5 min nap and no nap conditions did not (14 - 16).

There was an evident that performance and alertness decreased through the post-lunch dip when no nap was taken (17). Afternoon tiredness is a natural of our circadian rhythms and occurs even if a good night's sleep was obtained. This explains why majority of students preferred to nap in the afternoon. Furthermore, compared to those that napped in the morning and evening, majority of those that napped in the afternoon were able to concentrate on their studies for another 60 min (20.8%). Preference of when napping occurs has no significant relevance to age, gender or academic year of respondents. It is also interesting that most students who napped in the afternoon thought napping to be very advantageous (24.2%). Compared to students who did not nap, students

who napped were able to concentrate longer on their studies after napping. It was defined to habitual nappers as people who napped every day or once or twice a week and that they have better performance on post-nap motor procedural tasks than non-habitual nappers (18). Therefore, all the students in this study who napped can be considered as habitual nappers based on this definition. Most students think that there are no advantages to napping (38.1%). However, this is because the majority of the students who answered that there was no advantages to napping either napped less than 20 min (20%) or did not nap (6.9%). The majority of students who napped longer than 20 min were of the opinion that napping are very advantageous (20%). Previous studies have proved to be very advantageous (10, 19).

The limitations of this study included the use of self-reported data for napping pattern and effects on student's concentration ability instead of data measured by student's cognitive performance and alertness by having the respondents carry out tasks. This was due to time constraints and insufficient facilities on the researchers' part. Although this study attempted to prove the relationship between student's ability to concentrate and napping, further improvements should be made for future studies. Future studies should use a more reliable method of studying the effects napping has on a student's ability to concentrate as well as identifying the ideal time of day to take a nap. Cognitive tests should be carried out to properly assess the benefits of napping and other variables that influence pattern of napping. However, this study has shown that the majority of students nap and a student's ability to concentrate are positively affected by napping.

In conclusion, this study has shown that the napping does have a significant positive effect on student's ability to concentrate. The pattern of napping which includes duration of a nap, frequency of naps per week, and preference to time of day nap takes place significantly influences a student's ability to concentrate.

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References

1. National Sleep Foundation, n.d., Napping, retrieved august 15, 2010, from http://www. sleepfoundation.org/article/sleep-topics/napping
2. Brody JE. New respect for the nap, a pause that refreshes. January 4, 2000, retrieved august 13, 2010, from http://www.physics.ohio state.edu/~wilkins/writing/Resources/ essays/nap_ refreshs.html
3. Cambridge University Press, n.d., Cambridge Dictionary Online, retrieved august 15, 2010, from http://dictionary.cambridge.org/dictionary/british/nap_1
4. Cambridge University Press, n.d., retrieved august 15, 2010, from Cambridge Dictionary Online: http://dictionary.cambridge.org/dictionary/british/concentration_1
5. Johnson E. Why do we nap and should we stop?. March 22, 2006, retrieved august 13, 2010, from http://media.www.leprovoc.com/media/storage/paper453/news/2006/03/22/ Viewpoint/ Why-Do.We.Nap.And.Should.We.Stop-1984379.shtml
6. Science Daily. Napping. A more effective counter measure to sleepiness in younger people, december 3, 2007, retrieved august 14, 2010, from http://www.sciencedaily.com/ releases /2007/12/071201082346.htm
7. LiveScience. Naps clear the mind, help you learn, february 21, 2010, retrieved august 14, 2010, from http://www.livescience.com/health/nap-brain-learning-100221.html
8. StatTrek, n.d., retrieved september 2010, from random number generator and random number table: http://stattrek.com/Tables/Random.aspx
9. Arne H and Eliasson CJ. Early to bed, early to rise! sleep habits and academic performance in college students. Sleep and Breathing 2010, 71-75.
10. Vgontzas SP. Daytime napping after a night of sleep loss decreases sleepiness, improves performance, and causes beneficial changes in cortisol and interleukin-6 secretion. Am J Physiol Endocrinol Metab 2007, E253-261.
11. Lahl O. An ultra short episode of sleep is sufficient to promote declarative memory performance. J Sleep Res. 2008, 17: 3-10.
12. Vela-Bueno A. Sleep and behavioral correlates of napping among young adults: a survey of first-year university students in madrid, Spain. J Am College Health. 2008, 150-158.
13. Cote CE. Benefits of napping in healthy adults: impact of nap length, time of day, age and experience with napping. J Sleep Res. 2009, 272- 81.
14. Tietzel AJ and Lack LC. The recuperative value of brief and ultra-brief naps on alertness and cognitive performance. J Sleep Res. 2002, 11: 213-18.
15. Dhand R. Good sleep, bad sleep! The role of daytime naps in healthy adults. Curr Opin Pulmonary Med. 2006, 12; 6: 379-382
16. Brooks A and Lack L. A brief afternoon nap following nocturnal sleep restriction: which nap duration is most recuperative? Sleep. 2006, 29; 6: 831-840.
17. Hayashi M. Motoyoshi N. and Hori T. Recuperative power of a short daytime napwith or without Stage 2 sleep. Sleep. 2005, 829-836.
18. Milner CE, Fogel SM and Cote KA. Habitual napping moderates motor performance improvements following a short daytime nap. Biol. Psychol. 2006, 73; 2: 141-156.
19. Takahashi M. and Arito H. Maintenance of alertness and performance by a brief nap after lunch under prior sleep deficit. Sleep. 2000, 23: 1-7.