Health Factors and Academic Performance among Residential College Students
(Faktor-faktor Kesihatan dan Pencapaian Akademik dalam Kalangan Pelajar Kolej Kediaman)

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ABSTRACT

A healthy lifestyle is very important to ensure a good health during study period at university. This study aims to measure the body mass index (BMI), physical activities, sleep duration and academic performance among 334 Universiti Kebangsaan Malaysia students staying in Tun Syed Nasir Residential College, Kuala Lumpur. All data were collected using questionnaires and anthropometric measurement. The results showed 22% of students had underweight problems, 11% overweight and 3% obese, respectively. About half of the male students (52%) showed high physical activity levels, whereas moderate physical activity levels were reported in 59% of female students. Additionally, majority of the students (90%) had sleep duration less than eight hours per day. The participated students showed 3.06±0.34 of min CGPA. Pearson correlation test showed in-significant relationship between moderate physical activity, walking and sleep duration during weekends with CGPA performance. However, there were negative relationship between BMI (r=-0.174, p<0.05) and high physical activities (r= -0.118, p< 0.05) with CGPA performance. Moreover, only sleep duration were found to have significant positive correlation with CGPA performance (r=0.132, p<0.05). In conclusion, this study manages to prove that students' academic performance is related to BMI, physical activities and sleep duration.

Keywords: BMI, physical activity, sleep duration, academic

ABSTRAK

Amalan gaya hidup sihat sangat penting untuk memastikan kesihatan yang baik di sepanjang tempoh pengajian di universiti. Kajian ini bertujuan untuk mengukur indeks jisim badan (IJT), aktiviti fizikal, tempoh tidur dan pencapaian akademik (PNGK) dalam kalangan 334 orang pelajar Universiti Kebangsaan Malaysia yang menghuni Kolej Tun Syed Nasir, Kuala Lumpur. Kesemua data telah dikumpulkan menggunakan borang soal selidik dan pengukuran antropometri. Hasil kajian menunjukkan 22% daripada pelajar mengalami masalah kurang berat badan, 11% berat badan berlebihan dan 3% obes. Lebih kurang separuh daripada pelajar lelaki (52%) menunjukkan tahap aktiviti fizikal yang tinggi, manakala 59% daripada pelajar perempuan mempunyai tahap aktiviti fizikal sederhana. Selain itu, majoriti pelajar (90%) tidur kurang dari 8 jam sehari. Pelajar yang terlibat mempunyai purata pencapaian PNGK sebanyak 3.06±0.34. Ujian korelasi Pearson menunjukkan tiada hubungan signifikan antara aktiviti fizikal sederhana, berjalan dan tempoh tidur pada hujung minggu dengan pencapaian PNGK pelajar. Namun begitu, terdapat hubungan signifikan yang negatif antara IJT (r = -0,174, p <0.05) dan aktiviti fizikal yang tinggi (r = -0,118, p <0.05) dengan pencapaian PNGK. Selain itu, hanya tempoh tidur pada hari biasa didapati mempunyai hubungan signifikan yang positif dengan pencapaian PNGK (r = 0.132, p <0.05). Kesimpulannya, kajian ini membuktikan pencapaian akademik pelajar mempunyai kaitan dengan status IJT, aktiviti fizikal dan tempoh tidur.

Kata kunci: IJT, aktiviti fizikal, tempoh tidur, akademik

INTRODUCTION

Students living in residential colleges or university housings have unique needs and challenges during their students' life. They need to manage their time to achieve good academic results and at the same time acquire new generic skills in order to compete for a better career after they graduate, as well as to stay healthy. Twenty-four hour fast food restaurants, late-night food stalls and easy to reach midnight entertainment outlets are among the common attractions available in city centre as Kuala Lumpur. Therefore, they also have to face challenges to maintain a healthy lifestyle. Costa (2004) suggested that healthy lifestyles can be measured by five domains which were food intakes, smoking habits, drugs and alcohol consumption as well as sleep durations. These domains may also contributed to the students' low academic performance. Meanwhile, female students at the Loyola University, New Orleans who had underweight BMI showed low academic performance (Costa 2004). Another study that conducted at Alexandria University, Egypt revealed that 86% of students consumed unhealthy food, 33.8% were physically inactive, 25.3% were overweight, 32.2% had not enough sleep and 17.5% male students were heavy smokers (Albolfotouh et al. 2007).

Good academic performance is one of the factors considered by potential employers during a career interview. Cumulative grade point average (CGPA) is a common indicator that is used to measure academic performance of university students. The CGPA serves to measure the students' cognitive ability (Trockel et al. 2000). A high CGPA is essential for the students during their academic years as it reflects the student's academic performance. In order to achieve a good academic performance, students are required to have high physical stamina and maintain good lifestyles. According to Trockel et al. (2000) and Costa (2004), academic performance can be affected when students are not in good physical health. Thus, to achieve a good performance, students are required to have high physical stamina and maintain good lifestyle. It is common in Malaysia that the average age of university students range from 18 to 24 years. In the context of this age group, food habits that are related to food intake have changed from dietary pattern under parent guidance and control to self-responsibility (Kwek 2006; Tun et al. 2006). Lack of knowledge on healthy lifestyle among university students in Malaysia is crucial because prevalence of obesity and underweight are increasing among them particularly female students (Gan et al. 2011). Poor BMI status indicates students spend less time for physical activities. Maintaining a healthy lifestyle such as practicing healthy food, sleep habits and physical activities may improve the students' academic performance (Fatimah & Vidal 2007). Unfortunately, they are limited literature available on the relationship between these factors and academic performance and students' lifestyles. Therefore, this study focused on the relationship between BMI, physical activities and sleep duration with academic performance of students in Tun Syed Nasir Residential College (TSNRC), Universiti Kebangsaan Malaysia (UKM), Kuala Lumpur.

METHODS

Study Design and Sampling

This cross-sectional study involved a total of 334 UKM students from TSNRC. TSNRC is one of the 13 residential colleges under UKM and the only one located in Kuala Lumpur city centre. Students selected for this study come from four faculties namely Health Sciences, Pharmacy, Dentistry and Medicine. However, students from Faculty of Dentistry were not included in this study because they do not use CGPA as an academic performance indicator. A total of 93 male and 241 female students aged between 19 and 26 years participated in this study.

Data Collection

The questionnaire developed in this study consists of four major components including demographic, anthropometric, sleep duration and physical activities. The demographic section consists of students' academic year, faculty, ethnicity, age and CGPA. Weight, height, body mass index (BMI), percentage of fat and waist circumference were measured in this study for anthropometric data. The students' weight, height, percentage of fat and waist circumference was measured using TANITA body composition (±0.5: clothes' weight), SECA body meter and measuring tape respectively. The SECA body meter was set up at an empty wall for accurate readings. BMI was calculated based on weight (kg)/height2 (m). BMI <18.5 kg/m2 was considered underweight, BMI >18.5 kg/m2 and <24.99 kg/m2 was considered normal, BMI ≥25.00 kg/m2 was considered overweight and BMI ≥30.0 kg/m2 was considered obese (WHO 2003). Meanwhile questions on sleep duration during weekdays, weekends and napping time were developed based on model by Harris (2004). The International Physical Activity

Questionnaire (IPAQ) questionnaires was used to assess the duration of recreation, house chores, walking and sitting activities of the subjects. The IPAQ provides data for physical activity (min/week). The classification of physical activity were calculated using the MET score formula (Craig 2005).

The questionnaire was pre-tested and validated prior to data collection. A total of 400 questionnaires were distributed to selected students. However only 344 questionnaires were returned and answered by the students. Therefore, the anthropometric of the same 344 students were analysed for this study.

Statistical Analysis

All data were recorded and analyzed using PASW Statistics Software, version 18.0 (Peter & Kellie 2008). The mean difference between male and female students was compared using unpaired t-test. Mean difference of two or more variables using ANOVA. Pearson correlation test was used to identify correlation between physical characteristics, physical activity and sleep duration with students' CGPA.

RESULTS

Table 1 shows the demographic information of 334 students aged from 19 to 26 years. The mean age of male and female students was 20.9±1.3 years and 20.7±0.9 years respectively. More than half of the students (62.6%) were from Faculty of Health Sciences, while 25.1% were from Faculty of Medicine and the rest 12.3% were from Faculty of Pharmacy with significant difference among the faculties ($\chi2=8.29$, $p=0.01$). Most of the students were Malay (68%), 22.2% were Chinese, 7.2% were Indian and other ethnics were 2.7% (Kadazan, Iban and Bidayuh). The mean CGPA of the students were 3.06±0.34 which range from 1.70 to 3.85 with significant difference between male and female students ($t=-2.38$, $p=0.02$).

TABLE 1. Demographic characteristics of male and female students

	Male (n=93) n(%)	Female(n=241) n(%)	All (n=334) n(%)	$\chi2/t$	p value
Current academic year				0.28	0.86
2nd year	53(57.0)	148(61.4)	201(60.2)		
3rd year	20(21.5)	69(28.6)	89(26.6)		
Final year	20(21.5)	24(10.0)	44(13.2)		
Faculty				8.29	*0.01
Health Science	59(63.4)	150(62.2)	209(62.6)		
Medicine	24(25.8)	60(24.9)	84(25.1)		
Pharmacy	10(10.8)	31(12.9)	41(12.3)		
Ethnic				6.01	0.11
Malay	64(68.8)	163(67.6)	227(68.0)		
Chinese	17(18.3)	57(23.7)	74(22.2)		
Indian	11(11.8)	13(5.4)	24(7.2)		
Others	1(1.1)	8(3.3)	9(2.7)		
	Mean±SD	Mean±SD	Mean±SD		
Age (years) Range	20.9±1.3 (19-26)	20.7±0.9 (19-23)	20.7±1.0 (19-26)	1.70	0.09
CGPA Range	2.99±0.35 (1.70-3.85)	3.09±0.34 (2.05-3.84)	3.06±0.34 (1.70-3.85)	-2.38	*0.02

*Significant difference (p>0.05) between male and female students with Chi-Square ($\chi2$) and t test

The physical characteristics of the students are shown in Table 2. Male students had significantly higher body weight (61.0±10.2 kg) than female students (52.4±11.3kg). The mean height of male students (168.1±7.2 cm) was also significantly higher than female students (156.6±5.8 cm). However, the female students showed the mean percentage of body fat (27.7±7.8) was significantly higher than male students (20.8±7.1). Otherwise, the mean waist circumference of male students (72.5±8.3) was significantly higher than female students (66.4±8.8).

TABLE 2. Physical characteristics of the students

	Male (n=93) Mean±SD	Female(n=241) Mean±SD	All (n=334) Mean±SD	t	p value
Weight (kg)	61.0±10.2	52.4±11.3	54.8±11.6	6.43	*0.01
Range	(38.3-85.9)	(32.2-122.9)	(32.2-122.9)		
Height (cm)	168.1±7.2	156.6±5.8	159.8±8.0	15.11	*0.01
Range	(153.1-186.6)	(141.4-172.5)	(141.4-186.6)		
BMI (kg/m²)	21.6±3.3	21.3±4.2	21.4±4.0	0.51	0.61
Range	(15.6-31.7)	(13.3-49.5)	(13.3-49.5)		
Percentage of Body Fat (%)	20.8 ± 7.1	27.7 ± 7.8	25.8±8.2	5.67	*0.01
Range	(8.9-41.1)	(8.7-69.5)	(8.7-69.5)		
Waist Circumference (cm)	72.5±8.3	66.4±8.8	68.1±9.1	-7.40	*0.01
Range	(56.5-93.3)	(49.5-117.5)	(49.5-117.5)		

*Significant difference (p<0.05) between male and female students with unpaired t test

Table 3 shows that majority of the students (63.5%) had normal BMI and 21.9% were underweight, while the rest 11.4% and 3.3% were respectively overweight and obese. The percentage of underweight and obese was higher among female students (23.2%, 4.1%) compare to male students (18.3%, 1.1%). The mean CGPA of male and female students according to their BMI classification did not differ significantly (Table 4). However, based on trend both male and female students with normal BMI had higher CGPA compared to underweight and overweight students.

TABLE 3. Percentage distribution of students according to Body Mass Index (BMI)

Classification of BMI	Male (n=93) n(%)	Female (n=241) n(%)	All (n=334) n(%)	χ2	p value
				4.30	0.23
Underweight	17(18.3)	56(23.2)	73(21.9)		
Normal	61(65.6)	151(62.7)	212(63.5)		
Overweight	14(15.1)	24(10.0)	38(11.4)		
Obese	1(1.1)	10(4.1)	11(3.3)		

No significant difference (p>0.05) between male and female students with unpaired Chi-square test

TABLE 4. Mean ± SD of male and female CGPA according to BMI classification

	Male (n=93)	Female (n=241)	All (n=334)	F	p value
	Mean±SD	Mean±SD	Mean±SD		
BMI (kg/m²)				0.22	0.23
Underweight (<18.5)	2.95±0.23	3.09±0.34	3.05±0.32		
Normal (18.5-24.9)	3.03±0.39	3.13±0.33	3.10±0.35		
Overweight (>25)	2.87±0.27	2.93±0.36	2.91±0.33		

No significant difference (p>0.05) with ANOVA

Table 5 presents data on physical activity duration of male and female students. The results show that male students significantly (p<0.05) spent more time on moderate and high physical activity compared to female students. Table 6 shows that pattern of CGPA according to physical activity level. Generally, the study found that students with low physical activity level had the lowest CGPA. Even though not statistically significant, students with moderate level of physical activity had the highest CGPA. Figure 1 shows the distribution of physical activity level according to gender. Male students (52.7%) were more likely to be categorized into high physical activity level than female students (24.9%). More than half of the female students (58.9%) were categorized into moderate physical activity as compare to 43% among male students. 4.1% of male students and 15.2% female students had low physical activity.

TABLE 5. Physical activity duration of male and female students

	Male (n=93)	Female (n=241)	All (n=334)	F	p value
Physical activity duration (min/week)	Mean±SD	Mean±SD	Mean±SD	27.31	*0.01
Walking	284.7±251.5	238.7±218.1	251.5±228.4		
Moderate physical activity	210.2 ±168.1	150.6±159.6	167.2±163.9		
High physical activity	252.1± 253.6	110.9± 156.5	150.2±198.6		

*Significant difference (p<0.05) with ANOVA

TABLE 6. Mean±SD of CGPA according to physical activity level

Physical Activity Level	Male (n=93)		Female (n=241)		All (n=334)		F	p value
		CGPA					1.40	0.24
	n	Mean±SD	n	Mean±SD	n	Mean±SD		
Low	4	3.21±0.05	39	3.00±0.35	43	3.02±0.34		
Moderate	40	3.03±0.34	142	3.11±0.34	182	3.09±0.34		
High	49	2.94±0.36	60	3.11±0.33	109	3.03±0.35		

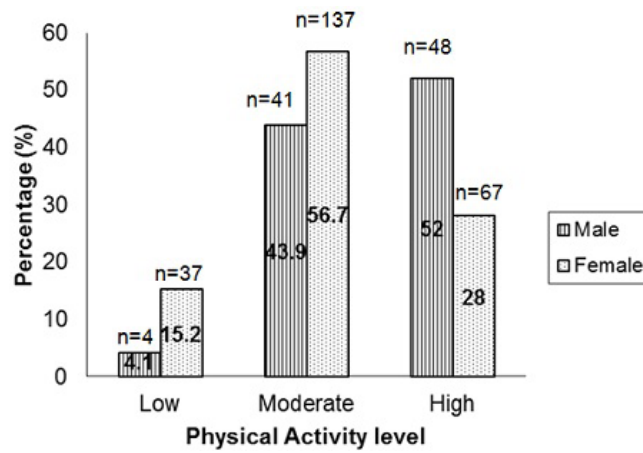No significant difference (p>0.05) between male and female students with ANOVA

FIGURE 1. Physical activity level of male and female students according to MET-min/week score

Sleep duration of male and female students is shown in Table 7. The mean sleep duration during weekdays were shorter (5.9±1.2 hours/day) compared to weekend (7.5±1.7hours/day). For analysis purposes, the students were categorized into two categories of sleeping hours which are less and more than 8 hours per day during weekdays and weekends. Out of 334 students, 90.1% of them are reported sleep less than 8 hours per day during weekdays. However, during weekends there were equal percentage of students who sleep less and more than 8 hours. Furthermore, this study found that CGPA was slightly higher among those who sleep more than 8 hours (3.15±0.33) compared to less than 8 hours (3.05±0.35) during weekdays (Table 8). During weekends, students who had more and less than 8 hours sleep duration had almost same CGPA but significantly different between male and female students.

TABLE 7. Sleep duration of male and female students

Sleep duration (hours/day)	Male (n=93) Mean±SD	Female (n=241) Mean±SD	All (n=334) Mean±SD	F	p value
Sleep during weekdays Range	5.9±1.3 (3-11)	5.9±1.1 (3-10)	5.9±1.2 (3-11)	0.30	0.76
Sleep during weekend Range	7.8±1.8 (5-14)	7.5±1.7 (4-14)	7.5±1.7 (4-14)	1.53	0.12

No significant difference (p>0.05) between male and female students with unpaired t test

TABLE 8. Mean ± SD of male and female students' CGPA according to sleep category

Physical Activity Level	Male (n=93)		Female (n=241)		All (n=334)		F	p value
	n	Mean±SD	n	Mean±SD	n	Mean±SD		
Sleep during weekdays							0.15	0.69
<8 hours	82	2.96±0.35	219	3.09±0.34	301	3.05±0.35		
≥8 hours	11	3.20±0.30	22	3.13±0.35	33	3.15±0.33		
Sleep during weekends							5.68	0.02*
<8 hours	42	2.98±0.32	122	3.09±0.33	164	3.06±0.33		
≥8 hours	51	3.00±0.38	119	3.09±0.35	170	3.07±0.36		

*Significant difference ($p < 0.05$) with ANOVA

This study found negative correlation between BMI (r= -0.174, p=0.01) and high physical activity (r= -0.118, p=0.03) with CGPA. While positive correlation were found between sleeping duration during weekdays and CGPA (r=0.132, p=0.01) as shown in Table 9.

TABLE 9. Correlation between physical characteristics, physical activity and sleep duration with CGPA

Characteristics	CGPA (n=334)	
Physical characteristics	r	p value
Weight	-0.108	0.05
Height	0.077	0.16
Body Mass Index	-0.174	0.01*
Percentage of fat	-1.000	0.08
Waist circumference	-1.070	0.05
Physical activity duration		
Walking duration	0.056	0.30
Moderate physical activity duration	0.002	0.96
High physical activity duration	-0.118	0.03*
Sleep duration		
Sleep during weekdays	0.132	0.01*
Sleep during weekend	0.077	0.15

*Significant correlation ($p < 0.05$) with Pearson correlation test

DISCUSSION

This study found that the underweight and overweight students were higher than current study among Malaysian university students on 2011. This study revealed the increasing percentage of underweight students from 19% to 21.9% compared to their study. Similar to this study, their study showed that the percentages of underweight students were higher among female students (22.4%) compared to male students (14.3%) (Gan et al. 2011). Abolfotouh et al. (2007) suggested that female students were underweight because they keen to look beautiful and obsessed in skinny fashion trend. This trend may also is spreading among male students and lead to higher prevalence of underweight BMI among them. The percentage of overweight students in this study also increased to 2% from 9.4% overweight students participated in study done by Gan et al. (2011). Both male and female students had higher percentage than current study. This may occur when students can easily access of fast and processed food in the middle city like Kuala Lumpur.

This study also found that the percentages of subjects that were categorized into underweight, overweight and obese were significantly difference from the adult subjects used in the National Health and Morbidity Survey III (NHMS III) on 2006. The percentage of underweight subjects in this study was 21.9% and was more than twice of the NHMS III data (8.5%). However, the percentages of overweight and obese in this study (11.4% and 3.3%) were lower than percentage of overweight and obese from the NHMS III data. It can be happened because students in this subject more active as they are in the younger age compare to subjects of NHMS III data.

In this study, researchers found that poor BMI status correlates with students' academic performance. The results are supported by previous findings. They reported that lower academic performance was related to poor BMI status. (Stock et al. 2001; Costa 2005; Albolfotouh et al. 2007). Limited knowledge in practising better health among them may effect on taking daily balance diet (Stock et al. 2001). Thus, BMI status which was calculated from data of weight and height often relate to personal lifestyle.

For physical activity levels, the results of this study are similar to previous research by Albolfotouh et al. (2007). They found that more male students involved in high physical activities than female students. Furthermore, they also reported that more female students (48.1%) were physically inactive than male students (15.6%). Study by Huang et al. (2003) also found the same results. This also could be explained by the behavioural as well as socio-cultural factors as female students have fewer opportunities to go outside the residential college environment, whereas male students are more independent, mobile and are able to exercise with their peers (Albolfotouh et al. 2007).

Poor physical activities may lead to poor BMI and academic performance (Stock et al. 2001; Costa 2004; Kelly 2004; Abolfotouh et al. 2007). Academic tasks require of rigorous cognitive ability and also physical stamina. Students need a healthy body to do physical activities as well as stimulate the brain to meet and complete given tasks (Kelly 2004). If students had poor physical condition, they may not be able to give full attention during academic lessons. This may be the reason for students practiced low physical activity had lowest CGPA compared to who practiced moderate and high physical activity. Furthermore, inactive students sleep less than active students may spend more time being on computers or games. Study by Amudha et al. (2012) found that almost 13% inactive students felt difficult in doing exercise and stressful.

According to Brown et al. (2002), a total of 8 hours or more of sleep per day was considered enough. Past research showed that 32.2% of the study subjects had poor sleeping behaviour in terms of quantity and quality (Abolfotouh et al. 2007). Meanwhile this study showed higher percentage in less sleep duration during weekdays (90.15) and during weekends (49.1%). Majority of the students in this study sleep less than 8 hours especially during weekdays because they may spend more time in attending classes, finishing the assignments and planning programs for club or any organizations they were joined.

Findings of this study showed similar results with previous research which established that sleep is a healthy factor lifestyle that has correlation with grade point average. For example, Pilcher and Walters (1997) found that sleep deprivation negatively influenced student's cognitive abilities to perform in an examination and stay alert during class. Studies by Kelly et al. (2001) and Costa (2004) also found that students with higher grade point averages reported sleep longer hours than those with lower grade point averages. In other case, female students in this study significantly had higher CGPA compared to male students sleep during weekends. This can be explained when female students spent more time to study compare to have leisure time with their friends like male students during weekends. The findings of this study on poor BMI status, poor sleep behaviour and vigorous physical activity is related to low academic performance. Each factor influences the other for example too much physical activity and insufficient sleep durations lead to higher

weight and high BMI level then negatively effects the academic performance. In contrast, study by Amudha et al. (2012) reported that poor BMI was consequence by the sedentary lifestyles among students. Positive relationship between sleep and CGPA was similar with previous study done by Trockel et al. (2001), Kelly et al. (2001) and Costa (2005). Vigorous activity may lead to tiredness. While they have to sleep less in order to study at night. Therefore, this scenario may lead to low academic performance.

CONCLUSION

This study revealed that the higher BMI and physical activities contributed lower academic performance meanwhile ideal sleep duration resulted higher academic performance. Therefore, it can be proposed that students should practice healthy lifestyle as it influences their academic performance.

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