ORIGINAL ARTICLE

Prevalence of Physical Activity and Sleep Quality and Their Relationship With Academic Achievement Among Pre-clinical MBBS Students of Cyberjaya University

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ABSTRACT

Introduction: Inactive students with poor sleep quality are frequently linked to diminished cognitive function. This study is to evaluate the prevalence of physical activity and sleep quality and to find their relationship with academic achievement among preclinical students in University of Cyberjaya. **Methods:** A cross sectional study was conducted among pre-clinical MBBS students in University of Cyberjaya, aged 18-30 years and students of at least one semester. Respondents were chosen using convenient sampling. Data were collected using validated online questionnaires. **Results:** 42.6% of the respondents were physically inactive and 60% of them were less likely to score ≥ 3.0 GPA. Physical inactivity was reported the highest among male (45.2%), age group ≤ 20 years old (24.6%), Year 2 (30.6%) and Chinese/Indian/Others (75%). Among the physically inactive respondents, the most significant barriers reported were 'Busy' (35%), 'Lazy/Unmotivated' (27.5%) and 'Afraid to go out due to COVID-19' (17.5%). In addition, overall prevalence for poor sleep quality was 23.4% whereas 30% of them were less likely to score ≥ 3.0 GPA. High prevalence of poor sleep quality was reported among females (27%), age group ≥ 20 years old (31%), Year 2 (24.5%) and Malay (25.7%). Multivariate analysis indicates that there was no association between physical activity and sleep quality with academic achievement ($p>0.05$). **Conclusion:** Only minority of preclinical medical students are physically inactive and have poor sleep quality. Both physical activity and sleep quality are also found to have no effect on academic achievement.

Keywords: Physical activity, Sleep quality, Academic achievement, Association, Cyberjaya

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INTRODUCTION

Medical students are future physicians who will be in charge of providing health care to others. They face a comparatively more competitive atmosphere than students in other careers and working very closely with patients and hospital personnel, as well as dealing with the pressure of gaining professional competence in addition to academic skills (1). As medical training is regarded as among the most difficult, medical students devote an enormous amount of time to their studies at the expense of physical activity and sleep duration, especially when exams are approaching (2).

Physical inactivity has been recognised as one of major risk factors for global mortality, accounting for an estimated 6% of all deaths worldwide (3). he National Health and Morbidity Survey (NHMS) in Malaysia revealed that the prevalence of physical inactivity among adults aged 16 and above was 33.5% in 2015 and 25.1% in 2019 (4-5). Booth et al (6) has reported that physical activity patterns during university and college years are crucial factors on normal physical activity in adult life, and therefore have direct consequences for short- and long-term health outcomes. Furthermore, many researchers discovered a strong correlation between physical activity and academic performance. A study conducted by Lipo ek et al (7) discovered that two to three hours of weekly physical activity were positively associated with academic success. This finding was supported by a study by Hou et al that demonstrated that improved physical

fitness can contribute to students' academic achievement (8).

Poor sleep quality is also common among medical students, with a twofold increase in prevalence when compared to the general population (9-10). A research paper conducted in Brazil discovered that 51.5% of medical students had poor sleep quality (11). Vyazovskiy (12) indicated that a sufficient amount of high-quality, optimal-duration sleep improves information processing and learning. It aids in the maintenance of attention, executive cognitive functions, sensorimotor integration, and information consolidation. Alalageri et al. (13) hypothesised that lack of sleep can cause students to have poor academic achievement.

The purpose of this study is to ascertain the level of physical activity and the quality of sleep and to explore their association with academic achievement among pre-clinical medical students at the University of Cyberjaya. Furthermore, it aims to identify the barriers to being physically active among physically inactive medical students.

MATERIALS AND METHODS

Study location
University of Cyberjaya, Cyberjaya, Selangor.

Type of study
Cross-sectional study

Duration of study
April 2020 to January 2021

Sample population
Inclusion criteria : All Year 1 and Year 2 at the University of Cyberjaya with a total of 220 students with at least one semester of the ages of 18 and 30 were chosen.

Exclusion criteria : Individuals who are mentally disabled and have medical conditions that prevent them from engaging in physical activity.

Non-respondents criteria : Respondents who refused to answer the questionnaire after two approaches and those who have taken educational leave.

Sampling frame
All Year 1 and Year 2 MBBS students at the University of Cyberjaya

Sampling unit
All students who are registered for Bachelor of Medicine and Bachelor of Surgery (MBBS) courses in University of Cyberjaya and are using the Block system for their curriculum.

Sample size
The sample size for this study was determined based on the two proportion formula. Prevalence of physical activity and sleep quality were calculated according to previous research findings, giving a sample size value of 100 and 40 respectively. The highest sample size which is 100 was taken as the minimum number of sample size in this study and after considering the 10% for non-respondent, the final sample size for this study was 110. From a total of 220 students, stratified sampling was done by dividing them according to year of studies in Year 1 or Year 2. After obtaining the sample size of the students according to year of studies, systematic random sampling was used to figure out how many students to be selected from each stratum to satisfy the sample size for the study. Next, respondents were selected through simple random sampling from each year of studies.

Sampling method
From a total of 220 students, stratified sampling was done by dividing them according to year of studies in Year 1 or Year 2. After obtaining the sample size of the students according to year of studies, systematic random sampling was used to figure out how many students to be selected from each stratum to satisfy the sample size for the study. Next, respondents were selected through simple random sampling from each year of studies. We obtained 110 respondents to satisfy the calculated sample size in this study.

Approval
All respondents' consent forms will be obtained, along with an explanation of the nature and purpose of the study. All respondents have the option of participating or not participating in this study. The respondents will be assured that the information gathered will remain anonymous.. This information, along with research data, will be kept confidential and will not be disclosed to any third party. The research data and information will be available only to the students listed as researchers on the front page and our supervisor. This study will only be published with the subjects' approval and consent.

Research data will be saved up to ten years in the university record upon completing the study. Documents containing personal identifying information (PII), such as consent forms and printouts, will be stored securely and handled as a confidential document only by authorized staff members.

Instruments
Online questionnaires with a series of standardized validated questionnaires from The International Physical Activity Questionnaire (IPAQ) and The Pittsburgh Sleep Quality Index (PSQI) were used in this research. These questionnaires included three

parts; A - Sociodemographic data including respondent's CGPA, B - Physical Activity Status and C - Sleep Quality. The questionnaire includes explanations to the respondents of the reason, purpose of study and consent for the use of data was also required. The data was self-reported and completed by the participants themselves. To increase the validity of questionnaire, a pre-test was conducted on samples that are similar to respondents, and the time taken to ask the questions was measured prior to the onset of data collection in order to see if the questions are understandable, relevant, and would not last too long. Reliability testing will test the appropriateness of questionnaire use in this study. Cronbach's Alpha was used as it is the most frequently used reliability test tool by social researches. Reliability factor of 0.8 was obtained which is within a good range of reliability (14)

Data analysis

The data will be analysed by the Statistical Package for the Social Sciences Version 23 (SPSS 23) data analysis software. Descriptive analysis will be used to assess prevalence of categorical variables while multivariate logistic regression tests will be used to assess the relationship between the variables.

ETHICAL APPROVAL

University of Cyberjaya Research Ethics Committee (CRERC) has approved this study to be conducted with CRERC Reference Number: UOC/CRERC/ER/245

RESULTS

Out of 110 respondents, only 94 data was able to be used giving a response rate of 85.5%. One reason for the last minute withdrawal of sixteen students were change of mind and deciding not to consent to their data for this study and another reason being medical conditions that prevent them from engaging with any physical activities.

Based on Table I, a majority (57.4%) of the respondents are physically active and the prevalence of the physically inactive are higher among male (45.2%), age below than 20 years old (24.6%), Chinese/Indian/ others (75%) and in year 2 (30.6%). 'Chinese/Indian/ Others' were 12 times more likely to be inactive compared to 'Malay', whereas Year 2 students are 4 times more likely to be inactive than Year 1 students. However, statistically there was no significant association between physical activity status with all socio-demographic factors among preclinical

Table I : Prevalence and association [1]of physical inactivity by sociodemographic factors (N=94)

Sociodemographic factors		Physical activity status		Total, n (%)	Odd ratio (CI)	p-value
		Inactive, n (%)	Active, n (%)			
Overall students		54(57.4)	40(42.6)	94(100)		
Gender	Male	23(54.8)	19(45.2)	42(100)	1.22 (0.5359,2.7750)	0.535
	Female	31(59.6)	21(40.4)	52(100)	1	
Age group	≤ 20 years old	49(75.4)	16(24.6)	65(100)	2.04 (0.6166,6.7548)	0.236
	≥ 20 years old	25(86.2)	4(13.8)	29(100)	1	
Ethnicity	Malay	59(79.8)	15(20.2)	74(100)	1	
	Chinese/Indian/Others	5(25.0)	15(75.0)	20(100)	11.81 (3.6991,37.6419)	0.372
Year of studies	Year 1	40(88.9)	5(11.1)	45(100)	1	
	Year 2	34(69.4)	15(30.6)	49(100)	3.53 (1.1624,10.7160)	0.210

Based on Table I, majority (57.4%) of the respondents are physically active and the prevalence of physically inactive are higher among male (45.2%), age below than 20 years old (24.6%), Chinese/Indian/others (75%) and in year 2 (30.6%). 'Chinese/Indian/Others' were 12 times more likely to be inactive compared to 'Malay', whereas Year 2 students are 4 times more likely to be inactive than Year 1 students. However, statistically there was no significant association between physical activity status with all socio-demographic factors among preclinical MBBS students in University of Cyberjaya ($p > 0.05$). Therefore, we fail to reject the null hypothesis

Table II : Association between physical activity and academic achievement (N=94)

Physical activity status	Academic achievement		Total	Odd Ratio	P value
	< 3.0 GPA	≥ 3.0 GPA			
	n (%)	n (%)	n (%)	(CI)	
Active	16 (21.6)	58 (78.4)	64 (100)	1	0.676
Inactive	6 (30)	14 (70)	20 (100)	0.58	
				(0.0720, 1.1941)	

Table II shows that inactive students have 60% less likely to score ≥ 3.0 GPA than active students. There is no association between physical inactivity with academic achievement OR=0.58 (95% CI=0.0720, 1.1941)

MBBS students in University of Cyberjaya (p > 0.05). Therefore, we fail to reject the null hypothesis.

Table II shows that inactive students have 60% less likely to score ≥ 3.0 GPA. There is no association between physical inactivity with academic achievement OR=0.58 (95% CI=0.0720, 1.1941).

Table III shows the prevalence of good sleep quality was 76.6% and the prevalence of good sleep quality was higher among male (81.0%), age below 20 years old (80.0%), Chinese/Indian/others (91.7%) and year 1 (77.8%). However, statistically there was no significant association between sleep quality with all socio-demographic factors among preclinical MBBS students in University of Cyberjaya (p > 0.05). Therefore, we fail to reject the null hypothesis.

Table IV shows that students with poor sleep quality have 30% less likely to score ≥ 3.0 GPA than students with good sleep quality. There is no relevant association between sleep quality with academic achievement OR=0.26 (95% CI=0.0556, 1.2156).

Table III : Prevalence and association of poor sleep quality by sociodemographic factors (N=94)

Sociodemographic factors		Sleep quality		Total	Odd ratio	p-value
		Good	Poor	n (%)	(CI)	
		n (%)	n (%)			
Overall student		72(76.6)	22(23.4)	94(100)		
Gender	Male	34 (81.0)	8(19.0)	42(100)	1	0.804
	Female	38(73.0)	14(27.0)	52(100)	1.57	
					(0.5852,4.1896)	
Age group	≤ 20 years old	52(80.0)	13(20.0)	65(100)	1	0.498
	≥ 20 years old	20(69.0)	9(31.0)	29(100)	1.80	
					(0.6661,4.8643)	
Ethnicity	Malay	55(74.3)	19(25.7)	74(100)	1.96	0.362
					(0.5159,7.4285)	
	Chinese/Indian/Others	17(91.7)	3(8.3)	20(100)	1	
Year of studies	Year 1	35(77.8)	10(22.2)	45(100)	1	0.067
	Year 2	37(75.5)	12(24.5)	49(100)	1.14	
					(0.3380,2.2963)	

The prevalence of poor sleep quality is the highest among female (27%), age group ≥ 20 years old (31%). Majority of students with poor sleep quality were among Malay (25.7%) and in Year 2 (24.5%). However, statistically there was no significant association between sleep quality with all socio-demographic factors among preclinical MBBS students in University of Cyberjaya (p > 0.05). Therefore, we fail to reject null hypothesis.

Table IV : The association between sleep quality and academic achievement

Sleep Quality	Academic achievement		Total	Odd Ratio
	< 3.0 GPA	≥ 3.0 GPA	n (%)	(CI)
	n (%)	n (%)		
Poor	2 (9.1)	20 (90.9)	22 (100)	0.26 (0.0556,1.2156)
Good	20 (27.8)	52 (72.2)	72 (100)	1

Table IV shows that students with poor sleep quality have 30% less likely to score ≥ 3.0 GPA than students with good sleep quality. There is no relevant association between sleep quality with academic achievement OR=0.26 (95% CI=0.0556, 1.2156)

DISCUSSION

Findings of this study indicated that there was no significant association between participation in physical activity and sleep quality with academic achievements (p>0.05). These findings are consistent with a local study conducted by Syafiq et al. (2014) (15) and studies from other countries by Al-Drees et al. (2016) and Van Dijk et al. (2014) (16-17). Since this university progressively promotes the integration of active lifestyle and good sleep quality to equip students with better academic performance, they should be aware of the program's ineffectiveness or even possible dire effects on students' academic achievements (15). On the other hand, there was no discernible connection between sleep quality and academic achievement (p>0.05) in our research. This is consistent with research by Seoane et al. (2020) and Alotaibi, et al. (2020) (18-19). A reasonable interpretation that can be offered to students in pre-clinical years may have trouble dealing with the new environment and also lack time management skills. In addition, one of the causes for low sleep quality during pre-clinical years may be the increased number of lectures and workloads (20).

This study also examined the prevalence of physical activity and sleep quality according to sociodemographic factors among preclinical MBBS students in University of Cyberjaya. Our research determined that the prevalence of physically inactive preclinical students in University of Cyberjaya was 42.6% which is higher compared to the 2019 NHMS report at 25.2% (5) and earlier study in the same university at 23.6% (14). The plausible explanation for this is that the accountability of medical students to personal and professional health promotion declined throughout their medical school years (21).

Male students are associated with higher odds of physical inactivity (45%) compared to female students (40%). This finding is supported by a similar study done in the United Kingdom, who also proposed that males could be more at risk of burnout than females in their study (22). Male tend to perform high intensity physical activity while females prefer regular activity such as walking and cycling but did it consistently (13). Male students were more inactive as they experienced more personal barriers to physical activity (23). Students aged less than 20 years old are reported to be more physically inactive (24.6%) than age more than 20 years old (13.8%) which is inconsistent with previous study conducted among students of University of Malaya (43%). However, according to the findings, student age has little impact on physical activity levels (24).

With regards to the year of studies, our study indicated that Year 2 students are 4 times more likely to be inactive than Year 1 students. Second-year students recorded high levels of mental fatigue and poor physical activity (22). Majority of first year students (50%) were involved in three out of four levels of physical activity due to the curriculum requirement (23). Another study indicated that a large percentage of patients are at risk of being physically inactive with increasing years of studies although they were being taught with health benefits of physical activity (21).

During the study, we tried to identify the possible barriers for being physically active among inactive participants. Majority of the physically inactive students felt that there was at least one barrier to physical activity. The significant barrier reported by them was "Busy" (35%), followed by "Lazy or unmotivated" (27.5%) and "Afraid to go out due to COVID-19" (17.5%). These conditions were consistent with El-Gilany & El-Masry (2011), Awadalla, et.al (2014) and Al-Asousi & El-Sabban (2016) (25-27). This condition is most likely to be influenced by their study-related activities as medical students spend most of their free time studying. It is also supported by Wattanapisit et al (23) stated that medical students devote a significant amount of time to their studies as physical exercise was deemed less significant than study-related behaviors by them. Previous study in the same university also reported the association

between 'Amotivation' and inactivity. They reported that level of physical activity is predicted by the integrated regulation of medical students' own personal belief that motivates them into performing physical activity (13). Simply put, our current medical students were unable to identify their expectation that they will become potential healthcare workers, and as a result, they do not partake in daily physical exercise to protect their fitness. We also identified 'Tiredness' (10%) as one of the barriers to physical activity which coherent with the study among medical students in Thailand, stating that regular night duties disrupted their physical activity level as they were just too tired after the night shifts (23).

When determining the prevalence of sleep quality, we found that 22 out of 94 pre-clinical students had poor sleep quality giving a prevalence of 23.4%. This result is comparable with a study by Pey-Peng & Yee-How (2013) at 67.1% (24). The number of students may be inflicted by the heavy workload of academic and stress issues (28). The workloads and early lecture hours, according to Azad et al. (9) will lead to low sleep quality and reduced sleeping hours.

Female students (27%) experienced poorer sleep quality compared to male students (19%). A similar trend was observed in a middle eastern university (20). The plausible explanation is the fact that females are more likely to suffer from psychological problems which might be the contributing factor for poor sleep (29). However, another Malaysian study found that males were significantly more likely than females to have low sleep quality (30) which corresponds with the study by Attal, Bezdan and Abdulqader (31). They also found that sleep length, latency, and performance were the major differences in sleep habits between male and female Yemeni students. 31% of students who aged above 20 had poorer sleep quality than students aging below 20 years old which was 20%. This is inconsistent with another study by Ibrahim et al. (2017). These findings may be reasonably explained by the continuous lectures and pile of assignments in early stages of preclinical years (20).

When compared to Year 1 students, Year 2 students had a higher rate of reduced sleep efficiency (24.5% vs 22.2%) and we found a non-significant association between sleep quality and year of studies ($p>0.05$). This subtle disparity in prevalence may be due to the fact that Year 2 students just had their mid-course assessment during the data collection process. Tien Ngu et al. (2017) also noted an insignificant association between years of studies and sleep quality which corresponded with Brick, Seely and Palermo (32).

CONCLUSION

The overall prevalence of physical inactivity and poor sleep quality among pre-clinical MBBS students in University of Cyberjaya was relatively low, and the commonest barriers from being physically active were reported as 'Busy', 'Lazy/Unmotivated' and 'Too tired' which are all modifiable.

It is also recommended for the academic schedule to be made flexible in order to provide students more time to enhance their physical activity and sleep quality. Besides, consistent interventions and health education are crucial to promote better understanding on the benefit of physical activity and good sleep quality to improve their cognitive ability for better academic performance. It is also suggested for the students to be introduced to non-time consuming physical activities and effective study methods in order to get a balanced lifestyle.

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