

Physical Activity among Preclinical Medical Students at The University of Malaya, Malaysia

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Abstract

Medical students should have knowledge of the benefits of healthy lifestyle, so that they can advise their future clients. This study was carried out to assess the physical activity level among students in the preclinical phase at the University of Malaya, Malaysia. The study involved 150 males and 100 female students – who responded to a questionnaire that included three main categories: demographics, nutrition, and physical activity. Students represented different ethnic backgrounds and provinces of Malaysia. Most students (90%) lived and dined on campus, 62% ate 3 meals/day, 63% felt that their nutrition was proper, 50% used nutritional supplements, and 64% had a normal BMI. As for physical activity; 76% of students exercised regularly, and 63% preferred to exercise in groups. Those who exercised had different activity levels, with a gender difference in favor of males ($P < 0.001$). Students with at least one parent being physically-active were significantly influenced to exercise ($P < 0.001$). Students who did not exercise cited lack of time (62%) and laziness (38%) as reasons. Enhancing knowledge and significance of healthy lifestyle can be instrumental in increasing the percent of exercising medical students, with an attitude that would benefit them and those whom they will cater for in the future.

Keywords: Exercise; Lifestyle; Medical school; Malaysia; Nutrition; Physical Activity; Preclinical

Abbreviations

BMI: Body Mass Index; SPSS: Statistical Package for Social Studies; WHO: World Health Organization.

Introduction

The World Health Organization (WHO) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure [1]. Regular physical activity is one of the most important practices that a person can do to stay healthy. Physical activity will not only increase one's chances of living longer; but also it can help control body weight, reduce risks for cardiovascular disease, type 2 diabetes, metabolic syndrome, some cancers. Regular exercise strengthens bones and muscles, prevent falls among older adults, improve mental

health and mood, and improve the ability to do daily activities [2]. Physical inactivity and the related health problems pose an emergent threat to public health [3].

Although behaviors of students are considered a temporary part of college life; however, unhealthy habits picked up at this stage can persist in adult life [4]. Therefore, university and college years represent an important opportunity to students for learning about healthy lifestyle and enhancing nutritional awareness. Medical students can learn and derive the most benefit of a healthy lifestyle, by virtue of the nature of their studies [5]. It is presumed that medical students have substantial knowledge about physical activity and its benefits and, as health care professionals-to-be, they will have an influence on their patients' attitude towards the need for a regular physical activity program and an ethical obligation to prescribe suitable exercises. It is well known that there is a direct correlation between physical activity level in medical students and the medical advice they provide to their patients [6-9]. However, there is no evidence to indicate that this knowledge translates into practice in terms of maintaining good health. The structure of medical education itself is likely to cause disruption to students' health habits [10]. Staying physically-active during medical school is one of the hardest things to do; as with busy schedules, medical students may not find the time to exercise regularly. Numerous studies on physical activity level have produced different results, often presenting a sharp contrast between medical students' knowledge about the benefits of regular physical activity and its application in everyday life [11-16]. Angyan *et al.* [16] reported that medical students had low physical activity levels as a result of high workload and less free time.

The purpose of this study was to acquire a quantitative account for the physical activity levels of preclinical medical students at the University of Malaya Medical Centre and to learn about the influencing factors on such activities. Also, it was of interest to acquire data on student nutrition to reveal information on the prevalent lifestyle of these students.

Methods

The University of Malaya Medical Centre

The University of Malaya campus is located at Lembah Pantai, the Province of Selangor, a suburb of Kuala Lumpur - the National Capital of Malaysia. It is one of the government-run co-educational institutions of higher learning. The university has its own medical center, which includes the Faculty of Medicine. One of the programs being offered by the Faculty of Medicine is the Bachelor of Medicine and Surgery, which includes 3 phases. The first 2 phases are non-clinical studies lasting for 3 years while the clinical phase starts with the 4th year and continues for 3 years. The annual medical student intake is approximately 200 from all localities in the country.

Study subjects

Study subjects were female and male medical students at the Faculty of Medicine, University of Malaya. Students were in their first 3 years of study – as at this stage of their medical curriculum, they may be less busy with their studies than their clinical years counterparts and may lead a close-to-healthy lifestyle. A total number of 250 students responded to a questionnaire that was designed for this study. With such an annual medical student intake at the Faculty of Medicine, University of Malaya, the number of students included in this study (approximately 1/3 of the a 3-year intake) was considered as a representative sample.

The administrated Questionnaire and Data collection

Data collection was based on a questionnaire that was designed to fall into three main categories, which are demographics, personal nutrition, and exercising data. The questionnaire was pilot-tested with 20 students to ensure its fluency and ease of understanding inquiry points. Such a questionnaire was slightly modified and the involved survey was implemented. Each trained interviewer was available at the time when students responded to the questionnaire. Any inquiries about the meaning of a certain question were provided by the interviewers. Carrying out this work was approved by the Faculty of Medicine, University of Malaya, in 2014.

Data analysis

Data were analyzed using the Statistical Package for Social Studies (SPSS), version 17.0 (SPSS Inc., Chicago, Illinois, USA). Descriptive analyses were expressed in term of percentages. Pearson correlation coefficients were calculated to determine the relation between the independent variable (physical activity level: minutes/week) and each dependent variable (e.g.; age, gender, year of study...etc.). The level of significance for these tests was set at $P < 0.05$.

Results

Demographic characteristics

Demographic data are presented in [Table 1]. A total of 250 students participated in this study, 60% were males and 40% were females – with an average age of 21.1 ± 1.2 years. Half of the students were in their first year of study while the rest were

Table 1: Socio-demographic characteristics of respondents (n=250).

Item	No.	%
Gender		
Male	150	60.0
Female	100	40.0
Age*		
≤ 20	119	47.6
>20	131	52.4
Year of study		
1	125	50.0
2	68	27.2
3	57	22.8
Ethnic background		
Malay	120	48.0
Chinese	100	40.0
Indians	20	8.0
Others	10	4.0
Province / Region		
Peninsular	221	88.4
None Peninsular	20	8.0
N.S.**	9	3.6
Living on campus		
Yes	225	90.0
No	25	10.0
No. of brothers or sisters		
0-3	154	61.6
4-6	82	32.8
>6	14	5.6
Position in family		
The only	7	2.8
First	89	35.6
Middle	60	24.0
Last	94	37.6
Any of parents work?		
Yes	204	81.6
No	46	18.4
Any siblings at UM?		
Not at all	235	94
Yes In medical	4	1.6
Yes in Other colleges	11	4.4

*Average age \pm S.D (21.1 ± 1.2).
** N.S. - not specified.

in their second and third years – 27 and 23%, respectively. The majority of the study subjects (88%) were from different locations of the Peninsular Malaysia whereas 8% were from non-peninsular provinces. Students with the Malay and Chinese ethnic backgrounds represented 48 and 40% of subjects, respectively. Most students (90%) lived on the University of Malaya campus. Other demographic information showed that 62% and 33% had up to 3 and 4-6 siblings, respectively. About 3% of the participants were the only son/daughter and most of them were distributed in either the first (38%) or last (39%) position in their families. Only 6% of the participants had siblings at the University of Malaya. More than 81 % of the participant's parents, either parent or both, were working.

Nutrition information and status

Information items on nutrition of respondent students are

Table 2: Nutrition and eating habits among respondents (n=250).

Item	No.	%
Do you eat on campus?		
Yes	223	89.2
No	27	10.8
How many meals do you eat/day?		
1-2	34	13.6
3	156	62.4
> 3	60	24.0
Do you think your nutrition is proper?		
Yes	158	63.2
No	92	36.8
Do you take any supplements?		
Yes	126	50.4
No	124	49.6
Body Mass Index (BMI)*		
Underweight (<18.5)	42	16.8
Normal (18.5-22.9)	160	64.0
Pre-obese (23-27.4)	43	17.2
Obese class I (27.5-34.9)	5	2.0

*BMI (kg/m²) is calculated based on WHO criteria for Asians [17].

presented in [Table 2]. The majority of students (89%) ate on campus – most of which (62%) ate 3 meals/day and 24% ate more than 3 meals, up to 6. More than half of the students (63%) perceived their nutrition as being proper and the rest (37%) considered their diet imbalanced and inadequate because of the lack of fruits, vegetables, protein, vitamins, and contained high oil and sugar. Half of the participants took nutritional supplements, mainly: vitamins, minerals, and hormones. The Body Mass Index (BMI) was based on World Health Organization cut-offs for Asian populations guidelines [17]. The majority of students (64%) had a normal BMI and the rest were underweight (17%), overweight (17%) and obese (2%).

Information on physical activity

Data from questions pertaining to physical activity of students are shown in Table 3. About 76% of students were physically-active at different levels while the remaining were not exercising. The majority of students' parents were engaged in exercises (76%) whereas the rest did not have exercising parents. Most students (87%) reported that even that they did not exercise at the University, they had exercised before and 82% of those who did not exercise at the university wished that they would like to exercise. The great majority of students reported that they were engaged in physical exercises prior to their admission into medical school. Data also showed that the majority of students exercised on campus (84%) and 75% felt that exercising facilities on campus were sufficient. Most students preferred to exercise in groups (63%) and 21% indicated that they exercise under supervision of a coach or by professional advice. Among exercising students, 59% were committed to regular exercises and 78% of exercising females (n=71) reported that they continued exercising during their menstrual cycle. Only 10% of the respondents represented the University of Malaya, state, national club, or the country in athletic competitions. About

25% of students reported that they won gold, silver, bronze and medals in their sporting activity events.

Additional questions that pertain to physical activity of students are shown in Table 4. Students reported that the main reason for them to exercise is to have proper health (53%), followed by being physically fit (29%), and 12% just exercised for fun. The rest of the students indicated other reasons for exercising such as: utilizing free time, interest in sport, building stamina and relief of tension. The main motivating reasons for students to exercise were those of: appearance (39%), health (29%), friends (16%), and self-interest (9%). As to the types of preferred exercise/game/sport, students reported a variety of physical activities with jogging on top of such. Students pointed out a variety of positive feelings after exercising and others indicated tiredness, in contrast. As for the students who did not exercise, having either no time and/or feeling lazy were the only reasons given – 62 and 38%, respectively.

Association between demographic parameters and physical activity

As shown in Table 5, percentages of inactive males and females were almost equal - 52 and 48%, respectively. Gender was a significant factor in having different levels of weekly physical activity (P<0.001). Student age was not a significant

Table 3: Student answers to exercise-related questions*.

Question	Yes No. (%)	No No. (%)
Does any of your parents exercise? (n=250)	190 (76.0)	60 (24.0)
Do you exercise? (n=250)	189 (75.6)	61 (24.4)
If you do not presently exercise, have you ever exercised? (n=60)	52 (86.7)	8 (13.3)
Even you do not currently exercise, would you like to exercise? (n=61)	50 (82.0)	11 (18.0)
Do you prefer to exercise alone? (n=189 - exercising participants)	69 (36.7)	119 (63.3)
Do you exercise on campus? (n=189 - exercising participants)	159 (84.1)	30 (15.9)
Are facilities sufficient on campus? (n=159 - exercising on campus)	118 (74.7)	40 (25.3)
Did you exercise prior to being in medical school? (n=189 - exercising participants)	179 (94.7)	10 (5.3)
Do you exercise with a coach or under a professional advice? (n=189 - exercising participants)	40 (21.2)	149 (78.8)
Are you committed to exercising? (n=188 - exercising participants)	111 (59.0)	77 (41)
Do you exercise during your menstrual cycle? (n=71 - exercising females)	48 (67.6)	23 (32.4)
Do you represent UM/State-National sporting club/country? (n=250)	25 (10%)	225 (90%)
Were you recognized for your sporting activities? (n=250)	62 (24.8)	188 (75.2)

*Numbers of responses vary according to questions. Available responses are shown for each question in the table.

Table 4: Types of exercises practiced by students and perceptions of physical activity.

Item	No.	%
Why do you exercise? (n=189)		
Proper health	100	52.9
Physically fit	54	28.6
For fun	22	11.6
Others	13	6.9
Why you don't exercise? (n=61)		
No time	38	62.3
Laziness	23	37.7
Type(s) of exercise/games/sports you prefer* (n=189)		
Jogging	51	27.0
Badminton	37	19.6
Swimming	29	15.4
Football	28	14.8
Basketball	22	11.6
Tennis	22	11.6
Walking	13	6.9
Others	39	20.6
How do you feel after exercise? * (n=189)		
Refreshed	77	40.7
Tired	75	39.6
Relaxed	59	31.2
Energetic	46	24.3
Fulfilled	44	23.2
What motivates you to exercise? (n=189)		
Appearance	73	38.6
Health	55	29.1
Friends	30	15.9
Self esteem	17	9.0
Others	14	7.4

*Students may have more than one answer.

factor in practicing different physical activity levels. First-year students were the majority in the all four physical activity levels - 43% for non-active, and more than 50% for the 3 levels of physical activity. Neither ethnic background nor where students came from had a significant effect on having different weekly physical activity levels. Whether students lived on or off campus did not have a significant effect on their physical activity level and neither did the number of brothers and sisters. Although respondents with working parents were of highest percentage in all active and inactive categories, there was no significant difference found between respondents with working parents comparing to those with non-working parents. All of the students who had no siblings in the University of Malay were physically-inactive and the highest majority of students with siblings at the university were physically active at all different levels ($P < 0.001$).

Association between physical activity and nutrition

Data on the relationship between nutritional factors and physical activity are shown in Table 6. There was no significant effect for whether students ate on or off campus on the physical activity level. The number of meals consumed per day was a significant factor affecting the physical activity level ($P < 0.02$).

Most of the inactive students (67%) and those with low (63%), and medium (61%) activity levels were having three meals per day – while 50% of those who practiced a high physical activity ate more than three meals per day. Whether students perceived that their nutrition was proper or not had no significant effect on their physical activity level. Most of the inactive students (61%) were not taking any supplements and about half of those who were physically-active were taking supplements. There was no significant difference in physical activity level between students who were taking nutritional supplements or not. Students with normal BMI represent the majority (> 50%) of the respondents in all four physical activity levels, showing no significant relation between BMI and the level of physical activity. Having at least one parent who exercised was a significant factor of being physically active ($P < 0.001$). All participants with exercising parents were also exercising and almost all of those with non-exercising parents were not exercising (98%).

Discussion

Being physically active is an essential part of healthy life style. Health benefits of physical activity include improved fitness, strength and overall feeling better. Therefore, all medical professionals should maintain being physically active in order to remain healthy and become role models for their patient in order to motivate them towards physical activity [18-21]. The objectives of this research were to evaluate the physical activity levels among medical students of University of Malaya, Malaysia, and to explain the factors associated with physical activity of the participants. Factors such as socio-demographic, nutritional and lifestyle habits play an important role in influencing physical activity levels.

Majority of the respondents in this study were physically active (76%), which is in agreement with a similar finding from research work conducted by the Malaysian Ministry of health [22]. In this study, male participants were more physically-active compared to females, a finding in support by previous results of similar studies [23-27]. The participants were almost in the same age range (21.1 ± 1.2) years. Results showed no effect of student age on physical activity levels. Other studies showed that during the transition to college, exercise and fitness levels usually decrease and that they are unlikely to improve as students get older [28-30]. The current study did not reveal any major difference in the year of study on the physical activity level of students. This can be explained on the basis that scholastic duties of all the participants were similar as they were in their preclinical stage.

The composition of the sample represented the ethnic distribution in Malaysia [31]; in particular, Malays and other Bumiputera (native) groups comprised the majority of the distribution, followed by Chinese and Indians. There was no association between the physical activity level and ethnic background. About 90% of the participants were from provinces of peninsular Malaysia and those participants were of the highest percentage in all the physical activity level groups. Unlike a previous study which showed that level of physical activity was significantly higher in students living on campus compared to

Table 5: Association between physical activity (minutes/week) and demographic parameters.

Variable	Physical Activity (Minutes/Week)								P value
	None n=61		30-60 n=99		90-120 n= 70		>120 n=20		
	No.	%	No.	%	No.	%	No.	%	
Gender									<0.001
Male	32	52.5	47	47.5	53	75.7	18	90.0	
Female	29	47.5	52	52.5	17	24.3	2	10.0	
Age									0.796
≤20	26	42.6	50	50.5	34	48.6	9	45.0	
≥20	35	57.4	49	49.5	36	51.4	11	55.0	
Year of Study									0.550
1	26	42.6	52	52.5	37	52.9	10	50.0	
2	20	32.8	28	28.3	17	24.3	3	15.0	
3	15	24.6	19	19.2	16	22.9	7	35.0	
Ethnic Background									0.212
Malay	31	50.8	50	50.5	27	38.6	12	60.0	
Chinese	25	41.0	39	39.4	32	45.7	4	20.0	
Indians	3	4.9	7	7.1	6	8.6	4	20.0	
Others	2	3.3	3	3.0	5	7.1	0	0.0	
Province/Region									0.672
Peninsular	51	83.6	90	90.9	61	87.1	19	95.0	
None Peninsular	6	9.8	6	6.1	7	10.0	1	5.0	
N.S.*	4	6.6	3	3.0	2	2.9	0	0.0	
Living on campus									0.696
Yes	57	93.4	89	89.9	61	87.1	18	90.0	
No	4	6.5	10	10.1	9	12.9	2	10.0	
No. of brothers and sisters									0.955
0-3	35	57.4	61	61.6	45	64.3	13	65.0	
4-6	23	37.7	31	31.3	22	31.4	6	3.0	
>6	3	4.9	7	7.1	3	4.3	1	5.0	
Position in family									0.928
1	24	39.3	37	37.4	25	35.7	10	50.0	
2	13	21.3	31	31.3	19	27.1	4	20.0	
3	14	23.0	15	15.2	11	15.7	3	15.0	
4	6	9.8	5	5.1	6	8.6	1	5.0	
5	1	1.6	6	6.1	4	5.7	1	5.0	
≥ 6	3	4.9	5	5.1	5	7.1	1	5.0	
Any of parents work									0.142
Yes	44	72.1	83	83.8	61	87.1	16	80.0	
No	17	27.9	16	16.2	9	12.9	4	20.0	
Any sibling in UM									<0.001
Yes	0	0.0	8	8.1	2	2.9	5	25.0	
No	61	100.0	91	91.9	68	97.1	15	75.0	
Parents exercising									<0.001
Yes	1	1.6	99	100.0	70	100.0	20	100.0	
No	60	98.4	0	0.0	0	0.0	0	0.0	

* N.S. - Not specified.

those living off campus [32], this study did not show an effect for the place of living on the physical activity level. Results showed that the student position in his/her family and the number of siblings were not influencing factors toward physical activity. The majority of the participants (82%) were with at least one employed parent. The study showed that participants with a working parent were the majority in the four physical activity categories, 72, 84, 87 and 80% - for none, low, medium and high physical activity levels, respectively. There was no significant effect of the parent's employment status on the physical activity

of the participants. The results showed that all participants who had no sibling(s) in the University of Malaya were physically-inactive, while none of the students who had siblings in University of Malaya were inactive (p<0.001). Studies have shown an important effect of family support for physical activity [33-34]. This can explain the effect of having siblings at the university - as being a form of family support.

The majority of participants in the four physical activity categories were from those dined on campus - 95, 90, 86 and 80% for none, low, medium and high physical activity levels,

Table 6: Association between physical activity (minutes/week), nutrition and nutritional status.

Variable	Physical Activity (Minutes/Week)								P value
	None n=61		30-60 n=99		90-120 n= 70		>120 n=20		
	No.	%	No.	%	No.	%	No.	%	
Eating on campus									0.181
Yes	58	95.1	89	89.9	60	85.7	16	80.0	
No	3	4.9	10	10.1	10	14.3	4	20.0	
No. of meals eaten/day									0.022
1-2	11	18.0	16	16.2	5	7.1	2	10.0	
3	41	67.2	62	62.6	45	61.3	8	40.0	
>3	9	14.8	21	21.2	20	28.6	10	50.0	
Perceived nutrition as proper									0.944
Yes	37	60.7	64	64.6	45	64.3	12	60.0	
No	24	39.3	35	35.4	25	35.7	8	40.0	
Taking supplements									0.170
Yes	24	39.3	50	50.5	41	58.6	11	55.0	
No	37	60.7	49	49.5	29	41.4	9	45.0	
Body Mass Index (BMI)*									0.683
Underweight	13	21.3	19	19.2	7	10.0	3	15.0	
Normal	34	55.7	65	65.7	48	68.6	13	65.0	
Overweight	12	19.7	13	13.1	14	20.0	4	20.0	
Obese	2	3.3	2	2.0	1	1.4	0	0.0	

* BMI (kg/m²) is calculated based on WHO criteria for Asians [17].

respectively. Dining on or off campus was not a factor that influenced the level of physical activity of students. It was found that the number of meals consumed per day had a relation with the level of physical activity ($P < 0.02$) in favor of having 3 meals per day. This was supported by the notion that having at least 3 meals a day allows the body to maintain a stable bodily function enabling the participants to undergo regular physical activity [35]. At least 60% of the participants perceived that their nutrition was proper, and this had no effect on their physical activity level. Whether taking or not nutritional supplements did not show any significant difference between physical activity levels of the participants. Having different BMI categories did not show any significant difference among the physical activity levels. This was supported by results obtained from other studies that did not reveal significant associations between changes in BMI and physical activity [36-37].

All students with non-exercising parents were also physically-inactive, whereas 99.5% of participants with exercising parents were exercising at different activity levels. There was a significant difference between physical activity and having at least one parent who exercised ($P < 0.001$). This association was supported by studies which revealed that families engaged in physical activity were important predictor factor of physical inactivity of adolescents [38-39]. Our findings revealed that more than 80% of inactive participants were exercising before joining medical school and expressed the desire to exercise. They explained their recent inactivity by the nature of medical school studies. Those who were engaged in physical activities preferred exercising in groups (63.3%) and explained that having friends and socializing were their motivation factors. Many studies supported the importance of socializing as an encouraging factor for exercising [40-46]. There was no significant difference between the physical

activity level and the place of exercising. Most of the students who exercised on campus (74.7%) felt satisfied with its facilities, and the remainder of students felt that their campus lacked a satisfactory number of courts and instruments. Enjoying proper health and being physically-fit were the most motivating factors for students to exercise. Lack of time and being lazy were the major barriers for students who were not exercising, an observation that was supported by many studies showing the same results [47-49].

Data of this study revealed the status of physical activity of preclinical medical students at the University of Malaya, Malaysia, and add to other studies in the pertinent literature on this subject. Percentages of exercising and non-exercising students – as well as the levels of physical activity were expressed. Factors and conditions that influence student physical activity were explored and associations were detected. Considering that nowadays medical students will be the future medical doctors, emphasizing the significance of a healthy lifestyle for proper health of these doctors and their patients is of extreme importance. It needs to be stressed that it is of many benefits to any society that all segments of its population follow healthy dietary guidelines and be engaged in regular physical activity programs and routines.

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Declarations

As this was not a clinical trial, there was no need for obtaining an approval from any ethics committee or clearance at the

University of Malaya. My co-author and I would wish to declare that there is no conflict of interest is related or associated with this study.

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