Prevalence of Physical Activity and its Association with Body Mass Index Among Late Adolescents in Kuantan, Malaysia

Nurjasmine Aida Jamani[1], Abdul Hadi Said[1]*, Karimah Hanim Abd Aziz[2], Mohd Aizuddin Abd Rahman[1]

1. Department of Family Medicine, Kulliyyah of Medicine, International Islamic University Malaysia, Kuantan, Malaysia.
2. Department of Community Medicine, Kulliyyah of Medicine International Islamic University Malaysia, Kuantan, Malaysia.

Abstract

A national data reported more than half of school going adolescents in Malaysia were physically inactive. This study aimed to describe the prevalence of physical activity among late adolescent in Kuantan, Malaysia and to determine factors associated with their physical activity level. A cross sectional study among late adolescents aged 17 - 19 from seven governmental higher learning institutions in Kuantan, Malaysia was conducted from April to October 2018. A validated, self-administered International Physical Activity Questionnaire (IPAQ) questionnaire was used to measure the level of physical activity among participants. Weight and height of the participants were measured and the body mass index (BMI) was calculated. Chi-square test was used to test for association between physical activity level and BMI of the participants. The association between physical activity and socio-demographic profile was tested using logistic regression analysis. One third of the participants (37.6 %) have high physical activity level while 29.0% of them only practiced low physical activity level. Non-smokers were 0.4 times more physically active than smokers (aOR 0.39, 95% CI 0.19-0.78) while male gender was 2.46 times more active than female (aOR 2.46, 95% CI 1.55-3.92). There was no statistically significant association between physical activity level with BMI of the participants ($\chi^2 = 0.93$, $p = 0.63$). Only one third of late adolescents in our study practiced high level of physical activity. This is worrying as it may leads to increased number of morbidity and mortality related to low physical activity. Furthermore, physical activity level during adolescence-age group may influenced their physical activity level during adulthood. Therefore, continuous health education focused on the important of physical activity is undoubtedly crucial. Smokers were found to be less physically active than non-smokers. Hence, health education focused on the important of physical activity and the harm of smoking should be targeted simultaneously.

Clinical article (J Int Dent Med Res 2019; 12(4): 1671-1675)

Keywords: Physical Activity, Body Mass Index, Adolescent.

Received date: 21 February 2019 **Accept date:** 19 May 2019

Introduction

Based on the nationwide data, more than half (55%) of Malaysian school going adolescents were physically inactive.[1] A study done among 894 university students in Selangor found that the prevalence of physical inactivity was 41.1%.[2] The decrement could be explained by the new environmental transition from high school to the college or university, where they were independently took the decisions to incorporate in physical activity or not.[3] Eighty one per cents of school going adolescents globally were considered to be physically inactive as they were unable to complete recommendation of 60 minutes of moderate to vigorous intensity physical activity per day.[4] Despite the fact that South East Asia region was having the lowest percentage of physical inactive population, Malaysia was listed as the one of the top ten countries in the region with highest percentage of physically inactive population.[4]

Previous literatures had mentioned number of factors that possibly influenced physical activity level among adolescents. Male sex was quoted by few studies locally to be more physically

Corresponding author:
Abdul Hadi Said
Department of Family Medicine,
Kulliyyah of Medicine, International Islamic University Malaysia,
Kuantan, Malaysia.
E-mail: abdulhadi@iium.edu.my

active as compared to female adolescents.[5-8] As a multiracial country, the level of physical activity among Malaysian adolescents also related to the racial factor. This was evidenced by local studies which stated that Malays were noticed to be more physically active as compared to other races.[5] Conversely, a study among private university student which involved late adolescents age group discovered that most Indian participants had high physical activity level.[9]

Meanwhile, a systematic review in 2010 revealed that family socio-economic status is a factor associated with physical activity level. Participants from the higher socio-economic status family were more physically active in comparison to those from lower socio-economic status family.[10] Other factor that significantly affected physical activity level among adolescents was educational level. Well educated adolescents tend to possess more high physical activity level as compared to those who were less-educated.[5,11-12]

The relationship between BMI and physical activity level was discussed in the past studies both locally and globally. A study among 588 thirteen years old and sixteen years old students from Perak found out that 76% of the obese participants were physically inactive.[13] The finding was supported by another study done in a private university in Selangor which found that 60% of the obese respondents have low physical activity level while majority of the normal weight respondents have high and moderate activity level.[9] On the contrary, a few regional and international studies observed that there was no association between body weight status and physical activity level.[7,8,14] However, none of the studies focused on late adolescents.

Hence, the objectives of this study were to describe the prevalence of physical activity among late adolescents in the country as well as to determine the associated factors which influenced their physical activity level. The result of this study will hopefully help in planning the future intervention.

Methods

Design and population

A cross sectional study among late adolescent aged 17-19 from seven governmental higher learning institutions in Kuantan, Malaysia was conducted from April 2018 to October 2018. These seven higher learning institutions were selected using purposive sampling. Subsequently, using simple random sampling, 65 respondents from each institution were selected to participate in this study.

Sample size calculation

The sample size was calculated using the single proportion formula as below:

$$n = \frac{(Z\,\frac{\alpha}{2})^2\, p\,(1-p)}{d^2}$$

where Z = 1.96 which was the value that contains the area under the normal curve of 95% confidence interval, d = desired level of precision (0.05) and P is the estimated prevalence of an attribute that is present in the population. From a few local studies, the prevalence of physical inactivity among adolescents were range between 41% – 55%.[1,2] Thus, p = 0.50 was used to cater for maximum sample size required. Therefore, the sample size calculated was 383. However, considering 25% non-response rate, the final sample size needed was 479.

Data collection

A validated, self-administered questionnaire using the short version of International Physical Activity Questionnaires Malay version (IPAQ-M) was used in this study. The questionnaire consists of seven questions. Participants were required to recall type, frequency (days per week) and duration (hours and minutes per day) of each activity performed during last seven days. The assessment was based on the intensity of physical activities classified as vigorous (e.g.: aerobic walking, jogging and running), moderate (e.g.: brisk walking, general home exercises, recreational swimming) and just normal walking. Level of physical activity was categorized as low, moderate and high based on metabolic energy (MET)-min per week. The IPAQ-M demonstrated good reliability and validity for the evaluation of physical activity among Malaysian population.[15]

Participants' body weight and height were measured. BMI (kg/m²) was calculated by dividing weight (kg) by the height squared (m2). BMI was then classified based on WHO cut-off points for Asian population.[16]

Data analysis

All statistical analysis was done using IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp. The socio demographic

characteristics were reported as descriptive statistics using frequencies and percentages. Chi-square test was used to test the association between physical activity level and BMI of the participants. Binary logistic regressions were used to determine independent associated factors with physical activity level. The association was considered significant when *p* value < 0.05.

Ethics

This study was approved by the International Islamic University Malaysia Research Ethic Committee (IREC) (IREC 2018-079) on 13th April 2018 prior to commencement of the study.

Funding

This study was funded by International Islamic University Malaysia Research Initiative Grant Scheme (RIGS17-153-0728).

Results

The physical activity levels were measured using IPAQ-M questionnaire. Participants were categorized into three main categories which were low, moderate and high. The weightage of physical activity levels among participants were almost identical as shown in Figure 1.

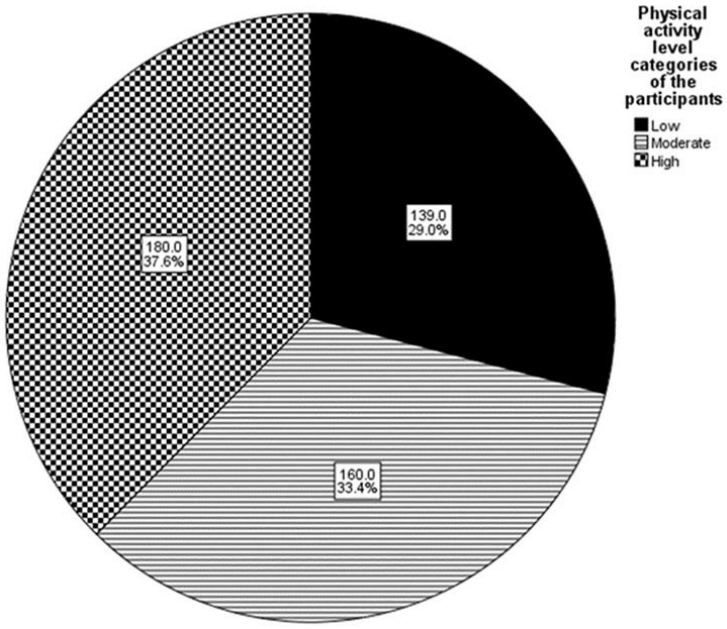

Figure 1. Physical Activity Level Categories of the Participants.

Socio-demographic profiles	n (%)	Crude odd ratio (95% CI)	Adjusted odd ratio (95% CI)
Age	17.8 (0.68) *	0.44 (0.22-0.86)	0.53 (0.26-1.07)
Gender			
Male	230 (48.0)	0.49 (0.32-0.73)	**2.46 (1.55-3.92)**
Female	249 (52.0)		
Race			
Malay	439 (91.6)	1.24 (0.59-2.60)	1.12 (0.51-2.47)
Others	40 (8.4)		
Parental income			
<RM3000	256 (53.4)	1.29 (0.87-1.93)	0.79 (0.52-1.18)
≥RM3000	223 (46.6)		
Smoking status			
Smoker	48 (10.0)	1.56 (0.84-2.89)	**0.39 (0.19-0.78)**
Non-smoker	431 (90.0)		

*Mean (SD)

Table 1. Factors Associated with Physical Activity Level.

BMI	Physical activity levels						Statistics*	p-value
	Low		Moderate		High			
	n	%	n	%	n	%		
Underweight/normal weight	82	28.0	96	32.8	115	39.2	0.93	0.63
Overweight/Obese	57	30.6	64	34.4	65	34.9		

Table 2. Association Between BMI and Physical Activity Level.

We used the binary logistic regression to further analyzed association between socio-demographic profiles with physical activity level as shown in table 1. Smoking status was significantly related to the active physical activity (aOR 0.39, 95% CI 0.19-0.78), where smokers were 60 percent less physically active than non-smoker. Male gender was 2.46 times more active than female (aOR 2.46, 95% CI 1.55-3.92). Other socio-demographic profiles were not statistically associated with physical activity level.

Further analysis of BMI and physical activity level relationship was done using chi-square test as shown in table 2 where we found that there was no statistical significant association seen between them (χ^2=0.93, p=0.63).

Discussion

Physical activity is an important component of health promotion and disease-prevention programme that should be adopted among adolescents. Highest proportion of our participants have high physical activity level as compared to moderate and low physical activity level although the differences was relatively small (Figure 1). The result was comparable to a study among a local private university students whom greater number of them were physically active.[9] Another local study participated by middle-aged adolescents (secondary school-age adolescents) found that most of the participants tend to have low physical activity level with none of them were practicing high physical activity.[8] Meanwhile, a multi-national study done comparing prevalence of physical activity among adulthood found that Japanese and Taiwanese had more physical inactive participants as compared to other countries (Australia, Canada, New Zealand, USA).[17] Physical activity level during adolescence-age group may influence their physical activity level during adulthood. Continuous physical activity at a youth age increases the likelihood of being an active adult.[18]

Expectedly, male participants in our study have higher physical activity level as compared to female participants (aOR 2.46, 95% CI 1.55-3.92) as shown in Table 1. Previous studies have identified that gender had significant association with physical activity level where males were physically more active in comparison to female participants either in late adolescents age group,[2,19] or school-aged adolescents.[7,20]

Our study found that there was no significant difference noticed in term of race group as most of the Malay and other races participants inseparably possessed high physical level than moderate and low physical activity level. This was similar to the study among adolescents attending a school in Kuantan where no difference in term of physical activity was observed among Malay and Chinese respondents.[7] In contrast, several studies including both locally and globally have found that there was diversity among races toward physical activity level.[9,11,21]

Our study also found that there was no significant association between socio-economic status of the family with their physical activity level. This finding contradicts the result in a systematic review which reported that participants from the higher socio-economic status family were more physically active.[10] Those findings were justified by the economic influence as some of the physical activities required financial outlay such as sport equipment, membership fees or transportation. Fewer, unkempt and far-located recreational areas in lower socioeconomic neighborhood would also lead to low physical activity level.[22] Despite the previous findings, our study failed to find any association between the two.

Another finding in our study was that non-smokers were physically more active as compared to smokers. This was further proved

by logistic regression test where non-smoker was significantly related to active physical activity (aOR 0.39, 95% CI 0.19-0.78). Negative relationship between smoking and physical activity level was also disclosed in other previous studies.[23]

The result of our study showed that there was no significant association between BMI of the participants with their level of physical activity (Table 2). The finding differed from a local study which revealed that majority of obese Malaysian adolescents have low physical activity level.[9,13] On the other hand, a few studies concluded that there was no association between body weight status and physical activity level.[7,8] A systematic review among adolescents in China discovered that two studies have inverse relationship between BMI and physical activity level.[24,25] while another study found that there was no significant correlation between those two variables.[14] A study among adolescents in United States also demonstrated that there was significant association between weight status and physical activity level whom overweight participants were less active than non-overweight participants.[26] This disparity could be influenced by the different age categories participated in the previous studies.

Conclusion

Only one third of late adolescents in our study practiced high level of physical activity. This is worrying as it may leads to increased number of morbidity and mortality related to low physical activity. Continuous health education focusing on the importance of physical activity is undoubtedly crucial. Smokers were found to be less physically active than non-smokers. Hence, health education focused on the important of physical activity and the harm of smoking should be targeted simultaneously.

References

1. National Institutes of Health Ministry of Health Malaysia. In: National Health and Morbidity Survey (NHMS) 2017.
2. Mohammed G, Md Said S, Ariffin AA, Jusoff K. Physical Inactivity and Its Associated Factors among University Students. IOSR J Dent Med Sci 2014;13(10):119–30.
3. Fountaine CJ, Liguori GA, Mozumdar A, Schuna JrJM. Physical Activity and Screen Time Sedentary Behaviors in College Students. Int J Exerc Sci 2011;4(2):102–12.
4. World Health Organization. Prevalence of insufficient Physical activity, 2014. Available at: https://www.who.int/gho/ncd/risk_factors/physical_activity_text/en/.
5. Cheah YK, Lim HK, Kee CC, Ghazali SM. Factors associated with participation in physical activity among adolescents in Malaysia. Int J Ad Med Health 2016;152(2):228–30.
6. Cheah YK, Lim HK, Kee CC. Demographic and lifestyle determinants of time spent in physical activity among Malaysian adolescents. Int J Pediatrics Ad Med 2018;5(2):49–54.
7. Dan SP, Mohd NM, Zalilah MS. Determination of Factors Associated with Physical Activity Levels among Adolescents Attending School in Kuantan, Malaysia. Malays J Nutr 2011;17(2):175–87.
8. Farah WZ, Mohd NMT, Hazizi AS. Physical Activity, Eating Behaviour and Body Image Perception among Young Adolescents in Kuantan, Pahang. Malays J Nutr 2011;17(3):325–36.
9. Rajappan R, Selvaganapathy K, Liew L. Physical Activity Level Among University Students: A Cross Sectional Survey. Int J Physiotherapy Res 2015;3(6):1336–43.
10. Stalsberg R, Pedersen AV. Effects of socioeconomic status on the physical activity in adolescents: A systematic review of the evidence. Scand J Med Sci in Sports 2010;20(3):368–83.
11. Gordon-Larsen P, McMurray RG, Popkin BM. Determinants of Adolescent Physical Activity and Inactivity Patterns. Pediatrics 2000;105(6):e83–e83.
12. Micklesfield LK, Pedro TM, Kahn K, et al. Physical activity and sedentary behavior among adolescents in rural South Africa: levels, patterns and correlates. BMC Pub Health 2014;14(40).
13. Pon LW Jr, Kandiah M, Mohd Nasir MT. Body image perception, dietary practices and physical activity of overweight and normal weight Malaysian female. Malays J Nut 2004;10(2):131–47.
14. Wang C, Chen P, Zhuang J. A national survey of physical activity and sedentary behavior of chinese city children and youth using accelerometers. Res Quart Exercise Spor 2013;84(2):37–41.
15. Chu AH, Moy FM. Reliability and Validity of the Malay International Physical Activity Questionnaire (IPAQ-M) Among a Malay Population in Malaysia. Asia-Pacific J Pub Health 2013;27(2):2381-9.
16. Pan WH, Yeh WT. How to define obesity? Evidence-based multiple action points for public awareness, screening, and treatment: an extension of Asian-Pacific recommendations. Asia Pac J Clin Nutr 2008;17(3):370-4.
17. Bauman A, Bull F, Chey T, et al. The International Prevalence Study on Physical Activity: Results from 20 Countries. Int J Behav Nut Phys Activity 2009;6:1–11.
18. Steinbeck KS. The Importance of Physical Activity in the Prevention of Overweight and Obesity in Childhood: A Review and an Opinion. Obesity Rev 2001;2(2):117–30.
19. Salamudin N, Harun MT. Physical Activity Index among Malaysian Youth. Asian Soc Sci 2013;9(12):99–104.
20. Lu C, Stolk RP, Sauer PJJ, et al. Factors of Physical Activity among Chinese Children and Adolescents: A Systematic Review. Int J Behav Nut Phys Activity 2017;14(1):1–10.
21. Schmitz KH, Lytle LA, Phillips GA, et al. Psychosocial correlates of physical activity and sedentary leisure habits in young adolescents: The teens eating for energy and nutrition at school study. Prev Med 2002;34(2):266–78.
22. Gordon-Larsen P. Inequality in the Built Environment Underlies Key Health Disparities in Physical Activity and Obesity. Pediat 2006;117(2):417–24.
23. Romaguera D, Tauler P, Bennasar M, et al. Determinants and Patterns of Physical Activity Practice among Spanish University Students. J Spor Sci 2011;29(9):989–97.
24. Wang X, Hui Z, Terry PD, et al. Correlates of insufficient physical activity among junior high school students: A cross-sectional study in Xi'an, China. Int J Environ Res Pub Health 2016;13(4).
25. Ying-Xiu Z, Jin-Shan Z, Jing-Yang Z, et al. Comparison on physical activity among adolescents with different weight status in Shandong, China. J Trop Pediat 2013;59(3),226–30.
26. Levin S, Lowry R, Brown DR, et al. Physical Activity and Body Mass Index Among US Adolescents. Arch Pediat Ad Med 2003;157:816–20.