PHYSICAL ACTIVITY LEVEL AMONG UNDERGRADUATE STUDENTS IN TERENGGANU, MALAYSIA USING PEDOMETER

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ABSTRACT

A cross-sectional study determine physical activity level among 95 undergraduate students at UniSZA using pedometer. Subjects consented and completed socio-demographic details, weight and height were measured. Each subject was supplied with a pedometer and wear it for a week and record steps per day from the pedometer each night before bed. Descriptive statistic and independent T-test coefficient analyze the data using IBM SPSS version 22.0. Results showed that 66.4% of the subjects were classified as sedentary according to pedometer determined physical activity. Males recorded significantly more steps than female per day. Subjects in the age group of 18-20 years old had the highest mean average steps count than the older age group of 21-24 years old and $\geq$ 25 years old per day. Only 5.2% were classified as active and highly active using pedometer determined physical activity level.

Keywords: physical activity; pedometer; steps; body composition.

1. INTRODUCTION

Physical inactivity among college students in the United State had been reported to be on an uprising trend. According to [1], 46.7% of the university students self-reported that they did not engage in vigorous physical activity and 16.7% were physically inactive. There is also age and sex related differences in activity levels. Women tend to be less active overall than men with 31.3% counted as sedentary compared with 23% of men [2]. Approximately, 28.8% of female college students and 39.4% of male college students are being classified as overweight or obese [3]. Physical activity contributes positively to health but sedentary or inactivity has been identified as the one of the leading risk factor for mortality causing an estimated 6% of deaths globally. Physical inactivity are rising in many countries with major causes for the general health of people worldwide and for the prevalence of non-communicable diseases such as cardiovascular disease, diabetes and cancer and their risk factors such as increased blood pressure, increased blood sugar and overweight. According to a WHO study, Malaysia is one of the top 10 physically inactive countries in south East Asia with 61.4% of Malaysians age 15 and above was considered inactive. In Malaysia, 35.2% adults aged 18 years and above were reported physically inactive based on IPAQ definition. Based on [4], classification 33.3% (5.4 million) were pre-obese and 27.2% (4.4 million) were obese. Malaysian Adult Nutrition Survey carried out in 2010 showed 31.3% of physical inactivity among Malaysians. Only 22.3% females and 40% of males were physically active and only 32.9% from age range of 20-29 were physically active. In another study carried out by [5] reported that using IPAQ, 56.5% Asia Metropolitan University students, located at Cheras, Selangor, Malaysia with age range 22-25 years were physically inactive and 56% of male students had high PA level while only 24% female students were physically active. There is no previous local studies have looked at the physical activity level among University students located at the East Coast of Malaysia. Therefore, this study aims to determine the physical activity level of undergraduate students of UniSZA using pedometer.

2. METHODOLOGY

This is a cross-sectional study among 150 undergraduate University Sultan Zainal Abidin

(UniSZA) students in the period from late July to early September 2016. UniSZA is one of the two Public University located in the state of Terengganu. The study was approved by the University Human Research Ethic Committee (UHREC/2016/3/009). A total of 95 returned completed socio-demographic details and records of steps using pedometer. The participation in this study was voluntary and participants signed the informed-consent form. Data collection comprised of anthropometry assessments and socio-demographic information and pedometer measured steps for one week.

2.1. Anthropometry Assessment

Body weight and height in accordance with WHO guidelines were measured using a portable weighing scale and stadiometer (Seca®), taking the mean of three consecutive measurements of weight and height (bare footed) and subject's Body Mass Index (BMI) [6]. Body fat percentage (%) was measured using Hand Held Omron body fat analyzer.

2.2. Step Measurement using Pedometer

Each subject was supplied with a pedometer (Omron, Walking style One 2.1 HJ-321-E) and instructed to wear the pedometer for one week from the time subjects woke up in the morning until they retired for the night except during sleeping, personal hygiene and swimming. The stride length of each subject was measured prior setting the pedometer. The subjects were encouraged to continue their customary physical activity habits. Subjects were required to record steps per day from the pedometer each night before sleeping. Steps/day determined by the pedometer was classified based on [7] as follows: < 5000 steps/day as a 'sedentary lifestyle', 5000-7499 steps/day considered as 'low active', 7500-9999 considered 'somewhat active', $\geq$ 10 000 steps/day indicates as 'active' and > 12 500 steps/day are classified as 'highly active.

All data were analyzed using Statistical Package for Social Sciences version 22.0. The descriptive analyses included means, frequencies and standard deviations for socio-demographic and pedometer data. Pearson's correlation coefficient was used to determine the relationship between the independent variable, which is pedometer-determined physical activity level and for dependent variable which was body composition. Independent T test was used for comparison of pedometer determined physical activity level among male

and female undergraduate students. For this study, a statistical significance level was set at 0.05.

3. RESULTS AND DISCUSSION

3.1. Demography and Anthropometry Data

A total of 95 undergraduate students, age ranging from 18 to 25 years participated in the study. Majority of the subjects were female (72%), while male subjects accounted for 28%. Of the total subjects, 88.4% were Malays, followed by 8.4% of Indians and 3.2% of Chinese (Table 1). Although results showed no significant difference in BMI between gender, but there was a significant difference in the body fat percentage ($p < 0.00$) between gender as shown in Table 2. Using BMI classification, majority of the students (57.8%) are normal, 14.7% subjects are underweight, 16.8% of subjects are overweight and 10.6% subjects are obese.

3.2. Physical Activity

Majority of the subjects (66.3%) recorded less than 5000 of average steps count per day which is sedentary and only 1% of subject is classified as highly active. Most of female subjects (77.9%) shows higher percentage of being sedentary, followed by low active (20.6%) and somewhat active (1.5%) and none as active or highly active. However, most of the male subjects (48.1%) showed higher percentage of being low active followed by sedentary (37.0%), somewhat active (11.1%) and highly active (3.7%). When the physical activity level was analyzed based on age group, ethnic and BMI, only ethnic group Malay showed significantly more active ($p < 0.5$) than the Indian or Chinese subjects.

Table 1. Socio-demographic characteristics of subjects (n = 95)

	Variables	n (%)
Gender	Male	27 (28)
	Female	68 (72)
Age	18 – 20	56 (59)
	21 – 24	37 (39)
	25	2 (2)
Ethnicity	Malay	84 (88.4)
	Chinese	3 (3.2)
	Indian	8 (8.4)

Table 2. Anthropometry, body fat percentage and physical activity level of subjects (n = 95)

	Male n = 27 n (%)	Female n = 68 n (%)	Total n = 95 n (%)	p-Value
Mean Height (cm)	1.71±0.01	1.57±0.02	1.61±0.08	0.001*
Mean Weight (kg)	68.10±1.32	56.70±1.69	59.90±13.30	0.001*
Mean BMI (kg/m^2)	23.20±0.50	22.80±0.66	22.90±4.84	0.720
Underweight	1(3.7)	13(19.1)	14(14.7)	
Normal	18(66.7)	37(54.4)	55(57.8)	
Overweight	7(25.9)	9(13.2)	16(16.8)	
Obese	1(3.7)	9(13.2)	10(10.6)	
Body fat percentage	19.6±0.7	27.3±0.8	25.1±6.9	0.001*
Low	0(0)	9(13.2)	9(9.5)	
Normal	14(51.9)	39(57.4)	53(55.7)	
Moderate	11(40.7)	10(14.7)	21(22.0)	
High	2(7.4)	10(14.7)	12(12.6)	
Classification PA (steps)	6030.0 ±2993.6	3755.5 ±1432.3		0.001*
Sedentary (< 5000)	10(37.0)	53(77.9)	63(66.3)	
Low active (5000-7499)	13(48.1)	14(20.6)	27(28.4)	

Somewhat active (7500-9999)	3(11.1)	1(1.5)	4(4.2)
Active (≥ 10000)	0(0)	0(0)	0(0)
Highly active (≥ 12500)	1(3.7)	0(0)	1(1.0)

[ab]Significantly different at $p < 0.05$ between male and female

Table 3. Steps count of subjects by age group and ethnicity (n = 95)

	Mean±SD	p-Value
Age group (years)		0.460
18-20	4597.3±1834.3	
21-24	4182.1±2767.4	
≥ 25	2997.1±1352.6	
Ethnic group		0.019*
Malay	4625.5±2261.9	
Chinese	3511.0±1490.6	
Indians	2388.9±580.3	
BMI		0.274
Underweight	3705.0±1197.7	
Normal	4795.4±2681.0	
Overweight	4291.8±1474.0	
Obese	3389.8±812.9	

*Significant different at $p < 0.05$ between Malay and Indian

The electronic pedometer is a simple device that can be used to assess physical activity and usage of pedometers for both research and practice is expanding. This is simply because these devices provide an inexpensive, objective means of assessing physical activity and they are generally believed to be accurate and reliable. Usually, pedometer data express as "steps," because that is the most direct expression of what the pedometer measures [8].

Gender is one of the most important predictors of physical activity. A study by [2] showed that physical activity level among adolescence varied by genders, whereby males demonstrated a higher percentage of physical activity level than females. Similarly, this study also showed

that male students were more active than females. The percentage of sedentary for both male and female was 37.0% and 77.9% respectively according to pedometer determined physical activity. In addition, in this cross-sectional study, the means steps count per week for male 6030.0±2993.6 higher than female 3755.5±1432.3 with significant correlation. This finding was similar to previous literatures in which there were higher steps count among male compared to female. Among the age categories, 18-20 years old having the highest mean steps of 4597.3±1834.3 compared to other categories. The results of this study positively associated with the statement that the level of physical activity declined as age increases. Besides, the total mean steps were statistically different between Malays and Indians in this study. However, a study by [5] showed that Indians were more physically active than Malays and Chinese.

Obesity is defined as excessive fat accumulation to the extent that health may be impaired. Physical activity has been shown to affect body composition and weight favourably by promoting fat loss while maintaining or increasing lean-tissue mass [9]. Analysis of this study indicated the number of steps taken was significantly related to body fat percentage. Female subjects with low body fat percentage (mean steps of 4462.2±1502.1) and male subjects who were classified with normal body fat percentage category (mean steps of 6936.1±3572.4) recorded more mean steps per day than moderate and high body fat percentage category. Meanwhile, study by [10] reported physical activity level was negatively associated with body fat percentage among male but positively associated with body fat percentage among female students at University Putra Malaysia. According to [11], increase in physical activity tends to lower triglycerides and increase plasma HDL cholesterol and HDL/LDL ratio level. Elevated HDL/LDL ratio is one of the protective factors to coronary heart diseases.

However, number of steps taken in this study was not significantly related to BMI. In [10] also showed that there was no relationship between pedometer determined physical activity and BMI. However, in [5, 12] reported positive correlation between BMI and physical activity level. The discrepancy may be due to different study location for example Selangor versus Terengganu and population study. Findings of this study also contradict with a study by [13], which showed that African-American women who accumulated with more steps per day had

lower BMI values and body fat percentages.

There is substantial evidence to suggest that the relationship between BMI and body fat percentage is dependent upon other factors such as race or ethnicity, body build and level of physical activity [9]. The observed inverse relationship between steps per day and BMI recommends that higher levels of physical activity level make it easier to stay in caloric balance, which refers to the number of calories take in compared to the number of calories burn. Physical activity may help prevent and control obesity which has been well established as a major health threat. Apart from that, a recent Malaysian study showed that high physical activity had strong positive correlation with better quality of life among children [14]. Based on this cross-sectional study, prevalence of physical inactivity of UniSZA students was 66.4%. Female (55.7%) demonstrated a higher prevalence of physical inactivity that men (10.7%) did. One possible explanation is that female students tend to focus more on academic performances whereas male students tend to participate in physical activity such as jogging and cycling in the evening after lecture hours.

The findings from this study are in line with [5], where a greater percentage of males (56%) showed high physical activity level than females (24%) at Asia Metropolitan University, Selangor. In contrast, females showed high percentage of physical inactivity level. Findings from a study by [15] revealed that the prevalence of physical inactivity among undergraduate students of University Putra Malaysia was 41.4% also with higher physical inactivity level among females (48%) when compared with their male counterparts (18.8%). The crude worldwide prevalence of physical inactivity was 21.4% being higher among women (23.7%) than men (18.9%) [16].

The outcomes of this study are also in agreement with several other international literatures, whereby the female students are more physically inactive than their counterparts in the studies by [17]. However, prevalence of physical inactivity among Malaysian adults aged 16 and above was 35%. Another study by [18] showed prevalence of overall physical inactivity with 43.7% among adults aged more than 18 years. This could be due to different type of population used. This study only focused on university students who normally are with the burdens of assignments, projects or project reports with deadlines to meet that occupy most of

their time after lecture hours. Therefore, they might be left with limited time to engage in physical activities.

4. CONCLUSION

In summary, based on the physical activity levels obtained using pedometer, the majority of the respondents in our study were sedentary. This study also showed that males were more active than females. Furthermore, this study provided link between daily steps count and body fat percentage among subjects. The association between body fat percentage and steps taken per day needs to be investigated further to confirm the relationship in a larger sample size and possibly involving several tertiary education institutions in East Coast of Malaysia.

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