PHYSICAL INACTIVITY AMONG MEDICAL AND NON-MEDICAL STUDENTS: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Physical inactivity is the fourth leading risk factor for global mortality and led to 3.2 million deaths per year. Physical inactivity is also one of the global public health burdens in both developed and developing countries. Physical inactivity will lead to various non-communicable health consequences such as increased risk of high blood pressure, cancer, cholesterol and etc. Based on National Health and Morbidity Survey 3 in 2008, the prevalence of physical inactivity among Malaysian adults was 43.7%. Studies showed that medical students had low physical activity and did not meet recommended physical activity. The objectives of this study were to estimate the prevalence of physical inactivity among medical students and non-medical students in University Malaysia Sabah associated demographic factors.

Materials and Methods: A cross sectional study with a total participation of 300 University Malaysia Sabah’s undergraduate students (100 medical students and 200 non-medical students) was done. The research instruments were questionnaires that contain information about socio-demographic as well as International Physical Activity Questionnaire (IPAQ) short form to assess physical activity level.

Result: 49% of medical students were physically inactive compared to 35% non-medical students, OR 1.79 (95% CI 1.10, 2.91) which was statistically significant. 44% and 30% of female and male students were physically inactive respectively. After adjusted for socio-demographic cofounders, gender and year of study were found to be confounders that associated with physical inactivity.

Conclusion: The prevalence of physical inactivity among medical students was higher compared to non-medical students and physical inactivity was found higher in female students. Further investigation is required to assess physical inactivity among medical students as they are the future health care providers.

Keywords: Physical inactivity; university students; IPAQ; MET
1.0 Introduction

Physical activity is defined as any movement of the body produced by skeletal muscles that requires use of energy (Caspersen, Powell, & Christenson, 1984). American College of Sports Medicine together with Centre for Disease Control and Prevention with endorsement by American Heart Association has recommended that the minimum amount of physical activity for people aged 18 to 65 years is 30 minutes per day for 5 days per week of moderate-intensity activities, 20 minutes per day for 3 days per week of vigorous-intensity activities, or an equivalent combination of both moderate and vigorous-intensity activities to maintain health (Haskell et al., 2007). Moderate-intensity activities are the ones that will noticeably increase heart rate, for example brisk walking (for about 5 km/h), tennis (doubles), general gardening and bicycling (slower than 16 km/h); whereas vigorous-intensity activities are those that produces rapid breathing as well as substantial acceleration of heart rate such as hiking uphill, tennis (single), bicycling (faster than 16 km/h) and jogging or running (Washington, D. C., 2008).

The incidence of non-communicable diseases such as diabetes mellitus, hypertension and cardiovascular diseases are increasing globally, affecting both developed and developing countries. World Health Organization in 2015 estimated that 38 million people died every year due to non-communicable diseases, in which physical inactivity was identified as one of the major risk factor (WHO, 2016). Physical inactivity is the 4th leading risk factors for global mortality and causes about 1.9 million deaths worldwide (WHO, 2002).

Physical inactivity levels vary among countries across the globe, ranging from 9% to 43% (Bauman et al., 2009), and it also differs according to gender as well as between urban and rural regions (Anjana et al., 2014). In Malaysia, the National Health and Morbidity Survey 2011 (NHMS 2011) showed that 36% (34% males and 40% females) of Malaysian adults were physically inactive based on IPAQ definition and during National Health and Mobility Survey 2015 (NHMS 2015), it was reported that 35.5% (28.5% males and 38.5% females) of Malaysian adults were physically inactive, which was more common in females. These statistics show an alarming fact that physical inactivity is one of the public health concerns in Malaysia. In many other studies, it is shown that males are generally more active and engage in more vigorous activities than their female counterparts, while people in urban regions are significantly less active than in rural regions (Anjana et al., 2014) (Ng et al., 2009) (Guthold, Ono, Strong, Chatterji, & Morabia, 2008). It is also worthy to note that Malaysia, one of the Western Pacific countries participated in World Health Survey in 2008, has 16.5% of males and 23.6% of females who are physically inactive causing it to be a growing public health concerns (Guthold et al., 2008).

Adoption of healthy lifestyle, which includes physical activity, is recommended by many health organizations across the globe as a prevention and concurrent treatment for non-communicable diseases (Department of Health, 2011) (MOH, 2013). To effectively deliver this message, healthcare workers must be physically active themselves, as it is shown that physically active healthcare workers will most likely prescribe physical activity to their clients (Lobelo, Duperly, & Frank, 2009). Medical students, being the future medical practitioners, generally adhered to moderate to vigorous activities as recommended in physical activity guidelines in many parts of the world irrespective of being in developed or developing countries. In a study conducted among fourth year medical students in the USA,
64% of the students met the physical activity level recommended by Canadian Society for Exercise Physiology 2011 (Holtz, Kokotilo, Fitzgerald, & Frank, 2013). In another study conducted among USA medical students from 16 medical schools, only 18% were physically active compared to the general population (Frank, Tong, Lobelo, Carrera, & Duperly, 2008). Another study conducted in Karachi, India showed that only 18% of medical students were physically active compared to 28% of combined dentistry and nursing students. Therefore, in this study, medical students did not meet requirement of physical activity (Hassan Ali, Amool Sakeena Rizvi, & Naqvi, 2013). Among 259 medical students in Bangalore, India, 15.4% students showed low physical activity level based on IPAQ questionnaire (Padmapriya, Krishna, & Rasu, 2013). A cross sectional study on 319 Egyptian and 297 Saudi medical students showed that 41.1% of Saudi medical students were physically inactive compared to 15.4% among Egyptian medical students (Abdel-Hady El-Gilany, 2011). Nevertheless, some studies have also shown the opposite, whereby more than half of the medical students are physically inactive due to busy academic schedule and lack of facilities, among various other reasons (Anand, Tanwar, Kumar, Meena, & Ingle, 2011) (Rao et al., 2012) (Otmani, Serhier, Housbane, & Othmani, 2016).

Currently, the data regarding physical activity levels among medical students of private and public institutions in Malaysia is lacking. Medical students are future health care providers and have important role in health promotion and dissemination of healthy lifestyle. They should also set a good example of practicing a healthy lifestyle. Therefore, it is important to evaluate the physical inactivity level among university students. The aims of this study were to estimate and compare the prevalence of physical inactivity among UMS medical and non-medical students and to examine for any association between physical inactivity and socio-demographic factors.

2.0 Materials and Methods

2.1 Study setting

This study was carried out in University Malaysia Sabah, Kota Kinabalu, Sabah, East Malaysia. University Malaysia Sabah is the ninth public university in Malaysia and it is the biggest public university in Sabah. UMS is established in 24th November 1994. This study was conducted during the period between March 2016 and April 2016, which was two months after semester break. The study was approved by the research ethical committee at University Malaysia Sabah.

2.2 Study design and sampling

A cross sectional study was conducted among 300 UMS undergraduate students comprising of 100 medical students and 200 non-medical students selected through random sampling. The sample size was calculated based on prevalence of physical inactivity of and with absolute precision at 3% and 95% confidence. The inclusion criteria for this study were (1) both male and female gender (2) undergraduate students in the first and second year of study (3) full-time students (4) English literate, and (5) no serious medical illnesses. Meanwhile, the exclusion criteria were (1) students who were pregnant and (2) disabled students. Students
who met the inclusion criteria as well as free from the exclusion criteria were explained about the study objectives. Among them, only those who gave consent were included in this study.

2.3 Study tool

An anonymous self-administered questionnaire was used to collect data about socio-demographic and physical activity level. This questionnaire consists of two parts, part 1 was for socio-demographics and part 2 was to assess physical activity level. To assess physical activity, short form of International Physical Activity Questionnaire (IPAQ) questionnaire was used (Craig et al., 2003). This questionnaire was validated in many countries and is recommended by World Health Organization (WHO) to assess physical activity level for subjects aged between 15 to 69 years old. This instrument contains three specific types of activities namely walking, moderate and vigorous intensity activity. Based on this questionnaire, the subjects would be categorized into three levels of physical activity which were low, moderate and high level. All questionnaires were self-reported and completed by the participants themselves.

2.4 Data analysis

Data were analysed using SPSS (Statistical Package for Social Science) version 23. Descriptive statistics was presented as frequency, relative frequency, mean, minimum value, maximum value, and standard deviation. In categorical data, Chi-squared and Fisher’s exact test were used to make comparison between groups. Level of significant of all the tests was set at P<0.05 (2-sided). Significant variable on simple logistic regression were entered into multivariate logistic regression analysis to find out the final outcome.

3.0 Result

The sample consisted of 300 UMS undergraduate students (100 medical students and 200 non-medical students).

3.1 Socio-demographic characteristic of the participants

| Table 1: Socio-demographic characteristic of the participants |
|-------------|-----|-----|-----|
| Age         |     |     |     |
| Min         | 19  | 19  | 19  |
| Max         | 23  | 25  | 25  |
| Mean        | 20.41| 21.3| 21  |
| SD          | 0.7793| 0.987| 1.013|
| Gender      |     |     |     |
| Male        | 28(28%)| 61(30.5%)| 90(30%)|
| Female      | 72(72%)| 139(69.5%)| 210(70%)|
| Year        |     |     |     |
| First       | 55(55%)| 70(35%)| 125(41.7%)|
| Second      | 45(45%)| 130(65%)| 175(58.3%)|
| Race        |     |     |     |
| Malay       | 29(29%)| 62(31%)| 91(30.3%)|
| Chinese     | 16(16%)| 20(10%)| 36(12%)|
| Indian      | 17(17%)| 3(1.5%)| 20(6.7%)|
Table one represents the socio-demographic data of the students. The mean age for medical students was 20.41 years (SD=0.7793) and 21.3 years (SD=0.987) among non-medical students. The minimum ages for both groups were 19 years and maximum age was 23 and 25 for medical and non-medical students respectively. Majority of participants were female students for both group which were 72% (n=72) in medical student and 69.5% (n=139) in non-medical student. Freshmen students made up the majority in medical students group which accounted for 55% (n=55). Among non-medical students, 58.3% (n=175) were year two students.

As for family income, 36% (n=36) and 62% (n=124) of respondent’s family income were below RM 2500 per month among medical and non-medical students group respectively.

### 3.2 Prevalence of physically inactive among medical and non-medical students

<table>
<thead>
<tr>
<th></th>
<th>Medical students</th>
<th>Non-Medical students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of physically inactive</td>
<td>49(49%)</td>
<td>70(35%)</td>
<td>119(39.70%)</td>
</tr>
</tbody>
</table>

According to IPAQ scoring, 49% (n=49) of medical students where physically inactive as compared to non-medical students 35% (n=70). In total, 39.7% (n=119) of students where physically inactive (Table 2).

### 3.3 Association between socio-demographic factors and physical inactivity level

<table>
<thead>
<tr>
<th>Respondents characteristic</th>
<th>Physical Activity level</th>
<th>OR (95% CI)</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of student (n=300)</td>
<td>Inactive</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical student</td>
<td>49(49%)</td>
<td>51(51%)</td>
<td>1.79(1.10,2.91)</td>
<td>5.46</td>
</tr>
<tr>
<td>Non-medical student</td>
<td>70(35%)</td>
<td>130(65%)</td>
<td>2.27(1.32,3.90)</td>
<td>9.079</td>
</tr>
<tr>
<td>Gender (n=300)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>91(44%)</td>
<td>115(56%)</td>
<td>1.62(1.01,2.59)</td>
<td>4.059</td>
</tr>
<tr>
<td>Male</td>
<td>28(29.8%)</td>
<td>66(70.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year of study (n=300)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>58(46.4%)</td>
<td>67(53.6%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table three represent the association between physical inactivity and independent socio-demographic variables. Based on Chi-Square test, type of student, gender and year of study have significant association with physical inactivity. Females have higher odds of being physically inactive than males (OR: 2.27, 95% CI; 1.32, 3.90). Medical students have higher odds of being physically inactive than non-medical students (OR; 1.79, 95% CI; 1.10, 2.91). Year 1 students have higher odds of being physically inactive than year 2 students (OR: 1.62, 95% CI; 1.01, 2.59).

Table four shows simple logistic regression of all socio-demographic factors. In this model, female gender, year one of study and medical students are statistically significantly associated with physical inactivity. The odds of physically inactive is 2 folds higher in females than males (OR = 2.272, 95% CI, 1.322, 3.583), 1.8 folds higher in year 1 students (OR=1.784, 95% CI, 1.023, 2.512) and 1.7 folds higher among medical students (OR=1.618, 95% CI, 1.107, 2.432).

Table 5: Multiple logistic regression of predictors of physical inactivity

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E</th>
<th>Sig</th>
<th>Exp(B)</th>
<th>95% CI</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>0.899</td>
<td>0.283</td>
<td>0.001</td>
<td>2.458</td>
<td>1.411</td>
<td>4.283</td>
</tr>
<tr>
<td>Year of study (Year 1)</td>
<td>0.504</td>
<td>0.252</td>
<td>0.046</td>
<td>1.656</td>
<td>1.009</td>
<td>2.712</td>
</tr>
<tr>
<td>Type of student (Medical Students)</td>
<td>0.491</td>
<td>0.259</td>
<td>0.058</td>
<td>1.633</td>
<td>0.984</td>
<td>2.232</td>
</tr>
<tr>
<td>Constant</td>
<td>1.453</td>
<td>0.289</td>
<td>0</td>
<td>1</td>
<td></td>
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</tr>
</tbody>
</table>

Zulkhairul Naim, Khairul Anwar, Abdul Rahman, Nur Zuliani
Multiple logistic regressions were performed to independent variables which have been significant both in chi-square test and simple logistic regression. In this final model, as shown in table 5, being a female and year 1 students are associated with physical inactivity.

4.0 Discussion

This study focused on physical inactivity among university undergraduate students. To our knowledge, this is the only study conducted to assess physical inactivity in Sabah, Malaysia. In the present study, the prevalence of physical inactivity among medical students was 49%. This result is consistent with result reported by previous studies in Saudi Arabia(20). Among all undergraduate students, the prevalence was 39.7% and in total agreement with previous study conducted among students at University Putra Malaysia, Malaysia(26). Analysis of socio-demographic predictors for physical inactivity using simple logistic regression showed that, being a female, year one and medical student were significantly associated with physical inactivity. Gender related differences in physical activity levels do exist whereby female students tend to be less active than men in both groups. Prevalence of physical inactivity among females is 44% than in males (29.8%), (OR 2.27(1.32,3.90), p value =0.003). The results of this study were consistent with the findings conducted by Marina et. al and Brosnahan et. al(27)(28). Being a freshman student was found to be significantly associated with physical inactivity. Prevalence of physical inactivity among year one student was 46% compared to 36% among year 2 students. Although being taught and well known about health benefits of physical activity, being a medical student was found to be significantly associated with physical inactivity. These finding was consistent with study conducted in Egypt(29). In a study conducted in Iran, 40% of medical students reported physical inactivity(30). Meanwhile, in a study conducted in Thailand showed that 26.8% of medical students had sufficient physical activity(31). Nus MA et. al found that medical student’s commitment to personal and professional health promotion decreased during their years of medical school. It seems that medical study and training is giving negative impact to students’ lifestyle(32).

This study observed that family income was found not to be associated with physical inactivity. But, there is a mixed picture about the effect on physical inactivity. Some studies reported low socio-economic status was associated with physical inactivity(33). On the other hand, few studies found that high socio-economic status was associated with physical inactivity(34)(35).

These results have several limitations. Firstly, it is related to study design. The study design was cross sectional, which only enables the estimation of prevalence and does not allow establishing the cause and effect. Secondly, this study used questionnaire as a tool which is prone to recall bias leading to underestimating or overestimating the prevalence of physical inactivity. Thirdly, the study group were selected from only one university and does not represent the whole country. In the future, further study should be carried out to identify the determinant and perceived barriers for physical inactivity. In addition, multicentre and large scale study is also needed in the future. Because the prevalence of physical inactivity is found to be high, it is a good opportunity to review students’ current habits, to develop physical activity programs in university’s curriculum, as well as to create a clear guideline for physical activity among university students.
5.0 Conclusion and recommendation

As a conclusion, this study demonstrated that the prevalence of physical inactivity among medical students was higher compared to non-medical students, as well as in female students compared to males. Physical inactivity was also found to be statistically significant for freshman students. With an increasing rate of death due to non-communicable diseases, this is a demand to review current lifestyle and policy. Therefore, further investigation is required for both groups’ especially medical students as they are the future health care providers.

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Declaration

The authors of this article declare that there is no conflict of interest regarding publication of this article.

Author’s contribution (if more than one author)

Author 1: Zulkhairul Naim - Data collection and SPSS, writing manuscript (Methodology, result)

Author 2: Khairul Anwar - Data collection, entry and cleaning, writing manuscript (abstract and introduction)

Author 3: Abdul Rahman - Data collection and data entry, writing manuscript (discussion and conclusion)

Author 4: Nur Zuliani – Data collection, data entry, manuscript (proofread)

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