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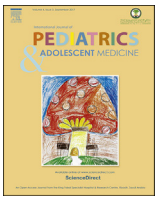

Original article

Demographic and lifestyle determinants of time spent in physical activity among Malaysian adolescents

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ABSTRACT

The objective of the present study is to examine factors affecting time spent in physical activity among adolescents in Malaysia. A nationally representative data of adolescents that consists of 25399 respondents is used. The demographic (age, gender, education) and lifestyle (fruits and vegetables consumption, carbonated soft drink consumption, cigarette smoking, alcohol drinking, sex behaviour, participation in physical education class, obesity) determinants of physical activity are assessed using binomial regression. The results show that age is negatively associated with time spent in physical activity. However, being male and education levels are positively related to time spent in physical activity. Having unhealthy lifestyle and being obese are associated with low levels of physical activity. Physical education seems to promote participation in physical activity. In conclusion, demographic and lifestyle factors play an important role in determining levels of physical activity among adolescents. In order to reduce the prevalence of physically inactive adolescents, policy makers should focus primarily on late adolescents, females, adolescents who engage in unhealthy lifestyle and seldom attend physical education classes, as well as obese adolescents.

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1. Introduction

It is clearly evident that physical activity plays an important role in improving health. Being physically active is negatively associated with the risk of mortality, heart diseases, cancers, diabetes, high blood pressure, obesity, osteoporosis and mental health disorders [1,2]. Studies show that there are numerous factors affecting the decision of people to participate in physical activity (i.e. demographic, lifestyle and health factors) [3–5]. Interestingly, there are evidences suggesting that individuals who are physically active in adolescent years are more likely to engage in physically active behaviour in their adulthood than their peers who are physically inactive in adolescent years [6].

In Malaysia, a recent report of the Ministry of Health showed that the prevalence of being physically active among adolescents is very low (14.1%) [7]. As a consequence of this phenomenon, the number of obese adolescents has increased tremendously [7], which may lead to various diseases in adulthood. Therefore, physical inactivity among adolescents has become a serious public health issue and has been given attention by researchers and policy makers. If policy makers have a better understanding of factors affecting level of physical activity among adolescents, a more effective intervention measure directed towards promoting physically active lifestyle among adolescents can be introduced.

Numerous studies related to participation in physical activity among adolescents in Malaysia were conducted [8–10]. However, only few used a nationwide data with a large sample size. Study by Baharudin et al. [11] is by far the most comprehensive study. The authors used a nationwide data and found that demographic factors, such as age and gender are associated with participation in physical activity. Other non-demographic factors such as school session, breakfast intake and body weight were also found to be significant in influencing physical activity. However, there are other potential determining factors of physical activity which are not examined by Baharudin et al. [11] but are worthy of consideration. These include dietary behaviour, cigarette smoking, alcohol drinking, sex behaviour and participation in physical education (PE)

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class. The present study anticipates that physical activity is associated with these factors because they reflect health awareness. Since physical activity is a health investment, health awareness may be closely related to it. It is also noteworthy that study by Baharudin et al. [11] only examined whether adolescents were physically inactive or not, and did not analyse time that adolescent spent in physical activity. As a result, factors affecting decisions related to time spent in physical activity remain unidentified.

Given the gaps in the literature related to physical activity among adolescents, a more comprehensive study is needed. The present study makes an effort to investigate factors associated with physical activity among adolescents in Malaysia, and attempts to contribute to existing literature in several ways. Firstly, various demographic and lifestyle factors are taken into account in the analysis, which include dietary behaviour, cigarette smoking, alcohol drinking, sex behaviour and PE class. Secondly, different from previous studies, the present study uses a count data regression to examine time spent in physical activity (i.e. amount of physical activity). Thirdly, the statistical analysis is performed based on a nationwide data that consists of a large sample. Taken together, findings of the present study can assist policy makers in identifying which group of adolescents tends to spend more or less time in physical activity. Hence, the prevalence of physical inactivity among adolescents can be reduced.

2. Methods

2.1. Sample

The present study was based on a secondary analysis of a cross-sectional dataset. Data was extracted from the Malaysia Global School-based Student Health Survey (GSHS) 2012 [7]. The survey used a two-stage cluster sampling in order to ensure that the sample could represent secondary school students in Malaysia. In the first-stage sampling, secondary schools were selected based on the probability proportional to the size of school. Of all the secondary schools in Malaysia, 234 were selected to take part in the survey. In the second-stage sampling, systematic random sampling was applied to select classrooms from each school. All the students in the selected classrooms were surveyed.

A total of 25507 questionnaires were distributed. The response rate was 88.7%. The survey was carried out from 23 February to 26 April 2012. The data was made available to the public in 2014 after the 2-year window. While the survey was not the latest dataset, it had a large sample size and was representative. Ethical approval was obtained from the Ministry of Health Research and Ethics Committee and Ministry of Education Ethics Committee (Project code: NMRR-11-974-10401). Parental consent forms were obtained before the survey. Adolescents who were not given consent by their parents were not canvassed.

2.2. Questionnaire

Self-administered bilingual questionnaires (English and *Malay*) were used. They were designed according to the standard questionnaire used by the GSHS. All the information was self-reported. The demographic data used in the present study consisted of age, gender and education level. Age was formatted as a discrete variable (11–18 years) to allow for a linear relationship. Education level was assessed based on the grades of adolescents. It was divided into six categories: Remove, Form 1, Form 2, Form 3, Form 4 and Form 5. Remove until Form 3 were lower secondary, while Form 4 and Form 5 were upper secondary.

The lifestyle factors comprised information on physical activity, fruits and vegetables (FV) consumption, carbonated soft drink consumption, cigarette smoking, alcohol drinking, sex behaviour, participation in PE class and obesity. The definition of physical activity was explained prior to asking questions about physical activity. Adolescents were asked: 'During the past 7 days, on how many days were you physically active for a total of at least 60 min?' They answered with: '0 day', '1 day', '2 days', '3 days', '4 days', '5 days', '6 days' or '7 days'.

In terms of dietary behaviours, the survey asked adolescents about their FV consumption behaviour: 'During the past 30 days, how many time per day did you usually eat vegetables and fruits?' The possible answers were: 'not at all', '1 time', '2 times', '3 times', '4 times' and '5 or more times'. Carbonated soft drinks consumption behaviour was also assessed. Adolescents were asked: 'During the past 30 days, how many times per day did you usually drink carbonated soft drinks?' They responded with: 'not at all', '1 time', '2 times', '3 times', '4 times' or '5 or more times'.

The smoking behaviour was measured based on the following question: 'During the past 30 days, on how many days did you smoke cigarettes?' with plausible responses: 'did not smoke', '1–2 days', '3–5 days', '6–9 days', '10–19 days', '20–29 days' and '30 days'. Adolescents were categorised as non-smokers if they chose 'did not smoke'. Otherwise, they were coded as smokers. Alcohol drinking behaviour was assessed on the basis of the following question: 'During the past 30 days, on the days you drank alcohol, how many drinks did you usually drink per day?' The choices were: 'did not drink', '1 drink', '2 drinks', '3 drinks', '4 drinks' and '5 or more drinks'. Non-alcohol drinkers referred to those who chose 'did not drink'.

Adolescents were also asked to self-report their sexual behaviour. The question was designed as: 'Have you ever had sexual intercourse?'. Adolescents were considered to have sexual intercourse if they answered 'yes' and were considered to have no sexual intercourse if they answered 'no'. In addition, adolescents were requested to self-report their height and weight. These heights and weights were used to calculate body mass index (BMI) and determine whether adolescents were obese. Although self-reported information on height and weight may have reporting error, it was appropriate for research [12].

2.3. Statistical analysis

The dependent variable used in the present study was time spent in physical activity (i.e. the days of being physically active for at least 60 min). The maximum value of the dependent variable was 7 days and the minimum value was 0 day. The independent variables consisted of demographic (age, gender, education) and lifestyle variables (FV consumption, carbonated soft drink consumption, cigarette smoking, alcohol drinking, sex behaviour, participation in PE class, obesity). All the independent variables were categorical variables, except age. Since the dependent variable was discrete with count data, the present study used a binomial regression (i.e. a count data regression) to examine the factors associated with time spent in physical activity, assuming that overdispersion exists. A simple statistical test for overdispersion was conducted in order to confirm that there was overdispersion. Binomial regression and the test for overdispersion were described in great detail elsewhere [13]. Significant level was based on $P < .05$. Adolescents with missing information were removed from the sample. As a result, only 25399 respondents were used for analyses.

3. Results

Demographic and lifestyle characteristics of total sample and adolescents participating in physical activity are presented in Table 1. The mean age of all respondents and physical activity

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