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Determination of Factors Associated with Physical Activity Levels among Adolescents Attending School in Kuantan, Malaysia

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ABSTRACT

Introduction: Findings from the National Health and Morbidity Survey III (MOH, 2008) indicate a 43.7% prevalence of physical inactivity among Malaysian adults. This sedentary lifestyle can also be observed among children and adolescents. **Methodology:** A cross-sectional study was conducted to determine factors associated with physical activity levels of four hundred, 13 year-old adolescents in Kuantan, Pahang. Data on socio-demographic, health-related, and psychosocial factors were collected using a self-administered questionnaire while physical activity level was assessed using the Physical Activity Questionnaire for Older Children (PAQ-C). **Results:** About one-third of the respondents were in the low physical activity level category, 61.5% were in the moderate category and only 3.0% of the adolescents were in the high physical activity level category. Males were more physically active than females (χ^2=23.667, p=0.0001) with female adolescents (45.1%) twice as likely as male adolescents (22.1%) to be in the low physical activity level category. The associations between physical activity level with socio-demographic and health-related factors, perception of weight status and body parts satisfaction were not significant. However, physical activity was found to be positively correlated with physical activity self-efficacy (r=0.496, p=0.0001), peer influence (r=0.468, p=0.0001), family influence (r=0.298, p=0.0001) and beliefs in physical activity outcomes (r=0.207, p=0.0001). Negative relationships were found between physical activity with depression (r=-0.116, p=0.021) and body size discrepancy (r=-0.143, p<0.01). Respondents who had a better perception of their current health status were more physically active (χ^2=21.062, p=0.0001). Multivariate analyses for the prediction of physical activity showed that physical activity self-efficacy, sex and peer influence were the most significant contributors in explaining physical activity among adolescents. **Conclusion:** Physical activity interventions should include psychosocial components as mediator variables in interventions designed to promote regular physical activity in adolescence.

Keywords: Adolescents, physical activity, psychosocial factors, health-related factors and socio- demographic factors

INTRODUCTION

Engaging in physical activity during childhood and adolescence is an imperative as it exerts many health benefits and has protective effects on several chronic diseases as well as premature mortality (Lahti-Koski *et al.*, 2002). However, many studies have

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shown marked declines in physical activity during adolescence (Jago *et al*., 2005; Pahkala *et al*., 2006). The US National Youth Risk Behaviour Survey indicates that there was a dramatic decline of youth participating in daily physical educational classes from 42.0% in 1991 to 27.0% in 1997 (CDC, 1997a). Similarly, a high percentage of low physical activity level was also observed in Malaysia. Findings from the National Health and Morbidity Survey III (MOH, 2008) indicate the prevalence of physical inactivity among Malaysian adults to be 43.7%. This sedentary lifestyle can also be observed among children and adolescents. Lim (2005) reported that of 75 adolescents studied, about 44% were in the sedentary category.

Sedentary behaviour often originates in childhood and adolescence, may persist into adulthood, and may lead to many adult chronic diseases (Monge-Rojas *et al*., 2002). Adolescence is a particularly unique period in life since it is a time of intense physical, psychosocial, and cognitive developmental changes (WHO, 2000). Each of these changes influence adolescent participation in physical activity (McCabe & Ricciardelli, 2004).

As numerous studies have shown that there are dramatic declines in physical activity during adolescence (Jago *et al*., 2005; Pahkala *et al*., 2006), young people at this stage of life are an important target group to focus on. To optimally promote physical activity, there is a need to study and understand factors or predictors that affect physical activity levels of adolescents. Physical activity levels can be influenced by a broad range of factors including biological, socio-demographic, health-related factors as well as psychosocial factors (Schmitz *et al*., 2002; Aarnio *et al*., 2002). Thus, the objective of this study was to determine the factors that predict physical activity levels of adolescents.

METHODOLOGY

Study population

This was a cross-sectional study and subjects were Form 1 students from two national schools in Kuantan, Pahang. These schools were randomly selected since they were all multi-ethnic and co-educational in their student composition. All Form 1 students in the two schools were invited to participate in the study with the final sample consisting of 400 adolescents.

This study was approved by the Medical Research Ethical Committee, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia and the Ministry of Education. Permission was obtained from the school principals before the inception of the study and a written informed consent was obtained from the respondents prior to their involvement.

Measurements

Data collection was carried out using a self-administered questionnaire. Anthropometric measurements of height and weight were assessed by the researchers and all measurements were carried out in the school setting.

The questionnaire used for data collection was translated into Malay. Forward translation from the original English version was performed by a university professor and a university student who were both fluent in the Malay language. Back translation was also performed by the university professor and the final version of the questionnaire was derived from a reconciliation of the original, back and forward translations. A pre-test of the questionnaire among thirty-six Form 1 students was carried out prior to the scheduled data collection. This was to determine whether the students understood the items and the questions in the questionnaire and to measure the reliability (internal consistency) of the scales in the questionnaire.

Assessment of physical activity

The Physical Activity Questionnaire for Older Children (PAQ-C), which was modified and adapted from Kowalski,

Crocker & Donen (2004) and Ernst & Pangrazi (1999) was used to assess general levels of physical activity of the adolescents. The physical activity items listed out in the questionnaire were modified according to the physical activities proposed in the school co-curriculum. The instrument consisted of 10 items. Item 1 was on leisure time activity during the last 7 days. The adolescents were required to respond to an activity checklist and were scored on a 5-point scale ranging from 'no' activity being scored as 1 and '7 times or more' being scored as 5. The mean score of all activities on the activity checklist was calculated to form a composite score for item 1.

Items 2 to 8 related to activities of the adolescents during physical education (PE) class, recess, lunch, immediately after school, evenings, weekends, and leisure times. The answer options for each item began from the lowest activity response (score 1) and progressed to the highest activity response (score 5). For item 9, the adolescents were asked on the frequency of participating in daily physical activity in the previous week. A score of 1 was assigned to 'none' and a score of 5 was assigned to 'very often'. The mean physical activity score for all days of the week was calculated to form a composite score for item 9. Finally, item 10 was used to identify adolescents with unusual activities during the previous week.

Once the sum of the scores from items 1 to 9 was calculated, the final PAQ-C activity summary score could be obtained by taking the mean of these 9 items. All the adolescents were classified into three categories (low, moderate and high) based on their mean total physical activity score (Kowalski *et al*., 2004). An adolescent with a mean total score ranging from 1 to 2.33 was categorised as having low physical activity level, 2.34 to 3.66 as moderate physical activity level, and 3.67 to 5 as high physical activity level. The internal consistency (Cronbach's alpha) of this assessment, calculated from an independent sample of 36 Form 1 students, was 0.79.

Anthropometric measurements

Weight and height of the adolescents were measured using a TANITA digital weighing scale (Tanita, Japan) and body meter (Seca, Germany), respectively. Each measurement was obtained twice with the weight recorded to the nearest 0.1 kg and the height to the nearest 0.1 cm. Body Mass Index (BMI) in kg/m^2 was calculated and categorised according to BMI-for-age reference (WHO, 1995).

Socio-demographic background

This section consisted of four questions that were used to assess the socio-demographic background of respondents, which included the date of birth, sex, ethnicity and household size. Besides, this section also included questions on respondents' parents such as occupation, total years of schooling, educational attainment and monthly income.

Health-Related Factors

Eating Behaviours

The Eating Attitude Test (EAT-26), which was adapted and modified from Garner & Garfinkel (1979) consisted of 26 items and was used as a screening tool to measure symptoms and concerned characteristics of eating disorders.

An individual with a total score greater than or equal to 20 points was categorised as being prone to eating disorders. Conversely, an individual with a total score of less than 20 points was categorised as having no symptoms of eating disorders. The internal consistency for this measure was high (Cronbach's alpha = 0.93).

Psychosocial Factors

This section was divided into 6 parts as follows:

1. Perception of current health status
   This section recorded the respondent's perception of current health status. Five

choices were given and the respondent was required to choose only one answer that best represented the current health status.

2. Physical Activity Self-Efficacy
This scale which was adapted from Saunders *et al.* (1997) consisted of 17 items to assess perceived self-efficacy or confidence in one's ability to be physically active. The respondent was required to respond based on a 5-point scale from 'not at all confident' to 'extremely confident' for each item. A high score indicates a high self-efficacy for physical activity. The internal consistency (Cronbach's alpha) of this scale was 0.88.

3. Social Influences for Physical Activity
This scale for physical activity was adapted from Saunders *et al.* (1997). It consisted of 8 items to assess peer influence and family influence on physical activity, respectively. The internal consistency of this scale was 0.87. Further, the internal consistencies for peer influence (Cronbach's alpha=0.87) and family influence (Cronbach's alpha=0.82) subscales were also calculated separately for the purpose of the study.

4. Beliefs in Physical Activity Outcomes
A total of 16 items adapted from Saunders *et al.* (1997) were used to assess beliefs in physical activity outcomes. The respondent was required to answer each of the items on a 5-point scale. A high score indicates a strong positive belief in the outcomes of physical activity. The internal consistency (Cronbach's alpha) of this scale was 0.67.

5. Depression
The Center for Epidemiologic Studies-Depression Scale (CES-D) (Radloff, 1977) was used to measure self-reported symptoms associated with depression experienced in the past week. There was a total of 20 items which provided a score ranging from 0 to 60. A high score indicates more depressive symptoms. The internal consistency (Cronbach's alpha) of this scale was 0.83.

6. Body Image
   a. Perception of body size (shape)
   The respondent was required to choose figures from the 'Contour Drawing Rating Scale' (Thompson & Gray, 1994) to represent his or her perceived current body size, ideal body size and healthiest body size. A discrepancy score was determined based on the difference between perceived current body size and perceived ideal body size.

   b. Perception of body weight status
   This section assessed the correctness of the respondents' perception of their current weight status (Koay, 1998; Simko, Cowell & Hreha, 1989). A respondent's perceived current body weight status was compared with his or her actual current body weight status (Body Mass Index). The respondent was classified into one of the three categories which were correct-estimator, over-estimator or under-estimator.

   c. Body parts satisfaction
   There were a total of 10 main body parts in this section, which was adapted and modified from Koay (1998). The respondent was required to indicate level of satisfaction with each of the ten body parts listed. Respondents were classified into either one of the two categories which were satisfied ($\geq$ 65) and dissatisfied (<65) based on the total score.

Statistical Analysis

Data were analysed using the SPSS for Windows version 14.0. Descriptive statistics

Table 1. Characteristics of the subjects

Characteristics	*n (%)*
Sex	
Male	167 (41.8)
Female	233 (58.2)
Ethnicity	
Malay	225 (56.2)
Chinese	168 (42.0)
Indian	7 (1.8)
Body Mass Index (kg / m^2) (Mean+SD)	20.18+4.61
Underweight	29 (7.3)
Normal Weight	280 (70.0)
At risk of overweight	91 (22.7)
Parents' Years of Education	
Father (Mean+SD)	12.91+4.07
Mother (Mean+SD)	12.29+3.39
Total Household Income (Mean+SD)	3238.12+2740.55
< RM 500	6 (1.6)
RM 501-RM 1000	112 (28.0)
RM 1001-RM 2000	79 (19.7)
RM 2001-RM 3000	49 (12.2)
> RM 3000	154 (38.5)
Household Size (Mean+SD)	5.74 + 1.60
< 5	84 (21.0)
5-7	260 (65.0)
> 8	56 (14.0)
Physical Activity Level (Mean+SD)	2.56±0.57
Low	142 (35.5)
Moderate	246 (61.5)
High	12 (3.0)

such as frequencies, means, standard deviations, and percentages were used to describe variables such as physical activity, sex, ethnicity, body mass index, household income, household size and parents' education level. Normality test was conducted using graphical methods (e.g. histogram, Q-Q plot), descriptive statistic and frequentist test (e.g. Shapiro–Wilk test, Kolmogorov-Smirnov Test).

Cronbach's alpha was used to assess internal consistency of each scale in the questionnaire. The Chi-square test was used to determine associations between categorical variables. Pearson Product-Moment Correlation was used to determine the relationship between two continuous variables. Multiple Linear Regression was used to measure the amount of influence an independent variable had on a dependent variable. A statistical probability level of $p < 0.05$ was considered as significant.

RESULTS

Table 1 shows that a total of 400 adolescents (167 males and 233 females) with a mean age of 13.23± 0.31 years participated in the

present study. They comprised 225 (56.2%) Malay, 168 (42.0%) Chinese, and 7(1.8%) Indian adolescents. The distribution of respondents by physical activity level indicated that a majority of the respondents (61.5%) were in the moderate physical activity level category while only 3.0% of the respondents were in the high physical activity level category. Moreover, about one-third of the respondents (35.5%) were in the low physical activity level category.

Physical activity and socio-demographic factors

Table 2 shows males to be more physically active than females (χ^2= 2.296, p<0.001). Most of the male (77.9%) and female (54.9%) respondents were in the moderate / high physical activity level. However, there were twice as many female adolescents (45.1%) who were in the low physical activity level compared to male adolescents (22.1%).

In the analysis of physical activity levels by ethnicity, Indians were excluded since they comprised only a small proportion of the respondents. Results showed that there was no association between physical activity and ethnicity (χ^2=1.550, p>0.05).

Additionally, no association was found between socio-demographic factors and physical activity except for father's total years of schooling. There was a positive and weak association between father's total years of schooling and physical activity score (r = 0.105, p = 0.036).

Physical activity and health-related behaviour

As shown in Table 2, the distribution of respondents with low and moderate / high physical activity levels was almost similar whether they were underweight, normal weight or at risk of overweight. No association was found between physical activity and weight status (χ^2=0.023, p>0.05).

For eating behaviours, 14.3% were categorised as prone to eating disorders. A close inspection of Table 2 reveals that more respondents who were prone to eating disorders (42.1%) were in the low physical activity level as compared to respondents who had no eating disorder symptoms (34.4%). However, no significant association was found between physical activity level and EAT-26 score category (χ^2=1.267, p>0.05).

Physical activity and psychosocial factors

Table 2 also shows the distribution of respondents according to perception of current health status for physical activity level. There was a significant association between physical activity level and perception of current health status (χ^2=15.399, p<0.001) (Table 2). In other words, respondents who have a better perception of their current health status were more physically active.

For physical activity self-efficacy, there was a positive and moderate linear relationship between physical activity self-efficacy and physical activity scores (r=0.496, p<0.001) (Table 2) based on Guilford's Rule of Thumb (Hinkle, Wiersma &Jurs, 1981). In other words, as physical activity self-efficacy increased, physical activity also increased.

As shown in Table 2, there was a positive and moderate linear relationship between peer influence and physical activity score (r=0.468, p<0.001). On the other hand, a positive and weak relationship was found between family influence and physical activity score (r=0.298, p<0.001). Most of the respondents strongly agree that if they were physically active most days, it would help them to be healthy (65.5%), control their weight (44.5%) and give them energy (53.7%). In contrast, about 50.0% of the respondents strongly disagree that being physically active would be boring, may hurt them physically and may embarrass them in front of others. As a whole, most of the respondents agreed that being physically active would give them positive outcomes. Further, there was a positive and weak correlation between beliefs in physical

Table 2. Bivariate correlation between physical activity and socio-demographic factors, health related factors & psychosocial factors

Factors	*Physical activity Level*		χ^2	*r value*
	Low n(%)	*Moderate/High n(%)*		
Socio-demographic Factors				
Sex			2.296***	
Male (n=167)	37 (22.1)	130 (77.9)		
Female (n=233)	105 (45.1)	128 (54.9)		
Ethnicity			1.550	
Malay (n=225)	86 (38.2)	139 (61.8)		
Chinese (n=168)	54 (32.1)	114 (67.9)		
Father's total years of schooling				0.105*
Mother's total years of schooling				0.08
Household income				0.08
Household size				0.03
Health Related Factors				
Body Mass Index			0.023	-0.043
Underweight (n=29)	10 (34.5)	19 (65.5)		
Normal Weight (n=280)	100 (35.7)	180 (64.3)		
At risk of overweight (n=91)	32 (35.2)	59 (64.8)		
Eating Behaviours			1.267	
No symptoms of eating disorders (n=343)	118 (34.4)	225 (65.6)		
Prone to Eating disorders (n=57)	24 (42.1)	33 (57.9)		
Psychosocial Factors				
Perception of health status			15.399***	
Good (n=204)	54 (26.5)	150 (73.5)		
Moderately good (n=175)	77 (44.0)	98 (56.0)		
Poor (n=21)	11 (52.4)	10 (47.6)		
Physical activity self-efficacy				0.496 ***
Peer influence				0.468***
Family influence				0.298***
Beliefs in physical activity outcomes				0.207***
Depression score				-0.116**
Perception of body weight status			1.366	
Correct-estimator (n=238)	79 (33.2)	159 (66.8)		
Under-estimator (n=95)	37 (38.9)	58 (61.1)		
Over-estimator (n=67)	26 (38.8)	41 (61.2)		
Body Size Discrepancy Score				-0.143**
Body Parts Satisfaction			2.666	
Satisfied (n=191)	60 (31.4)	131 (68.6)		
Dissatisfied (n=209)	82 (39.2)	127 (60.8)		

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 3. Multiple linear regression of physical activity

Variables	*Unstandardised coefficients*	*Standardised coefficients*	*t*	*p-value*
	B	*Beta*		
Constant	11.430		12.660	0.0001
Self-efficacy	0.151	0.338	7.245	0.0001
Sex (male)	2.366	0.229	5.571	0.0001
Social influence (peer)	0.339	0.248	5.255	0.0001

Notes: R= 0.599; R^2= 0.359; Adjusted R^2 = 0.354; F=74.012, p=0.0001

activity outcomes score and physical activity score (r=0.207, p<0.001) (Table 2).

The Center for Epidemiologic Studies Depression Scale (CES-D) which was adapted from Radloff (1977) was used to assess depressive symptoms. Table 2 shows a negative and weak relationship between depression and physical activity score (r= -0.116, p<0.01). This finding indicates that respondents with more depressive symptoms were more likely to be physically inactive.

Respondents' body image was assessed in three parts which included perception of body weight status, perception of body size, as well as body parts satisfaction. For perception of body size, a majority of the respondents with low physical activity level chose a smaller figure (Figure 3) of the Contour Drawing Rating Scale to represent their current and ideal body sizes while most respondents with moderate and high physical activity level chose Figure 4 or 5 (of the Contour Drawing Rating Scale) to represent their current and ideal body sizes. Further, body size discrepancy score of the respondents was determined based on the difference between perceived ideal body size and perceived current body size. Results showed that there was a significant negative association between discrepancy score and physical activity score (r= -0.143, p=0.004) (Table 2). In other words, respondents who were more dissatisfied with their body size were more likely to be physically inactive.

For perception of body weight status, the distribution of the respondents by physical activity categories was almost similar for under-estimators, correct-estimators and over-estimators. Hence, there was no significant association between perception of weight status and physical activity level category (χ^2=1.366, p>0.05).

For body parts satisfaction, more respondents who were satisfied with their body parts (68.6%) fell in the moderate or high physical activity level categories. Nevertheless, no association was found between physical activity level and body parts satisfaction (χ^2 = 2.666, p>0.05) (Table 2).

Multivariate analysis

The multiple linear regression was used to measure the amount of influence independent variables had on a dependent variable. Based on the stepwise method used, only three variables were found to be significant in explaining physical activity (Table 3). These three variables were physical activity self-efficacy, sex and peer influence.

The R-square of 0.359 implied that about 35.9% of the variance in physical activity was explained by physical activity self-efficacy, sex and peer influence. Based on the

Guildford's rule of thumb, the R value of 0.599 indicated that the relationship between the three variables (physical activity self-efficacy, sex and peer influence) and physical activity was moderate.

Furthermore, Table 3 shows that physical activity self-efficacy *(t* = 7.245, *p* = 0.0001), sex (*t* = 5.571, *p* =0.0001) and peer influence (*t* = 5.255, *p*=0.0001) contributed significantly toward physical activity at the 0.05 level of significance. In other words, an increase in physical activity self-efficacy, peer influence and being male tended to increase the physical activity levels among the adolescents.

DISCUSSION

Many studies have reported on children and adolescents being physically inactive (Monge-Rojas *et al*., 2002; Pahkala *et al*., 2006). Similarly, the present study showed that more than one-third of the adolescents were physically inactive. This is consistent with a study carried out by Pahkala *et al*. (2006) which showed that the amount of leisure-time physical activity produced by one-third of 13-year-old girls was extremely low. Further, Jago *et al*. (2005) also reported that high levels of sedentary activity were found among adolescent boys and girls during all time periods.

Sex was one of the important predictors of physical activity (Kjelsas & Augestad, 2004). A number of studies reveal that physical activity levels vary by sex whereby male adolescents are more physically active as compared to female adolescents (Aarnio, 2003; Wenthe, Janz & Levy, 2009). Similarly, our study also showed that males were more physically active than females whereby female adolescents were twice as likely as male respondents to fall in the low physical activity level category. Boys are more likely to be encouraged to participate in physical activity by family and friends than girls, while girls are less likely than boys to be rewarded for their physical activity (Wenthe *et al*., 2009). Family members may restrict female children from playing outside by shielding them in the home in order to protect them, while boys may be allowed to play outside because they are traditionally viewed as being physically tough (Gomez *et al*., 2004).

Several studies have shown that physical activity patterns varied by race (Schmitz *et al*., 2002; Gordon-Larson, McMurray & Popkin, 2000). However, no association was found between physical activity levels and ethnicity in this study. In contrast, studies done on US adolescents reveal ethnic differences in physical activity. More non-Hispanic black and Hispanic adolescents were found to engage in moderate to vigorous physical activity compared to Asian adolescents. Likewise, NHMS III (MOH, 2008) showed that the highest prevalence of physical inactivity was observed among Chinese, followed by Indians, Other Bumiputras (indigenous people) and Malays.

The BMI status was not correlated with physical activity level in the present study. However, Lahti-Koski *et al.* (2002) reported a negative relationship between BMI and physical activity level whereby overweight subjects tended to be more physically inactive. In contrast, overweight Malaysian adolescents were found to be more physically active than normal weight adolescents (Pon, Mirnalini & Mohd Nasir, 2004). The discrepancy among these studies may be due to the selection of different segments of the study population, for example, adolescents versus children.

Socio-demographic factors were found to be related to physical activity in many previous studies (Aarnio, 2003; Gordon-Larson *et al.*, 2000; Lasheras *et al.*, 2001). In contrast, the present study found none of the socio-demographic factors to be correlated with physical activity except father's total years of schooling. Nevertheless, other studies reported that children and adolescents whose parents had

higher educational levels were more physically active than those children and adolescents whose parents had a lower educational level (Schmitz *et al*., 2002; Gordon-Larson *et al.*, 2000; Lasheras *et al.*, 2001)

Dieting in adolescents is commonly believed to be associated with negative health behaviours. A study of 1482 university students in Norway which was conducted by Kjelsas & Augestad (2004) found that disordered eating behaviour was a significant predictor of physical activity ($p<0.05$). The present study showed that 14.3% of the adolescents were prone to eating disorders but no association was found between EAT-26 score category and physical activity level.

A variety of psychosocial factors have been studied as to their influence on physical activity in adolescents. The present study showed a significant relationship between perception of current health status and physical activity level among adolescents, a reflection that respondents with a better perception of their current health status were also more physically active. This was consistent with other studies which also indicated that adolescents who perceived their current health and health improvement as important were more physically active (Aarnio *et al*., 2002; Aarnio, 2003). Likewise, Schmitz *et al.* (2002) also reported that a higher value given to health predicted higher physical activity and lower sedentary leisure habits in adolescents.

Numerous studies have shown that self-efficacy is strongly correlated with physical activity (Lewis *et al*., 2002; Wenthe *et al*., 2009). Adolescents with higher self confidence are more likely to participate in physical activities (Monge-Rojas *et al*., 2002). In line with other studies, the present study showed that physical activity self-efficacy was positively and moderately correlated with physical activity among adolescents. In other words, adolescents who have a higher self-confidence in physical activity were more likely to be physically active.

In line with self-efficacy, social influence and support from family and peers were associated with greater involvement in physical activity (Springer, Kelder & Hoelcher, 2006; Wenthe *et al*., 2009). This study also showed a positive relationship between family and peer influence with physical activity. However, findings showed that friends exerted more influence on the adolescent to be involved in physical activity as compared to family influence.

This study indicated that beliefs for physical activity outcomes were positively correlated with physical activity. On the other hand, depressive symptoms have been shown to predict higher sedentary leisure habits (Schmitz *et al*., 2002) and consistent with this, the present study showed a negative relationship between depression and physical activity. This reflects that adolescents with depressive symptoms are more likely to be less physically active.

Body image perception and dissatisfaction were found to be associated with physical activity. Nevertheless, no association was found between perception of weight status and body parts satisfaction with physical activity level while a significant and negative relationship was found between body size discrepancy and physical activity in the present study. This indicated that respondents who were dissatisfied with their body size were more likely to be physically inactive. Likewise, Anton, Perri & Riley (2000) reported that larger discrepancies between ideal body size and actual body size were found to be associated with lower physical activity. Monge-Rogas *et al*. (2002) also reported that the influence of body image was the most important factor in explaining physical activity among Costa Rican adolescents.

The multivariate linear regression analyses showed that physical activity self-efficacy, sex and peer influence were significant predictors of physical activity among adolescents. Based on these findings, an increase in physical activity self-efficacy and peer influence will likely increase the

physical activity levels of adolescents. This shows that adolescents who had more confidence in physical activity such as having skills needed to be physically active or were able to overcome the barriers of physical activity (homework and time constraints) were more likely to be involved in physical activity. Moreover, adolescents with greater encouragement from friends were more physically active as well. Sex also played an important role in physical activity whereby male adolescents were more physically active. This is consistent with numerous studies which have also shown similar results whereby self-efficacy is a strong predictor of physical activity (Strauss *et al*., 2001; Monge-Rojas *et al*., 2002). Some studies also showed that peer participation in physical activity and support from peers was positively correlated with physical activity level (Springer *et al*. 2006; Wenthe *et al*., 2009).

CONCLUSION

The primary findings in the present study show that self-confidence in performing physical activity, social influences as well as sex are the main factors that predict physical activity levels among adolescents. These results provide further support that self-efficacy and peer influence play important roles in influencing changes in physical activity among adolescents. As such, these should be potential areas to embark upon when developing physical activity interventions to further establish an active lifestyle for adolescents. Besides, male and female adolescents exhibit different physical activity levels with female adolescents being more physically inactive. This should be taken into account when planning and implementing physical activity programmes or interventions.

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