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Physical Activity, Eating Behaviour and Body Image Perception among Young Adolescents in Kuantan, Pahang, Malaysia

Farah Wahida Z, Mohd Nasir MT & Hazizi AS

Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

ABSTRACT

Introduction: A cross-sectional study was conducted to determine physical activity, eating behaviour, body weight management knowledge, perception of body image and their association with body weight status of adolescents. **Methods:** Respondents were 360 adolescents, aged between 13 to 14 years, from six randomly selected secondary schools in Kuantan, Pahang. Physical activity, eating behaviour, body weight management knowledge and perception of body image were measured by the Physical Activity Questionnaire for Older Children (PAQ-C), Eating Attitude Test-26 (EAT-26), Weight Management Knowledge Inventory (WMKI) and Contour Drawing Rating Scale (CDRS), respectively**. Results:** Almost half of the respondents were categorised as having a normal BMI, while 30.3% were severely thin and thin and 20.3% were overweight and obese. Mean physical activity score was 2.06$\pm$0.45 with more males (35.0%) being physically active than females (17.3%). Mean eating behaviour score was 15.41$\pm$10.37, with 27.8% of the respondents being at-risk for eating disorders. Mean weight management knowledge score was 5.35$\pm$1.80, with more females (77.7%) having higher mean scores than males (42.3%). Further, mean discrepancy score for body image perception was 1.24$\pm$0.99, with 78.1% of the respondents being dissatisfied with their current body size. Positive associations were found between eating behaviour ($r=0.28$, $p<0.05$) and body image ($r=0.35$, $p<0.05$) with BMI. Respondents with high eating behaviour scores and body image discrepancy scores were more likely to have greater BMI. **Conclusion:** This study shows the need for healthy eating and body image intervention programmes to prevent overweight and obesity problems among adolescents.

Keywords: Physical activity, eating behaviour, body weight management, body image perception, adolescents

INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health (WHO, 2004). Obesity is a complex, multifactorial and chronic condition resulting from the interplay between the environment and genetics (Segal & Sanchez, 2001). The rapid phase of industrialisation and globalisation has indirectly caused an obesity epidemic worldwide. The increment in overweight and

* Correspondence author: Dr Mohd Nasir Mohd Taib; Email: *nasir@medic.upm.edu.my*
Emails of co-authors: *sakuraley_1241@yahoo.com*; *hazizi@medic.upm.edu.my*

obesity problems has been related to an increasing sedentary lifestyle as well as changing dietary habits. Energy imbalance due to calories consumed less or more than calories expended is one of the main causes of abnormal body weight (WHO, 2004). Studies have shown that overweight and obesity problems are significantly linked to unhealthy dietary patterns, physical inactivity and misperception of body image (Khor *et al*., 2009; Pon, Kandiah & Mohd Nasir, 2004).

The prevalence of overweight and obesity has been growing at an alarming rate for decades in both children and adults (Giammattei *et al*., 2003). In 2005, the prevalence of global overweight and obesity was estimated to be on an increase, with approximately 1.6 billion adults being overweight and 400 million of them obese. Likewise, among children less than 5 years, more than 20 million were overweight (WHO, 2004). A national survey conducted in the United States reported that increments of overweight from 1988 to 1994 were 20% among adolescents and children aged between 12 to 17 years and 10% among 6 to 12 years old (Segal & Sanchez, 2001). The increase in prevalence of overweight in the population occurs not only in developed countries, but also in developing countries. For example, in Thailand, the prevalence of obesity among 5 to 12 year old children has increased by 3% within a two-year period (WHO, 2004).

Similarly in Malaysia, the transitions of nutrition and lifestyle have been associated with Malaysians consuming diets high in fat and calories and generally leading a sedentary lifestyle. The Third National Health and Morbidity Survey (2006) reported a 5.4% prevalence of overweight among children aged below 18 years , with a slightly higher prevalence among males (6.0%) than females (4.7%) (IPH, 2008). In addition, Zalilah, Bond & Johnson (2000) showed that among primary school children in Kuala Lumpur, the prevalence of overweight was 5.8%. Recently, a study by Ismail *et al.* (2009) found that among 7 to 12 year old children in Peninsular Malaysia, 10.5% were overweight and 5.9% obese. Specifically, more Indian children (18.4%) were overweight and obese as compared to Malay (16.7%) and Chinese (14.8%) children. These studies strongly indicate that the problem of overweight and obesity will pose a major public health challenge for Malaysia in the future.

Studies have found that overweight children and adolescents have low physical activity level and inadequate exercise on a regular basis (Giammattei *et al*., 2003; Lasheres *et al*., 2001). Children who are physically inactive have greater body weight and body fat levels as compared to those who are active (Giammattei *et al*., 2003). In addition, eating behaviour also influences the gain in adolescents' weight. A study by Story *et al.* (2001) reported that obese children may have higher intakes of fat and lower intakes of carbohydrate than normal weight children. Consumption of sugary soft drinks also was high in overweight children (Giammattei *et al*., 2003). Unhealthy snacking habits and meal skipping in most days could contribute to abnormal body weight in adolescents (Ismail *et al*., 2009). Along with those factors, body image plays an important role in the management of body weight, especially among adolescents. The assessment of body image is important to understand its relationship to the maintenance of excess weight or in initiating motivation for weight reduction (Pon *et al*., 2004).

Since overweight and obesity problems may start early in life and their subsequent effect on morbidity are laid down in childhood and adolescence, early identification of the risk factors is important and need to be clearly determined to prevent and reduce the incidence of childhood obesity. Thus, this study aimed to determine the associations between physical activity, eating behaviour, body weight management

knowledge and perception of body image with body weight status among adolescents in Kuantan, Pahang.

METHODS

Sample size determination

The minimum sample size for the study was calculated using a formula by Daniel (1999):

$$n = \frac{z^2 p (1-p)}{d^2}$$

where

n = estimated sample size
z = standard value of confidence level at 95%
= 1.96
p = estimated prevalence of overweight among adolescents aged between 11 to 15 years in Peninsular Malaysia (Khor *et al*., 2009)
= 34%
d = margin of error set at 5%
= 0.05

Thus

$$n = \frac{1.96^2 (0.34) (1-0.34)}{0.05^2}$$
$$= 344.82$$
= 345 respondents

Respondents

Form 1 students aged between 13 and 14 years were selected for this study as they have a higher tendency to be influenced by environmental factors which may contribute to an unhealthy lifestyle compared to other adolescents (Kennedy & Prothrow-Stith, 1997). Six secondary schools were randomly selected from a total of thirty national, multi racial and non-single sex schools in Kuantan, Pahang. Two Form 1 classes from each of the six schools were randomly selected and all students in each of the selected classes were invited to participate in the study. A final sample of 360 students was recruited for the study with 50 to 75 students from each of the six schools participating.

Approvals to conduct the study were obtained from the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, and from the Ministry of Education and State Education Department of Pahang. Permission was also obtained from the respective school principals before conducting the study. Written informed consent was elicited from the parents and respondents prior to the data collection.

Measurements

Information on physical activity, eating behaviour, body weight management knowledge and perception of body image were collected using a self-administered questionnaire in the Malay language. Anthropometric measurements of body weight and height were obtained to calculate BMI-for-age. In addition, a pre-test of the questionnaire was conducted among 13 to 14 year old adolescents who were not involved in this study to determine the clarity and understanding of the questions 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), was used to assess general levels of physical activity of the adolescents. It consisted of ten items which measured physical activity done by the child in the past seven days. Each item was scored using a five-point scale, with higher scores indicating higher levels of activity. A mean score of 1 indicates low physical activity and a mean score of 5 indicates high physical activity. Further, the mean scores were classified into three categories of either 'low' (1-2.33), 'moderate' (2.34-3.66) or 'high' (3.67-5) (Dan, Mohd Nasir & Zalilah, 2007). The internal consistency of PAQ-C was

previously reported to be high (Cronbach's alpha=0.89) (Crocker *et al.*, 1997). Similarly in this study, the internal consistency of the instrument was also high (Cronbach's alpha=0.88).

Assessment of eating behaviour

Eating behaviour was assessed using the Eating Attitude Test-26 (EAT-26) (Garner & Garfinkel, 1979). A six-point Likert scale ranging from 'Always', 'Usually', 'Often', 'Sometimes', 'Rarely' to 'Never' was used to rate each item. Responses for each item were given a score of 0 for 'Sometimes', 'Rarely' and 'Never', a score of 1 for 'Often', a score of 2 for 'Usually' and a score of 3 for 'Always'. However, scoring for item 25 was reversed. The possible total scores were 0 to 76. Based on their total scores, the respondents' eating behaviour was categorised into 'no-risk' (<20) or 'at-risk' (≥20) of eating disorders. The internal consistency of EAT-26 was previously found to be high (Cronbach's alpha=0.90) (Rivas *et al*., 2010). For this study, the internal consistency of the scale was also high (Cronbach's alpha=0.81).

Assessment of body weight management knowledge

To assess adolescents' knowledge on weight management, the Weight Management Knowledge Inventory (WMKI) by Thombs, Mahoney & McLaughlin (1998) was used. This inventory consisted of 12 items and each had one correct and three incorrect answers. A correct answer was scored as 1 point, while an incorrect answer was given a score of zero. The possible total scores were 0 to 12 and the scores were categorised into three categories of 'low' (0-6), 'moderate' (7-9) or 'high' (10-12) (Pon *et al*., 2004). In this study, the internal consistency of the instrument was moderate (Cronbach's alpha=0.62).

Assessment of body image perception

A questionnaire adapted from Thompson & Gray (1994) was used to determine the respondents' perception of body size. It consisted of three items and respondents were shown a series of figures from the Contour Drawing Rating Scale. In the scale, each of the nine figures was given a number that represents a different degree of body size. Respondents were required to choose a figure that best represents their current, ideal, and healthy body size. Each of the figures was scored from 1 (the thinnest body size) to 9 (the biggest body size). A discrepancy score, which is the difference between perception of a current body size and perception of an ideal body size, was calculated. An adolescent with a zero discrepancy score was categorised as satisfied, while a negative or a positive score indicates that the adolescent was dissatisfied with his / her current body size.

Anthropometric measurements

Body weight and height of the respondents were measured by a TANITA digital weighing scale and a body metre, respectively. Each measurement was obtained twice with weight recorded to the nearest 0.1 kg and height to the nearest 0.1 cm. Body Mass Index (BMI) was calculated and categorised according to BMI-for-age reference (WHO, 2007).

Statistical analysis

Data were analysed using the SPSS for Windows version 17.0. Descriptive statistics were used to describe variables, such as sex and ethnicity, body mass index (BMI), physical activity, eating behaviour, body weight management knowledge and perception of body image. Independent sample *t*-test was used to compare the difference between two group means. Chi-square and Pearson correlation tests were used to determine associations between the variables. Statistical significance was set at $p<0.05$ and $p<0.001$.

Table 1. Characteristics of study respondents

Characteristics	*Male* *n (%)*	*Female* *n (%)*	*Total* *n (%)*
Gender	163 (45.3)	197 (54.7)	360 (100.0)
Ethnicity			
Malay	95 (58.3)	113 (57.4)	208 (57.8)
Chinese	66 (40.5)	78 (39.6)	144 (40.0)
Indian	1 (0.6)	5 (2.5)	6 (1.7)
Others	1 (0.6)	1 (0.5)	2 (0.6)
Fathers' education level			
Not formal	3 (1.8)	1 (0.5)	4 (1.1)
Primary	9 (5.5)	20 (10.2)	29 (8.1)
Secondary	66 (40.5)	90 (45.7)	156 (43.3)
University / college	85 (52.1)	86 (43.7)	171 (47.5)
Mother's education level			
Not formal	1 (0.6)	3 (1.5)	4 (1.1)
Primary	13 (8.0)	13 (6.6)	26 (7.2)
Secondary	76 (46.6)	106 (53.8)	182 (50.6)
University / college	73 (44.8)	75 (38.1)	148 (41.1)
Body Mass Index (BMI) Categories			
Severe thinness	24 (14.7)	26 (13.2)	50 (13.9)
Thinness	23 (14.1)	36 (18.3)	59 (16.4)
Normal	75 (46.0)	103 (52.3)	178 (49.4)
Overweight	24 (14.7)	13 (6.6)	37 (10.3)
Obese	17 (10.4)	19 (9.6)	36 (10.0)
Mean ± SD (kg / m²)	19.10 ± 4.35	19.18 ± 4.31	19.14 ± 4.32 (χ^2=7.59, p=0.108)

RESULTS

Socio-demographic characteristics

A total of 360 adolescents from six secondary schools in Kuantan, Pahang participated in this study. All of the respondents were between 13 to 14 years old, and their mean age was 13.23±0.31 years. Table 1 shows that 45.3% of the respondents were males and 54.7% were females. The study sample was multi-ethnic in composition with more than half (57.8%) of the respondents being Malay, 40.0% Chinese, 1.7% Indian and 0.6% others. In addition, for both sexes, nine out of ten of their parents had attained a minimum of secondary school education.

Anthropometric measurements

Mean body weight, height and BMI of the male respondents were 46.36±12.23 kg, 1.55±0.07 m, and 19.10±4.35 kg / m² respectively, whereas for females, mean body weight, height and BMI were 45.14±11.47 kg, 1.53±0.06 m, and 19.18±4.31 kg / m² respectively. About half of the respondents (49.4%) were categorised as having a normal BMI, while 13.9% were severely thin, 16.4% thin, 10.3% overweight and 10% obese. More of the male respondents were in the overweight and obese categories as compared to females. However, there was no significant association between the respondents' sex and BMI categories (χ^2=7.59, p=0.108).

Physical activity level

Table 2 shows that the respondents' overall physical activity score was low with a mean score of 2.06±0.45. Male respondents were significantly more physically active than

Table 2. Distribution of physical activity, eating behaviour, body weight management knowledge and total discrepancy score of adolescents by sex

Characteristics	*Male* *n (%)*	*Female* *n (%)*	*Total* *n (%)*	χ^2 *value*
Physical activity				
Low	106 (65.0)	163 (82.7)	269 (74.7)	14.81**
Moderate	57 (35.0)	34 (17.3)	91 (25.3)	
High	0 (0.0)	0 (0.0)	0 (0.0)	
Mean ± SD	2.19 ± 0.45	1.95 ± 0.42	2.06 ± 0.45	
Eating behaviour				
No-risk of eating disorder	116 (71.2)	144 (73.1)	260 (72.2)	0.17
At-risk of eating disorder	47 (28.8)	53 (26.9)	100 (27.8)	
Mean ± SD	15.25 ± 10.20	15.54 ± 10.53	15.41 ± 10.37	
Body weight management knowledge				
Low	69 (42.3)	44 (22.3)	113 (31.4)	16.56**
Moderate	94 (57.7)	153 (77.7)	247 (68.6)	
High	0 (0.0)	0 (0.0)	0 (0.0)	
Mean ± SD	4.19 ± 1.87	5.71 ± 1.66	5.35 ± 1.80	
Discrepancy score categories				
Satisfied	44 (27.0)	35 (17.8)	79 (21.9)	4.43*
Dissatisfied	119 (73.0)	162 (82.2)	281 (78.1)	
Mean ± SD	1.14 ± 0.99	1.31 ± 1.00	1.24 ± 0.99	

*significant at $p<0.05$
**significant at $p<0.001$

females ($\chi^2=14.81$, $p<0.001$), with more males (35.0%) than females (17.3%) in the moderate physical activity level category whereas more females (82.7%) than males (65.0%) were in the low physical activity level category. None of the respondents were in the high physical activity level category.

Eating behaviour

Mean eating behaviour score was 15.41±10.37, with about one in three respondents (27.8%) being at-risk of eating disorders. The distribution of the respondents with respect to eating behaviour categories was almost similar for both sexes ($\chi^2=0.17$, $p=0.723$).

Body weight management knowledge

There was a significant association between body weight management knowledge categories and sex of the respondents ($\chi^2=16.56$, $p<0.001$). Three in four (77.7%) female respondents were categorised in the moderate weight management knowledge category, while more males (42.3%) were categorised in the low knowledge category. However, none of the respondents were categorised in the high knowledge category.

Body image perception

Mean discrepancy score was 1.24±0.99, with three-quarters (78.1%) of the respondents found to be dissatisfied with their current body size. Also, there was a significant association between the discrepancy score categories and sex of the respondents ($\chi^2=4.43$, $p<0.05$) with more females (82.2%) than male respondents (73%) being dissatisfied with their current body image. As presented in Table 3, more males (70.6%) selected a normal-size figure as their current

Table 3. Distribution of respondents by perception of body image classifications and by sex

Classifications	*Male n (%)*	*Female n(%)*	*Total n (%)*
Current body image perception			
Underweight (figure 1-3)	16 (9.8)	55 (27.9)	77 (21.4)
Normal weight (figure 4-6)	115 (70.6)	116 (58.9)	231 (64.2)
Overweight (figure 7-9)	32 (19.6)	26 (13.2)	58 (16.1)
Ideal body image perception			
Underweight (figure 1-3)	6 (3.7)	24 (12.2)	30 (8.3)
Normal weight (figure 4-6)	151 (92.6)	170 (86.3)	321 (89.2)
Overweight (figure 7-9)	6 (3.7)	3 (1.5)	9 (2.5)
Healthy body image perception			
Underweight (figure 1-3)	0 (0.0)	23 (11.7)	23 (6.4)
Normal weight (figure 4-6)	143 (87.7)	158 (80.2)	301 (83.6)
Overweight (figure 7-9)	20 (12.3)	16 (8.1)	36 (10.0)

Table 4. Correlations between physical activity, eating behaviour, body weight management knowledge, body image perception and BMI

Characteristics	*r-value*				
	Physical activity	*Eating behaviour*	*Body weight management knowledge*	*Total discrepancy score*	*BMI*
Physical activity	-	0.04	-0.07	-0.11*	-0.03
Eating behaviour	-	-	-0.14*	0.14 *	0.28**
Body weight management knowledge	-	-	-	0.09	-0.03
Total discrepancy score	-	-	-	-	0.35**

*significant at $p<0.05$
**significant at $p<0.001$

body size as compared to the female respondents (58.9%). Conversely, females were three times (12.2%) more likely than males (3.7%) to select an underweight figure as their ideal body size. However, there were almost equal percentages of male (87.7%) and female (80.2%) respondents who selected a normal-size body figure as a healthy body size.

As presented in Table 4, the eating behaviour score (r=0.28, $p<0.001$) and body image discrepancy score (r=0.35, $p<0.001$) correlated positively with BMI. Adolescents with high eating behaviour scores and body image discrepancy scores were more likely to have greater BMI. However, there were no significant correlations between physical activity and body weight management knowledge with BMI. In addition, the results revealed that eating behaviour was significantly correlated with body weight management knowledge (r=-0.14, $p<0.05$) and body image discrepancy score (r=0.14, $p<0.05$).

DISCUSSION

The present study determined the factors contributing to body weight status of male and female adolescents in Kuantan, Pahang. The study respondents were selected among 13 to 14 year old adolescents, who may be at a higher risk to establish many undesirable lifestyle habits such as physical inactivity, poor eating habits, and misperception of their body image compared to other adolescents (Kennedy & Prothrow-Stith, 1997). Adolescents gain up to 50% of their adult weight, 20% of adult height and 50% of adult skeletal mass during adolescence. However, there are sex differentials in acceleration of growth and maturation during this period. These include earlier onset of puberty and higher fat mass in females but higher fat-free mass, peak height velocity and increase in shoulder span in males (Vizmanos & Marti-Henneberg, 2000). Thus, normal development and growth of the adolescents are important in order to prevent many health problems such as overweight and obesity, as well as chronic diseases during adulthood.

In this study, only half of the respondents were categorised as having a normal BMI, with more females than males in the normal weight category. One in five of the respondents were overweight or obese, with about 25% of males in these BMI categories. A report by the Third National Health and Morbidity Survey (2006) found that 5.4% of children aged below 18 years were overweight, but there was no significant difference between male and female children (IPH, 2008). In addition, a study by Ismail *et al.* (2009) found that among 7 to 12 year old children in Peninsular Malaysia, 10.5% were overweight and 5.9% obese, with subtle differences between sexes and regions.

This study found that more than 30% of the respondents were severely thin or thin. This may be because a majority of the respondents were from low to moderate income households. In 2006, the Third National Health and Morbidity Survey (NHMS III) reported that 13.2% of children aged below 18 years were underweight. Most of the underweight children (66.8%) in that survey were from households earning less than RM 2000 per month (IPH, 2008). In addition, a study among primary school children from low income households in Kuala Lumpur showed the prevalence of overweight to be only 5.8%, while a majority of the children (52%) were underweight (Zalilah *et al*., 2000).

Furthermore, three in four respondents were physically inactive, while the rest were in the moderate physical activity level category. A study by Dan *et al.* (2007) reported that only 3% of adolescents in their study were in the high physical activity level category, while the remaining 35.3% and 61.5% were in the low and moderate physical activity level categories, respectively. Moreover, our results showed that males were more physically active than females and this finding has been reported in other studies. For example, a study among Spanish children found that less than 30% of them were physically active, with more males being active regularly as compared to females (Lasheras *et al*., 2001).

One in every third respondent was found to be at-risk of eating disorders, with no significant difference in disordered eating scores between males and females. Disordered eating is a common and widespread problem among adolescents. A report by Youth Risk Behavior Survey (YRBS) in 2005 found that 4.5% of adolescents surveyed have vomited or taken laxatives to lose weight or to keep from gaining weight, with more females (6.2%) practising these unhealthy eating behaviours (CDC, 2006). In addition, a study by Jillian *et al.* (2002) found that among 15 to 18 year old adolescents, overall disordered eating was higher in females (55%) than in males (30%). More female adolescents ate less and took laxatives and diuretics as compared to males.

More than half of the respondents were categorized as having moderate body weight management knowledge, with more females (77.7%) than males (57.7%) in this category. The result also suggests that the respondents were not very knowledgeable about their body weight management as none of them were categorised into the high knowledge category. Similarly, a study by Siew (2003) reported that only 5.8% of the adolescents in their study were categorised into the high knowledge category, while a majority was categorised into the moderate knowledge category. In addition, a study conducted by Pon *et al.* (2004) also found that almost two thirds of female adolescents in Perak were in the low body weight management knowledge category.

Three quarters of the respondents in this study were found to be dissatisfied with their current body size, with more females (82.2%) than male adolescents (73%) dissatisfied with their body size. This study also found that more than 25% of female respondents selected an underweight figure, while a majority of the male respondents selected a normal-size figure as their perception of current body size. These findings are consistent with several other studies, which found that female adolescents were more likely to be dissatisfied with their current body size. A study by Gustafson & Terry (1992) reported that male and female adolescents have a different dissatisfaction of their current body size, with females more likely desiring to be thinner, while males were more likely desiring to be taller. Another study by Khor *et al.* (2009) reported that more male adolescents (49.1%) preferred a larger body size while more females (58.3%) desired a smaller body size.

Further, there were significant correlations between eating behaviour and body image discrepancy scores with BMI of the adolescents. Similar findings were also reported by other studies in that there was a significant positive correlation between eating behaviour and body weight status of the adolescents. A study by Khor, Cobiac & Skrzypiec (2002) found that dieting practices were positively correlated with BMI of Malaysian university students. In addition, Story *et al.* (2001) reported that heavier children were significantly more likely to have dieted or attempted weight loss through a variety of methods as compared to normal weight children. More than 70% of the respondents in their study had tried to lose weight although they were categorised as having a normal BMI.

Body image plays an important role in the management of body weight of adolescents. Our study found that body image discrepancy score was correlated positively with BMI of the adolescents. This was consistent with a study by Pon *et al.* (2004), which reported that adolescents with higher body weight had significantly greater body image dissatisfaction and tended to skip meals as compared to those with a normal body weight. In addition, a study by Martins *et al.* (2010) among 11 to 13 year old adolescents in Brazil found that body image dissatisfaction was positively correlated with body weight status. Overweight female adolescents in the study were more likely to be dissatisfied with their body image than those with normal weight.

On the contrary, this study did not find any correlation between physical activity and BMI of the adolescents. Several other studies also reported similar findings with no significant associations between physical activity and body weight status of adolescents (Dan *et al.*, 2007; Tan, 2003). Otherwise, a study that reported an association between these two variables indicated that overweight or obese adolescents were less likely to be physically active than their non obese or non overweight peers (Bellisle & Rolland-Cachera, 2001). In addition, our study revealed that there was no association between body weight management knowledge and BMI of the adolescents. However, Pon *et al.* (2004) reported that more normal weight

adolescents were in the high weight management knowledge category as compared to overweight adolescents.

There were marked differences in the adolescents' physical activity, body weight management knowledge and body image discrepancy score categories by sex. In addition, eating behaviour and body image perception were observed to be significantly correlated with body weight status of the adolescents. Hence, our findings support that eating behaviour and body image perception are the factors associated with the adolescents' body weight status. Further investigations are required to confirm these findings in the general Malaysian adolescent population.

There are several limitations to our study that could affect the interpretation of the findings. The study was conducted only in six out of thirty national secondary schools in Kuantan, Pahang. Hence, the results may not be representative of adolescents from other schools, other districts in Pahang, and other states in the country. Also, the questionnaire used in this study was self-administered and reliance on self-reported data depends on the honesty and the ability of the adolescents to understand the questions.

CONCLUSION

In conclusion, our study found that unhealthy eating behaviour and negative body image perception may positively contribute to the body mass index of the adolescents. Strategies for obesity prevention among adolescents should include measures that promote positive eating behaviour and positive body image perception. Thus, it is recommended that both government and non-government agencies carry out programmes to promote healthy eating and positive body image among children and adolescents so that healthy lifestyle patterns can be established and developed throughout life.

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