

## Childhood obesity and physical activity patterns in an urban primary school in Thailand

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### Objective

This study aimed to assess childhood obesity and physical activity patterns in an urban Thailand primary school.

### Methods

In a case-control study, 85 male and female school children, aged 10-12-years old, were randomly selected from a school in Nakhon Pathom province, Thailand.

Anthropometric data, including weight and height were collected. Obese or overweight children were considered as case group. Obesity was defined as percentile = 95<sup>th</sup>, and overweight was defined as percentile = 85, of the sex- specific BMI-for-age growth CDC charts. A routine activity checklist evaluated different activities of the children during weekdays and on weekends. Based on CDC site, all activities were classified as light, moderate or heavy.

### Results

There was a significant difference between sleeping hours of case and control groups on weekends ( $P=0.000$ ), and control group had longer sleeping periods. The case group had less moderate activity on weekdays and weekends, but there was no statistically significant difference between case and control group. The hours of light activities on weekends in the control group were significantly less than that in the obese group ( $P<0.000$ ).

### Conclusions

Physical activity pattern of the school children was different in case and control groups. However, daily activity of children does not relate directly to obesity in children. (Rawal Med J 2009;34:203-206).

### Key words

Obesity, child obesity, physical activity.

## INTRODUCTION

In Western countries, the incidence of childhood obesity has more than doubled over the past generation.<sup>1</sup> In developing countries with under-nutrition, a similar pattern is now emerging, but it has not been paid attention so that public health strategies can be developed.<sup>2</sup> As a result, obesity can create an enormous economic and public health burden for these countries in the near future.<sup>3,4</sup> The etiology of obesity involves a complex interaction of various factors; one of these factors is physical activity. It is well established that there is an inverse relationship between physical activity and overweight/obesity among children.<sup>5-6</sup> The prevalence of obesity in 5 to 12 year old children in Thailand increased from 12.2% to 15.6% in just two years and a prevalence of 26% among primary school children in Nakhon Pathom municipal school, Nakhon Pathom province, Thailand was found.<sup>7</sup> The aim of this study was to determine physical activity patterns of, and any relationship between physical activity and childhood

overweight/obesity among, urban Thai school children living in Nakhon Pathom province.

## SUBJECTS AND METHODS

In this case-control study, 85 male and female school children (52 boys, 33 girls) were selected. They were 4, 5, and 6 graders, aging 10-12 years, and attending a school in Nakhon Pathom province, Central Thailand. Students of the school were from all socio-economic class. The sample was selected using stratified random sampling, out of 837 children. The controls (not obese children) and the cases were drawn from the same population.

Each student was interviewed separately, and each interview was conducted by a translator. The students recalled their different activities during weekdays and on weekends, by a routine activity checklist, which evaluated the students' activities on a typical day, from morning until going to bed. Various physical activities were classified as light, moderate or heavy according to CDC.<sup>8</sup>

Weight was measured by a digital scale (Soehnle

Max 150 kg x 100g), with the subjects wearing light clothes and without shoes. Height was measured to the nearest 0.5 cm by a tape fixed on a vertical wall. Overweight was defined by index of BMI-for-age, as having BMI= 85th percentile.<sup>9</sup> The study protocol was approved by the Institute of Nutrition, Mahidol University. Kolmogorov-Smirnov test was used to assess the distribution of data. If the distribution of data was normal, T-test was used to assess the mean difference between two groups, and if otherwise, the data was analyzed by Mann-Whitney. A p<0.05 was considered to be statistically significant.

**RESULTS**

The differences between age, height, weight and BMI of two groups were statistically significant (Table 1

**Table 1. Values of students by demographic factors.**

categorization variables	control n=48		obese n=37		P value <sup>a</sup>
	Mean	SD	Mean	SD	
Age(years)	10.5	0.85	10.9	0.80	0.02
Height(cm)	140.8	8.9	151.5	7.6	0.00
Weight(kg)	34.9	7.8	69.1	11.7	0.00
BMI(kg/m2)	17.4	2.6	29.9	2.9	0.00

<sup>a</sup>Analyzed by t-test.

Based on physical activity level, no activity was classified as heavy, and there was only light or moderate activity. The results show longer sleeping periods among the control group. There was a significant difference between sleeping hours of two groups on weekends (Table 2, P<0.000).

**Table 2. Values for hours of sleeping of children.**

Activity	Weight status	Hours of sleeping on weekdays	Hours of sleeping during weekends
Control n=42 <sup>a</sup>	Mean	9.39	10.48
	SD	1.09	1.22
Obese n=32 <sup>a</sup>	Mean	9.11	9.57
	SD	1.08	0.97
P value <sup>b</sup>		0.28	0.001

<sup>a</sup>Physical activity checklist of some samples was not accessible.

<sup>b</sup>Analyzed by T-test.

The hours of light activities on weekends in the control group were significantly less than that in the obese group (Table 3, P<0.000).

The obese group had less moderate activity on weekdays and weekends and there was no difference between hours of sedentary activities on weekdays and weekends among the two groups (Table 3, P>0.05).

Activity	Weight status	mean	SD	P value
Hours of light activity on weekdays	Control n=42 <sup>a</sup>	14.18	1.19	0.30 <sup>b</sup>
	Obese n=32 <sup>a</sup>	14.47	1.25	
Hours of light activity on weekends	Control n=42	12.63	1.57	0.00 <sup>b</sup>
	Obese n=32	13.93	1.29	
Hours of moderate activity on weekends	Control n=42	0.87	1.56	0.21 <sup>b</sup>
	Obese n=32	0.48	1.00	
Hours of moderate activity on weekdays	Control n=42	0.42	0.66	0.92 <sup>b</sup>
	Obese n=32	0.40	0.87	
Hours of non sedentary activity on weekdays	Control n=42	2.77	0.87	0.84 <sup>c</sup>
	Obese n=32	2.70	0.97	
Hours of sedentary activity on weekdays	Control n=42	11.83	1.20	0.34 <sup>b</sup>
	Obese n=32	12.17	1.32	
Hours of non sedentary activity on weekend	Control n=42	3.24	2.73	0.21 <sup>b</sup>
	Obese n=32	4.08	2.91	
Hours of sedentary activity on weekend	Control n=42	10.26	2.57	0.90 <sup>b</sup>
	Obese n=32	10.34	2.96	

**Table 3. Values for daily activities of children.**

<sup>a</sup> Physical activity checklist of some samples was not accessible. <sup>b</sup> Analyzed by t-test <sup>c</sup> Analyzed by Mann-Whitney

**DISCUSSION**

This study showed that the time spent on sleeping on weekdays and weekends was higher in the control

group than that in the overweight group. This is possibly because children in the control group are more active than those in the overweight group, and require more sleep. The time spent on sleeping has been reported to be a positive factor, maintaining a balance between weight and height.<sup>10</sup> Some studies have speculated that sleep deprivation could be a cause of obesity; it is also possible that low sleep quality followed as a result of the subject's being obese, because of sleep apnea.<sup>11</sup> Moreover, some studies suggest that obese people had less sleeping time compared to non-obese people, and there was an inverse association between obesity and sleep duration.<sup>12-14</sup>

Hours of light activities on weekdays and weekends were more in the overweight group than that in the control group. Furthermore, regular outdoor moderate physical activities can have a great impact on daily energy expenditure and thereby reduce overweight.<sup>15</sup> In our study, the overweight group had less moderate activity on weekdays and weekends, but there was no statistically significant difference between the two groups. A study from Thailand also showed that there was no significant difference between normal and obese groups in terms of the daily activity patterns of children.<sup>7</sup> While several studies have reported on the positive associations between adiposity in children and adolescents and physical activity,<sup>16-18</sup> others have found no relationship.<sup>19</sup>

For studies on physical activities, there is a need to define and investigate specific types of activities, rather than only looking at "light, moderate, or heavy" tendencies in assessing energy expenditure.<sup>18</sup> Besides, time spent on different days, activities should be calculated more precisely by different methods, such as direct observation or record of physical activities by parents, rather than asking only the children.<sup>20</sup> The authors acknowledge the limitations affecting the findings of this study, including, small sample size, the stratified random sampling technique, which limits the possibility of drawing conclusions for the Nakhon Pathom province, lack of valid questionnaires for assessing physical activity status and lack of control of eating habit in both groups of this study. In conclusion, daily activity of children does not relate directly to

overweight in children.

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