The Association between Television Viewing and Childhood Obesity : A National Survey in Thailand

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Abstract

Objective : To determine the relationship between television viewing and obesity among Thai children.

Design : A one-stage cross-sectional national survey.

Setting : National communities in Thailand.

Subjects : Four thousand one hundred and ninety-seven children aged 6 to 12 years old.

Results : By using the new national growth reference as a normative data, 262 (6.2%) children in this survey were obese. According to the caregivers, 62 per cent of children watched television 1 to 3 hours per day. Children who spent more than 3 hours per day watching television were more likely to be obese than the children who watched television less with the odd ratio of 1.8 (95% confidence interval = 1.2-2.8).

Conclusion : With a one-stage design for determining the association between television viewing and childhood obesity, Thai school age children who watched television more than 3 hours per day were more likely to be obese with statistical significance.

Key word : Television Viewing, Obesity, Children, Thailand

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The prevalence of childhood and adolescent obesity is increasing dramatically in many countries, including Thailand[1-4]. Childhood obesity is a result of an interaction between genetic and environmental factors. The inheritance of body mass index (BMI) and a specific gene defect, leptin, are currently well-known genetic factors[5]. Environmental factors shown to be associated with childhood obesity include being the only child[6], the absence of one parent[7], excessive television viewing[8], and physical environment including season, geographic region and population density[9]. Television viewing and childhood obesity has been studied extensively in the past decade[10]. A substantial number of epidemiologic studies have examined the positive association, even relatively weak, between television viewing and childhood obesity[11]. In the first of these studies, Dietz and Gortmaker reported statistically significant association between hours per day of watching television and prevalence of obesity[12]. The largest reported associations have come from a nationally representative sample participating in a 4-year longitudinal study. In that study, there was a dose-response relationship between hours of television viewing and overweight[1].

From the authors' search, there has not been a report which studied this association in an Asian population. In 1997, the National Health Examination Survey II was conducted in both Thai children and adults. The purpose of this study was to investigate the association between television viewing and childhood obesity by analyzing the data in that survey.

SUBJECTS AND METHOD

In 1997, the Ministry of Public Health of Thailand conducted a multi-stage random cross-sectional survey named the National Health Examination Survey II. The sampling frame was obtained from the National Statistical Office, Office of the Prime Minister. The National Statistical Office is responsible for the national census survey every ten years and produces a sampling frame for other national surveys. The sampling frame for the population census survey in 1995-1996 was used. Stratified multi-stage sampling was performed: 1st stage - Five geographic areas of Thailand were located (geographic stratification) including 4 regions (Central, Northern, Northeastern, Southern regions) and Bangkok; 2nd stage - Eight provinces of each region and 8 districts of Bangkok were then sampled at random; 3rd stage - Villages and communities underwent stratified sampling according to municipal and non-municipal areas except in Bangkok where all communities were municipal areas (67 communities/villages for Bangkok and the northern region, 61 for the central region, 71 for the northeastern region, and 68 for the southern region); 4th stage - 15 children aged 6-12 years from each village and community were then sampled at random. Therefore, 4,197 children were sampled for examination and their caregivers were interviewed. There were 688 subjects in Bangkok, 695 subjects in the central region, 957 subjects in the northern region, 954 subjects in the northeastern region, and 903 subjects in the southern region. All subjects were visited at their own houses. They and their caregivers or family members were told about the objective of this survey conducted by the Ministry of Public Health. Repeated visits were made as necessary.

The growth measurements were taken by trained medical personnel. The height of the children was measured in an upright position by using a measuring tape, which was fixed straight on the wall. Weight was measured by using a standard standing scale. Child demographic information collected included age, gender, and television viewing habits. Parental information surveyed included age, educational levels, household income. The caregivers (mostly mothers) were asked how many hours their children spent watching television (including video programs and playing video games) on a typical day.

Recently, a normal growth reference of Thai children was revised. The survey, which was conducted between June 1995 and October 1996, by Nutrition Division, Department of Health, Ministry of Public Health included the growth measurements of children with age ranged from 1 day to 19 years. The definition of obesity in this study is weight-for-height above mean plus 2SD, while the children with weight-for-height below mean minus 2SD were considered thin[13].

RESULTS

Among 4,197 children recruited in the study; 2,162 (51.6%) were boys, and 1,996 (47.6%) who resided in the urban area. The mean age of the group was 9.4 years (SD = 2.1), the mean family income per year was 13,010 baht (SD = 25,117). The characteristics of these children are shown in Table 1. By

using the new national growth reference as a normative data, 262 (6.2%) were obese, and 268 (6.4%) were thin (Table 2).

Most of the children (62%) watched television 1 to 3 hours per day on a typical weekday. Reportedly, 5.5 per cent of children did not watch television, whereas 7.1 per cent spent more than 3 hours on television viewing (Table 3).

Children who watched television more than 3 hours per day were more likely to be obese with the odd ratio of 1.8 (95% CI = 1.2-2.8). Children who spent fewer hours per day on this sedentary behavior had a relatively low frequency of being obese with statistical significance (Table 4).

Table 1. The selected sociodemographic characteristics of children (n = 4,197).

	Number	%
Gender		
Male	2,126	51.6
Female	2,035	48.4
Mother's education		
Primary school (grade 6)	2,753	64.9
Higher than primary school	1,444	35.1
Location of residence		
Municipal	1,996	47.6
Non-municipal	2,201	52.4

DISCUSSION

Television viewing has been part of everyday life activity for both children and adults all over the world for a few decades. Eight to 18-year-old children in the United States spent an average of about 4.5 hours per day watching television and videotapes and playing video games[10]. In the present study, 47 per cent of 6- to 12-year-old Thai children spent 1 to 3 hours per day doing the same activities. Ecological studies in England suggested that an increase in sedentary behaviors and decrease in total energy expenditure may be contributing to the prevalence of overweight in developed countries[14].

The prevalence of obesity in Thai children has been reportedly increasing[15,16]. By using weight-for-height values as a reference, the prevalence of obesity in the present study was 6.2 per cent, which is lower than the prevalence rate of 14 per cent reported in 1996[15]. However, the study sample in 1996 was a population in an urban area only. As the data of the urban group in the present study was analyzed, the number of obese children increased to 9.1 per cent. It is likely that childhood obesity tends to be more of a health problem as Thailand is undergoing economic transition.

Many studies in Western countries have demonstrated the association between television viewing and childhood obesity[12]. Dietz and Gortmaker

Table 2. Weight-for-height of children distributed by region.

Weight-for-height	Number of children in each region											
	Bangkok (n=688)	%	Central (n = 695)	%	North (n = 957)	%	Northeast (n = 954)	%	South (n = 903)	%	Total (n = 4,197)	%
Thin (< -2SD)	27	3.9	48	6.9	70	7.3	57	6.0	66	7.3	268	6.4
Normal (-2SD to +2SD)	596	86.6	612	88.1	825	86.2	847	88.8	787	87.2	3,667	87.4
Obese (> +2SD)	65	9.5	35	5.0	62	6.5	50	5.2	50	5.5	262	6.2

Table 3. The duration (hours per day) of children's television viewing distributed by region.

Duration of television viewing (hour/day)	Number of children in each region											
	Bangkok (n = 683)	%	Central (n = 695)	%	North (n = 957)	%	Northeast (n = 952)	%	South (n = 903)	%	Total (n = 4,190)	%
None	31	4.5	37	5.3	45	4.7	54	5.7	64	7.1	231	5.5
< 1	111	16.3	160	23.0	297	31.0	239	25.1	256	28.3	1,063	25.4
1-3	458	67.1	408	58.7	575	60.1	615	64.6	547	59.9	2,597	62.0
> 3	83	12.1	90	13.0	40	4.2	44	4.6	42	4.7	299	7.1

Table 4. The correlation of children's television viewing and weight-for-height.

Duration of television viewing (hour/day)	Weight-for-height	
	Non-obese (≤ 2SD)	Obese (> 2SD)
0-3	3,687	231
> 3	233	27*

* p = 0.004

first found that prevalence of obesity increased in 12- to 17-year-old adolescents by 2 per cent for each additional hour of television viewed. The same finding has been replicated in several studies, sampling in different age groups[1,17-19]. Some studies were conducted in the nationally representative samples [17,20]. In contrast, some other studies found no significant association between television viewing and obesity[21-23]. To the authors' knowledge, this is the first report from an Asian country which found that 6-to 12- year-old children who watched television more than 3 hours per day were likely to be obese with the odd ratio of 1.8.

There are three potential mechanisms suggested to link television viewing and obesity[10]. They are the reduction of energy expenditure from television viewing displacing physical activity, the increase of energy intake from eating during viewing or from the effects of food advertising, and the decrease of resting metabolic rate during viewing. Given the well-known difficulties in measuring television viewing, diet, and physical activity, the weak association of television viewing and obesity in cross-sectional studies, the causal relationship still needs to be further examined[24]. Cross-sectional studies cannot eliminate the possibility that the causal arrow is backward. Watching more television could be the consequence of being overweight. However, there have already been a few studies reporting the effectiveness of intervention programs of increasing physical activity and reducing television viewing that might prevent childhood obesity[25,26].

Because there are several adverse effects of television on child health, the American Academy of Pediatrics recommends that both parents and pediatricians participate and supervise children on television viewing, such as, avoiding television viewing for children under the age of 2 years, limiting time spent viewing television to less than one to two hours per day, etc[27,28]. In Thailand, there is not such a recommendation from any professional society, although television viewing and video game playing is increasing in children and adolescents.

However, there were a few limitations in the present study. Stadiometer, which is a standard scale for height measurement, was not used to measure the children's height. Using a non-elastic tape fixed on the wall might cause some error in measurement. Moreover, the time spent in television viewing might be underestimated by the caregiver because Thai children, especially in rural areas, sometimes watch television outside their houses. Currently, some villages in remote areas still lack electricity access, and there are no television sets in many households due to poverty. The authors do not have data collected to confirm the reason why some children (5.5%) did not watch television at all. They probably did not have television sets in their houses, or their television viewing outside the houses by their caregivers was not observed.

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ความสัมพันธ์ของการดูโทรทัศน์และภาวะอ้วนในเด็ก : การศึกษาระดับชาติในประเทศไทย

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วัตถุประสงค์ : เพื่อศึกษาหาความสัมพันธ์ของการดูโทรทัศน์และภาวะอ้วนในเด็กไทย

รูปแบบการวิจัย : การสำรวจระดับชาติแบบภาคตัดขวางขั้นตอนเดียว

สถานที่ : ชุมชนทั่วประเทศไทย

ประชากรศึกษา : เด็กวัยเรียนอายุ 6–12 ปี จำนวน 4,197 คน

ผลการศึกษา : จากการใช้เกณฑ์อ้างอิงการเจริญเติบโตใหม่ พบว่าเด็ก 262 คน (6.2%) ในการสำรวจครั้งนี้ มีภาวะอ้วน ในการสัมภาษณ์ผู้เลี้ยงดูเด็ก มีรายงานว่า 62 เปอร์เซนต์ของเด็กใช้เวลาในการดูโทรทัศน์ 1–3 ชั่วโมงต่อวัน โดยเด็กที่ดูโทรทัศน์นานกว่า 3 ชั่วโมงต่อวันจะมีโอกาสอ้วนมากกว่าเด็กที่ใช้เวลาน้อยกว่า 3 ชั่วโมงต่อวัน 1.8 เท่า (95% confidence interval = 1.2–2.8)

สรุป : จากการศึกษานี้พบว่า เด็กที่ใช้เวลาดูโทรทัศน์นานกว่า 3 ชั่วโมงต่อวันมีความเสี่ยงที่จะเกิดภาวะอ้วนมากกว่ากลุ่มที่ดูโทรทัศน์น้อยกว่า อย่างมีนัยสำคัญทางสถิติ

คำสำคัญ : การดูโทรทัศน์, อ้วน, เด็ก, ประเทศไทย

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