

Association of Obesity with Food Habits and Body Image in School Children of Nakhon Pathom Province, Thailand

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(Received 15 Jul 2005; revised 20 Nov 2005; accepted 6 May 2006)

Abstract

In order to assess the relationship between obesity with food habit and body image, this case control study was conducted among 85 urban primary school children male and female aged 10-12 years old, attending Anuban School in Nakhon Pathom Province, in Thailand. Two different questionnaires were used for data collection for caregivers and students. The standard used for definition of overweight and obesity was body mass index [BMI]. Obesity was defined as percentile \geq 95th of the sex-specific BMI-for-age growth chart, CDC. Obese children commonly (> 4 times per week) ate blanched /steamed foods as well as spicy foods. While sugar consumption was the same between the two groups, oil consumption was higher among the obese group. Compared with control children, obese children had more snacks before breakfast as well as during lunch and dinner on weekdays and weekends. Normal students had more foods- except for leafy vegetable and fried BBQ snacks. Two-thirds of the children knew about the food groups, but only one-third of them could classify foods into the food groups. Obese children knew about the food groups and could classify foods better than the way normal children could. Children gained information about foods from their parents, teachers, sisters, books, and television. Most of obese children knew they were obese, and they were not happy with their status. In conclusion, Programs must be designed to improve nutrition and in this way, parents and /or caregivers must be involved.

Keywords: *Obesity, Schoolchildren, Food habits, Thailand*

Introduction

Obesity has reached epidemic proportions globally. Over one billion adults are overweight, and at least 300 million of them clinically obese. According to the US Surgeon General, in the USA the number of overweight adolescents has tripled since 1980, while the prevalence of obesity among children aged 6 to 11 yr has more than doubled since the 1960s (1).

Obesity is a complex condition, with serious economic, social, and psychological consequences,

affecting virtually all ages and socio-economic groups. Economically, obesity accounts for 2-6% of total health care cost in several developed countries; some estimates put the figure as high as 7%. The true costs are undoubtedly much greater as not all obesity-related conditions are included in these calculations (2).

Obesity is a major contributor to the global burden of chronic disease and disability. Physiologically, overweight and obesity lead to adverse metabolic effects on blood pressure, cho-

lesterol, triglycerides, and insulin resistance, as well as to non-fatal, but debilitating, health problems including respiratory difficulties, chronic musculoskeletal problems, skin problems, and infertility (2). Childhood obesity is also associated with many negative social and psychological ramifications such as peer aggression, depression, etc. (2).

In a region in Thailand, the prevalence of obesity in 5 to 12 yr old children rose from 12.2% to 15.6% in just two years (3). Results of a recent study revealed a prevalence of 26% among primary school children in Nakhon Pathom municipal school, Nakhon Pathom Province, Thailand (3). The results of this study showed that age of students, sex, paternal obesity, meal frequency, snack consumption frequency, and a high consumption of fried food were significantly associated with obesity among primary age school children. Since childhood obesity is an increasing problem in Thailand, there is a need to confirm the findings of this earlier study to determine if they hold for more than one school. Moreover, there is a need to identify a clearer relationship between family and parental characteristics (including food beliefs), child food habits and their beliefs (a topic that was not examined in the previous study), as well as providing firmer quantitative evidence regarding actual food intake.

This study seeks to provide this information in order to recommend family and school actions to control obesity among primary age school children.

Materials and Methods

This project was a "case-control study." This design was chosen in order to assess the relationship between the exposures of risk factors associated with the development of obesity. It aimed to assess this exposure between groups of school children who were not obese (control) compared to those who were obese (case).

The study population included 85 male and female school children aged 10-12 yr in grades 4,

5, and 6 attending Anuban School in Nakhon Pathom Province, Central Thailand (52 boys, 33 girls). These children were selected using stratified random sampling out of a total sample of 837 children in the three grades. Most of case-control study sample size will be less than 50 in each group. We used this formula to calculate sample size:

$$N = \frac{2(z_{1-\alpha/2} + z_{1-\beta})^2 \cdot (p \cdot (1-p))}{(P_1 - P_2)^2}$$

Consequently, and in line with a case control study, the controls (who were not obese) were drawn from the same "underlying population" as the case.

The project consisted of two different questionnaires: caregiver and student. The self-administered caregiver questionnaire sought information on family food patterns, and main child caregiver (often mother). Caregivers received their questionnaires by mail, and, after they were completed, they were sent back by mail. The response rate was 93%.

The student questionnaire was divided into three parts. Part one (access information, messages and their sources) contained questions regarding close friends, issues favored by students for chatting, and whether the child had anyone with whom he or she could consult in times of emotional pressure. Part Two sought information on food habits, eating behaviors of the child, and related issues. The 17 questions focused on eating behaviors, the acquiring and eating of snacks, pocket money and items it is spent on, obesity and its causes, as well as perceived body size of students. Part Three was a food frequency questionnaire that included 103 food items. Each student was interviewed separately and a translator conducted each interview, because interviewers were not familiar with local language.

A digital scale (Soehnle Max 150 kg x 100g) and a tape with precision ±1 mm collected anthropometric data. Z-scores were calculated and compared with the cutoff point determined by

WHO for weight for height (1). A Z-score above 3 SD identified obese (case) children, where those with less than 3 SD represented the control group.

The Chi-square test was performed for categorical data, and the *t*-independent test was used for analyzing continuous data between the two groups. Descriptive statistics, namely, percentage and range (minimum, maximum) of participants responding in each group were used. All analyses were performed using the SPSS version 11 statistical package.

Qualitative data were collected through interviews with all of the children. Interview guides contained questions on food habits, related issues, and body size. Interview guides (open-ended questions) were combined with other questions in the student's questionnaire. Answers were recorded, transcribed, coded, and analyzed through content analysis to help explain statistical patterns arising from the quantitative analysis.

Results

Table 1 shows in general, methods of blanch steaming ($P=0.1$) and chili paste ($P=0.05$) were more common in families of obese children than normal ones (Table 2).

Sugar and oil, if consumed in high amounts, can contribute to obesity in children.

Figure 1 shows the mean consumption of sugar and oil among the case and control groups. The results show that while sugar consumption is the same between the two groups, oil consumption is higher among the obese group than the control. There was no statistically significant relationship between sugar and oil consumption in the two groups.

Table 2 shows that compared to control children, obese children had more snacks during weekday before breakfast (5.4% control; 15.2% case) as well as during lunch and dinner on weekdays (69.4% control; 83.3% case) and weekends (48.6% control; 72.7% case). Control group ate more snacks before going to bed but this difference was not considerable. This table

showed that there was a statistically significant relationship between eating snack before breakfast and between lunch and dinner in the two groups on weekends ($P=0.04$).

Although, there was no statistically significant fat consumption differences between the two groups, Fig. 2 shows that control children had more foods than obese children, except in the cases of leafy vegetables, fried BBQ snacks, and protein groups. Once again, the data indicate that the diet of obese children may be higher than in fat normal children, particularly in terms of snacks.

The qualitative data also showed, however, that two-thirds of the children know about food groups, but only one-third of them can classify foods into the food groups. Surprisingly, obese children knew about food groups and could classify foods better than normal children. Children gained information about food from their fathers, mothers, teachers, sisters, books, and television but according to the data, they gained the most information from their parents. Children also learn about obesity from their parents, relatives, doctors, teachers, hospitals, advertisements, books, lessons, television, newspapers, magazines, and the Internet.

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Table 3 shows that most of obese children

(86.1%) knew they were obese. Moreover, according to the qualitative results, obese children were not happy with their status, because they thought that obesity led to inactivity and health problems.

Table 1: Relationship between method of cooking and obesity status

Method of cooking	Times/week	Control		Obese		Total		P
		n	%	n	%	n	%	
Use blanch steam method	Never cook	9	25.0	4	12.1	13	18.8	0.1
	<4	22	61.1	17	51.5	39	56.5	
	4-5	4	11.1	6	18.2	10	14.5	
	6-7	1	2.8	6	18.8	7	9.9	
Total		36	100	33	100	69	100	
Use chill past method	Never cook	3	8.3	0	.0	3	4.3	0.02
	<4	29	80.6	20	60.6	49	71.0	
	4-5	3	8.3	5	15.2	8	11.6	
	6-7	1	2.8	8	24.2	9	13.0	
Total		36	100	33	100	69	100	

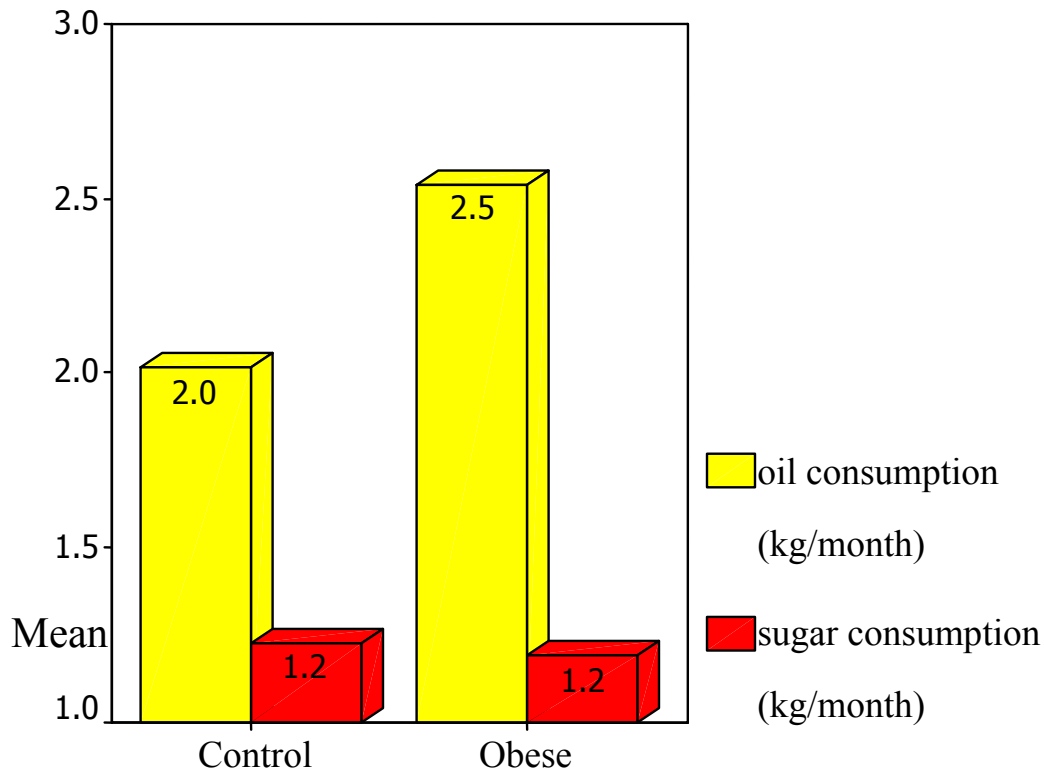


Fig. 1: Sugar and oil consumption in the case and control groups

Table 2: Relationship between eating snacks during weekdays and weekends and obesity status

		Control		Obese		Total		P
		n	%	n	%	n	%	
Eating snack during weekday before breakfast	No	34	94.4	29	85.3	63	90	0.19
	Yes	2	5.6	5	14.7	7	10	
Eating snack during weekend before breakfast	No	32	88.9	24	70.6	56	80	0.05
	Yes	4	11.1	10	29.4	14	20	
Eating snack during weekday before going to bed	No	18	50.0	20	58.8	38	54.3	0.30
	Yes	18	50.0	14	41.2	32	45.7	
Eating snack during weekend before going to bed	No	21	58.3	19	55.9	40	57.1	0.51
	Yes	15	41.7	15	44.1	30	42.9	
Eating snack during weekend between lunch and dinner	No	19	52.8	9	26.5	28	40	0.02
	Yes	17	47.2	25	73.5	42	60	
Eating snack during weekday between lunch and dinner	No	3	6.1	3	8.3	6	7.1	0.5
	Yes	34	69.4	30	83.3	64	75.3	

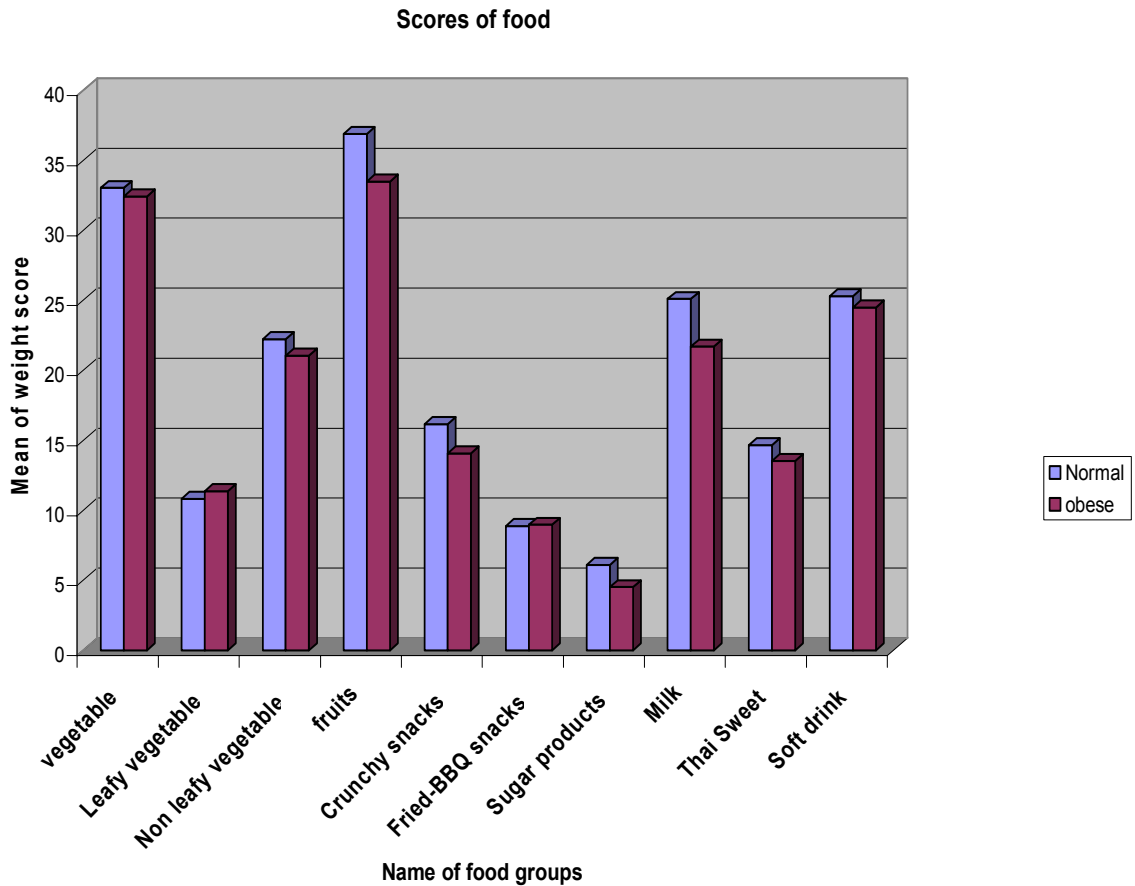


Fig. 2: Means comparison of weight score in different groups

Table 3: Number and percentage of children by attitude towards body size

	Attitude toward his/her body size									
	Slim/thin		Good shape		Slightly obese		Obese		Total	
	n	%	n	%	n	%	n	%	n	%
Control	21	42.9	8	16.3	16	32.7	4	8.2	49	100
Obese	-	-	1	2.8	4	11.1	3.1	86.1	36	100
Total	21	24.7	9	10.6	20	23.5	35	41.2	85	100

Discussion

In general, variety and diversity of diet can stimulate appetite. There was a significant difference between the two groups in using blanch steam and chili paste methods of cooking. The results of this study showed that obese children commonly (>4 times per week) ate blanched/steamed food as well as spicy food. This finding is surprising since high fat intake would supposedly be associated with obese children. What this finding may actually be reflecting, however, is a family food pattern, particularly since other findings in this study show that the oil consumption of obese children is higher than that of the control group. This increased intake in fat may be coming from snacks rather than from family meals.

Taste preference is an important factor for food choice of families. In one study, food preferences played an important role in defining children's food patterns, as they were linked to food acceptance (4). This situation may contribute to an overall increase in dietary fat, sugar, and salt, and potentially contribute to greater health risk (5). The findings from the present study showed families of obese children tended to prefer oily, sweet, salty, and sour foods more than families of normal children. Moreover, obese children preferred oily, sweet, salty, and sour foods, the first two of which (oily, sweet) could contribute to obesity in childhood as well as adulthood. The control group, however, preferred coconut based and spicy foods.

In this study, the results showed that families of obese and normal children usually prepare

foods at home rather than purchasing foods. Families of obese children, however, consume more home-prepared foods, and the preference was for oily foods which could contribute to obesity in children. Accordingly, and confirming other studies (3), the results of the present study indicate that oil consumption among the control group was less than the obese group, while sugar consumption was equal in both groups.

Results of this study also showed that compared to normal children, obese children had more snacks before breakfast and between lunch and dinner on weekdays and weekends. Today, large increase in total energy and energy density of snacks among young adults in the United States may be contributing to obesity epidemic (6). In a study (3) that was conducted in Thailand, obese children consumed more snacks. Interestingly, in the present study, the normal group snacked more before going to bed. This may be due to the insufficient intake of food during the entire day, and they may seek to compensate for lack of their energy intake in this way.

Most of the obese children knew that were obese, but they still ate excessively. This indicates that either they do not have enough knowledge on this matter, or their knowledge has not changed their practices. This is an important issue because the qualitative findings showed that obese children knew about food groups and could classify foods better than normal children. Their major sources of information about foods and obesity come from family members, teachers, health workers, and the

mass media. This finding supports those of other studies where parents are the primary means by which children learn the socio-cultural context of eating (7).

For almost all of the food groups, normal students had more foods-except for leafy vegetables, fried-BBQ snacks, than the obese students. The data indicated that the normal group even consumed more soft drinks, even though it was previously reported that sweetened beverage consumption might be related to an increased risk for obesity (8). A higher frequency of fried food consumption, such as snacks, has also been shown to have a relationship to obesity (3).

In conclusion, children obesity in Thailand seems to be in rise and it is, somehow related to unhealthy practices. Qualitative data show while obese children know about their disease, their practice is not changed yet. Programs must be designed to improve nutrition, increase physical activity and reduce sedentary activities among obese children. In this way, parents and/or caregivers must be involved.

Acknowledgements

We would like to express our appreciation to the Health Ministry of Islamic Republic of Iran that provided support for this project. We owe a special note of gratitude to course coordinator Dr Jintana Yhoung-aree, whose special knowledge and insights were contributions to the research and data analysis. A special thank is extended to George A. Attig for his valuable comments and suggestion. Finally, our deepest heartfelt appreciation to the staff of Anuban Nakhon Pathom School who made this study a reality.

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