Effect of Lifestyle, Dietary Pattern, School Based Weight Control Programon Overnutrition among Schoolchildren in the Northeast of Thailand

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Abstract

Background: Overnutrition are dramatically raising among school age groupin lowand middle-income countries.

Method: A cross-sectional study was conducted among 494 grades five and six pupils from ten primary schoolsin fourprovinces of the Northeast of Thailand. The multiple logistic regression was used to determine the association between dietary pattern, school-based program, lifestyle, socio-demographic and overnutrition among school children in the Northeast of Thailand.

Results: 14.2% of the pupils were overnutrition. The multivariable analysis indicated factors that significantly associated with overnutrition among school children were; consumed high calories food (adj. OR= 4.67; 95%CI: 2.46-8.85), did not participate in school weight control program (adj. OR=4.08; 95%CI: 2.08-8.02), did not join weight control school lunch program (adj. OR= 4.49; 95%CI: 1.89-10.85), did not consume weight control food (adj. OR=3.46; 95%CI: 1.64-7.30), no physical activity (adj. OR = 3.02; 95%CI: 1.56-5.76), when controlling the effect of other covariates.

Conclusion: Almost one-sixth of the pupils were overnutrition. Dietary pattern, school-based program, lifestyle, socio-demographic had influence on overnutrition. Appropriate management on food consumption and school-based program, improving lifestyle would help control overweight and obesity.

Keywords: *Dietary Food Consumption, Lifestyle Socio-Demographic, School Based Program, Overnutrition, Overweight and Obesity.*

Introduction

The increasing rates of overnutrition which comprises overweight and obesity (OW/OB) were almost doubled since 1980[1]. Overnutrition is a key factor of noncommunicable diseases which are the leading cause of death worldwid[2]. In Thailand, the overall picture is unclear[3] due to differences in year of survey, sampling, the age range of children studied and the criteria used for defining OW/OB. For example, a national survey of 10 provinces in 2003 found 5.4% of children aged 6-14 years were OW/OB[4]. In the same year an OW/OB of 10.8% was reported in a survey among children aged 7-9 years in a province in the Northeast[5]. The OW/OB rate at 13.7%, was report for older age group (12-18 years) in the same area[6]. The Thailand Multiple Indicator Cluster Survey in children aged 6-14 years over the period 1995-

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2009, and the latest data indicated a national prevalence for primary school children of 9.7%[7].

Continuous surveillance is necessary due to the associated short- and long-term problems[8,9]. Perhaps the most serious consequence is the likelihood that childhood obesity will prevail in adulthood. In the USA overweight kindergarten children are four times more likely to become obese as young teenagers than normal weighted kindergarteners[10], a study showed that infant weight and preschool body mass index (BMI) were strongly associated with overweight in later childhood and adolescence[11], and a systematic review concluded that obese children and adolescents are more likely to be obese as adults[12,13].

In Southeast Asia region (SEAR), Malaysia had the highest obesity prevalence at 14 %, while Thailand (8.8%) had the second ranking[14]. According to WHO, the prevalence of overweight and obesity in Thai females was higher than male[15]. In Thailand, these are likely to be different from those found in other countries, especially western developed countries[16].

Many factors have been indicated as associated with childhood OW/OB. These include gender[17-19], high birth weight, dietary behavior, high media consumption[20], dietary concerns, body satisfaction and psychosocial factors[21], skipping breakfast[19,22,23], excess energy and fat intakes[24], television viewing[23,25,26]. Family-based factors have included low literacy of mothers[22,27,28], parental OW/OB[24,25,29], family dysfunction[27], neighborhood socioeconomic status[22,30] are the factor influence on the OW/OB. Fried food sales around the school are the factor considered as the school based program influence on the OW/OB[31].

There was limited study on OW/OB and its determinants amongthe school children especially in the Northeast of Thailand. Therefore, it is important to determine the prevalence of overnutrition and its associate factors including dietary intake, school-based weight control program, lifestyle, socio-demographic among school children in the Northeast of Thailand.

Method

Study Design and Population: This cross-sectional study was conducted among schoolchildren in the Northeast of Thailand. The total of 494 participants were recruited by using a multistage random sampling from ten primary school in four provinces. The inclusion criteria were 1) pupil in the age 10-11 years, 2) studyingin the grade 5th and 6thof primary school, 3) agreed to participated in this study with a written informed consent from their parents. The pupil who suffering with severe illness or had mental health problems were excluded. An anthropometric measurement was performed by trained health teachers. A self-administered structured questionnaire was used to assess socio-demographic, lifestyle, dietary intake, school-based weight control program. The outcome variable was and overweight status (overweight and obesity), using the weight-for-height growth chart developed by the Ministry of Public Health (MoPH), Thailand that standardized to WHO and the IOTF[32,33]. Subjects were categorized by the number of SDs which their weight-for-height at their age was above or below the reference value: obesity (>+3 SD), overweight (>+2.0 to +3.0 SD), slightly overweight (>+1.5 to +3.0 SD), normal (-1.5 to +1.5 SD), slightly underweight/thin/underweight (<-1.5 SD). The slightly underweight, thin and underweight categories were combined because children in these groups were outside the focus of the present study. All the anthropometric measurements were assessed by teachers trained in school health using a Xiangshan EB9003L electronic weighing scale and an Invicta B8A7415 to measure height.

Statistical Analysis: Descriptive statistics including frequency and percentage were used to describe categorical data, whereas mean, standard deviation were for continuous data. A simple logistic regression was used to identify the association between each independent variable and OW/OB. The independent factors that had p-value <0.25were processed to the multi variable analysis using the multiple logistic regression to identify their association withOW/OB when controlling the effect of other covariates.

Results

Among the total of 494 respondents, 55.9% were males with an average age of 10.9 ± 0.5 years old. Majority of the respondents stayed with parents (76.1%) and at least one family member had history of obese in their family (29.6%). Their family financial status was had enough income with saving. Most of them had physical activities and aware of their own body image (84%). Majority of them did not consumed weight control food. Almost all of them had low to average levels of overnutrition prevention and low to average level of overnutrition prevention behaviors. A quarter

usually consumedhigh calories food. Concerning school factor, nearly half joining exercise provided by school all the times, 92.9% participated in weight control school lunch program, 40.1% participated in school weight control program and majority of these pupilshad information on high calories diet and drinks.

Most of the pupils had normal weight (65.2%), 13.3 % were underweight. Concerning overnutrition; Slightly overweight was 7.3%, overweight and obese were 5.7% and 8.5%,respectively which means 14.2% of the pupils were overnutrition.

Table 1. Multivariable analysis of factors associated with OW/OB

Variables	Number	OW/OB %	Adj. OR	95%CI	p-value
Consumedhigh calories diet					**<0.001**
Never	399	10.5	1		
Sometimes/Every day/often	95	29.5	4.67	2.46-8.85	
Participated in weight control school lunch program					**0.001**
Yes	459	13.1	1		
No	35	28.6	4.49	1.89-10.85	
Participated in school weight control program					**<0.001**
Yes	202	6.9	1		
No	292	19.2	4.08	2.08-8.02	
Consume weight control food					**0.001**
Yes	148	8.11	1		
No	346	16.8	3.46	1.64 – 7.30	
Physical activity					**0.001**
Yes	415	11.6	1		
No	79	27.9	3.02	1.56 - 5.76	
Family history of obesity					**0.016**
No	348	17.2	1		
At least one family member	146	6.9	2.52	1.19 -5.34	
Gender					**0.013**
Female	276	10.9	1		
Male	218	18.4	2.08	1.17-3.72	

The multiple logistic regression indicated four factors that were significantly associated with over nutrition among school children in the Northeast of Thailand included; consumed high calories diet(adj. OR= 4.67; 95% CI: 2.46-8.85), did not join school weight control program (adj. OR=4.08;95%CI: 2.08-8.02), did not participate in weight control school lunch program (adj. OR= 4.49; 95%CI: 1.89-10.85), did not consume weight control food (adj. OR=3.46; 95%CI: 1.64-7.30), no physical activity (adj. OR =3.02; 95%CI: 1.56-5.76), had family history of obesity (adj. OR=2.52; 95%CI: 1.19-5.34), were males (adj. OR=2.08; 95%CI: 1.17-3.72), when controlling the effect of other covariates (Table 1).

Discussion

The present study indicated the prevalence of overnutrition (OWand OB) among school children in Northeast of Thailand was 14.2% which was higher than the age-adjusted rate of 10.7% reported in 2012 for children aged 7-9 years in major urban areas of the same region using a similar definition of OW/OB[34]. This prevalence exceeds 10% of minimized a risk problem

of the Thai Ministry of Public Health (MoPH) in the National Health Development Plan XII (2017-2021)[32]. This finding is consistent with those of previous studies in Thailand over the period 2006 to 2013[31,34,35]. This suggested the problem of increasing prevalence over the past decade. The rise in OW/OB in Southeast Asia is likely to have been largely due to the increasing consumption of fast foods which tend to be very fattening. A study of Chinese Singaporeans by Odegaard et al.[36] found the relationship between fast food consumption with Type 2 diabetes (T2DM) and coronary heart disease (CHD). Therefore,fast food consumption was critical issue to weight gain and obesity risk[37].

Factors that were significantly associated with (OW/OB) of participants included; consumed high calories diet, did not participated in school weight control program,did not participate in weight control school lunch program, did not consume weight control food, no physical activity,had family history of obesity, and were males.

The finding also indicated that did not participate in weight control school lunch program is also associated with OW/OB that consistent with previous study indicated that school lunch program were significantly associated with OW/OB. Lunch provided by school was important[18,28], and regarding to dietary changes effected to dietary behaviors for childhood obesity[20,21]. Physical activities at school were unrelated to the prevention of OW/OB. According to the children, their schools played was less satisfactory role in reducing the prevalence of OW/OB. Most of schoolchildren denied attending any school's prevention and control of OW/OB programs. Therefore, schools need to review their contribution on reducing the problem of OW/OB. This major suggestion to school healthy policy, a global challenge for healthy meals in schools by multi-sectors was essential[38].

Being males were more likely to be OW/OB than females. This is inconsistent with previous research studies in Thailand, but consistent with elsewhere[19,34]. The presence and direction of gender differences in OW/OB do appear to vary with ethnic and cultural factors[34]. Perceived obesity in family members (first-degree relatives and grandparents) was associated with OW/OB. This finding is consistent with many previous studies in other parts of the world1[9,25,29]. Families can also have considerable influence over the diet of younger family members, and they also act as role models for patterns of food consumption and behavior which lead to overnutrition. Families should always be involved in attempts to reduce the prevalence of overnutrition in children.

Conclusions

Almost one-sixth of the pupils was overnutrition. Dietary pattern, school-based weight control program, lifestyle, socio-demographic had influence on the school children overnutrition. Appropriate management on dietary food consumption and school-based program, improving lifestyle would help control the overnutrition problems among school children in the Northeast of Thailand.

Ethical Clearance: This study was approved by the Ethical Committee of Khon Kaen University, the approval number was HE 552278.

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Conflict of Interest: None declared

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