

An Intervention Study of Changing Eating Behaviors and Reducing Weight in Thai Children Aged 10–12

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Abstract: Childhood obesity or being overweight is a growing international issue. This experimental pretest-posttest control group study examined the effects of an individually-based intervention to improve healthy eating specially for weight control and nutritional status among Thai 10–12-year-olds who were overweight. We report a study, based on the Theory of Planned Behavior, that examined the impact of an intervention on: the intention of children to perform eating behaviors for weight control, their eating behaviors generally, and their overall nutritional status.

Students from two Thai schools were randomized into either an experimental or control group. Participants of each school, who met the inclusion criteria, were drawn independently into the experimental group (68 children) who received an intervention, while the control group (68 children) received the school's usual healthy-eating educational program. The *Demographic Characteristics Questionnaire*, *Intention to Perform Eating Behaviors for the Weight Control Questionnaire*, and *Eating Behaviors for Weight Control Questionnaire* were used to gather three data sets. Participants completed the questionnaire at baseline, and at weeks 6 and 18 after the intervention. Analysis of the data was performed using descriptive statistics, two-way repeated measures MANOVA, and independent t-tests.

The results revealed significant improvement in the children of experimental group in their intention to perform eating behaviors for weight control, eating behaviors, and nutritional status at all periods of measurements than those in the control group. The findings suggest that nurses need to consider increased adoption of individual-based interventions, based on Theory of Planned Behavior, in order to effectively intervene in the obesity epidemic in Thailand.

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Introduction

According to the World Health Organization (WHO), the spiraling level of obesity and being overweight, defined as abnormal or excessive fat accumulation that may be harmful to health, has become an epidemic problem, and is now the fifth leading risk to global health faced by both developing and developed countries. While adults are most usually affected, children are increasingly at risk, with the prevalence of children being overweight increasing rapidly around the world since 1980.¹ Being

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overweight in childhood is a particular concern because of the severity of the associated psychosocial conditions and many physical problems^{2,3} that have a significant impact on a child's social, emotional, and cognitive development.^{4,5} Furthermore, such children are more likely to suffer from low self-image and social anxiety.^{6,7}

Multiple factors influence children being overweight and these can be divided into three groups: personal, parental, and environmental.^{8,9,10} Personal factors include aspects such as dietary intake, levels of physical activity, and sedentary behavior of children.¹¹ Parental factors include children's learned dietary practices, accessibility of food, meal structures, food socialization practices, and food-related parenting style.¹² Environmental factors include influences such as peers, mass media and advertising, and the impact of schools, fast-food restaurants, and convenience stores on childhood eating behaviors.^{13,14}

Like the rest of the world, Thailand is also facing an obesity crisis, and the prevalence of obesity in Thai 10–12-year-olds increased to 20% in 2013.¹⁵ In addition, the prevalence of children 10–12 years old who are overweight in Chiang Mai and Lampang in northern Thailand was 16.5% and 14.2%, respectively.^{16,17} As in other countries, the Thai government has identified the problem as an area of concern; however, the prevalence of being overweight remains in excess of the national goal of 10% recommended in the 11th National Economic and Social Development Plan (NESDP).¹⁵ Therefore, Thai public health professionals are grappling with the urgent need to arrest the increase and looking for ways to reverse this complex problem.

A variety of previous studies have indicated that individual-based interventions provide some measure of success in changing eating habits and controlling weight, as well as improving children's overall eating behaviors.^{18,19} The primary advantages of individual-based interventions include regular monitoring of progress and the provision of feedback.

Individual information can be updated at each interaction, so ensuring careful monitoring. In addition, feedback can be given about the direction and extent of changes in behavior. Another reason for the success of these initiatives is the relative maturity of the participants. Children who are 10–12 years old begin to develop the capacity for abstract thinking as a formal operation and the move from dependence on parents to independent behavior.²⁰ Thus, they can take care of their dietary behavior and choose types of food by themselves.¹¹ Changed eating patterns and improved self-control could be possible outcomes. Previous studies have tended to focus mainly on children's beliefs about food, eating behavior, and social norms, neglecting the role of individualized monitoring and feedback.^{18,21} Therefore, to be successful, interventions to target being overweight should increasingly focus on modifying individual behaviors.

The Theory of Planned Behavior (TPB) has been used as a framework for various interventions designed to encourage healthy eating in children.^{22–27} TPB was used in this study which examined how attitudes towards modification of eating behaviors for weight control, perceptions of subjective norms regarding eating behaviors for weight control, and children's perceived control of their own behaviors for weight control affected intention to perform various eating behaviors and eating behaviors more generally.

Review of Literature

Childhood overweight has increased dramatically over the last few years in both developed and developing countries. Projections by the WHO are that by 2015 approximately 2–3 billion people on the planet will be overweight and, of these, 700 million will be obese.¹ Overweight in children is a particular concern due to its significant physical and psychosocial long-term impact. Therefore, public health organizations have set high-priority research goals for the prevention and remedy of overweight and obesity.¹

Individual-based interventions program: Individual-based interventions are intermediations that are customized to meet individual characteristics, such as dietary intake behaviors and levels of physical activity. Typical components of such interventions include dietary counseling and behavioral counseling, usually delivered one-to-one and face-to-face. However, some individual-based interventions have demonstrated success in improving the quality of dietary intake and increasing levels of physical activity in children when delivered by mail and phone.¹⁸ In all cases, the benefits of such interventions resulted from enhanced sensitivity to individual specific needs¹⁸ and can improve a child's cognition and change behavior.²⁸ Successful interventions generally focus on modifying individual behavior, corresponding to social norms around food consumption.¹ Thus, an intervention should facilitate individual maintenance of behavior change in children and emphasize the modification of attitude, subjective norms, perceived behavior control, and eating healthy food.²⁹

Theoretical framework: TPB³⁰ was used as a framework to guide this study. According to Ajzen and Manstead³¹, behaviors such as eating behavior are influenced by one's attitude towards the behavior, subjective norms, and perceived behavioral control. These three factors determine one's intention to perform the behavior, the indication of how hard one is willing to work, or the effort one plans to give in order to perform the behavior.³⁰ Moreover, TPB claims that behavioral intention and perceived behavioral control are direct antecedents to the behavior, given that an individual has actual control over the behavior, which includes having the necessary skills, resources and other prerequisites necessary to perform that behavior.³⁰ Studies based on TPB in children focus on intention to eat five portions of fruit and vegetables a day and awareness of the health benefits of fruit and vegetables. The strategies were designed to motivate reinforcement, self-monitoring, and goal setting. TPB-based interventions have been successful in increasing intention, and awareness of the health

benefit of eating five portions of fruit and vegetables. However, studies have also evidenced four main barriers in that there are difficulties with: addressing subjective norms such as parents, friends and teachers; following the TPB framework in the intervention procedure; increasing intention to have other healthy eating behaviors (not only consumption of fruit and vegetables in overweight children); and individually tailoring interventions to influence attitude and behavior intention for every case.²²⁻²⁷

Aim: This study examined the effects of an individual-based intervention on intention to perform eating behaviors for weight control, general eating behaviors, and nutritional status among children who were overweight.

Method

Design: An experimental pretest-posttest control group was used.

Sample and setting: This study was conducted at public schools in a northern province of Thailand. Two schools were randomly selected from 16 schools: the experimental group, School A, and the control group, School B. Randomization was accomplished via drawn lots without replacement from the school identification number. The first researcher obtained permission from the Faculty of Nursing, Chiang Mai University to conduct the study before requesting the prospective schools to participate. Once permission had been granted, participants of each school were drawn independently from the total number of overweight students in fifth grade to become the experimental group receiving an individual-based intervention, and the control group receiving the school's usual healthy-eating educational program only. The criteria for sample inclusion were children who: a) were 10-12 years old; b) studied in grade 5; c) had a BMI-for-age >+1 S.D. [according to 2007 WHO growth reference: BMI for age (Z-scores) 5 to 19 years], d) agreed to participate in this study, and e) had parental agreement to participate in this study.

The sample size for repeated measurement analysis was determined with a significance level $\alpha=.05$ (for probability of type 1 error) and a statistical power of .90.³² Therefore, the total number of subjects needed in this study was 136, with 68 people per group. There were no drop-outs during the study.

Intervention design: An 18-week, individually-based intervention was provided for children in experimental group that emphasized the modification of children's behaviors based on a TPB framework. This included: attitudes toward eating behaviors for weight control; subjective norms regarding eating behaviors for weight control; perceived behavioral control toward eating behaviors; and increased intention to perform eating behavior for weight control. The main component comprised nutritional education based around four modules with different objectives. Module A emphasized modifying attitudes toward eating behaviors for weight control. Information was provided through media such as a computer game, cartoon animation, a box game, and a comic book in order to raise awareness about the health impact of being overweight and healthy eating behavior. Module B focused on modifying subjective norms regarding eating behaviors for weight control. The influence of normative beliefs and motivation was provided through the opinions of influential people in close relationships with the child such as the father, mother, grandfather, grandmother, teachers, and friends. Module C aimed to modify perceived behavioral control toward eating behaviors. The children were asked to consider their opinions about their ability to perform healthy eating behaviors. Finally, Module D involved setting goals to achieve eating behaviors for weight control. The assumption here was that once children understood their capabilities and the underlying normative values, they can confidently set their own goals to perform effective eating behaviors and follow through with their plan. It is also important that the children not only set goals and make a plan but also that they monitor themselves

as they carry out their plan. In this way, the individual commits to follow a plan of their choosing and observes their own progress.

The intervention contents were approved by five experts: a pediatric doctor; a nursing faculty member expert in children and TPB; two nursing faculty members, experts in nutrition and overweight in children; and a behavioral science faculty member expert in health behaviors. These experts were requested to review the content in the manual to clarify, and assess its adequacy in terms of construct validity and appropriateness. Their suggestions were used to make revisions to the program. Content validity was determined in a pilot test with ten children to evaluate the readability and understandability of the materials. The recommendations of children were used to make revisions during implementation.

The intervention comprised 20 sections, each containing two activities from two modules that took one hour per section (four days per week). The intervention was spread out over five consecutive weeks, with a total duration of 25 hours. In addition, the children recorded their dietary intake in an activity book every day until week 18.

Ethical Considerations: Approval to conduct the study was granted by the Research Ethics Review Committee of the Faculty of Nursing, Chiang Mai University, and the administrators of the two schools where the children studied. A letter describing the study, its purpose, methods, potential risks, benefits of participation, and the protection of confidentiality was given to all parents of eligible participants. All parents consented and all children assented to take part in the study and returned the letter within one week of receipt.

Procedure: Before the study began, the first researcher and a research assistant (RA) were trained by an expert in child nutritional programs in the use of a role play demonstration to be employed during this intervention. Additionally, this intervention was tested on ten children who were overweight in other schools.

Furthermore, the baseline assessment data on each child’s weight/height was gathered, and three baseline questionnaires were used to obtain data from both groups.

Starting with the experimental group, the individual-based intervention was implemented at the participants’ school (see **Table 1** and **Table 2**). The activities in each of sections 1–20 were conducted by the researcher and the RA beginning in week 1. Each child met the researcher individually every day. The children in this group were given advice to follow through the four modules of an individual-based intervention. Moreover, after each module was done,

the children were asked to fill out the activity book. Their activity book was checked, and if the children did not meet the evaluation criteria, the researcher would revise this module again before passing to another module. Furthermore, the monitoring process was started after Section 1. Monitoring consisted of a visit to the school by the researcher for consultation and the children were required to complete a food consumption self-report every day until week 18. Additionally, they were given a reward when they met their weekly plan and goal. Each activity was conducted with every child by the researcher or RA.

Table 1: Individual-based intervention plan

Week / Day	1	2	3	4	5
Week 1	Section 1 A1B1	Section 2 C1D1		Section 3 A2B2	Section 4 C2D2
Week 2	Section 5 A3B3	Section 6 C3D3		Section 7 A4B4	Section 8 C4D4
Week 3	Section 9 A5B5	Section 10 C5D5	Monitor	Section 11 A6B6	Section 12 C6D6
Week 4	Section 13 A7B7	Section 14 C7D7		Section 15 A8B8	Section 16 C8D8
Week 5	Section 17 A9B9	Section 18 C9D9		Section 19 A10B10	Section 20 C10D10
Week 6	Posttest 1 / Self report				
Week 7	Self-report				
Week 8	Self-report				
.	Self-report				
.	Self-report				
Week 18	Posttest 2 / Evaluation				

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Table 2: Individual-based intervention schedule and content

Time	Section	Module	Content
Week1/Day1	1	A1	The children watched a cartoon animation about the impact of overweight. This was designed to help modify their perceptions of and attitudes to the impact of overweight.
Week1/Day1	1	B1	In their activity book, the children recorded their answer to the question: what would happen if my mother thinks I look overweight?
Week1/Day2	2	C1	The researcher gave a situation for each child to consider: “I think that controlling weight is difficult/easy for me”. Each child presented their own opinion on each situation and how they would manage if they were in each situation.
Week1/Day2	2	D1	In the activity book, the children wrote down how, where, and when they will control weight. The children were asked to keep hold of their plans and put them into action during the week. Thus, they will record and also monitor themselves for next seven days according to their plan.
Week1/Day3			Monitoring
Week1/Day4	4	A2	The children watched a cartoon animation about the five food groups to modify perceptions of and attitudes to the benefits of each group.
Week1/Day4	4	B2	In their activity book, the children wrote their answer to the question: “If my father thinks that the five food group have many benefits, I should.... eat/not eat”
Week1/Day5	5	C2	The researcher gave a situation to each child: “I think that control weight was difficult/easy for me”. Each child presented their own opinion on the situation about how they managed when they were in each situation.
Week1/Day5	5	D2	In the activity book, the children wrote down how, where, and when they will eat each of the five food groups. The children were asked to keep hold of their plans and put them into action during the week. Thus, they will record and also monitor themselves for next seven days according to their plan.
Week2/Day1	1	A3	The children watched a cartoon animation about the impact of overweight to modify perception and attitude on impact of overweight.
Week2/Day1	1	B3	In the activity book, the children wrote down the answer to the question: What happens if my mother thinks I look overweight and should control my weight?
.	.	.	.
.	.	.	.
Week5/Day5	20	C10	The researcher gave a situation to each child: “I think that eating sugar, fat and sodium which meet the recommendation of food labeling is...difficulty/easy”. Each child presented their own opinion about how they manage when they are in each situation in the activity book.
Week5/Day5	20	D10	In the activity book, the children wrote down how, where, and when they would eat to meet the recommendations of food labeling. The children were asked to keep hold of their plans and put them into action during the week. Thus, they were expected to record and monitor themselves for next seven days according to their plan.
Week6			Posttest 1 /self-report
Week7			Self-report
Week18			Posttest 2/ evaluation

The control group underwent different activities. First, in week 6 data was gathered on each child's weight/height, their intention to perform eating behavior for weight control, and their eating behaviors for weight control using the relevant questionnaires. Second, in week 18, the results of the intervention were evaluated by assessing the child's weight/height and children filled out the three questionnaires. Moreover, the control group received school's usual healthy-eating educational program from their curriculum during week 18 of intervention and this included lessons regarding the five food groups.

Instruments: Data were obtained using three self-reporting questionnaires which assessed: demographic characteristics; intention to perform eating behavior for weight control; and eating behaviors for weight control. It took approximately one hour to complete the questionnaires.

The *Demographic Characteristics Questionnaire* was developed specifically for this study by the first researcher. Data collected included gender, age, religion, education levels of father and mother, family income, number of family members, and daily allowance.

The *Intention to Perform Eating Behaviors for the Weight Control Questionnaire* was developed by Choyhirun³³ in Thailand. It is made up of 16 lists used to measure intention to perform or not perform eating behaviors for weight control. Examples of questions were: "I intend to perform eating behaviors for weight control in the next month"; "I intend to avoid eating fast food in the next month". Scores ranged from +2 (definitely) to -2 (definitely not). The total score ranged from -32 to 32. Positive scores indicated children had intention to perform eating behaviors for weight control. An alpha coefficient of original study was .92. In this study, Cronbach's alpha coefficient of this instrument was .90.

The *Eating Behaviors for Weight Control Questionnaire* was also developed by Choyhirun.³³

It is a self-reported questionnaire consisting of 15 items answered using 4-point Likert scales (from 1=never to 4=always). There were seven positive statements and eight negative ones. Examples of questions were: "I have eaten desserts" and "I have decreased amounts of foods". The score was reversed for negative statements. The total score ranged from 15-60. Higher scores (from 46-60) indicated a higher level of performing eating behaviors for weight control. An alpha coefficient from original study was .79. In this study, the Cronbach's alpha coefficient of this instrument was .83.

The validity of the original two instruments developed by Choyhirun³⁵ were approved by panel of seven experts and had been pilot-tested in 20 overweight children for internal consistency.

Nutritional Assessment: Anthropometry is an indirect method of nutritional assessment that measures body composition. In this study, the 2007 WHO Growth Reference BMI for Age (Z-scores) 5 to 19 years³⁴ and the WHO Anthro Plus program were used to assess nutritional status.³⁴

Data analysis: Descriptive statistics, Chi-square and Fisher's exact test were used to analyze the demographic characteristics data in the sample. The one-way repeated measures MANOVA was used to evaluate differences among the experimental group's scores at the baseline and in Weeks 6 and 18. Next, the mean scores of intention to perform eating behaviors for weight control, eating behaviors for weight control, and nutritional status between the experimental and control group were compared using two-way repeated measures MANOVA. Prior to analysis the assumption of normality was tested. However, an interaction effect between the two groups was identified. Therefore, the independent t-test was used. All probabilities were calculated with two-tailed tests. The significance level for the statistics was set at .05.

Results

The majority of children in the experimental and control groups: had similar average ages (11.04 years; $SD=0.56$ vs. 11.03; $SD=0.51$). Sixty eight were males (50% vs. $n=44$; 64.7%) and 68 were females (50% vs. $n=24$; 35.3%); the majority did not have a history of illness ($n=53$; 77.9% vs. $n=56$, 82.4%); 33 had around 4–5 members in their family (48.5% vs. $n=37$; 54.3%); and had a daily allowance of 30–40 baht/day ($n=32$; 47.1% vs. $n=34$; 50%). Most children were Buddhist. The majority, in the experimental and control groups, respectively had fathers who had graduated from secondary school ($n=22$; 32.4% vs. $n=24$; 35.3%); mothers with a bachelor degree or higher ($n=24$; 29.4% vs. $n=30$; 58.8); and family incomes between 30,001–50,000

baht/month ($n=29$; 42.6% vs. $n=32$; 47%). There were no significant differences between the demographic characteristics of the experimental group and the control group ($p > .05$).

As noted in **Table 3**, the experiment revealed a significant difference in mean scores for intention to perform behaviors for weight control and BMI for age (Z-scores) ($p < .001$) between the baseline (T_1), and in Weeks 6 (T_2) and 18 (T_3). There was a significant difference in mean score between T_1 and T_3 for eating behaviors ($p < .001$). The mean scores for eating behaviors between T_1 and T_2 were found not to be statistically different ($p > .05$). However, mean scores for intention to perform eating behaviors for weight control, eating behaviors and BMI were statistically different ($p < .001$) between T_2 and T_3 .

Table 3: Comparison of mean score of intention to perform eating behaviors for weight control, eating behaviors and BMI for age (Z-scores) in experimental group

Variables	Mean	S.D.	Mean difference	
			T_2	T_3
Intention to perform eating behaviors				
Baseline (T_1)	11.87	11.48	4.28**	11.28**
Week 6 (T_2)	16.15	4.87	-	7.00**
Week 18 (T_3)	23.15	3.09	-	-
Eating behaviors				
Baseline (T_1)	40.07	4.14	0.63	3.16**
Week 6 (T_2)	40.71	2.37	-	2.53**
Week 18 (T_3)	43.24	2.74	-	-
BMI for age (Z-scores)				
Baseline (T_1)	2.39	0.42	0.20**	0.38**
Week 6 (T_2)	2.19	0.48	-	0.19**
Week 18 (T_3)	2.00	0.50	-	-

** $p < .001$

In addition, results of two-way repeated measures MANOVA of mean scores for all three variables (intention to perform eating behaviors for weight control, eating behaviors and nutritional status) indicated differences between the experimental group and the control group at T_1 , T_2 and T_3 ($p < .001$). However, an interaction effect was indicated by the level of variance in each factor: intention to perform eating behaviors for weight control ($F=100.861$, $p=.000$), eating behaviors ($F=12.070$, $p=.000$), and nutritional status ($F=128.497$, $p=.000$).

Therefore, this study used an independent t-test to compare mean scores for each variable in the experimental group and the control group at each stage, T_1 , T_2 and T_3 . The results showed no statistical difference in the mean scores between the two groups in each key variable before implementation of the program (baseline; T_1) ($p > .05$). However, in week 6 week after baseline (T_2), and week 18 after the baseline (T_3), significant differences ($p < .001$) were found, between the experimental and control group (see Table 4).

Table 4: Comparison of mean scores of intention to perform eating behaviors for weight control, eating behaviors, and BMI for age (Z-scores) among the experimental group and control group

Variables	Experimental group (n=68)		Control group (n=68)		t
	Mean	S.D.	Mean	S.D.	
Intention to perform eating behaviors					
Baseline (T_1)	11.87	11.48	15.37	9.85	-1.908
Week 6 (T_2)	16.15	4.87	3.85	4.74	14.926**
Week 18 (T_3)	23.15	3.09	3.09	3.63	34.705**
Eating behaviors					
Baseline (T_1)	40.07	4.14	38.32	6.40	1.901
Week 6 (T_2)	40.71	2.37	35.15	2.42	13.516**
Week 18 (T_3)	43.24	2.74	37.53	2.65	12.358**
BMI for age (Z-scores)					
Baseline (T_1)	2.39	0.42	2.53	0.56	-1.749
Week 6 (T_2)	2.19	0.48	2.55	0.55	-4.161**
Week 18 (T_3)	2.00	0.50	2.55	0.55	-5.923**

** $p < .001$

Discussion

This intervention demonstrated improvement in each of the three areas tested in the experimental group compared to the control group: intention to perform eating behaviors for weight control, eating behaviors, and nutritional status. Significant aspects of this individual-based intervention which may account for its success included that it followed the TPB framework, and emphasized modifying attitudes

towards subjective norms, and perceived behavioral control, goal-setting and improving healthy eating behavior using self-monitoring in the recording of diet. In this study, attitude toward behaviors, subjective norms, perceived behavioral control had a significant effect on intention to perform eating behavior for weight control, eating behavior, and nutritional status among children who are overweight across the intervention time period.

These findings were consistent with other studies which contended that applying attitude, subjective norms and perceived behavioral control to increase intention to perform healthy eating behavior was important and which recommended individually-based intervention programs as the major strategy for obesity programs.^{22–27}

A key element of our intervention was the emphasis on goal setting and feedback. Children who were overweight in the experimental group were encouraged to improve eating behaviors by planning and setting goals for eating healthy food during the following week and by monitoring themselves. Regular individual feedback and verbal support were given. They were given rewards if they met their weekly goals or plan.

Finally, in this study the increase of intention to perform eating behaviors for weight control and the improvement of eating behaviors in the experimental group were associated with a significant improvement in nutritional status. This is may be due to activities which encouraged children who were overweight to assess and monitor their own weight/height progress individually, and the offering of further encouragement by a reward when they met the evaluation criteria.

Limitations and Recommendations: Like all studies, this one had limitations. First, the participants came only from elementary schools in a northern province of Thailand. Thus, caution is warranted regarding the generalizability of findings to children overweight in other areas and age groups. Second, the participants' responses to the self-monitoring dietary record may have been influenced by the rewards offered by the researcher. Thus, observation of their eating behavior at school time is necessary. Third, longitudinal studies longer than 13 weeks after intervention are needed to determine the long-term effect of changes in eating behaviors and body weight among children who are overweight. Finally, the application of self-monitoring with a dietary record in this age group should include simple recording methods, as the methods used in this study were found to be difficult and to take time.

Implications for nursing practice: This program provided nursing intervention for children who are overweight. Applying the program to individual overweight children at clinics or other primary healthcare settings is recommended. Nursing practitioners could apply strategies such as self-monitoring, self-awareness, stimulus control, and implement intention aimed at improving intention to perform eating behavior for weight control, eating behavior, and nutritional status among overweight children.

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References

1. World Health Organization. Obesity and overweight; 2013 [updated 2013 March 01; cited 2013 April 13]. Available from <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>.
2. Center of Disease Control and Prevention. Obesity at a Glance 2011 – Halting the Epidemic by Making Health Easier At A Glance; 2011 [updated 2011 May 26; cited 2012 August 26]. Available from <http://www.cdc.gov/chronicdisease/resources/publications/aag/obesit.htm>.
3. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Body mass index in U.S. children and adolescents: 2007–2008. *JAMA*. 2010; 303: 242–249.
4. Stegelin DA. Children, teachers, and families working together to prevent childhood obesity: Intervention strategies, DEC. 2008; 36(1): 8–15.
5. American Obesity Association. Childhood Overweight; 2012. [updated 2010 January 05; cited 2012 February 17]. Available from <http://www.obesity.org/resources-for/childhood-overweight.htm>
6. Puder JJ, Munsch S. Psychological correlates of childhood obesity. *Int J Obes (Lond)*. 2010; 34 Suppl 2:S37–43.
7. Hwang JW, Lyoa IW, Kim BN, Shin MS, Kim SJ, Cho SC. The relationship between temperament and characteristic and psychopathology in community children with overweight. *J Dev Behav Pediatr*. 2006; 27(1): 18–25.

8. Epstein LH, Paluch RA, Roemmich JN, Beecher MD. Family-based obesity treatment, then and now: Twenty-five years of pediatric obesity treatment. *Health Psychol.* 2007; 26(4): 381–391.
9. Reifsnider E, Keller CS, Gallagher M. Factors related to overweight and risk for overweight status among low-income Hispanic children. *J Pediatr Nurs.* 2006; 21(3): 186–196.
10. Abdelkafi KA, Younes K, Gabsi Z, Bouslah A, Maalel I, Maatouk El, et al. Risk factors of children overweight and obesity. *Tunis Med.* 2012; 90(5): 387–393.
11. Chotibang J, Fongkaew W, Mo-suwan L, Meininger JC, Klunklin P. Development of family and school collaborative program to promote healthy eating and physical activity among school-age children. *Thai J Nurs Res.* 2008; 13: 133–147.
12. Ventura A, Birch LL. Does parenting affect children's eating and weight status? *Int J Behav Nutr Phys Act.* 2008; 5: 15–27.
13. American Dietetic Association. Individual-, family-, school- and community-based interventions for pediatric overweight. *J Am Diet Assoc.* 2006; 106: 925–945.
14. McCormick DP, Ramirez M, Caldwell S, Ripley AW, Wilkey D. YMCA Program for Childhood Obesity: A Case Series. *Clin Pediatr.* 2008; 47: 693–690.
15. Institute of Nutrition, Mahidol University: The South East Asia Nutrition Survey; SEANUTS; [updated 2013 May; cited 2013 July 16]. Available from <http://www.inmu.mahidol.ac.th/th/news/121.php> (in Thai)
16. Chiang Mai Provincial Public Health Office. Report: The survey of nutritional and weight status of school age children living in Chiang Mai 2011; 2012. (in Thai)
17. Lampang Provincial Public Health Office. Report: The survey of nutritional and weight status of school age children living in Lampang; 2011. (in Thai)
18. Chen JL, Weiss S, Heyman MB, Lustig RH. Efficacy of a child-centered and family-based program in promoting healthy weight and healthy behaviors in Chinese American Children: a randomized control study. *J Public Health.* 2010; 32(2): 219–229.
19. Summerbell CD, Waters E, Edmunds LD, Brown T, Campbell KJ. Interventions for preventing obesity in children. *Cochrane Library.* 2007; 3: CD001871.
20. Piaget J. "Piaget's theory". In P. Mussen (ed). *Handbook of Child Psychology.* 4th ed. New York: Wiley; 1983.
21. Wilfley DE, Tibbs TL, VanBuren DJ, Reach KP, Walker MS, Epstein LH. Lifestyle interventions in the treatment of childhood overweight. *Health Psychol.* 2007; 26: 521–532.
22. Fila SA, Smith C. Applying the Theory of Planned Behavior to healthy eating behaviors in urban Native American youth. *Int J Behav Nutr Phys Act.* 2006; 3(11): 1–10.
23. Hewitt AM, Stephens C. Healthy eating among 10–13-year-old New Zealand children: Understanding choice using the Theory of Planned Behavior and the role of parental influence. *Psycho Health Med.* 2007; 12: 526–535.
24. Araújo-Soares V, McIntyre T, Snichotta FF. Predicting changes in physical activity among adolescents: The role of self-efficacy, intention, action planning and coping planning. *Health Edu Res.* 2009; 24:128–139.
25. Blanchard CMJ, Fisher J, Sparling P, Shanks T, Nehe E, Rhodes R, et al. Understanding adherence to 5 serving of fruits and vegetable per day: a theory of planned behavior perspective. *J Nutr Edu Behav.* 2009; 41(1): 3–10.
26. Gratton L, Povey R, Clark-Carter D. Promoting children's fruit and vegetable consumption: Interventions using the Theory of Planned Behavior as framework. *BJHP.* 2007; 12:639–650.
27. Jansen W, Mackenbach JP, Joosten-van ZE, Brug J. Weight status, energy-balance behaviours and intentions in 9–12-year-old inner-city children. *JHND.* 2010; 23(1): 85–96.
28. Woolfolk AE, Winne, PH, Perry NE. *Educational psychology.* 3rded. Toronto: Pearson Allyn and Bacon; 2006.
29. Nicklas TA, Hayes D. Position of the American Dietetic Association: Nutrition guidance for healthy children ages 2 to 11 years. *J Am Diet Assoc.* 2008; 108:1038–1047.
30. Ajzen I. The Theory of Planned Behavior. *Organ Behav Soc Hum Decis Process.* 1991; 50: 179–211.
31. Ajzen I, Manstead, AS. Changing health-related behaviors: An approach based on the theory of planned behavior. *The scope of social psychology: Theory and applications.* New York: Psychology Press; 2007.p. 43–63
32. Polit DF, Beck CT. *Nursing research: Generating and assessing evidence for nursing practice.* 8thed. New York: J. B. Lippincott; 2008.
33. Choyhirun T, Suchaxaya P, Chontawan R, Kantawang S. Predictors of eating behaviors for weight control among overweight early adolescents. *Thai J Nurs Res.* 2008; 12(2): 107–120.
34. World Health Organization. Growth Reference 5–19 years; 2007; [updated 2013; cited 2013 June 18]. Available from http://www.who.int/growthref/who2007_bmi_for_age/en/index.html.

การจัดกิจกรรมเพื่อปรับเปลี่ยนกินพฤติกรรมการบริโภคและควบคุม น้ำหนักในเด็กไทยที่มีภาวะน้ำหนัก

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บทคัดย่อ: ปัญหาภาวะอ้วนและน้ำหนักเกินในเด็กถือเป็นปัญหาสาธารณสุขที่สำคัญระดับชาติของหลายประเทศ การศึกษานี้เป็นการวิจัยเชิงทดลองแบบสองกลุ่มวัดก่อนและหลังการทดลองมีวัตถุประสงค์เพื่อทดสอบประสิทธิภาพของการจัดกิจกรรมรายบุคคลต่อพฤติกรรมการบริโภคเพื่อควบคุมน้ำหนักและภาวะโภชนาการในเด็กไทยอายุ 10-12 ปีที่มีภาวะน้ำหนักเกิน การจัดกิจกรรมได้พัฒนามาจากทฤษฎีพฤติกรรมตามแผนเพื่อศึกษาถึงผลของ 1) ความตั้งใจในการบริโภคเพื่อควบคุมน้ำหนัก 2) พฤติกรรมการบริโภคและ 3) ภาวะโภชนาการของเด็ก

นักเรียนจากสองโรงเรียนถูกสุ่มเลือกให้เป็นกลุ่มทดลองหรือกลุ่มควบคุมจากนั้นกลุ่มตัวอย่างในแต่ละโรงเรียนที่มีคุณสมบัติตรงกับปัจจัยการคัดเลือกเข้าสู่กลุ่มทดลอง 68 คนและกลุ่มควบคุม 68 คน กลุ่มทดลองได้รับการจัดกิจกรรมรายบุคคล ส่วนกลุ่มควบคุมได้รับการสอนเกี่ยวกับการบริโภคอาหารที่มีประโยชน์ตามหลักสูตรของโรงเรียน เก็บรวบรวมข้อมูลทั้งสองกลุ่ม ก่อนเริ่มโปรแกรมสัปดาห์ที่ 6 และสัปดาห์ที่ 18 หลังจากเริ่มโปรแกรม โดยใช้แบบสอบถามข้อมูลส่วนบุคคล แบบสอบถามความตั้งใจในบริโภคเพื่อควบคุมน้ำหนัก และแบบสอบถามพฤติกรรมการบริโภคเพื่อควบคุมน้ำหนักวิเคราะห์ข้อมูลโดยใช้สถิติการวิเคราะห์ความแปรปรวนร่วมแบบวัดซ้ำและสถิติที่แบบสองกลุ่มอิสระ

ผลการศึกษาพบว่ากลุ่มทดลองมีความตั้งใจในการบริโภคเพื่อควบคุมน้ำหนัก พฤติกรรมการบริโภคและภาวะโภชนาการดีขึ้นอย่างมีนัยสำคัญทางสถิติมากกว่ากลุ่มควบคุมตลอดระยะเวลาของการวัดผลซึ่งแสดงให้เห็นว่าการจัดกิจกรรมที่ได้พัฒนามาจากทฤษฎีพฤติกรรมตามแผนมีประสิทธิภาพต่อการเพิ่มความตั้งใจในการบริโภคเพื่อควบคุมน้ำหนัก พฤติกรรมการบริโภคและภาวะโภชนาการในเด็กที่มีภาวะน้ำหนักเกิน ดังนั้นพยาบาลควรนำการจัดกิจกรรมรายบุคคลนี้ไปประยุกต์ใช้ในเด็กกลุ่มอื่นที่มีภาวะน้ำหนักเกิน เพื่อนำไปสู่การควบคุมโรคอ้วนได้อย่างมีประสิทธิภาพ

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