

ผลของโปรแกรมการใช้ครอบครัวเป็นฐานเพื่อป้องกันภาวะโภชนาการเกินในเด็กวัยเรียน Effects of Family-based Intervention to Prevent Overweight in School-age Children

นิพนธ์ต้นฉบับ

Original Article

มยุรฉัตร กัญยามะ*, ศรีสุดา รัศมีพงศ์ และ นฤเนตร จุฬากัญจน์
สาขาวิชาพยาบาลชุมชน คณะพยาบาลศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ อ.องครักษ์ จ.นครนายก
26120

* Corresponding author: mayurachat.k@gmail.com

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Mayurachat Kanyamee*, Srisuda Rassameepong and Narunest Chulakarn
Department of Community Nursing, Faculty of Nursing, Srinakharinwirot University, Ongkharak,
Nakhonnayok 26120 Thailand

* Corresponding author: mayurachat.k@gmail.com

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บทคัดย่อ

วัตถุประสงค์: เพื่อทดสอบประสิทธิผลของโปรแกรมการใช้ครอบครัวเป็นฐานเพื่อป้องกันภาวะโภชนาการเกินในเด็กวัยเรียน การจัดกิจกรรมได้พัฒนาจากทฤษฎีการเรียนรู้ทางสังคมของ Bandura **วิธีการศึกษา:** การวิจัยกึ่งทดลองมีกลุ่มตัวอย่างเป็นเด็กวัยเรียนที่กำลังศึกษาชั้นประถมศึกษาปีที่ 5 - 6 ในจังหวัดกรุงเทพมหานครและนครนายกจำนวน 136 คน แบ่งเข้ากลุ่มควบคุมและทดลองอย่างละเท่า ๆ กัน กลุ่มทดลองได้รับโปรแกรม 5 สัปดาห์ กลุ่มควบคุมได้รับความรู้เกี่ยวกับการบริโภคอาหารตามหลักสูตรของโรงเรียน เครื่องมือที่ใช้ประกอบด้วย แบบสอบถามข้อมูลทั่วไป แบบสอบถามพฤติกรรมการบริโภคผักและผลไม้ แบบสอบถามพฤติกรรมการบริโภคไขมันและอาหารที่มีรสหวาน วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา (descriptive statistics) และการทดสอบค่าที (independent t-test) **ผลการศึกษา:** พบว่ากลุ่มทดลองมีคะแนนพฤติกรรมการบริโภคผักและผลไม้เพิ่มขึ้น และคะแนนพฤติกรรมการบริโภคไขมันและอาหารที่มีรสหวานลดลงกว่าก่อนได้รับ โปรแกรมอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 **สรุป:** โปรแกรมการใช้ครอบครัวเป็นฐานเพื่อป้องกันภาวะโภชนาการเกินในเด็กวัยเรียนโดยประยุกต์ใช้ทฤษฎีการเรียนรู้ทางสังคมร่วมกับกิจกรรมมีส่วนร่วมจากผู้ปกครองสามารถช่วยให้เด็กวัยเรียนมีพฤติกรรมการบริโภคอาหารที่เหมาะสม นอกจากนี้ พยาบาลอนามัยโรงเรียนและครูในโรงเรียนสามารถใช้โปรแกรมดังกล่าวในการปรับพฤติกรรมการบริโภคอาหารของเด็กวัยเรียนให้ดีขึ้นได้

คำสำคัญ: โปรแกรมการใช้ครอบครัวเป็นฐาน, ทฤษฎีการเรียนรู้, ภาวะโภชนาการเกิน, เด็กวัยเรียน, พฤติกรรมการบริโภคอาหาร

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Abstract

Objective: To examine the effects of a family-based intervention on increasing fruit and vegetable intake and reducing fat and sugar intake among school-age children. The activities were based on the Bandura's social cognitive theory (SCT). **Methods:** In this quasi-experimental study, the sample was 136 children studying in grade 5 - 6 in Bangkok and Nakhonnayok province. They were randomized into experimental or control group. The experimental group received an intervention for 5 weeks while the control group received the school's usual consumption behavior educational program. Data were collected using three questionnaires including demographic characteristics, fruit and vegetable intake behavior, and fat and sweet intake behavior. These questionnaires were administered at baseline and 16th week after baseline. Data were analyzed by using descriptive statistic and independent t-test. **Results:** Significant differences between the experimental and control groups in fruit and vegetable intake, fat and sweet intake at 16th week after baseline (P -value < 0.05). **Conclusion:** The family-based intervention based on SCT was effective to improve healthy eating behavior among school-age children. Therefore, school health nurses and instructors can apply this intervention to improve eating behavior among school-age children.

Keywords: family-based intervention, learning theory, overweight, school-age children, dietary intake behavior

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Introduction

World Health Organization (WHO) stated that 'overweight' or 'obesity' is a global epidemic health problem both in adult and childhood age. The prevalence of overweight children has increased since 1980.¹ Between the year 2010 and 2016, the prevalence rate of childhood overweight in the United State increased from 16.9% to 18.4%.² Similarity, in Thailand, the prevalence of overweight between 10 - 12 years old children has increased from 9.7% in 2009 to 13.9% in 2014.³ Overweight in children has a strong correlation with adulthood overweight. It has been estimated that 70 - 80% of overweight children continue to be obese adults, which is associated with adiposity rebound.⁴ Moreover, overweight in children may cause important health consequence such as high blood

pressure, type 2 diabetes mellitus (DM), and cardiovascular diseases.⁵ Overweight also has detrimental psychosocial effects on children such as low self-image and social bully. These problems can further increase negative effects on the children's academic performances and achievements.⁶⁻⁸

In addition, multiple factors that may have an effect in causing overweight and obesity include personal factors, parental factors, and environment factors.^{9,10} The family-based interventions for weight control have been conducted to examine benefits of various strategies.^{11,12} Results of these studies suggested that the program should emphasize on modifying healthy eating behavior for children. In addition, using the intervention based on Social Cognitive Theory (SCT)

would improve children's fruit and vegetable intake and reduce fat and sugar intake among school-age children.

Thus, the objectives of this study were to compare 1) scores of fruit and vegetable intake before and after entering the intervention, 2) scores of fruit and vegetable intake among school-age children who received the intervention and those who did not, 3) scores of fat and sugar intake before and after receiving the intervention, and 4) scores of fat and sugar intake among school-age children who received intervention and those who did not.

Methods

This quasi-experimental study examined the effects of a family-based intervention on increasing fruit and vegetable intake and reducing fat and sugar intake among school-age children. The target population of this study were 5th and 6th grade students in Bangkok and Nakhonnayok province in the academic year of 2015 - 2016. The sample size was calculated by the formula of repeated measurement analysis.¹³ With a type I error (α) of 5%, a statistical power of 0.90, and an effect size of 0.56, a sample of 163 children was needed. The children participants were randomized to experimental or control group. Inclusion criteria were children who: 1) were 10 - 12 years old, 2) were in grade 5 - 6 at elementary schools, 3) were having a BMI-for-age of $-1*SD$ to $+1*SD$ (according to 2007 WHO growth reference: BMI for age Z-scores)¹⁴, 4) were able to read and write in Thai, 5) agreed to participate in this study, and 6) having parental agreement to participate in this study. However, exclusion criteria were children who had severe complications or current medical or psychiatric problems which made them unable to participate in this program such as heart disease as diagnosed by the physician.

Instruments

Data were obtained using three self-report questionnaires consisting of (1) demographic characteristics, (2) fruit and vegetable intake, and (3) fat and sweet intake at baseline. The questionnaires on the intake behaviors (2 and 3) were administered at baseline and 16 weeks thereafter.

It took approximately half an hour to complete the questionnaires. The demographic characteristic questionnaire was developed by the researcher. The questionnaire consisted of demographic data of children and their family.

The fruit and vegetable intake questionnaire developed by the researcher consisted of 20 checklist items with a response format of a 4-point Likert-type scale ranging from 1-never to 4-always. The score was reversed for negative statements. The total score ranged from 20 to 80 points where higher scores indicate better intake behavior. The fat and sugar intake questionnaire developed by the researcher also consisted of 20 checklist items with a response format of a 4-point Likert-type scale ranging from 1-never to 4-always. The score was reversed for negative statements. The total score ranged from 20 to 80 points where higher scores indicate better intake behavior. Correlation coefficient for test-retest reliability of the two intake questionnaires tested with school-age children comparable to the prospective participants in our study within a one-month period were 0.82 and 0.85 respectively.¹⁵

In terms of human right protection, the approval to conduct the study was granted from the Research Ethics Review Committee of the Srinakharinwirot University (Approval number: SWUEC/E-063/2557), and from the administrators of the two schools where the children were studied. Letters describing the study, its purpose, methods, potential risks and benefits of participation and the protection of confidentiality were given to all parents of eligible participants. The parents were asked to voluntarily provide written consent and the children for assent, and return the signed consent by postage mail within one week after receiving the letter.

Experiment and data collection

Once the approval to conduct the study was obtained, the consent and assent were secured. Baseline assessment data on school-age children's weight/ height and intake questionnaires were completed by both groups. The interventions were provided for the experimental group. The activities in each section were conducted by the researcher and research assistant beginning in the first week. The participants in experimental group had an advice to follow the modules of a family-based intervention in the first to fifth week. The intervention consisted of five sections containing knowledge about good nutrition and well-balanced diet, foods with low (green), medium (yellow), and high calories (red). Each section contained various activities which took 30 minutes to complete. The children recorded their dietary intake in an activity book every day until the 16th week.

At the 16th week, the researcher evaluated the results of the intervention by assessing the child's weight/height and administering the two intake questionnaires in the two groups. Furthermore, monitoring process was conducted by telephoning to contact the parents at home for some consultations. The control group will be waiting list control.

Data analysis

Descriptive statistics was used to present the data. Paired t-test or Wilcoxon signed rank test, as appropriate, was used to test the within-group difference of the intake behavior scores in each of the two groups. Independent t-test or Mann-Whitney U test, as appropriate, was used to test difference of the intake behavior scores between the two groups. Prior to analysis the assumption of normality was tested. All probabilities were the two-tailed tests and the significance level for the statistic was set at 0.05.

Results

For fruit and vegetable intake behavior in the experimental group, the mean score was 37.15 points at baseline (T₁) and was significantly increased to 45.16 points at 16th week after baseline (*P*-value = 0.002) (Table 1). A significant increase of mean score of fat and sugar intake behavior in the experimental group from baseline to 16th week thereafter was also found (40.07 and 48.79 points, respectively, *P*-value = 0.026).

Table 1 Mean scores of fruit and vegetable intake behavior and fat and sugar intake behavior at baseline and 16th week thereafter in the EXPERIMENTAL group (n = 68).

Behavior	Mean	S.D.	t*	P-value
Fruit and vegetable intake behavior				
Baseline (T ₁)	37.15	7.79	5.716	0.002
16 th week after baseline (T ₂)	45.16	5.44		
Fat and sugar intake behavior				
Baseline (T ₁)	40.07	3.19	7.149	0.026
16 th week after baseline (T ₂)	48.79	5.37		

* paired t-test for within-group comparisons.

In the control group, the mean score of fruit and vegetable intake behavior was 36.47.47 points at baseline (T₁) and was significantly increased to 40.23 points at 16th week after baseline (*P*-value = 0.044) (Table 2). There was a slight decrease of mean score of fat and sugar intake behavior from baseline to 16th week thereafter but with no statistical

significance (41.32 and 39.07 points, respectively, *P*-value = 0.068).

Table 2 Mean scores of fruit and vegetable intake behavior and fat and sugar intake behavior at baseline and 16th week thereafter in the CONTROL group (n = 68).

Behavior	Mean	S.D.	t*	P-value
Fruit and vegetable intake behavior				
Baseline (T ₁)	36.47	4.53	4.259	0.044
16 th week after baseline (T ₂)	40.23	6.68		
Fat and sugar intake behavior				
Baseline (T ₁)	41.32	6.40	6.916	0.068
16 th week after baseline (T ₂)	39.07	2.42		

* paired t-test for within-group comparisons.

At baseline, the mean scores of dietary intake behavior were not different between experimental and control groups either for fruit and vegetable intake behavior (37.15 and 36.47 points, respectively, *P*-value = 0.069) or fat and sugar intake behavior (40.07 and 41.32 points, respectively, *P*-value = 0.059) (Table 3). However, at 16th week after baseline, the mean scores of dietary intake behavior were significantly higher in experimental group than in control groups both for fruit and vegetable intake behavior (45.16 and 40.23 points, respectively, *P*-value = 0.044) and fat and sugar intake behavior (48.79 and 39.07 points, respectively, *P*-value = 0.048).

Table 3 Mean scores of fruit and vegetable intake behavior and fat and sugar intake behavior baseline and 16th week thereafter in the EXPERIMENTAL and CONTROL groups (n = 136).

Behavior	Experimental group (n = 68)		Control group (n = 68)		t*	P-value
	Mean	S.D.	Mean	S.D.		
Fruit and vegetable intake behavior						
Baseline (T ₁)	37.15	7.79	36.47	4.53	1.768	0.069
16 th week after baseline (T ₂)	45.16	5.44	40.23	6.68	13.584	0.044
Fat and sugar intake behavior						
Baseline (T ₁)	40.07	3.19	41.32	6.40	1.901	0.059
16 th week after baseline (T ₂)	48.79	5.37	39.07	2.42	14.528	0.048

* independent t-test for comparison between the two groups.

Discussions and Conclusion

This family-based intervention based on social cognitive theory was effective to improve fruit and vegetable intake behavior and fat and sugar intake behavior among school-age children. After the program implementation, school-age

children in the experimental group had significantly increased fruit and vegetable intake behavior and significantly reduced fat and sugar intake behavior (i.e., increased mean score). These findings were consistent with other studies which were successful in applying family-based intervention to increase healthy eating behavior in children and encourage healthful eating behavior.¹⁶⁻¹⁸ Therefore, this intervention program based on the social cognitive theory and social support could improve children's eating behavior, and implicitly skill of weight control and nutritional status.

According to the program, the school-age children met the researcher once a week to submit their dietary record as a self-monitoring. They were rewarded if they met their weekly goals or did as planned. They also received another point when they returned their dietary record. The collected points could be used to claim for a reward at the end of intervention.

Self-monitoring and family support in eating behavior is the activity in improving their healthy eating behavior. Some changes of behavior will occur as the children increase their awareness when they are provided with the opportunity to monitor or observe their behavior carefully.¹⁹ In addition, children dietary record folder should be created for each child in order to record their nutritional status and monitor problems of eating behavior. Finally, this intervention program should be collaborated with multidisciplinary team such as school's administrators and nutritionists for supporting the implementation of this program.

This study had certain limitations. First, since the study was carried out only in school-age children in elementary schools in Bangkok and Nakhonayok province, generalizability to other overweight children was limited. Second, since the intervention took place over a limited period of time, a thorough maintenance of the change in dietary intake behavior could be somewhat limited. Thus, studies with a longer follow-up period are needed to determine whether the change of eating behavior is sustainable.

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