ประสิทธิผลของโปรแกรมที่มุ่งเน้นบิดามารดาในการปรับปรุงพฤติกรรมการรับประทานอาหาร รูปแบบการรับประทานอาหาร และค่าดัชนีมวลกายของเด็กวัยก่อนเรียน

The Effectiveness of a Parent - Focused Intervention on Eating Behavior and patterns and BMI among Thai Preschool Children

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บทคัดย่อ

การวิจัยเชิงทดลองแบบสุ่มครั้งนี้มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของโปรแกรมที่มุ่งเน้นบิดามารดาต่อพฤติกรรมการรับประทานอาหารรูปแบบการรับประทานอาหาร และค่าดัชนีมวลกายของเด็กไทยวัยก่อนเรียนกลุ่มตัวอย่างเป็นบิดามารดาและบุตรวัยก่อนเรียนจำนวน 35 คู่ กลุ่มทดลองและ 30 คู่ กลุ่มควบคุมกลุ่มทดลองได้รับโปรแกรม 7 สัปดาห์ ๆ ละ 1 ครั้ง เครื่องมือวิจัยได้แก่ แบบสอบถามพฤติกรรมการรับประทานอาหาร และแบบสอบถามความถี่และปริมาณการรับประทานอาหารสำหรับเด็กฉบับภาษาไทยทั้งสองกลุ่มได้รับการประเมิน 3 ครั้งคือก่อนการทดลอง สัปดาห์ที่ 8 และ 12 หลังการทดลองเครื่องมือวิจัยมีค่าความเชื่อมั่นอยู่ระหว่าง .77 - .85 บันทึกอายุ น้ำหนัก และความสูงของเด็กเพื่อใช้คำนวณค่าดัชนีมวลกายสถิติพรรณนา การทดสอบที และการวิเคราะห์ความแปรปรวนแบบวัดซ้ำใช้เพื่อวิเคราะห์ข้อมูลผลการวิจัยพบว่าเด็กวัยก่อนเรียนที่ได้รับโปรแกรมมีพฤติกรรมการรับประทานอาหารดีกว่าเด็กในกลุ่มควบคุม และมีรูปแบบการรับประทานอาหารที่ไม่เหมาะสมของเด็กวัยก่อนเรียนในกลุ่มทดลองลดลงอย่างมีนัยสำคัญ อย่างไรก็ดีค่าดัชนีมวลกายสำหรับอายุเด็กระหว่างกลุ่มทดลองและกลุ่มควบคุมไม่แตกต่างกัน จากผลการวิจัยนี้มีข้อเสนอแนะว่าการมีส่วนร่วมของบิดามารดาสามารถช่วยปรับปรุงพฤติกรรมการรับประทานอาหาร และรูปแบบการรับประทานอาหารในเด็กวัยก่อนเรียน

คำสำคัญ : โปรแกรมที่มุ่งเน้นบิดามารดา พฤติกรรมการรับประทานอาหาร รูปแบบการรับประทานอาหาร ค่าดัชนีมวลกาย เด็กวัยก่อนเรียน

Abstract

This randomized control trial examined the effectiveness of the parent-focused intervention on Thai preschool children's eating behaviors and patterns and child body mass index for age (BMI-for-age). Thirty-five parent-child dyads in the control group and 30 dyads were recruited. The intervention group participated in a seven-week parent-focused intervention. The Thai versions of the CEBQ and the modified FFQ were used to measure eating behaviors and eating patterns at three time points : Baseline, week 8 and week 12 after the

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intervention. Cronbach's alphas ranged from .77-.85. The Child age, weight, and height were used to calculate their BMI-for-age. Descriptive statistics, t-test, and repeated measures. ANOVAs were used to analyze the data. Results showed that preschool children who received the parent-focused intervention had better eating behaviors than those who did not receive the intervention. Within the intervention group, inappropriate eating patterns significantly decreased by time. No difference was found for BMI-for-age between groups. These findings suggest that parents' involvement can help improve eating behaviors and patterns among overweight and obese preschool children in Thailand.

Keywords : Parent-focused intervention, Eating behavior, Eating patterns, Body mass index, Preschool children

Background and significance of the problem

Obesity in preschool children has been recognized as a global issue in both developed and developing countries. In Thailand, the percentage of overweight preschool children is constantly increasing.[7] While they are growing up, these children will have a greater risk of being obese. Children who are obese at an early age have a higher probability of affliction from several illnesses, including heart disease, kidney failure, diabetes, hypertension, bone diseases, and hypercholesterolemia.

Eating behavior has been defined as activities or styles of eating consisting of seven elements; food responsiveness, enjoyment of food, emotional over-eating, desire to drink, satiety responsiveness and slowness in eating, emotional under-eating, and food fussiness.[9] Research on Thai preschool children showed that they risked obesity because of high scores in food responsiveness and enjoyment of food.[8] Moreover, the report about the eating patterns of Thai preschool children showed that they did not comply with the recommendations for fruit and vegetable consumption, and exceeded in the consumption of energy-dense foods. The NHESO reported about child health between the years 2008 to 2009 that Thai preschool children aged 2 to 5 years consumed one portion a day of fruits and vegetables which is less than the recommended quantity for Thai children.[7] In addition, parenting practices and parenting styles are significant factors that have influence on child eating behavior and child weight status as well.[1] From the review of research studies during the years 2003 to 2012, it showed that there were 4 categories of management of childhood obesity including assessment, screening, management, and evaluation of childhood obesity. Management of childhood obesity focused on family, school, or community to evaluate the important outcomes such as child eating behaviors, weight status, and so on.[6] In the past, there were fewer programs to encourage daily consumption for preschool children than at the elementary level.[5] It is important therefore to develop the intervention for healthy eating behaviors and patterns of preschool children by focusing on parental participation to prevent obesity in Thai preschool children.

Conceptual framework

The ecological system theory (EST) was used to guide the conceptual framework of the study. 2 The parent-focused intervention concentrated on the individual or the characteristics of preschool children and their context (micro-systems and meso-system). The characteristics of preschool children were presented in the study such as age, gender, growth and development, eating behaviors, eating patterns, and their health. They had face-to-face interaction with two micro-systems (parents at the home environment and the kindergarten teachers at school)

and also interacted with meso-system (parents and kindergarten teachers). For meso-system, the parents had face-to-face interaction with kindergarten teachers that both of them also had influence on preschool children.

Purposes of the study

The purposes of the study were to develop the parent-focused intervention to improve healthy eating behaviors, eating patterns, and the BMI of preschool children, and to determine the effectiveness of the parent-focused intervention by comparing eating behaviors, eating patterns, and the BMI of preschool children between the intervention and the control groups.

Hypotheses

1. Preschool children in the intervention group have better eating behaviors than those in the control group.

2. Preschool children in the intervention group have better eating patterns than those in the control group.

3. Preschool children in the intervention group have more appropriate BMI-for-age than those in the control group.

Methods

A randomized controlled trial (RCT) aimed to examine effectiveness of the parent-focused intervention by comparing eating behaviors, eating patterns, and BMI-for-age of preschool children between the intervention and the control groups.

Sample and setting

The sample size was calculated by G*Power (3.1.6).[4] The effect size was .49, and statistical power was set at .80 to detect the difference in mean of the outcomes between the two groups at alpha .05 significance level. A total sample size of 58 parent-child dyads was required. Twenty-five percent was added as contingency, and therefore 74 parent-child dyads were recruited.

The inclusion criteria for parents consisted of a) age 18 years or older, b) live with the preschool children in an intact family, c) be able to read, write, and communicate in Thai, d) absence of any chronic illness, and f) willing to participate in the study throughout the program. The inclusion criteria for preschool children consisted of a) enrolled in kindergarten I, II, or III, b) absence any chronic illness, c) be able to communicate in Thai, and d) willing and given permission by their parents to participate in the study.

The study was conducted in a school in Bangkok during the academic year 2014. The target population of 520 parents and preschool children aged 3 to 5 years in kindergarten I, II, or III were invited to participate in the study. Eighty parent-child dyads were willing to participate in the study and they were randomly selected and assigned to either the 40 parent-child dyads in the control group, or the 40 parent-child dyads in the intervention group. The sample was randomly assigned into both groups based on inclusion and exclusion criteria. There were 38 and 36 parent-child dyads in the control group and the intervention group that participated in the study. During the study, 3 parent-child dyads dropped out from the control group, and 6 dropped out from the intervention group. Therefore, there were 65 parent-child dyads who completed the study, 35 in the control group and 30 in the intervention group, and these were analyzed.

Ethical considerations

This study had been approved from the ethics committee of the Faculty of Nursing, Burapha University. Parents were asked to complete and sign the informed consent forms before the intervention

implementation. The researcher gave full information to the parents regarding this study, including the research objectives, data collection procedures, and the advantages of the study. If any parents had any concerns and wanted to drop out from the study, they could do so at any time.

Research instruments

The instruments of the study included: a) the demographic information questionnaires of the parents and their preschool children, b) the child eating behavior questionnaire (CBEQ), c) the modified food frequency questionnaire (FFQ), and d) the parent-focused intervention.

a) The demographic information questionnaire completed by the parents was used to obtain data from the parents, such as gender, age, marital status, religion, educational level, family income, number of their children living in the home, and the underlying presence of any health problems. The demographic information questionnaire of preschool children was completed by their parents and used to obtain data of their children such as birth date, age, gender, religion, birth weight, and underlying presence of any health problems.

b) The Thai version of the children's eating behavior questionnaire (CEBQ) was used to measure child's eating behaviors.[8, 9, 10, 11] The CEBQ consisted of 7 subscales with a total of 35 items. Each item had five point Likert scales so that the response options were from 1 to 5, including never (1), seldom (2), sometimes (3), often (4), and always (5). The seven subscales were food responsiveness (5 items), enjoyment of food (4 items), emotional overeating (4 items), desire to drink (3 items), satiety responsiveness/ slowness in eating (9 items), emotional under-eating (4 items), and food fussiness (6 items). The total possible score therefore ranged from 35 to 175. Possible scores for each subscale were 5-25 for food responsiveness, 4-20 for enjoyment of food, 4-20 for emotional overeating, 3-15 for the desire to drink, 9-45 for satiety responsiveness/ slowness in eating, 4-20 for emotional under-eating, and 6-30 for food fussiness (Wardle et al., 2001). Cronbach's alpha of the Thai translated version was .79, and its items ranged from .77 to .79.

c) The modified food frequency questionnaire (FFQ) was a parent self-reportused to measure child eating patterns.[8] The modified FFQ contained a total of 35 items that included 16 items of appropriate foods and 19 items of inappropriate foods. The response options for each item were on a scale from 1 to 5, including never (1), not eaten every week or month (2), 1-2 times per week (3), 3-4 times per week (4), and 5-7 times per week (5). Higher scores of appropriated food intake and lower scores of inappropriate food intake indicated a better eating pattern. Cronbach's alpha of the modified FFQ was .81, and its items ranged from .79 to .82.

d) The parent-focused intervention: The ecological system theory and reviewed previous researches were used to develop a seven weekly program of parent-focused intervention. The intervention placed emphasis on the group of parental participation with seven sessions to discuss and share ideas between parents and the researcher, and the kindergarten class teachers were asked to participate and share ideas for four sessions during week 3, 5, 6, and 7. A period of group participation of about 60 or 90 minutes per weekly session was used to discuss a different topic every week. The content validity of each session and activities of parent-focused intervention was validated by five experts, including two pediatric nursing professors, a pediatrician, a child psychologist, and a nutritionist, and then each session of the parent-focused intervention was tested for clarity and feasibility with a pilot study.

The seven weekly sessions of the parent-focused intervention were implemented,

and the parent was given a daily checklist form to record what and how their children ate at home. During week 1, the group discussed about growth and development in preschool children and identified overweight or obese children by Thai growth charts based on gender and age.

At week 2, the group discussed how parenting food practices and parenting styles affected child eating behavior and patterns, and shared ideas among parents about how the home environment affected child eating behavior and patterns. At week 3, the group discussed about nutritional information and portion sizes for preschool children that focused on eating the five food groups, especially fruits and vegetables. At week 4, the group discussed and shared ideas about how parents prepared healthy food menus and the parents were given a menu book. At week 5, the group discussed and shared ideas about using rewards to encourage eating healthy food. At week 6, the group discussed and shared ideas about reading a story book which could help to encourage their children to eat vegetables. At week 7, the group discussed and shared ideas about diseases and health problems associated with overweight and obese preschool children.

Data collection procedures

Five hundred and twenty-two parent-child dyads were approached by sending out invitation letters. Seventy-four parent-child dyads signed informed consent forms, and were randomly assigned to the control or the intervention groups of 38 and 36 parent-child dyads, respectively. At the final analyses, there were 35 and 30 parent-child dyads of the control group and the intervention group, respectively who completed the study. Details were in Figure 1.

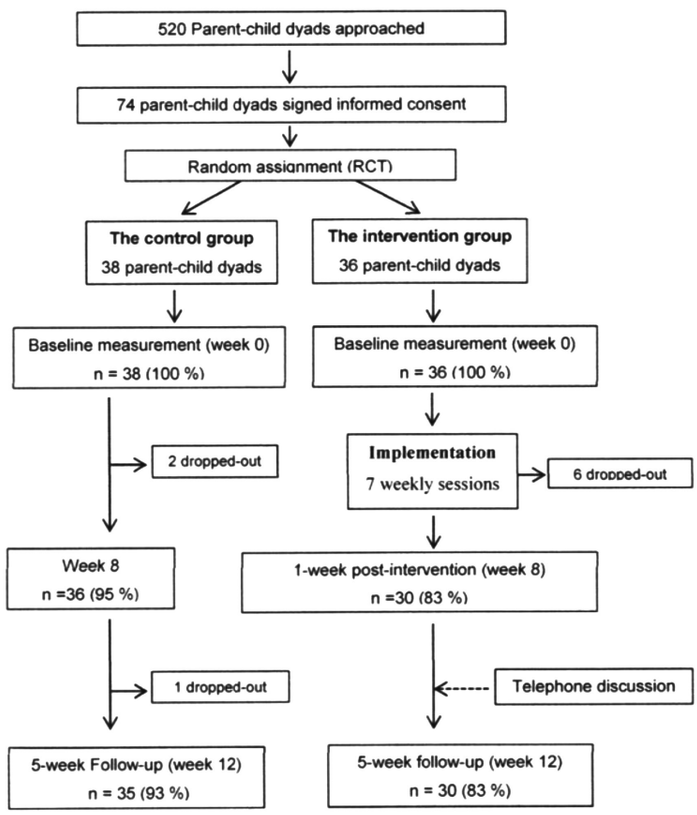

Figure 1 Data collection procedures and the summary of the sample allocation

Data analyses

Data analyses were performed by using the SPSS statistical software program and the statistical significant level was set at $p < .05$. Descriptive statistics were used to describe the characteristics of parents and their preschool children (gender, religion, education, income, number of children in the home, and birth weight) and the baseline variables of child eating behaviors, child eating patterns, and child BMI-for-age. Chi-square and independent t-test were used to examine mean differences in demographic variables between the groups and the baseline variables. Child BMI was calculated from the children's weights (kilograms) and square of heights (meters) by the BMI-for-age calculated based on gender and age-specific. Two-way repeated measure analysis of variance (one-between and one-within) was used to analyze mean differences in the mean scores of three outcome variables between the intervention and the control groups among three time measurements.

Results

Demographic characteristics

For parents in the control group, the results showed their mean age of 39 years and that about 89 % were mothers. Most of them were Buddhist (94.3%). About one half of them completed an undergraduate degree. Most of them had a monthly family income of more than 35,000 Baht. For the intervention group, the parents' mean age was 37 years and of this group that 93% were mothers. Ninety percent were Buddhist. More than a half (63%) completed an undergraduate degree, and had a monthly family income of 45,000 Baht or more (56.7%).

In the control group, the mean age of the preschool children was 3.75 years old and that 62.9% were boys, and 51.4% were the first of child of the family. In the control group, the mean age of the preschool children was 4.0 year old. There were boys of about 63.3%, and 63.3% were the first of child of the family.

Outcome variables

The independent t-test was used to compare mean differences of the three outcome variables, including child eating behaviors, eating patterns and BMI-for-age that were measured at the baseline (week 0). There were no significant differences in all outcome variables at the baseline between the control and intervention groups ($p > .05$).

Two-way repeated measured analysis of variance (one-between and one-within) was used to analyze the mean differences in mean scores. There were significant statistical differences in mean scores between the groups of the total scores of child eating behaviors and three subscales, including emotional overeating, desire to drink, and emotional under-eating. For child eating patterns, there were significant statistical differences in mean scores between the groups of eating inappropriate food, but not for the total scores and eating appropriate food.

The least significant difference (LSD) pair-wise comparison was used to compare means among the three time measurements. The results showed that there were statistically significant differences in mean scores of desire to drink and eating inappropriate food. The desire to drink in preschool children who received the parent-focused intervention significantly decreased, compared with those who did not. There were mean differences between week 0 and 8 ($M_{diff} = .900$, $SE = .267$, $p < .001^{**}$), and between week 0 and 12 ($M_{diff} = .912$, $SE = .265$, $p < .001^{**}$), but not between week 8 and 12 ($M_{diff} = .012$, $SE = .241$, $p = .961$). In the graph, the line of the intervention group constantly decreased over time, while the control group increased mean score, especially from week 8 to week 12 (See Figure 2).

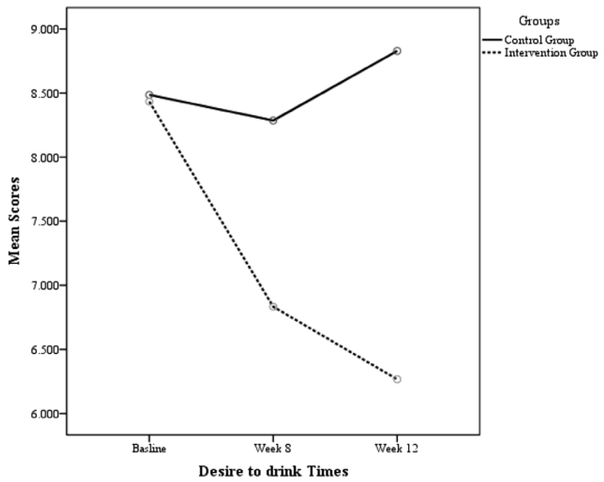

Figure 2 Comparisons of mean scores of desire to drink

For eating inappropriate food, there was a significant difference only between week 0 and 8 (M_{diff} = 2.064, SE = .755, p< .01), while there were no statistically significant mean scores between weeks 0 and 12 (M_{diff} = .845, SE = .672, p> .05), and between weeks 8 and 12 (M_{diff} = 1.219, SE = .687, p> .05). The line graph showed that mean scores of eating inappropriate food of the control group constantly increased with time, while the line graph of the intervention group showed a constant decrease with time (See Figure 3).

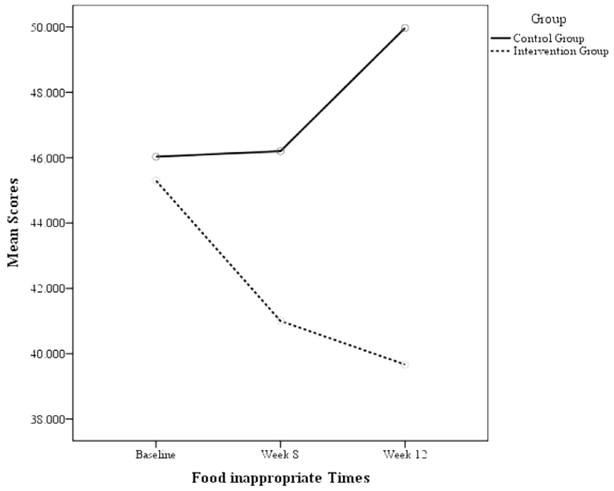

Figure 3 Comparisons of mean scores of food inappropriate intake

Discussion

The findings support the hypotheses that preschool children who received the parent-focused intervention program had better eating behaviors of desire to drink than those in the control group. However, there were significant differences in mean scores between the baseline and week 8, and week 12. Although the graph line showed a lower change over time than the control group, it also did not show any difference between weeks 8 and 12.

Inappropriate food intake of preschool children in the intervention group was significantly less than those in the control group. However, there was a significant difference in the time between the baseline and week 8. The graph line showed a lower change over time than in the control group, but it also did not show any differences between baseline and week 12, and weeks 8 and 12 between groups.

There was no significant difference of BMI-for-age of preschool children between the intervention and the control groups. Because of rate of growth and development of preschool children at the individual level had an influence on changing child weight status.3From the results, it was possible that more time was required to confirm the effectiveness of the intervention to improve child behavior and eating patterns more clearly. Additionally, after completing the intervention, the use of telephone discussions only with the parents might not be enough to continuously reduce the desire to drink and eat inappropriate food. Specific strategies are needed to decrease the desire to drink on a continuous basis.

Children adopt a process of gradual behavior change which takes time. Preschool children are more interested in play than in food eating activities, and this has an impact on their behavioral development. Some children drank sweetened milk or more sweet drinks before participating in the intervention that could influence children to consume healthy food. Some children liked these unhealthy drinks because of the sweetness but they could not understand that these were good or bad for their health. Therefore, sustainable improvement of eating behavior and patterns may require additional time for a long-term follow-up.

The strength points of the study were as follows: Firstly, the randomized control trial (RCT) was used and the samples were randomly assigned to the control or intervention groups. Secondly, despite some parents dropping out from the program, the remaining numbers were adequate to show the different between two groups, and the results were as expected. Thirdly, this intervention focused on parents and kindergarten teachers as important factors of preschool children in order to improve their eating behaviors and patterns.

Implications for nursing practice

The findings of the study were proofed effectiveness in improving eating behavior and patterns of Thai preschool children, especially decreasing the desire to drink and eat inappropriate food. Significantly, an authoritative parenting style, parenting food practices, good role models, and strong parental participation are the key factors for the effective intervention of preschool children. Not only parents but it should also include teachers and school policies as they are important factors to sustain decreasing sweetened beverages consumption and increasing healthy food consumption.

The effectiveness of the intervention is a positive factor toward nurses and nursing practice. In order to promote and encourage healthier eating behaviors and healthier eating patterns in preschool children continuously, professionals such as nurses can apply this intervention to improve and change the desire to drink and eat an unhealthy food intake in preschool children through parental involvement by discussion amongst nurses, parents, and kindergarten teachers, and they should allow a long period to follow-up eating behaviors and patterns of children.

Further research should be longitudinal studies to look at follow-up behaviors. During the follow-up, using only the telephone to discuss with parents might not be enough and that possibly adding different methods such as home visits may help to enhance the intervention efficiency and/or could

improve the healthy eating behavior and eating patterns clearly. Moreover, increasing the sample size may be necessary to confirm positive improvements in child eating behavior, eating patterns, and BMI. Improving eating behaviors and eating patterns of children can be shown clearly to be effective when they are monitored continuously. If the intervention can improve eating behaviors and patterns in childhood, they will become healthy adolescents and adults with appropriated BMI. Importantly, a strong parental role is an important and essential activity to encourage healthy eating and support behavioral changes of preschool children.

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References

1. Birch LL, Davison KK. Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight. Pediatric Clinics of North America 2001;48(4): 893-907.
2. Bronfenbrenner U, Morris PA. The bioecological model of human development. In W Damon, RM Lerner (Eds.), Handbook of child psychology, Vol. 1: Theoretical models of human development. 6th ed. (pp. 793 – 828). NewYork: Wiley; 2006.
3. Davison KK, Birch LL. Childhood overweight: A contextual model and recommendations for future research. Obesity Reviews 2001; 2 (3):159-171.
4. Faul F, Erdfelder E, Lang A-G, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. 2007.Behavior Research Methods 2007; 39 (2),175-191.
5. Hingle MD, O'Connor TM, Dave JM, Baranowski T. Parental involvement in interventions to improve child dietary intake: A systematic review. Preventive Medicine 2010;51(2): 103-111.
6. Chaisri., J., Klungtumneim., K., & Buajarean., H. Clinical nursing practice guideline for management of obesity in children: The synthesis of thesis. Journal of The Royal Thai Army Nurses 2014; 15(2) : 360-367.(in Thai)
7. National Health Examination Survey Office [NHESO]. The 4th survey Thai health report by physical examination: Child health 2008-2009. (in Thai)
8. Thongbai W, Fongkaew W, Kennedy CM, Aree P, Patumanond J. (2011). Risk factors contributing to overweight among preschool children. Pacific Rim International Journal Nursing Research 2011;15(1):13-27.
9. Wardle J, Guthrie CA, Sanderson S,Rapoport L.Development of the children's eating behaviour questionnaire. Journal of Child Psychology and Psychiatry 2001; 42 (7): 963-970.
10. Poonperm R. Food Consumption Behaviors of Family in The Community of Phramong Kutklao Hospital Personnel's Residence. Journal of The Royal Thai Army Nurses. 2016; 17(2): 78-88. (in Thai)
11. Kummabutr J., Kumpalikit S. The school-based participative Realth management in children: The preliminary outcomes on exercise and physical activity among adolescent. Journal of The Royal Thai Army Nurses. 2014; 15(1): 64-72. (in Thai)