โปรแกรมการให้คำปรึกษาด้านพฤติกรรมโดยใช้ครอบครัวเป็นฐานในเด็กวัยเรียนที่มีภาวะอ้วน: การวิจัยนำร่อง
A Family-Based Behavioral Counseling Program in School-aged Children with Obesity: A Pilot Study

นิพนธ์ต้นฉบับ

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Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความเป็นไปได้ของโปรแกรมการให้คำปรึกษาด้านพฤติกรรมโดยใช้ครอบครัวเป็นฐานในเด็กวัยเรียนที่มีภาวะอ้วนต่อพฤติกรรมการกินอาหารเพื่อสุขภาพ กิจกรรมทางกาย และดัชนีมวลกาย **วิธีการศึกษา:** การวิจัยกึ่งทดลองเปรียบเทียบกลุ่มเดียววัดผลก่อน และหลังการทดลองและติดตามผล กลุ่มตัวอย่างคัดเลือกแบบเฉพาะเจาะจง เป็นเด็กวัยเรียนที่มีภาวะอ้วนและผู้ปกครอง 5 ราย อายุ10 - 12 ปี ศึกษาในโรงเรียนเทศบาลเขต อ.เมือง จ.สุราษฎร์ธานี อาศัยอยู่กับบิดา/มารดา เก็บรวบรวมข้อมูล 4 สัปดาห์ โดยทำกิจกรรมที่บ้านเป็นรายครอบครัวโดยการเยี่ยมบ้าน 3 ครั้ง โทรศัพท์ให้คำปรึกษา 2 ครั้ง ทำกิจกรรมตามโปรแกรมครั้งละ 40 - 50 นาที เครื่องมือที่ใช้เก็บข้อมูลประกอบด้วยแบบสอบถามแบบสอบถามพฤติกรรมการกินสำหรับเด็กอายุ 6-13 ปี วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา และสถิตินอนพาราเมตริก **ผลการศึกษา:** พบว่าหลังการทดลองคะแนนพฤติกรรมการกินเพื่อสุขภาพและกิจกรรมทางกายมีคะแนนดีกว่าก่อนการทดลอง (*P*-value < 0.05) แต่ค่า BMI ไม่เปลี่ยนแปลง ทั้งก่อน หลังการทดลองและในระยะติดตามผล **สรุป:** โปรแกรมการให้คำปรึกษาด้านพฤติกรรมโดยใช้ครอบครัวเป็นฐานมีความเป็นไปได้ที่จะนำทดสอบในการศึกษาหลัก โดยทดลองกับกลุ่มตัวอย่างที่ใหญ่ขึ้น จำนวนครั้งที่ทำการให้คำปรึกษามากขึ้น และระยะเวลาที่ยาวนานเพียงพอ อาจช่วยส่งเสริมพฤติกรรมการกินและการใช้กิจกรรมทางกายซึ่งส่งผลให้มีความเป็นไปได้ที่ค่าดัชนีมวลกายในเด็กอ้วนจะลดลง

คำสำคัญ: การให้คำปรึกษาด้านพฤติกรรมโดยใช้ครอบครัวเป็นฐาน, เด็กวัยเรียนที่มีภาวะอ้วน

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Abstract

Objective: To examine the feasibility of a family-based behavioral counseling program in school- aged children with obesity relating to healthy eating behavior, physical activity, and body mass index (BMI). **Method:** In this quasi-experimental stuyd, one group, pre-posttest and follow- up design was used. Five school- aged children with obesity and their parents were purposively selected. They were 10 - 12 years old, studying at a municipal school, Maung district, Surat Thani province, and living with father/ mother. Data were collected for 4 weeks. The program was carried out at home of individual family, with 3 family visits and 2 telephone consultations. Each session lasted 40 - 50 minutes. The instruments used for data collection consisted of the Eating Behaviors Questionnaire for Children 6-13 years and the Physical Activity Questionnaire for Older Children (PAQ- C). Data were analyzed by using descriptive statistics and non- parametric statistics. **Results**: The scores for healthy eating behavior and physical activities were better than those recorded before the intervention (*P*-value < 0.05). However, the BMI scores had not changed between pre- and post- intervention or the follow- up. **Conclusion:** This family- based behavioral counselling program could be further tested in the main study with a larger sample size, more sessions, and longer duration. It could promote both healthy eating behavior and participating in physical activity, thereby resulting in lower body mass index scores for those obese children

Keywords: family- based behavioral counseling program; school aged children with obesity

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Introduction

Over the past three decades, the cases of overweight and obese individuals of all ages have increased substantially. The high prevalence of obesity in children can result in serious health consequences. The prevalence of children with obesity in the United States of America during 2015 – 2016 was 18.5%. Overall, the prevalence of obesity was 20.6% among adolescents (12 – 19 years) and 18.4% with younger children (6–11 years).[1] In Thailand, the rate of Thai boys with obesity had increased by 16.7 % from 2008 to 2009. In 2014, a prevalence of 26.1% was found which was equal to a 56% increase in the last 5 years. This increase was higher than the prevalence worldwide in the last 33 years for children in developing countries. Similarly, rate of obesity in girls had increased from 15.2% to 19.0% which was equal to a 25% increase in the last 5 years.[2]

Children with obesity are more likely to develop a variety of health problems as they grow into their adulthood. These problems include cardiovascular diseases, insulin resistance, diabetes, musculoskeletal disorders, and some cancers.[3] Moreover, obesity in children impacts children's physical health, social and emotional well- being, and self- esteem. Moreover, obesity could also relate to, or be the cause of,

unsatisfactory academic achievement as well as a poor quality of life.[4,5] Child obesity is a result of imbalanced energy between calorie intake and calorie use. To keep a particular weight, it was important that the energy gained from eating and drinking must be equal to the energy used in physical activity.[6-9] The cause of obesity will almost certainly involve eating unhealthy diets and doing less physical activity. Obesity in children is often associated with consuming high calorific snacks and fast food, having more than three meals a day, and drinking sugary beverages.[8-12]

Solving obesity in school aged children requires appropriate strategies with proper concepts. Family-based therapy or family-based intervention with the concept of self-efficacy and counseling is promising in promoting healthy eating behavior and physical activities among obese children.

Family was a direct environmental factor that substantially influences the quality of children's diets and their levels of physical activity. To prevent obesity and its possible impacts on the child's quality of life, as well as that of their family, it requires immediate action from each family to promote risk-free weight loss and efficient weight management.[5,13,14] The results of systematic literature review of parental perceptions of childhood obesity showed that parents' roles had been relatively modest when attempting to influence the behavior of their obese children. Support for healthy eating and physical exercise can be found in a society in which healthy eating and physical workouts are both valued and facilitated.[15] Family-based interventions could effectively promote the significant roles parents can play in the process of treatment.[16] According to a systematic review on strategies and challenges in managing obesity among children, family involvement was reported to be the most effective and sustainable means to tackle and deal with that child's obesity. With participation of their families, children can acquire healthy eating habits and exercise routines. By eating with family, children are likely to have a greater intake of whole grains, fruits, vegetables, low fat milk, and correspondingly a lesser intake of candy and fats. The family plays a major part in controlling weight of children in the long run.[17] Likewise, a meta-analysis[18] and a systematic review[19] revealed that family-based interventions were effective in reducing weight in childhood obesity, over both short and long periods. In addition, the family-based program is more effective in reducing body mass index (BMI) of obese school age children under 12 years old, whereas group-based is more suitable for school-aged children 12 - 17 years old.[19] Similarly, the 'Stoplight Diet' study, which included skill training for parents and monitoring of their child's eating and exercise habits at home, was the most effective family-based treatment intervention for child obesity in a clinical context.[18]

Interventions need motivational strategies. Among several strategies, a program based on self-efficacy is favorable. Self-efficacy imposes a direct effect on behavior or an indirect one via its influence on anticipated outcomes of the desired behavior.[20] A study on upper-grade elementary school students revealed that self-efficacy relating to their physical activity, as well as total self-efficacy was significantly higher in normal weight boys than their overweight counterparts. More specifically, normal weight boys showed greater confidence in four items related to physical activity than those overweight.[21] Likewise, a study about physical activity and self-efficacy in normal and over-weight children revealed that children with high in self-efficacy obtained more days of physical activity than children with low self-efficacy.[22] Furthermore, a current report of qualitative meta-synthesis on family-based interventions for obesity in children and adolescents showed that self-efficacy was also found to be a powerful predictor of behavioral changes and performance.[23] In another study on school-aged children with obesity aged 9 - 12 years reported that an improvement in self-efficacy led to healthier eating. The intervention in this study incorporated health education, training, exercise and physical activity to improve or sustain healthy eating behavior. As a result, children with higher levels of self-efficacy have healthy eating.[24] Correspondingly, with regard to research related to cognitive processes, the study showed that self-efficacy is associated with a father's education. Also self-efficacy is important in promoting children's obesity protective dietary intakes.[25] Therefore, self-efficacy and family-based intervention programs can be employed and applied to promote healthy eating behaviors and physical exercise in school-aged children with obesity.

Counseling is a method applied for behavioral change. In order to prevent health risks in obese children, the American Academy of Pediatrics suggested that healthcare providers should provide counseling, particularly motivational interviewing, to children and parents by responding to parents' questions, add to parents' knowledge base, and partner with parents and children and adolescents to help them grow up to be healthy.[26] In a study to promote physical activities among school-aged children, health and counseling services were incorporated in a 6-week program, which met weekly to

provide 45 minutes of structured physical activity and a 45-minute nutrition education class for parents and children. In this study, a counseling was provided for children, who considered themselves having low self-esteem and low body image. Intervention sites also participated in school-wide wellness activities, including health and counseling services, staff professional development in health promotion, parental education newsletters, and wellness policies for the provision of healthy foods at the school. At the end of 12 months, girls had an increase in physical activities and BMI Z-score whereas boy had a decrease in television viewing. [27] In addition, motivational interviewing (MI) counseling about healthy diet from pediatric practitioners to parents of obese children aged 2 - 8 years could significantly reduce BMI of children at 2-year follow-up.[28] Similarly, in a randomized trial to promote dietary intake of school-aged children, it revealed that a 4-5 week telephone dietary counseling session intervention for parents of overweight/obese school-aged children could change dietary intake of children.[29]

All evidences indicate that family-based counseling emphasizing children's self-efficacy can promote healthy eating behaviors and physical exercise of school-aged children with obesity. In this pilot study, the school-aged children with obesity at a Municipality School in Muang district, Suratthani province were selected. In these urban public schools, the school-aged students with obesity have the backgrounds similar to those general school-aged children with obesity, who live in urban areas and tend to be more obese than those in rural areas.[27,30] This pilot study was conducted to determine the feasibility of the family-based behavioral counselling program, based on self-efficacy, by comparing healthy eating behavior, levels of physical activity, and BMI scores in school-aged children with obesity at pretest, post-test, and follow-up.

The conceptual framework for this study was based on empirically existing interventions usually involving health education, parenting role model, building environment, behavior modification, behavioral therapy, home visit, and family-based counseling[31-36] and self-efficacy.[20] All concepts were applied in the family-based behavioral counselling program for school-aged children with obesity. The program was conducted for individual families to work on behavior modification for increasing healthy eating behavior, physical activity, and decreasing the BMI scores of school-aged children with obesity. This program was family-based, highlighting self-efficacy and counselling to identify the outcomes of behavioral modification. The purpose of this pilot study was to examine the feasibility and the outcomes of a family-based behavioral counseling program in school-aged children with obesity. For the feasibility, we aimed to explore information about the completion of the program, the availability of the resource at home, program acceptance, confidence of the parents, diversity of the child's problems, and response bias due to different mode of question administration. All findings would be beneficial in improving the main study.

Methods

In this quasi-experimental study, the feasibility of the family-based behavioral counseling program intervention (FBBCP) was determined. The impact of this program on healthy eating behavior, physical activity levels, and BMI scores were also determined at pre-test, post-test and follow up measurements.

The target population of this pilot study consisted of school-aged children with obesity who were 10 – 12 years old, had no chronic disease, lived with their families in Muang district, and were studying at municipal schools in the Suratthani province of Thailand. The state or condition of obesity was defined as BMI $\geqslant 85^{th}$ percentile.[37] Exclusion criteria included school-aged children with obesity who already had or developed chronic diseases. To assess the feasibility and efficacy of the program intervention, 5 school-aged children with obesity and their parents were included in the study. According to Hertzog, some researchers suggested no sample size specification; while some recommended 10% of the sample size in the main study, and others suggested at least 10 cases.[38] The sample size depends on cost, time constraint, and the population variability. In this pilot study, a basis of 10% of sample size of the main study and recommendations from experts was used. The experts included two professors in pediatric and family nursing, and one professor from the field of behavioral science with an experience in quasi experimental studies. As a result, 5 cases consisting 5 children and their families were included.

Research instrumentation

Instruments include demographic record form, weight and height measuring scales, questionnaires and the family-based behavioral counseling program (FBBCP) as the intervention.

Demographic data of children with obesity and their families including age, gender, weight, income, education level. Demographic record form was developed by researchers. A standardized digital weighing scale (Tania®)" was used to record the children body weight in kilograms. A portable stadiometer was used to measure children' s height in centimeters to the nearest 0. 1 centimeter. The children's weight and height were used to calculate BMI.

The children eating behavior was assessed using the Eating Behaviors Questionnaire for Children 6-13 years. This questionnaire was modified from the Eating Behaviors Questionnaire for Children 6- 13 years of the Bureau of Nutrition, Ministry of Public Health of Thailand[39] by the researchers as suggested by literature review. This questionnaire was validated by 5 experts and had a content validity index (CVI) of.88. The questionnaire contains 19 self-reported items asking about the eating behavior over 7 days of school-aged children with obesity. Responses to items are rated on a 4- point Likert- type scale ranging from 1 (never practice), to 2 (practice 1 - 3 days/week), 3 (practice 4 - 5 days/week), and 4 (practice 6 - 7 days/week). Scores of negative item are reversed. Higher scores indicate better or healthier eating behavior. Examples of items included "eating breakfast before school" (positive item) and "eating more than three times a day" (negative item). With the possible average total scores of 1 to 4 points, eating behavior could be categorized as poor, satisfactory and good (1.00 – 2.00, 2.01 – 3.00, and 3.01 – 4.00 points, respectively). In this present pilot study, its internal consistence reliability was acceptable with a Cronbach's alpha coefficient of 0.79.

Levels of physical activity was evaluated using the Physical Activity Questionnaire for Older Children (PAQ- C) . PAQ-C was developed by Kowalski, Crocker, & Donen [40] and translated into Thai by Aryuwat. [41] This 10-item self-administered questionnaire measures types and frequency of physical activity during the previous seven days. In this present pilot study, all 10 items of PAQ-C Thai were used. The first item examined the frequency of spare time activities from the past week on a five- point scale ranging from 1 (no activity), to 2 (1 - 2 times/week), 3 (3 - 4 times/week), 4 (5 - 6 times/week), and 5 (7 times or more/week) . Items 2 to 8 examined the type and frequency of activities during physical education class, recess, lunch, after school, evenings, and weekends. The response choices for these items ranged from 1 (no), to 2 (1 - 2 times), 3 (3 - 4 times), 4 (5 - 6 times), and 5 (7 times or more).

Examples of PAQ- C items are " In the last 7 days, how many days right after school, did you do sports, dance, or play games in which you were very active?" and " On the last weekend, how many times did you do sports, dance, or play games in which you were very active?" The final score was calculated on items 1 to 9, with a total score of 1 to 5 points. In this pilot study, internal consistence reliability of PAQ-C was acceptable with a Cronbach's alpha coefficient of 0.85.

The feasibility of the FBBCP intervention was evaluated during the program implementation. The participant observation and reflection on program activities were conducted to assess the feasibility of the program. For the completion of the program, we looked for the dose, frequency and course of the intervention were completed. For the availability of the resource at home, all diet and exercise related entities, such as exercise devices and space and dietary supply and preparations, were observed. Information regarding program acceptance, both on activities, trainer, and intrusion to the participant privacy were sought. For confidence of the parents, all concerns, worries and past experiences from parents and children were encouraged to share. For diversity of the child's problems, the researcher observed and recognized the problems as much as possible. Finally, any bias regarding different mode of question administration was identified.

For the **intervention,** the family- based behavioral counseling program (FBBCP) was developed by the researcher and validated by 5 experts including one nutritionist, one professor from sport science, two professors in pediatric and family nursing, and one professor from the field of behavioral science. FBBCP was implemented by the researcher (KR) who is a trained family counsellor.

The FBBCP consisted of 5 stages, specifically, (1) understanding the reality of healthy eating behavior and physical activity, (2) setting goals for increasing healthy eating behavior and physical activity, (3) promoting ability in switching to healthy eating behavior and physical activity, (4) supporting and maintaining 'good' healthy behavior and (5) evaluating the program. Prior to implementing the intervention, the researcher informed the selected participants about their participation in the program. Then, the researcher provided the FBBCP for the 5 individual school-age children and their

Table 1 Schedule, objectives, and activities of the family-based behavioral counseling program.

Week	Objectives	Activities
1st	**Pre-test**: To obtain baseline data. (at school)	- The participants answered questionnaires and BMIs were measured at each child's school by the research assistant
	Session 1: To understand the reality of healthy eating behavior and physical activity; to set goals for increasing healthy eating behavior and physical activity levels in children. (stage 1, 2, 5) (family visit)	- Building trusting relationships between the researcher, the children and their families. - Introducing each other. - Exploring beliefs about healthy eating behavior, physical activity and their impact on children and families. - Setting the goals for increasing healthy eating behavior and physical activity in children. - Commending children's and family's intentions to increase healthy eating and physical activity.
	Session 2: To promote children's ability to implement positive change in healthy eating behavior and physical activity levels of children. (stage 3, 5) (family visit)	- Providing updated information and skill training related to healthy eating and physical activity and doing a return demonstration with the children and their families. - Arranging family environments that are able to promote healthy eating and physical activity.
2nd	**Session 3:** To promote children's ability to undertake positive change in their healthy eating behavior and physical activity. (stage 3, 4, 5) (telephone visit)	- Encouraging family practice as a model of healthy eating and physical activity. - Providing family support by trying to modify eating behavior and physical activity. - Commending ability of the child and family in trying to modify eating behavior and physical activity. - Discussing additional plans or ideas related to obesity and family practices about healthy eating behavior and physical activity.
3rd	**Session 4** To meet the goals for increasing healthy eating behavior and physical activity, promoting children's and their family's ability to change healthy eating behavior and physical activity, supporting and maintaining, evaluating and reflecting. (stage 3, 4, 5) (family visit)	- Asking questions and problem solving relating to individual children via telephone counselling. - Reducing a child's stress by encouraging expression of feelings and offering mental support. - Commending the ability of children to change their eating behavior and physical activity levels.
	Session 5: To support, maintain, evaluate, and reflect upon the program. (stage 4, 5) (telephone visit)	- Strengthening the confidence of the child in controlling the situation for maintaining healthy eating behavior and physical activity. - Commending the ability of children for improving healthy eating behavior and physical activity. - Closing the program and thanking every child.
	Post-test: To obtain post-test data. (at school)	- Participants answered the same questionnaires as used in the pre-test and their BMI is measured.
4th	**Follow up:** To obtain the follow up data. (at home)	- Participants answered the same questionnaires as used in the pre-test and their BMI is measured.

family members at their homes. This individual family intervention was a 4-week program which was provided into 5 sessions with 40 - 50 minutes per session. This program dosage was based on motivational interviewing (MI) counseling to parents of obese children aged 2 – 8 years. In previous research, the 4 MI sessions provided by pediatric practitioner0s could significantly reduce BMI of children at -2-year follow-up. This MI counseling applied reflective listening, autonomy support, shared decision-making, and eliciting change talk.[28] Similarly, in a randomized trial to promote dietary intake of school aged children, it revealed that a telephone dietary counseling session intervention of 4 - 5 weeks for parents of overweight/obese school-aged children could change dietary intake of the children.[29] Schedule, objectives, and activities of the family- based behavioral counseling program is detailed in Table 1.

Ethical considerations

Based on its main study, this pilot study received an approval from the Institutional Review Board (IRB), Faculty of Nursing, Burapha University for the protection of human subjects (IRB approval number: 15-01-2561). The participants and their parents were informed about the research objective, method of participation in the study, potential risks and benefits of participation in the study, and the rights to discontinue involvement in the study. The confidentiality of participants was protected. Informed consent and assent form were obtained from parents and children with obesity, respectively.

Data analysis

Descriptive statistics were used to summarize demographic characteristics of the participants. Due to the small number of participants, Friedman test was conducted to compare mean scores of healthy eating behavior and physical activity, and BMI and weight between three-time evaluations, at pretest, post-test, and follow up. Dunn-Bonferroni post hoc test was applied for pair-wise comparisons. Significance level was set at a type I error or 5% or *P*-value < 0.05. All information about feasibility was categorized and summarized.

Results and Discussions

The study revealed two main results including the outcomes of the FBBCP program intervention and the feasibility of program implementation. All five school- aged children with obesity and their parents completed five sessions of the family- based behavior counselling program and the three- time evaluations. Of the five children, three were boys (60.00%). Their age ranged from 10 to 12 years (mean = 11.25 ± 0.850 years). The majority were in grade 6 (60.00%), had 5-to-7 family members living together (80.00%), had two siblings or fewer (80.00%), were the second child of the family (60.00%), had family members with obesity (60.00%), and had attempted to lose weight (80.00%). Among all family members, 80.00% of the children's parents were mothers. The parents' age was in a range of 32 – 39 years with a mean of 36.2 ± 2.77 years. The majority of the parents had high school education (60.00%). Their monthly income was in a range of 10,000 – 13,000 Baht with a mean of 11,600 ± 1,140.18 Baht.

The outcomes of the FBBCP program intervention revealed that the mean scores healthy eating behaviour and physical activity increased from baseline (pre-test), to post-test (post intervention), and follow-up phases (Table 2). Healthy eating behaviour scores at these three time points were statistically significant (*P*-value = 0.015, Friedman's test). The change of physical activity scores over time was also statistically significant (*P*-value = 0.022). For post hoc pairwise comparisons, both healthy eating behaviour and physical activity scores at follow-up were significantly higher than those at pre-test (*P*-value = 0.013 and 0.034, respectively), but was not significantly different between follow up and post test. There was no change in mean BMI over time (93.60 percentile at all three measurements). However, mean weight decreased with statistical significance (*P*-value = 0.007). Post hoc pairwise comparisons revealed that mean weight at follow-up was significantly lower than that at pre-test and post-test (*P*-value = 0.018 for both comparisons) (Table 2).

Table 2 Means and standard deviations of the scores of healthy eating behavior and physical activity, BMI and weight at three evaluations (N = 5).

Variable	Evaluation	Mean (SD)	X^2 *	df	*P*-value*
Healthy eating behavior	Pre-test	2.89 (0.29)	8.40	2	0.015
	Post-test	3.83 (0.04)			
	Follow-up	3.68 (0.12)			
Physical activity	Pre-test	2.67 (0.47)	7.60	2	0.022
	Post-test	3.40 (0.34)			
	Follow-up	3.56 (0.28)			
BMI (percentile)	Pre-test	93.60(1.52)	-	2	-
	Post-test	93.60(1.52)			
	Follow-up	93.60(1.52)			
Weight (kg)	Pre-test	56.12(4.33)	10.000	2	0.007
	Post-test	56.12(4.33)			
	Follow-up	55.80(4.25)			

* Friedman's test on categorical variables with poor, satisfactory and good on mean scores at pre-test, post-test and follow-up.

This pilot study showed that the FBBCP intervention could promote healthy eating behaviors and physical exercise at the 4th week follow-up. In addition, at the follow-up, two of five participants had lost 0.5 kilogram of their body weight. This weight loss was significantly different between pre-test and post-test as well as pre-test and follow-up evaluations. However, this weight change had not affected BMI. In the intervention, the researcher conducted a total of 15 family visits, which was three visits for each participant. Our findings were consistent with a few previous studies where family-based program could lead to healthy eating behaviors and increasing in physical activities.[18,19] However, the FBBCP intervention in school age children with obesity was found to be effective when it took adequate sample size of at least 24 children, longer duration of more than 3 months with at least 6 months follow-up, stringent research methodology, and reliable measurement. In addition, family-based program should be combined with school-based program for better health behavior outcomes.[19]

Study feasibility

In terms of feasibility, the first aspect was that the intervention was successfully implemented. All of the participants completed the whole 4-week sessions within the scheduled date. Therefore, the dose, frequency and course duration of the intervention was fully provided. Regularity, or frequency, was achieved since most of the session in each individual family was carried out as scheduled. Few sessions were postponed to the next few days because of a slight inconvenience due to time schedule conflict on the family side. Therefore, the researcher needed to make a telephone call before each visit. This postponed sessions could, on the other hand, indicate a reasonable flexibility of the program. Since the scheduled session could be postponed to the next few days, the dose of the intervention could be delivered in a continuous and seamless fashion that the effects of the prior sessions still lasted and the new dose could be given in time. However, one should keep in mind that a relatively small sample size allowed the postponed sessions to be rescheduled in a short period of time; there will be a high possibility that a larger sample size in the main study would not allow such easy management to happen. The investigators should be well prepared to handle the situation.

Second, all resources needed were not fully available at the participants' house. It was very important that parents provided healthy foods and facilitated children's physical exercise, when there was a limited exercise space at home. These included buying a hula hoop, bringing their children to exercise at neighborhood sport field or playground, or biking with their children around the village. Hence, in the main study it is necessary that the researcher assesses the children's home environment and helps the parents to identify the possible strategies for children's weight control.

Third, the program was found to be well accepted by the children and their family members. They all were enthusiastic to participate in every session. No participants showed boredom or rushed the sessions. This indicates that they

understood the concept of the program. This could also mean that most activities were viewed as beneficial and worth doing since they reported that the program could help them solve the child's long-standing problem. However, one activity which was recording the journal was viewed as too burdensome and not as useful as expected. In the main study, this activity needed to be improved so the participants would view it as worthy. Acceptance could also be in part due to the acceptance and trust on the trainer. It was found that the participants trusted the trainer. The participants were open and willing to share their thoughts about difficulties they had been facing in reducing the child's weight. They appeared to be relaxed and welcomed the trainer to their home. We were assured that our trainer possessed the desirable characteristics and personalities, and were able to carry out the right approaches successfully. In the main study, we could be certain that the acceptance on the trainer could also be achieved.

In relation to the acceptance, the participants did not view the approach as intrusive to their privacy and daily living. They were willing to share their personal life, psychologically and economically. The openness on the participant side could be enhanced by the individual family training, not group training. This on site private training could protect the participants from other families. As a result, they were not embarrassed to share their sedentary lifestyles with no judgment from others. Their economic status, knowledge, beliefs and thoughts could also be protected from others when sharing their lifestyle. Once they felt safe and relaxed, they were willing to share their life and adhere with the program. Therefore, continuity of performing the healthy eating behavior and physical activities could be maintained. Even though weight and BMI were not found to overtly improve after follow-up, these two outcomes could be achieved in the long run given the continuity of the activities post program.

Fourth, some parents did not have confidence, whether their children could perform healthy eating behavior and physical exercise. They also expressed the difficulties they faced in their previous efforts such as diet and nutrition calculation and being an example of healthy lifestyle to their children, and their past failure in doing so. These difficulties or lack of confidence, either from the past and the FBBCP program, indicated some of the obstacles that the trainer had to recognize and handle appropriately. Parents made comments such as: *"He cannot do it"*, *"I don't think she can do it"*, *"I said to him many times, but he never did"*, *"She eats a lot"* and *"He is lazy"*. This no confidence and trust of parents can lead to a lack of self-efficacy in their children. Self-efficacy is related to certain healthy behaviors.[23] Children with a higher level of self-efficacy performed more physical activity than those with lower self-efficacy levels.[21-22] Children with high levels of self-efficacy had confidence in, and practiced, their healthy eating behaviors.[24,42] In addition, self-efficacy is important in promoting children's obesity protective dietary intakes.[25] Therefore, in the self-efficacy counselling program, the researcher needs to encourage the parents to give compliments, encouragement, and support to enhance their children's self-efficacy levels as well as being a role model in healthy eating and physical exercise for their children.[43-44] Therefore, in the main study the researcher needs to assess how confidence and trust the parents have for their children and how much the children themselves believe they can perform healthy eating behaviors and physical exercise for the ultimate goal, which is a weight loss.

Fifth, unhealthy eating behaviors and low physical activities were found relatively similar among children in the five families. Other sedentary lifestyles were also not highly diverse. However, a larger diversity should be expected in the main study with its larger sample size. In the counseling activities in the main study, the researcher will face more challenges in encouraging individual children to assess their real problems of unhealthy eating behaviors and low physical activities, set goals, specify strategies for goal achievement, and identify their role model for a motivation to control their weight. According to the study of need for guidance and counselling at the primary school, it was found that in the counseling it was very important to verify problems, set goals and strategies for changes, and identify a role model.[45] In the pilot study intervention, the counselling comprised five stages: 1) understanding reality about obesity, 2) setting goals, 3) promoting ability to change belief and behaviors, 4) supporting and maintaining healthy behaviors and physical activity, and 5) evaluating the problem. Therefore, in the main study the researcher needs to provide the counseling not only based on these five stages, but also appropriately adjusted for real problems and goals of individual children and families.

Sixth, some bias in the answers obtained was found. In the implementation, the researcher did the post-test at school, but the follow-up test at home. It was found that the parents influenced the children to answer the questions in positive

ways, thereby creating a bias that can distort the results of study. Therefore, in the main study it is essential that all tests and measures are conducted at school in order to avoid this influence. In addition, in this pilot implementation program the researcher asked children to record their food consumption and physical exercise. The children found it boring and did not want to do it. In the main study, this recording should be omitted.

Lastly, in this pilot study, the healthy eating behavior, physical exercise, and BMI are used to measure the effectiveness of the program. These measured outcomes are appropriate to evaluate the program outcomes, which are commonly used to assess the family-based program for obese children.[19]

More suggestions for the main study could be made as follows. This pilot study had a small sample size and a short period of program intervention. Therefore, the changed outcomes are not fully achievable as they should be. However, the pilot study could guide the researcher and interested others how to conduct a reliable and valid family-based behavioral counseling program intervention for promoting healthy eating behaviors and physical activities in school aged children with obesity. In addition, this study is rather empirical-based study, not theoretical based. Most family-based program in children with obesity applied social cognitive theories, trans-theoretical theories, and other behavioral models to treat the children as well as parents.[19] Even though the family-based behavioral counseling program applied the concept of self-efficacy, this concept is not measured for how much it can affect or mediate the outcomes.

Conclusion

In this pilot study, implementation of the family-based behavioral counseling program confirmed the partial feasibility of the program that can make a significant difference in healthy eating behavior and physical exercise, among school aged children with obesity at the 4th week (follow-up). However, there is no difference in BMI. This result could be due to the pilot study's small sample size of five children and a short duration of the intervention and follow-up.

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