

The Effects of the Parent Training Program for Obesity Reduction on Anthropometric Measures of School-age Children

Muntanavadee Maytapattana¹, Aporn Deenan², Wannee Deoisres²,
and Deborah Loman³

The purposes of the study were to develop and evaluate the effectiveness of the Parent Training Program for Obesity Reduction (PTPOR) on anthropometric measures of school-aged children in Bangkok, Thailand. Evidence-Based Practice (EBP) technique was used to conduct the program. The PTPOR is a randomized control trial design. Participants were school-aged overweight or obese children, and their parents. One hundred and one parent-child dyads were recruited and randomly assigned into the PTPOR ($N = 30$), Educational Intervention or EI ($N = 32$), and control group ($N = 39$). The parents in the PTPOR group participated in eight weeks of training including an educational session, a cooking session, aerobic exercise training, 2-time group discussion sessions, and 4-times telephoned counseling sessions. The Repeated Measure ANCOVA was used to analyze data. The results revealed that the outcomes of the PTPOR group were better than the EI and the control groups at 1st, 8th, and 32nd weeks after finishing the program such as child BMI percentile, $F_{(2,97)} = 10.54$, $p = .00$, waist circumference ($F_{(2,97)} = 7.56$, $p = .00$), and body fat percentage ($F_{(2,97)} = 6.78$, $p = .00$). The results suggest that nurses and health care providers should apply the PTPOR for weight control and for the promotion of a healthy lifestyle among overweight and obese children.

Keywords: parental training program for obesity reduction, anthropometric measures, school-aged children

The prevalence of obesity in children has been increasing throughout the world. Obesity in Thai children has doubled in the past two decades. There have been several surveys and studies on overweight and obese children in Thailand. Data from three consecutive National Health Examination Surveys (NHES) have shown an increase, from 5.8% in 1997 to 6.7% in 2001, for overweight and obesity in school aged children (Aekplakorn & Mo-Suwan, 2009). The results of the 5th National Nutrition Survey also indicated that 15% of children in Bangkok, Thailand, were overweight or obese (Sinawat, 2008).

Obesity causes many problems in children. Literature reviews have shown that childhood obesity is strongly associated with risk factors for cardiovascular disease, hypertension, diabetes, orthopedic problems, and mental disorders (Holm et al., 2012; Tryggestad, Thompson, Copeland, & Short, 2012; World Health Organization [WHO], 2007). Moreover, obesity is associated with many physical and psychological consequences. Literature reviews have also documented that obese children have a high risk of psychological problems such as depression and low self-esteem and quality of life compared to their peers (Chuachai, 2009; De Niet & Naiman, 2011). There are many factors that contribute to obesity. Not only does the genetic risk factor for an individual child affect obesity (Papandreou, Malindretos, & Rousso, 2010), but also behavior and environment play major roles in the development of overweight and obesity in children (Chuachai, 2009). The eating patterns of Thai children that live in urban areas have changed with an increase in

¹ Ph.D., College of Nursing and Health, Suan Sunandha Rajabhat University, Bangkok, Thailand

² Assoc. Prof., Faculty of Nursing, Burapha University, Chon Buri, Thailand

³ Assoc. Prof., School of Nursing, St. Louis University, Missouri, United States of America

consumption of sugar, protein, and fast food, and fewer vegetables and fruits (Chaiamnuay, 2002; Chuachai, 2009). Moreover, inappropriate childrearing, including child food selection and preparation, and feeding strategies can influence child obesity (Peungposop, 2011).

Through an integrative review of research articles from the past ten years by using an Evidence-Based Practice (EBP), parental involvement program was identified to be important in managing child obesity (Berry, Savoye, Melkus, & Grey, 2007; De Mello, Luft, & Meyer, 2004; Estabrooks, Shoup, Gattshall, & Dandamudi, 2009). Besides, there is a lack of a program which is effective and sustainable for the long term reduction of overweight and obesity in children in Thailand. There has been no study of parental training on the outcomes of obesity reduction. Thus, the researcher developed the Parental Training Program by using an EBP technique that was appropriate for overweight and obese children appropriate in the Thai context. Portions of this program consisted of enhancing parental knowledge and skills to improve their child-rearing and changing parents' behavior by using behavior modification. The purposes of this study were to develop and to evaluate the effectiveness of the Parental Training Program for Obesity Reduction (PTPOR) for school-aged children. The hypothesis of this study was a change in the mean scores of the child anthropometric outcomes (i.e. BMI percentile, waist circumference, and body fat percentage) of the school-aged children in the PTPOR group after controlling for the effects of the covariates would be significantly lower than that of the children in the Educational Intervention (EI) and control groups across time.

Method

Design

This study used an experimental approach. Specifically, a randomized clinical trial (RCT) design was used to examine the effect of the PTPOR on the anthropometric measures in children.

Population and Sample

The target populations were school-aged children who were overweight or obese and their parents in five demonstration elementary schools in Bangkok and one private elementary school in Pathum Thani, a province in Thailand. Two research assistants chose the prospective participants by using the growth chart of weight-for height norms was published by the Bureau of Nutrition in 2000. Boys or girls who were in the level 2, 3 and 4 of the growth chart were selected to join the program. Level 2, at risk for overweight refers to the child whose weight-for-height ranges from plus 1.5 S.D. to plus 2 S.D. Level 3, overweight, refers to the child whose weight-for-height ranges from plus 2 S.D to plus 3 S.D. And level 4, obese, refers to the child whose weight-for-height is above line plus 3 S.D. line (Bureau of Nutrition, 2002).

Each family in each of the six schools had the same opportunity to be assigned to the intervention (PTPOR), the Education Intervention (EI), and the control group using the technique of drawing lots. The calculation of the sample size depended on the power analysis for the repeated measures design (Steven, 2002). From baseline to 40 weeks, a total of 101 parents and children dyads completed the entire study. There were thirty families for the

PTPOR group, 32 families for the EI group, and 39 families for the control group, respectively.

Instruments for children

The anthropometric measurements consisted of BMI percentile, waist circumference, skin fold thickness, and body fat percentage. The BMI percentile of the children was evaluated after the BMI of the children was calculated, using the BMI formula = Weight/Height (kg/m²). Weight was measured using a Tanita Body Fat Monitor and Scale and measured in kilograms (kg). Waist circumference was assessed by using a standard measuring tape-line, scaled and measured in inches. Furthermore, the body fat percentage was calculated using skinfold thickness of the triceps by a Baseline Caliper.

Parental instruments

1. Behavior modification handbook (Bureau of Nutrition, 2010a). A 59-page handbook, “ดูแลหุ่นสวยด้วยตัวเอง” roughly translated as “*Taking good care of your body*”, was comprised of various topics such as food for school-aged children, a version of the traffic light diet in Thai, the importance and advantages of physical activities, and an example of exercise for increasing physical activity.

2. Sample cookbook handbook (Bureau of Nutrition, 2002). A 31-page sample cookbook, “ใครอ้วนใครทำ” roughly translated as “*What makes me fat?*”, consisted of various topics such as food preparation for overweight and obese children, food intake calculation, principles of weight reduction, suggestions for serving food to overweight and obese children, and healthy menus for overweight and obese children.

3. Child obese pamphlet (Bureau of Nutrition, 2010b). A 2-page brochure, “กินพอดีไม่มีอ้วน” roughly translated as “*Appropriate consumption prevents obesity*”, included causes and impacts of obesity in children, characteristics of obese children, and management of obesity.

4. Demographic questionnaire created by the researcher. The questionnaire consisted of socioeconomic characteristics of families including name, age, marital status, religion, education level, occupation, monthly income in Thai baht, and number of family members.

Interventions

1. The Parental Training Program for Obesity Reduction (PTPOR)

1.1 Parental educational session: During the 1st week, the parents participated in a 60-minute educational session given by the researcher about obesity in children, healthy foods, and physical and sedentary activity topics at their child schools. Parents were taught about the causes and effects of obesity in children, the food guide pyramid, healthy diets, reading food labels when shopping, and healthy eating. The parents were provided information to help their children reducing access to high calorie foods and increasing access to healthy low calorie foods. For example, parents were taught to facilitate eating control when difficult eating situations could be anticipated, such as parties, holiday gatherings, and school or work functions.

1.2 Food training session: During the 2nd week, parents and children were given healthy food training by a registered nutritionist at their children’s schools. The first session was the healthy food training which took 180 minutes. Parents and children received healthy menus for the overweight and obese children from the registered nutritionist at the cafeteria,

and volunteer parents had to do presentation and healthy food cooking demonstration. Each family had to set a calorie target of 1,200 kcal/day/child participants.

1.3 Physical activity training session: At the 2nd week after finishing the food training session, parent and children were trained to do aerobic exercise by the physical therapy graduate students at an outdoor sports stadium. They practiced physical activity together by doing aerobic exercises for 45 minutes. The participants started to warm up for 5 minutes before exercising, and then they cooled down for 5 minutes to relax their muscles. After finishing the aerobic exercises, the physical therapy graduate students summarized the advantages of the physical activity and the disadvantages of the sedentary time.

1.4 Health management group discussion: During the third and the fourth weeks, the parents discussed the goals for reducing their child's weight for 60 minutes once a week. A group discussion was managed by the researcher at the schools. The two group meetings addressed parenting styles, barrier identification, techniques of decision making, problem solving, and positive reinforcement techniques for meeting parents' goals using two sheet works. The first was a self-care experience sheet for parents to write the details about the positive effects, barriers, and problems they experienced in implementing changes in diet and activities with their children. The second was a health modification sheet that had details about setting goals and a time table of their child weight reduction. If children achieved their targets, the parents would offer non-food rewards to them.

1.5 Telephone counseling: Parents received four sessions of telephone counseling by the researcher between the fifth and eighth weeks (about 30 minutes depending on each situation). The parents heard the goals that they had set during the previous meeting and ranked their achievement of those goals. The researcher inquired if the parent was able to keep his or her target goals. The parents that had a problem following up on the goals were given suggestions and counseling. During the last week, the parents received other advice regarding problems fulfilling their goals.

2. Educational Intervention (EI)

During the first week, the parents participated in a 60-minute educational session given by the researcher at their children's schools. The parents learned about obesity in children, healthy food, physical activity, and sedentary habits. During this session, the parents in the PTPOR group and the EI group joined together.

Data Collection

During the first session the participants were registered to enter the study and signed the informed consent form. All data of the participants were kept confidential. The researcher explained the purposes and processes of this study. All parents received documents, including the behavior modification handbook, a sample cookbook, and a child obesity pamphlet. The participants in three groups were evaluated using the same techniques. Particularly, during the first meeting, parents completed the demographic questionnaire while children were assessed for anthropometric outcome data by measuring height, weight, waist circumference, skinfold thickness and body fat percentage. During the 1st week, 8th week, and 32nd week after finishing the program, children were measured anthropometric measures at the school settings by two research assistants. At the 32nd week after finishing the program, there were 23 families who dropped out. Ten families from the PTPOR group, 2 families from the EI group, and 11 families from the control group. Hence, a total of 101 remaining parent-child

dyads completed the study. Thirty nine families were in the control group, 32 families were in the EI group, and 30 families were in the PTPOR group.

Data Analysis

The data were analyzed to address the research objectives. Descriptive statistics, including percentages, means, and standard deviations, were used to describe the parental characteristics (e.g. relationship with children, age, and number of children, marital status, religion, education, occupation, income, and adult family members) and the child's characteristics (e.g. gender and birth order). Pearson Chi-square and one-way ANOVA were used to evaluate the differences of demographic variables and the outcome variables among the three groups. Repeated Measures Analysis of Covariance (ANCOVA) using baseline mean scores as covariates was used to determine the difference among groups and to examine changes over time of the mean scores of the outcome variables of children.

Results

1. Characteristics of the participants

1.1 Demographic characteristics of the parents.

There were 39 parents participating in the control group. The majority of parents were mothers ($N = 30$). More than half of the parents of the control group were in the 41 to 50 years old ($N = 23$). About half of the parents had two children in their families ($N = 18$). More than 90 percent of the parents were married ($N = 37$). The lowest educational level of parents in the control group was primary school ($N = 1$), the highest educational level was master or doctoral degree ($N = 8$) and the majority of parents had completed a bachelor degree ($N = 19$). The majority of parents were the employees of the private companies ($N = 11$) and had an income above 30,000 baht ($N = 21$). About 50 percent of the families in the control group lived with their father and mother as well as with the father, mother and their grandparents in the home.

There were 32 parents that participated in the EI group. The majority of parents were mothers ($N = 22$). Half of the parents were in the 41 to 50 year-old age range ($N = 16$). Seventeen parents in the EI group had one kid in their families. More than 90 percent of the parents in the EI group were married ($N = 30$). The majority of parents had completed a bachelor degree ($N = 11$). About half of the parents in this group were the employees of the private companies ($N = 16$) and had an income above 30,000 baht ($N = 15$). More than half of the families in the EI group lived with their father, mother and their grandparents in the home ($N = 18$).

Moreover, there were 30 parents that participated in the PTPOR group. The majority of parents were mothers ($N = 23$). More than half of the parents were in the 41 to 50 year-old age range ($N = 21$). About 20 percent of the parents in the PTPOR group had two children in their families ($N = 21$). Eighty percent of the parents in the PTPOR group were married ($N = 24$). Twelve parents had completed a bachelor degree. The majority of parents were the employees of the private companies ($N = 9$) and had an income above 30,000 baht ($N = 15$). Over half of the families in the PTPOR group lived with their father, mother and their grandparents ($N = 17$). More than 95 percent of participants in the three groups were Buddhist. In order to determine any baseline differences of parents among the three groups,

their relationship with their children, age category, number of children, marital status, religion, education, occupation, income category, and family member were analyzed. Pearson Chi-Square tests were used and there were no significant differences at the .05 level.

1.2 Demographic characteristics of the children.

Sixty three point four percent of the children in this study were boys ($N = 64$) and 36.6% of the children were girls ($N = 37$). Twenty males and nineteen females were in the control group, 21 males and 11 females were in the EI group, and 23 males and 7 females were in the PTPOR group. The ages of all children ranged from 6 to 12 years. The mean age of the children in the control group was 9.15, $SD = 1.57$, the EI group was 8.81, $SD = 0.97$, and the PTPOR group was 9.57, $SD = 1.52$, respectively. More than half of them were the first child of their families (67.3%, $n = 68$). Pearson Chi-Square and ANOVA were used to examine any baseline differences among the three groups for child gender, birth order, and age. The results determined that the mean age of the children was not significantly different at the .05 level, with a mean of 9.15 years, $SD = 1.57$ in the control group, 8.81 years, $SD = 0.97$ in the EI group, and 9.57 years, $SD = 1.52$ in the PTPOR group, respectively. The mean scores of the BMI percentile, waist circumference, and body fat percentage of the children at baseline of the three groups of children and parents were summarized. One-way ANOVA was used to examine group differences at baseline. The results showed that the mean scores of the child anthropometric outcomes were not significantly different at the .05 level.

2. Anthropometric measures

Data were analyzed using a Repeated Measures ANCOVA. The main effects among the groups, the main effects of the three times of the evaluation, and the interaction between groups and the time intervals regarding the child anthropometric measures were reported in Table 1, 2, and 3, respectively.

Table 1

Repeated measures ANCOVA of child BMI percentile

Source	SS	df	MS	F	p
Covariate (Baseline of child BMI percentile)	1353.06	1	1353.06	365.64	< .01
Group	78.01	2	39.01	10.54	< .01
Error 1	358.95	97	3.70		
Within subject					
Time	3.52	1.20	2.93	1.02	.33
Time*Covariate	3.26	1.20	2.72	0.94	.35
Group*Time	57.17	2.40	23.82	8.28	< .01
Error 2	335.09	116.41	2.88		
Total	1790.02	100			

2.1 BMI percentile.

There was a positive relationship between the baseline mean score of child BMI percentile (covariate) and the 3 times mean scores of child BMI percentile (as shown in Table 1). After controlling for the effect of the covariate (baseline mean score of child BMI percentile), there was a significant difference in the main effect of children in the three

groups regarding BMI percentile at the .01 level ($F_{(2,97)} = 10.54, p = .00$), showing that the groups affected the mean scores of the child BMI percentile. Meanwhile, the effect of time intervals on the child BMI percentile was not significant at the .05 level ($F_{(2,97)} = 1.02, p = .33$). However, the interaction among the three groups and the time intervals on the BMI percentile was significant at the .01 level ($F_{(2,97)} = 8.28, p = .00$). Based on the estimated marginal means for the pairwise comparisons using the Bonferroni procedure, the mean scores for the BMI percentile of the children between the PTPOR group and the control group as well as between the PTPOR group and the EI group, were significant difference at the .01 level ($p < .01$). Figure 1 showed that the interaction was evidenced by nonparallel lines. The profile of the PTPOR group was definitely not parallel with the profiles of the other groups—it decreased from the baseline to the end of the data collection point.

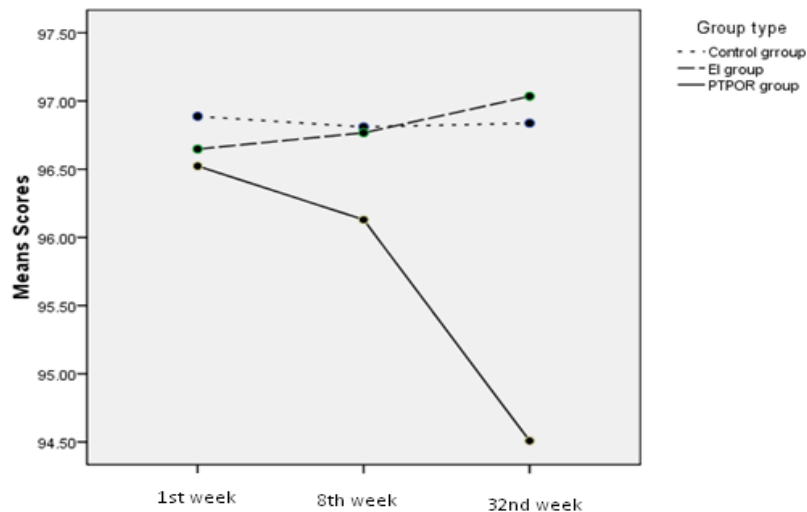


Figure 1. Child BMI percentile changes over time.

2.2 Waist circumference.

There was a positive relationship between the baseline mean score of child waist circumference (covariate) and the 3 times mean scores of child waist circumference. Table 2 shows that after controlling for the effect of the covariate (baseline mean score of child waist circumference), there was a significant difference in the main effect of children in the three groups regarding waist circumference at the .01 level ($F_{(2,97)} = 7.56, p = .00$), showing that the groups affect the mean scores of child waist circumference. Moreover, the effect of time intervals on child waist circumference was significant at the .05 level ($F_{(2,97)} = 3.53, p = .03$). The interaction among the three groups and the time intervals on the waist circumference was significant at the .01 level ($F_{(2,97)} = 8.89, p = .00$). Based on the estimated marginal means for the pairwise comparisons using the Bonferroni procedure, the mean score for the waist circumference of the children between the PTPOR group and the control group as well as between the PTPOR group and the EI group were significant difference at the .01 level ($p < .01$). Furthermore, the differences between time period 1 and time period 2, time period 1 and time period 3, as well as between time period 2 and time period 3 were statistically significant. Figure 2 showed that the interaction was evidenced by nonparallel lines. The profile of the PTPOR group was similar from the baseline.

Table 2

Repeated measures ANCOVA of child waist circumference

Source	SS	df	MS	F	p
Covariate (Baseline of child waist circumference)	2958.89	1	2958.89	652.46	< .01
Group	68.55	2	34.27	7.56	< .01
Error 1	439.89	97	4.54		
Within subject					
Time	8.51	2	4.26	3.53	.03
Time*Covariate	4.11	2	2.06	1.71	.18
Group*Time	42.82	4	10.71	8.89	< .01
Error 2	233.65	194	1.20		
Total	3467.33	100			

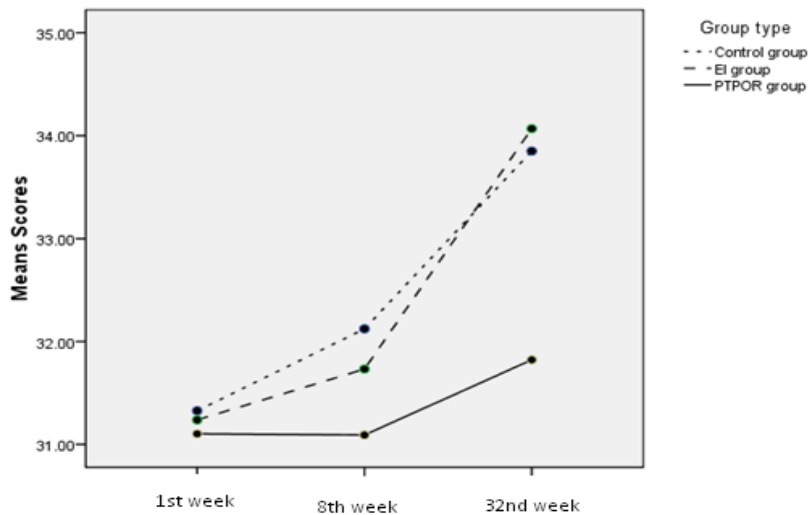


Figure 2. Child waist circumference changes over time.

2.3 Body fat percentage.

As reported in Table 3, there was a positive relationship between the baseline mean score of child body fat percentage (covariate) and the 3 times mean scores of the child body fat percentage. After controlling for the effect of the covariate (baseline mean score of child body fat percentage), there was a significant difference of the main effect of the children in three groups of body fat percentage at the .01 level ($F_{(2,97)} = 6.78, p = .00$), showing that the groups affected the mean scores of the child body fat percentage. Moreover, the effect of time intervals on child body fat percentage was significant at the .01 level ($F_{(2,97)} = 6.90, p = .00$). The interaction among the three groups and the time intervals on the body fat percentage were significant at the .01 level ($F_{(2,97)} = 4.79, p = .00$). Based on the estimated marginal means for the pairwise comparisons using the Bonferroni procedure, the mean score for the body fat percentage of the children between the PTPOR group and the control group were

significantly different at the .01 level ($p < .01$). The mean score for the body fat percentage of the children between the PTPOR group and the EI group was significantly different at the .05 level ($p < .05$). Moreover, the differences between time period 1 and time period 2, and time period 1 and time period 3, were statistically significant. Figure 3 showed that the interaction was evidenced by nonparallel lines. This graph showed that the profile for the PTPOR group was definitely not parallel with the profiles of the other groups; it decreased from the baseline.

Table 3

Repeated measures ANCOVA of child body fat percentage

Source	SS	df	MS	F	p
Covariate (Baseline of child body fat percentage)	10799.36	1	10799.36	1019.34	< .01
Group	143.75	2	71.87	6.78	< .01
Error 1	439.89	97	4.54		
Within subject					
Time	58.47	1.79	32.73	6.90	< .01
Time*Covariate	44.17	1.79	24.72	5.22	< .01
Group*Time	81.07	3.57	22.69	4.79	< .01
Error 2	821.21	173.28	4.74		
Total	11383.00	100			

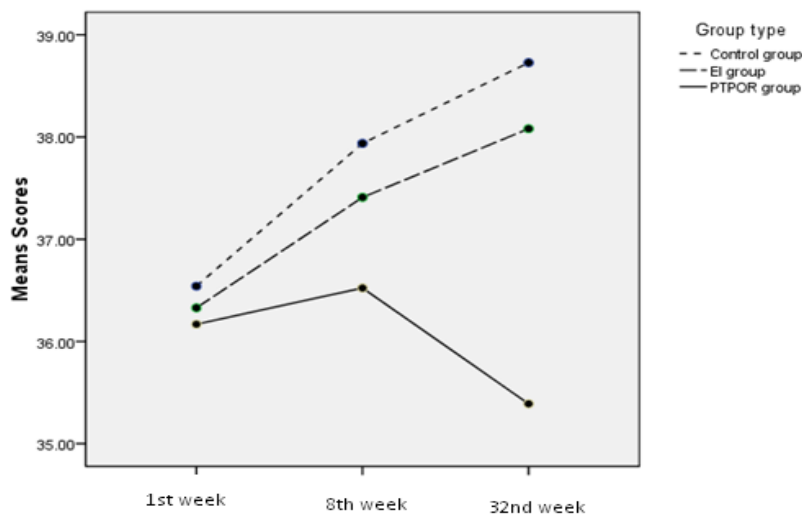


Figure 3. Child body fat percentage changes over time.

Discussion

The development of the Parental Training Program for Obesity Reduction

The researcher developed the PTPOR in order to change the behavior of the overweight and obese children by enhancing parental knowledge and skills to improve their child-rearing and changing parents' behavior. A review of the literature was conducted using the Cochrane Library, Science Direct, Sage Reference Online, and Google Scholar databases. Searches were conducted using the following key words: RCT, reduction, treatment, overweight or obesity, and school-aged children. The findings of the systematic review from the year 2000 to 2010 showed that there were 28 studies and all of the studies reviewed used a randomized controlled trials (RCT) design. Based on EBP, the researcher developed the Parent Training Program (PTPOR). The duration of the program was 8 weeks that incorporated 9 activities for the five components including a 60-minute educational session, a 180-minute food training session, a 45-minute physical activity training session, two times 60-minute group discussion, and four times 30-minute telephone counseling. The outcomes of this study included the BMI percentile, waist circumference, body fat percentage of children.

Change in the child anthropometric measures

The hypothesis of this study was the change in the mean scores of the child anthropometric outcomes such as BMI percentile, waist circumference, and body fat percentage of the school-aged children in the PTPOR group after controlling for the effects of the covariates would be significantly lower than that of the children in the Educational Intervention (EI) and control groups across time. After finishing the PTPOR, it were found that the mean scores of the BMI percentile, waist circumference, and body fat percentage of children in the PTPOR group were significantly lower than those in the EI and control groups across time at the .05 level ($F_{(2,97)} = 10.54, p < .01$; $F_{(2,97)} = 7.56, p < .01$; $F_{(2,97)} = 6.78, p < .01$). The positive findings may be the consequences of the change in the child health behaviors. It may be due to several possible explanations. First, many sessions of the PTPOR included the interactive and proactive techniques for instance demonstrating and cooking the healthy food, practicing aerobic exercise. Second, children in the PTPOR group were performed the real situations, faced with a friendly environment, played with the same age appropriateness. Third, parents in the PTPOR group were also received health educational session in class, discussed about their problems together. Moreover, parents may be role models in healthy eating behavior. Munsch et al. (2007) mentioned that parents might directly influence their children's eating styles with regard to the types of food consumed, how, where, and at what speed it is eaten. Parents may be role models in practicing physical activities such as jogging, aerobic exercise, and swimming 3 to 5 times per week. These reasons probably influenced child attitude towards physical activity and healthy eating behavior (Munsch et al., 2007). After children changed their attitude, they intended to modify their behaviors. The results were children change their health behaviors, exercise and dietary behaviors. If children practiced the health modification every day, they could be weight control. The final outcomes were decreased the BMI percentile, waist circumference, and body fat percentage. These finding were consistent with the previous studies (Weyhreter et al., 2003; Nemet et al., 2005).

Furthermore, 32 weeks after completion of the program, participants in the PTPOR group still decreased the anthropometric measures. This program can maintain the positive findings may be due to the two small group discussion sessions as well as the four telephoned counseling sessions with the researcher. These cooperative and proactive techniques may encourage and stimulate parents to keep their target goals. According to Estabrooks et al. (2009) developed a 12-month intervention using telephone counseling and group meeting techniques to support parents of overweight children. They integrated 10 sessions with interactive voice response (IVR) counseling as well as 2 small group sessions with a registered dietitian. The results of this study showed a decrease in the BMI z-score and an increase in the moderated physical activity.

In conclusion, the PTPOR could decrease the BMI percentile, waist circumference, and body fat percentage of the children. Parents in the PTPOR group were participated in four sessions of health behavior modification. They were trained to be the good models for their child weight reduction according to many studies shown the parental modeling was a powerful determinant of child weight reduction (Golan & Weizman, 2001; Lau, Lee, & Ransdell, 2007).

Limitations of the Research

The amount or dose of the intervention may be important for achieving a positive outcome (Zenzen & Kridli, 2009). Many researchers implemented 20 or more contacts or sessions for their interventions and the results were positive for both parents and child outcomes (Epstein et al., 2008a; Goldfield et al., 2001; Hughes et al., 2008). However, the researcher conducted the 8-week PTPOR that incorporated 9 activities for the five components to the PTPOR group because many activities or does of the intervention may consume the high costs such as the training and transportation. Recommendations for further studies are to investigate the effect per hour of the intervention and to add more group sessions to introduce new content or to reinforce content appropriately. Moreover, a long period of aerobic exercise may not be the best approach to use with parents and children during the first exercise session. The researcher used aerobic exercise as a specific type of physical activity training session because aerobic exercise can directly burns body fat (Fitzgerald, 2012). During the exercise, some participants could follow the action of the leaders but others could not keep up. Recommendation for further studies are regular physical activity should include activity or sport that the families choose independently for themselves such as walking, biking, jogging, playing tennis or football. Lastly, from the end of October 2011 through the beginning of December 2011, a large flood in Thailand occurred and affected Bangkok and suburban Bangkok during conducting the PTPOR. All parents and children in this program may have been affected by this flood disaster. Therefore, some outcomes may not be as expected.

Implications

Nurses and health care providers should use the PTPOR to train the parents who are taking care of their overweight and obese school-aged children. Moreover, nurses, health care providers, and parents of overweight and obese children should work together to modify their child behaviors; identify goals for their child weight loss. Meanwhile, nursing faculties should modify the PTPOR program to be a part of the nursing curriculum for nursing

students; especially, nursing faculties should educate their students in the techniques of group discussion sessions.

Recommendations

Replication and evaluation of the effects of the PTPOR to confirm the outcomes may alter behaviors of the participants in this study. The PTPOR should apply in other areas and populations such as school-aged children and parents in rural areas or pre-school children.

References

- Aekplakorn, W., & Mo-Suwan, L. (2009). Prevalence of obesity in Thailand. *Obesity Reviews, 10*, 589-592.
- Berry, D., Savoye, M., Melkus, G., & Grey, M. (2007). An intervention for multiethnic obese parents and overweight children. *Applied Nursing Research, 20*(2), 63-71.
- Bureau of Nutrition. (2002). *Kri Aaun Kri Tam* [What makes me fat?]. Bangkok, Thailand: A. Rung - ruang printing house.
- Bureau of Nutrition. (2010a). *Do Lae Hun Sauy Duay Tao Aey* [Taking good care of your body]. Bangkok, Thailand: Printing house of the War Veterans Organization.
- Bureau of Nutrition. (2010b). *Gin Poo Dee Mai Me Aaun* [Appropriate consumption prevents obesity]. Bangkok, Thailand: Printing house of the War Veterans Organization.
- Chaiamnuay, P. (2002). *Naew Thang Kan Pong Kun Lae Rak Sa Rok Aaun Ni Pra Cha Kon Thai* [Guideline for prevention and treatment obesity in Thai]. Bangkok, Thailand: Comfort.
- Chuachai, K. (2009). *Consequences of obesity in health behavior of obese children* (Unpublished master's thesis). Mahidol University, Bangkok, Thailand.
- De Niet, J. E., & Naiman, D. I. (2011). Psychosocial aspects of childhood obesity. *Minerva Pediatrica, 63*(6), 491-505.
- De Mello, E. D., Luft, V. C., & Meyer, F. (2004). Individual outpatient care versus group education programs: Which leads to greater change in dietary and physical activity habits for obese children?. *Jornal de Pediatria, 80*(6), 468-474.
- Epstein, L. H., Paluch, R. A., Beecher, M. D., & Roemmich, J. N. (2008a). Increasing healthy eating vs. reducing high energy-dense foods to treat pediatric obesity. *Obesity, 16*, 318-326.
- Estabrooks, P. A., Shoup, J. A., Gattshall, M., & Dandamudi, P. (2009). Automated telephone counseling for parents of overweight children: A randomized controlled trail. *American Journal of Preventive Medicine, 36*(1), 35- 42.
- Fitzgerald, K. (2012, December 13). Aerobic exercise best way to burn fat, not weights. *Medical News Today*. Retrieved December 13, 2013, from <http://www.medicalnewstoday.com/articles/254158>
- Golan, M. & Weizman, A. (2001). Familial Approach to the treatment of childhood obesity: Conceptual model. *Journal of Nutrition Education, 33*(2), 102-107.
- Goldfield, G. S., Epstein, L. H., Kilanowski, C. K., Paluch, R. A., & Kogut-Bossler, B. (2001). Cost - effectiveness of group and mixed family-based treatment for childhood obesity. *International Journal of Obesity and Related Metabolic Disorders, 25*(12), 1843-1849.
- Holm, J. C., Gamborg, M., Neland, M., Ward, L., Gammeltoft, S., Heitmann, B. L., et al. (2012). Longitudinal changes in blood pressure during weight loss and regain of weight in obese boys and girls. *Journal of Hypertension, 30*(2), 368-374.
- Hughes, A. R., Stewart, L., Chapple, J., McColl, J. H., Donaldson, M. D., Kelnar, C. J., Zabihollah, M., Ahmed, F. A., & Reilly, J. J. (2008). Randomized, controlled trial of a best-practice individualized behavioral program for treatment of childhood overweight: Scottish Childhood Overweight Treatment Trial (SCOTT). *Pediatrics, 121*(3), 539-46.
- Lau, P. W. C., Lee, A., Ransdell, L. (2007). Parent style and cultural influences on overweight children's attraction to physical activity. *Obesity, 15*, 2293-2302.
- Munsch, S., Hasenboehler, K., Michael, T., Meyer, A. H., Roth, B., Biedert, E., et al. (2007). Restrained eating in overweight children: Does eating style run in families?. *International Journal of Pediatric Obesity, 2*, 97 -113.

- Nemet, D., Barkan, S., Epstein, Y., Friedland, O., Kowen, G., Eliakim, A. (2005). Short- and long-term beneficial effects of a combined dietary-behavioral-physical activity intervention for the treatment of childhood obesity. *Pediatrics*, *115*(4), 443–449.
- Papandreou, D., Malindretos, P., & Rousso, I. (2010). Risk factors for childhood obesity in a Greek pediatric population. *Public Health Nutrition*, *13*(10), 1535-1539.
- Peungposop, N. (2011). Child’s rearing practices and obesity in children. *Journal of Behavioral Science*, *17*(2), 1686-1442.
- Steven, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Mahwah, New Jersey: Erlbaum.
- Sinawat, S. (2008). Prevalence of childhood obesity in Thailand. *Siriraj Medical Journal*, *60*, 41-42.
- Tryggestad, J. B., Thompson, D. M., Copeland, K. C., & Short, K. R. (2012). Obese children have higher arterial elasticity without a difference in endothelial function: The role of body composition. *Obesity*, *20*(1), 165-171.
- Weyhreter, H., Tannhauser, S., Muche, R., Debatin, M., Heinze, E., Strittmatter, U., et al. (2003). Evaluation of an outpatient treatment program for obese children and adolescents. *Klinische Padiatrie*, *215*(2), 57-64.
- World Health Organization. (2007). *Prevalence of excess body weight and obesity in children* (Fact Sheet No. 2.3). Copenhagen, Denmark: Author.
- Zenzen, W., & Kridli, S. (2009). Integrative review of school-based childhood obesity prevention programs. *Journal of Pediatric Health Care*, *23*(4), 242-258.