

CHAPTER 4

RESULTS AND DISCUSSION

This study aimed to determine the effects of an individual-based intervention on the improvement of intention to perform eating behavior for weight control, eating behavior and nutritional status among overweight children. The data were analyzed and presented in the following parts:

Part I: Demographic characteristics of the sample

Part II: Comparisons of intention to perform eating behavior for weight control, eating behavior, and nutritional status at the baseline, in the sixth week after the baseline, and in the eighteenth week after the baseline in the experimental group.

Part III: Comparison of intention to perform eating behavior for weight control, eating behavior, and nutritional status at the baseline, in the sixth week after the baseline, and in the eighteenth week after the baseline among the experimental group and control group.

Results

Part I: Demographic Characteristics of the Sample

Table 4-1 displays general information of the samples including gender, age, religion, father's and mother's highest education, father's and mother's occupation, family incomes, number of family members, daily allowances and child illness history. The average age of overweight children was 11-11.9 years old. Most of the children were Buddhist. The majority of fathers and mother of overweight children graduated from secondary school and bachelor degree or higher, respectively. More than half of overweight children had family income between 30,001-50,000 baht/month. Most overweight children had four to five members in their family. The average daily allowance of overweight children was 30-40 baht/day. More than half of overweight children did not have a history of illness.

The two groups were mostly similar in all demographic characteristics. There were no significant differences in all of demographic characteristics of the sample ($p > .05$) (Table 4-1).

Table 4-1

Demographic Characteristic of the Experimental and Control Group

Demographic Characteristics	Experimental (n=68)		Control (n=68)		Statistic test value	p-value
	n	%	n	%		
Gender						
Male	34	50.0	44	64.7	3.006	.083 ^a
Female	34	50.0	24	35.3		
Age(years)						
10-10.9	22	32.4	22	32.4		
11-11.9	44	64.7	45	66.2		
≥ 12.0	2	2.9	1	1.5		
Mean (S.D.)	11.04(0.56)		11.03(0.51)		0.98	.922 ^b
Body weight (kilograms)						
30-50	34	50.0	21	30.9		
51-70	32	47.0	39	57.3		
71-90	1	1.5	7	10.3		
91-110	1	1.5	1	1.5		
Mean (S.D.)	51.84(10.09)		57.59 (10.96)		10.69	.767 ^b
Height (centimeters)						
131-140	24	35.3	12	17.7		
141-150	32	47.0	26	38.2		
151-160	8	11.8	24	35.3		
161-170	4	5.9	6	8.8		
Mean (S.D.)	143.38(7.08)		149.34 (7.93)		14.16	.892 ^b
BMI						
25.0-29.9	48	70.6	49	72.1		
30.0-34.9	18	26.5	16	23.5		
35.0-39.9	2	2.9	3	4.4		
Mean (S.D.)	27.8 (2.56)		28.1 (2.42)		9.15	.753 ^b
Religion						
Buddhism	67	98.5	65	95.6	1.03	.619 ^c
Other	1	1.5	3	4.4		

Table 4-1 (continued)

Demographic Characteristics	Experimental (n=68)		Control (n=68)		Statistic test value	p-value
	n	%	n	%		
Father's education level						
Elementary school	8	11.8	9	13.2	4.835	.857 ^a
Secondary school	22	32.4	24	35.3		
Diploma	18	26.5	17	25.0		
Bachelor degree or higher	20	29.4	18	26.5		
Mather's education level						
Elementary school	9	13.2	6	8.8	8.362	.275 ^a
Secondary school	21	30.9	20	14.7		
Diploma	14	17.6	12	17.6		
Bachelor degree or higher	24	29.4	30	58.8		
Father's occupation						
Employee	24	35.3	16	23.5	5.859	.119 ^a
Private business	13	19.1	10	14.7		
Government enterprise	8	11.8	18	26.5		
Government employee	23	33.8	24	35.3		
Mather's occupation						
Employee	15	22.1	13	19.1	3.253	.516 ^a
Private business	17	25.0	16	23.5		
Government enterprise	6	8.8	13	19.1		
Government employee	19	27.9	18	26.5		
Housewife	11	16.2	8	11.8		
Family income(baht per month)						
10,000-30,000	11	16.2	8	11.8	5.738	.869 ^a
30,001-50,000	29	42.6	32	47.0		
50,001-70,000	10	14.7	14	20.6		
70,001-90,000	13	19.1	10	14.7		
> 90,000	5	7.4	4	5.9		
Number of family members						
≤ 3	17	25.0	15	22.1	0.539	.438 ^a
4-5	33	48.5	37	54.3		
6-7	11	16.2	8	11.8		
7-8	7	10.3	8	11.8		

Table 4-1 (continued)

Demographic Characteristics	Experimental (n=68)		Control (n=68)		Statistic test value	p-value
	n	%	n	%		
Daily allowance (baht)						
≤ 20	9	13.2	11	16.2	0.326	.758 ^a
21-30	16	23.5	15	22.0		
31-40	32	47.1	34	50.0		
41-50	11	16.2	8	11.8		
Child illness history						
No health problems	53	77.9	56	82.4	0.416	.519 ^a
With health problems	15	22.1	12	17.6		

^a = Chi-square test. ^b = t-test. ^c = Fisher's Exact test.

Part II: Comparison of Intention to Perform Eating Behavior for Weight Control, Eating Behavior, and Nutritional Status Before Entering the Intervention, and After Entering the Intervention in the Experimental Group

The object of this study was to compare intention to perform eating behavior for weight control, eating behavior, and nutritional status among overweight children before entering the intervention, and after entering the intervention. Research hypotheses to evaluate this objective were hypothesis 1-3.

The results of three hypotheses according to objective 1 were as follows:

Hypothesis 1. Overweight children who receive an individual-based intervention will have better intention to perform eating behavior for weight control than before entering the intervention.

As shown in Table 4-2, the mean score of intention to perform eating behavior for weight control in experimental group at the baseline (T₁), six weeks after the baseline (T₂), and eighteen weeks after the baseline (T₃) were 11.87, 16.15, and

23.15, respectively. The differences of intention to perform eating behavior for weight control in experimental group at three time interval were analyzed. The results of one-way repeated measures MANOVA showed that there were significant differences in intention to perform eating behavior for weight control at baseline, sixth week after baseline, and eighteenth week after baseline in the experimental group ($F=41.402$, $p=.000$).

Moreover, as shown in Table 4-3, multiple comparisons of mean difference revealed that there were significant differences in intention to perform eating behavior for weight control between a) the baseline (T_1) and six weeks after the baseline (T_2); b) the baseline (T_1) and eighteen weeks after the baseline (T_3); c) six weeks after the baseline (T_2) and eighteen weeks after the baseline (T_3). This result revealed that after receiving an individual-based intervention; the overweight children had better intention to perform eating behavior than before entering the intervention. Thus, hypothesis 1 was supported.

Table 4-2

Comparison of Mean Score of Intention to Perform Eating Behavior for Weight Control at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline in the Experimental Group

Time	Mean (S.D.)	F	p-value
Baseline (T ₁)	11.87 (11.48)	41.402	.000*
Six weeks after baseline (T ₂)	16.15 (4.87)		
Eighteen weeks after baseline (T ₃)	23.15 (3.09)		

*p < .001.

Table 4-3

Multiple Comparison of Mean Difference of Intention to Perform Eating Behavior for Weight Control at The Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline in the Experimental Group

Time (Mean)	T ₁ (11.87)	T ₂ (16.15)	T ₃ (23.15)
T ₁ (11.87)	-	4.28**	11.28*
T ₂ (16.15)	4.28**	-	7.00*
T ₃ (23.15)	11.28*	7.00*	-

*p < .001. **p < .05.

Hypothesis 2. Overweight children who receive an individual-based intervention will have better eating behavior compared to before entering the intervention.

As shown in Table 4-4, the mean score of eating behavior for weight control in experimental group at the baseline (T₁), six weeks after the baseline (T₂), and eighteen weeks after the baseline (T₃) were 40.07, 40.71, and 43.24, respectively. The differences of eating behavior for weight control in experimental group at three

time interval were analyzed. The results of one-way repeated measures MANOVA showed that there were significant differences in eating behavior for weight control at baseline, sixth week after baseline, and eighteenth week after baseline in the experimental group ($F=19.823$, $p=.000$).

Moreover, as shown in Table 4-5, multiple comparisons of mean difference revealed that there was a significant difference in eating behavior for weight control between a) the baseline (T_1) and eighteen weeks after the baseline (T_3); b) six weeks after the baseline (T_2) and eighteen weeks after the baseline (T_3). This result revealed that after receiving an individual-based intervention; the overweight children had better eating behavior compared to before entering the intervention. Thus, the hypothesis 2 was supported.

Table 4-4

Comparison of Mean Score of Eating Behavior for Weight Control at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline in the Experimental Group

Time	Mean (S.D.)	F	p-value
Baseline (T_1)	40.07(4.14)	26.066	.000*
Six weeks after baseline (T_2)	40.71(2.37)		
Eighteen weeks after baseline (T_3)	43.24(2.74)		

* $p < .001$.

Table 4-5

Multiple Comparison of Mean Difference of Eating Behavior for Weight Control at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline in the Experimental Group

Time (Mean)	T ₁ (40.07)	T ₂ (40.71)	T ₃ (43.24)
T ₁ (40.07)	-	0.63	3.16*
T ₂ (40.71)	0.63	-	2.53*
T ₃ (43.24)	3.16*	2.53*	-

*p< .001.

Hypothesis 3. Overweight children who receive an individual-based intervention will have better nutritional status compared to before entering the intervention.

As shown in Table 4-6, using the BMI for age (Z-scores) to classify nutritional status, the mean score of BMI for age in experimental group at the baseline (T₁), six weeks after the baseline (T₂), and eighteen weeks after the baseline (T₃) were 2.39, 2.19, and 2.00, respectively. The differences of mean score of BMI for age (Z-scores) in experimental group at three time interval were analyzed. The results of one-way repeated measures MANOVA showed that there were significant differences in BMI for age (Z-scores) at baseline, sixth week after baseline, and eighteenth week after baseline in the experimental group (F=184.468, p=.000).

Moreover, as shown in Table 4-7, multiple comparisons of mean difference revealed that there was a significant difference in mean score of BMI for age between a) the baseline (T₁) and six weeks after the baseline (T₂); b) the baseline (T₁) and eighteen weeks after the baseline (T₃); c) six weeks after the baseline (T₂) and eighteen weeks after the baseline (T₃). This result revealed that after receiving an

individual-based intervention, the overweight children had better nutritional status compared to before entering the intervention. Thus, the hypothesis 3 was supported.

Table 4-6

Comparison of Mean Score of BMI for Age (Z-score) at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline in the Experimental Group

Time	Mean (S.D.)	F	p-value
Baseline (T ₁)	2.39(0.42)	166.449	.000*
Sixth weeks after baseline (T ₂)	2.19(0.48)		
Eighteenth weeks after baseline (T ₃)	2.00(0.50)		

*p< .001.

Table 4-7

Multiple Comparison of Mean Difference of BMI for Age (Z-score) at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline in the Experimental Group

Time (Mean)	T ₁ (2.39)	T ₂ (2.19)	T ₃ (0.50)
T ₁ (2.39)	-	0.20*	0.38*
T ₂ (2.19)	0.20*	-	0.19*
T ₃ (0.50)	0.38*	.019*	-

*p< 0.001.

Part III: Comparison of Intention to Perform Eating Behavior for Weight Control, Eating Behavior, and Nutritional Status Before Entering the Intervention, and After Entering the Intervention Among the Experimental Group and the Control Group

The object of this study was to compare intention to perform eating behavior for weight control, eating behavior and nutritional status among overweight children who received an individual-based intervention and those who did not received the . Research hypotheses to evaluate this objective were hypothesis 4-6.

The results of three hypotheses according to this objective are detailed as follows:

Hypothesis 4. Overweight children who receive an individual-based intervention will have better intention to perform eating behavior for weight control compared to those who do not receive the intervention.

The intervention effect was analyzed using two-way repeated measures MANOVA. There was significant differences between the experimental group and the control group over time on intention to perform eating behavior for weight control ($p < .001$). However, the result of analysis of variance found an interaction effect ($F = 100.861, p = .000$) (Appendix D: Table D1). Thus, this study used an independent t-test to compare mean score of intention to perform eating behavior for weight control between the experimental group and the control group at the baseline, six weeks after the baseline, and eighteen weeks after the baseline.

Table 4-8 compares the mean score of intention to perform eating behavior for weight control by using an independent t-test. The results show that the mean

score in experimental group was significantly higher than in the control group at six weeks after the baseline and eighteen weeks after the baseline ($p < .001$). However, there was no significant difference in mean score of intention to perform eating behavior for weight control at baseline between the experimental group and the control group ($p > .05$).

In addition, the pattern of differences in mean score of intention to perform eating behavior for weight control could be seen clearly in the plot of three means shown in Figure 4-1. The line of mean between experimental group and control group showed the improvement of intention to perform eating behavior for weight control after entering the intervention. The improvement of intention was significantly higher than before entering the intervention. It can be inferred that the overweight children in the experimental group had better intention to perform eating behavior for weight control than the control group. Thus, hypothesis 4 was supported.

Table 4-8

Comparison of Mean Score of Intention to Perform Eating Behavior For Weight Control at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline Among the Experimental Group and the Control Group

Intention to perform eating behavior for weight control	Group Mean S.D.		t	p-value
	Experimental	Control		
Baseline (T ₁)	11.87 (11.48)	15.37 (9.85)	-1.908	.059
Six weeks after baseline (T ₂)	16.15 (4.87)	3.85 (4.74)	14.926	.000*
Eighteen weeks after baseline (T ₃)	23.15 (3.09)	3.09 (3.63)	34.705	.000*

* $p < .001$.

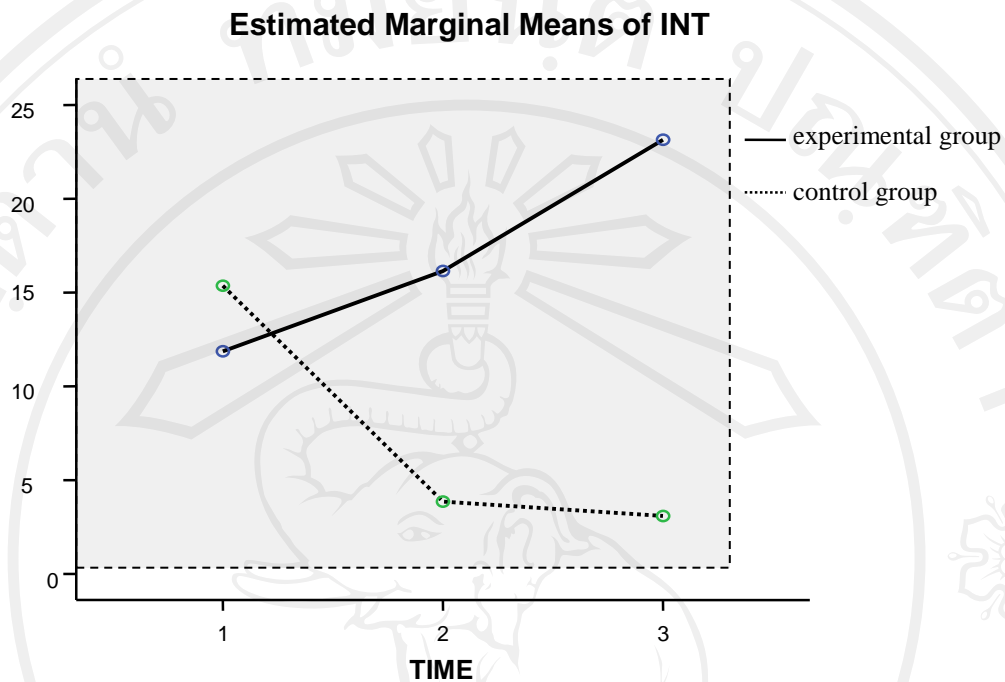


Figure 4-1. The line graph of mean score of intention to perform eating behavior for weight control

Hypothesis 5. Overweight children who receive an individual-based intervention will have better eating behavior compared to those who do not receive the intervention.

The intervention effect was analyzed using two-way repeated measures MANOVA. There was significant differences between the experimental group and the control group overtime on eating behavior for weight control ($p < .001$). However, the result of analysis of variance found an interaction effect ($F = 12.070$, $p = .000$) (Appendix D: Table D2). Thus, this study used an independent t-test to compare mean score of eating behavior for weight control between the experimental group and the

control group at the baseline, six weeks after the baseline, and eighteen weeks after the baseline.

Table 4-9 compares the mean score of eating behavior for weight control by using an independent t-test. The results show that the mean score in the experimental group was significantly higher than in the control group at six weeks after the baseline and eighteen weeks after the baseline ($p < .001$). However, there was no significant difference in mean score of eating behavior for weight control at the baseline between the experimental group and the control group ($p > .05$).

In addition, the pattern of differences in mean score of eating behavior for weight control can be seen clearly in the plot of three means shown in Figure 4-2. The line of mean between the experimental group and the control group showed the improvement of eating behavior for weight control after entering the intervention. The improvement of eating behavior score was significantly higher than before entering the intervention. This result implies that the overweight children in the experimental group had better eating behavior for weight control than the control group. Thus, hypothesis 5 was supported.

Table 4-9

Comparison of Mean Score of Eating Behavior for Weight Control at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline Among the Experimental Group and the Control Group

Eating behavior for weight control	Group Mean S.D.		t	p-value
	Experimental	Control		
Baseline (T ₁)	40.07(4.14)	38.32(6.40)	1.901	.059
Six weeks after baseline (T ₂)	40.71(2.37)	35.15(2.42)	13.516	.000*
Eighteen weeks after baseline (T ₃)	43.24(2.74)	37.53(2.65)	12.358	.000*

*p < .001.

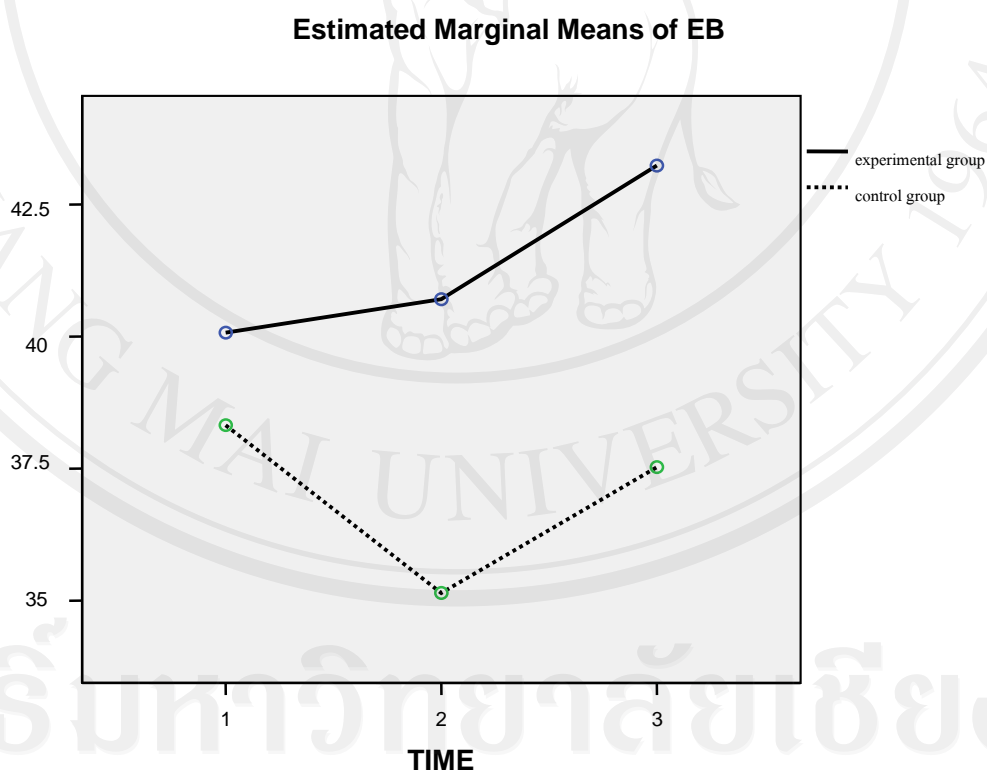


Figure 4-2. Line graph of mean score of eating behavior for weight control

Hypothesis 6. Overweight children who receive an individual-based intervention will have better nutritional status compared to those who do not receive the intervention.

The results of two-way repeated measures MANOVA of mean score for BMI for age show significant differences between the experimental group and the control group over time of measurement ($p < .001$). However, the result of analysis of variance found an interaction effect ($F = 128.497$, $p = .000$) (Appendix D: Table D3).

Thus, this study used an independent t-test to compare the mean score of BMI for age between the experimental group and the control group at the baseline, six weeks after the baseline, and eighteen weeks after the baseline.

Table 4-10 compares the mean score of BMI for age using an independent t-test. The results show that the mean score in the experimental group was significantly lower than in the control group at six weeks after the baseline and eighteen weeks after the baseline ($p < .001$). However, there was no significant difference in the mean score of BMI for age at the baseline between the experimental group and the control group ($p > .05$).

In addition, the pattern of differences in mean score of BMI for age can be seen clearly in the plot of three means shown in Figure 4-3. The line of mean between the experimental group and the control group shows the decrease of BMI for age at eighteen weeks after entering the intervention. It can be inferred that children in the experimental group had better nutritional status after receiving an individual-based intervention. Thus, hypothesis 6 was supported.

Table 4-10

Comparison of Mean Score of BMI for Age at the Baseline, Six Weeks After the Baseline, and Eighteen Weeks After the Baseline Among the Experimental Group and the Control Group

BMI for age	Group Mean S.D.		t	p-value
	Experimental	Control		
Baseline (T ₁)	2.39(0.42)	2.53(0.56)	-1.749	.083
Six weeks after baseline (T ₂)	2.19(0.48)	2.55(0.55)	-4.161	.000*
Eighteen weeks after baseline (T ₃)	2.00(0.50)	2.55(0.55)	-5.923	.000*

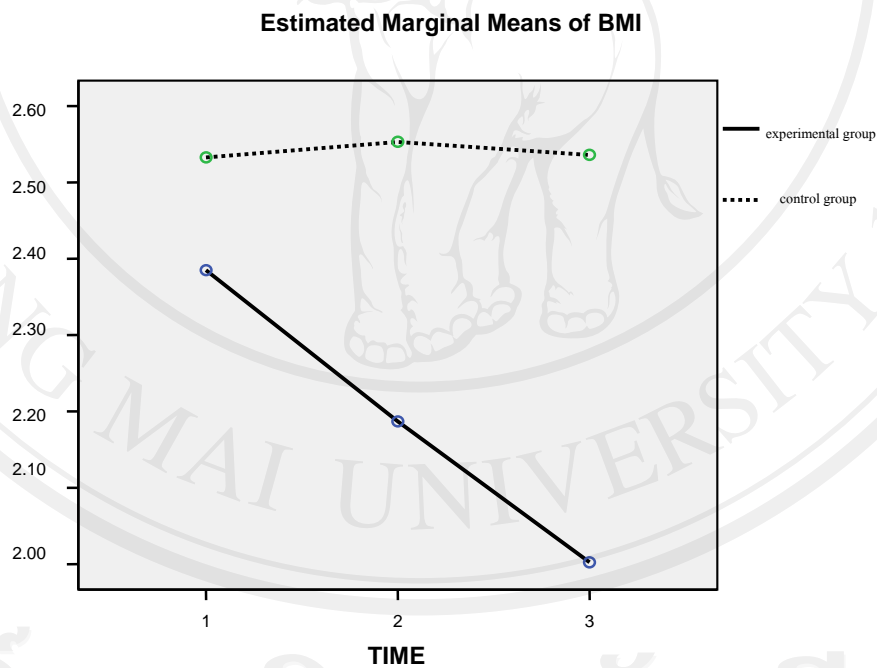


Figure 4-3. The line graph of mean score of BMI for age (Z-score)

Discussion

This study was conducted to determine the effects of an individual-based intervention on the improvement of intention to perform eating behavior for weight control, eating behavior, and nutritional status among overweight children. Results from this study revealed that overweight children in the experimental group had significantly increased intention to perform eating behavior for weight control ($p < .05$), improved their eating behavior ($p < .05$), and improved their nutritional status ($p < .05$) than before enduring the program. In addition, overweight children in the experimental group had a greater significantly increased intention to perform eating behavior for weight control ($p < .05$), improved their eating behavior ($p < .05$), and improved their nutritional status ($p < .05$) compared to overweight children in the control group at the baseline, six weeks after the baseline, and eighteen weeks after the baseline.

With the aim of assessing the effects of an individual-based intervention, these findings confirm the beneficial effects of this program since it promoted significantly different outcome variables as described above. On the basis of the theoretical framework used in this study, the results confirm that overweight children who received an individual-based intervention and specific strategies within the program improved their intention to perform eating behavior for weight control, eating behavior, and nutritional status. Since intention to perform eating behavior for weight control increased, eating behavior and nutritional status also improved. Therefore, the intervention promoted success in improving eating behavior and nutritional status among overweight children.

The success of the program may represent the effect of changed attitudes toward behaviors, changed subjective norms, and alteration of perceived behavioral control in the children. This is congruent with the explanation of TPB, which states that intention is determined by the person's attitude toward behaviors, subjective norms, and perceived behavioral control. A more positive attitude toward behaviors, supportive subjective norms, and greater perceived behavioral control can influence stronger behavioral intention (Ajzen 1991). Moreover, the increase of intention to perform eating behavior for weight control of the overweight children in the experimental group may be due to the designed activities of an individual-based intervention.

As has already been mentioned, this intervention followed the TPB framework which starts from attitude toward behaviors, subjective norms, and perceived behavioral control to increase intention to perform eating behavior for weight control in overweight children. The intervention -based TPB acted as the foundation for the four content modules with different objectives:

First, Module A: emphasis on modifying attitude toward eating behaviors for weight control. Information was provided through media such as a computer game, cartoon animation, a box game, and a comic book in order to raise their awareness about the health impact of being overweight and healthy eating behavior. Using media with explanations not only ensured a positive attitude and focused the attention of the children; it also facilitated them to understand easily. This was consistent with the study of Chen (2010) which used educational media to modify attitudes in children. This study showed that using media to modify attitudes toward healthy eating behavior can enable the children to have a more positive attitude than

they had before the intervention. However, the study of Chen was not successful in decreasing fat intake in children.

Second, Module B: emphasis on modifying subjective norms regarding eating behaviors for weight control. The reflection of the normative belief and motivation to comply was provided through the opinions of influential people in close relationships with the child such as the father, mother, grandfather, grandmother, teachers, and friends in order to influence children to have a clear understanding of the social norms associated with weight control. Similarity to the other studies reported that strongly influential people can lead children to think differently about how to perform eating behaviors for weight control (A°strøm, & Kiwanuka, 2006; Kellar & Abraham, 2005). In addition, in this study, if the influential norms did not reinforce healthy behavior in the child the researcher would intervene to correct the situation before passing the child on to Module C. For example in the activity in Module B7, the children were asked to write down the answer to the question, “If my father thinks that eating meets the recommendation of the Thai Nutritional Flag has many benefit, I should.... eat/not eat” in the activity book. When the researcher checked the activity book, if the overweight children did not meet the evaluation criteria, the researcher would revise with them the benefits of eating to meet the recommendations of the Thai Nutrition Flag. Then, children will talk to their father about this point. If their father did not perceive the change, the researcher would talk with him again before passing to Module C.

Third, Module C: emphasis on modifying perceived behavioral control toward eating behaviors. The reflection of control belief and perceived power was provided through their opinions on their belief to perform healthy eating behavior.

Fourth, Module D: emphasis on setting goals to achieve their eating behavior for weight control. Once children understand their capabilities and the normative values, they will set their goal to perform their eating behaviors and follow with their plan. It is also important to not only set goals and a plan but also to monitor themselves so that the individual that chooses to perform eating behavior for weight control can follow accordingly. This study is consistent with the suggestion that allowing children to set their own plan, thus, engaging them in healthy behavior (Gratton et al., 2007).

Interestingly, the result of intention to perform eating behavior for weight control in the control group had a significantly decreased compared to the baseline (Appendix D: Table D4). The mean score of intention to perform eating behavior for weight control decreased from 15.37 (baseline) to 3.85 (six weeks after baseline) and 3.09 (eighteen weeks after the baseline), respectively. Descriptive statistics show that more than half of the overweight children in the control group did not intend to perform eating behavior in three components including the intention to perform choosing the type of food, intention to perform limiting the amount of food, and intention to perform a method of eating to control weight after completing the program. The fact that intention to perform eating behavior for weight control in the control group rapidly decreased may be due to the midterm and final examinations time at their school which was differenced from the experimental group. The overweight children in the control group may have given their attention to the preparation for examinations rather than to performing eating behavior for weight control. Another reason might be the amount of sex in control group. More than half of overweight children in control group were male (64.7%) compare to girls (35.3%)

In this age group, boys concerned about their weight and body image less than girls (Comette, 2008). Then, the overweight boys might have low intention to control weight less than girls.

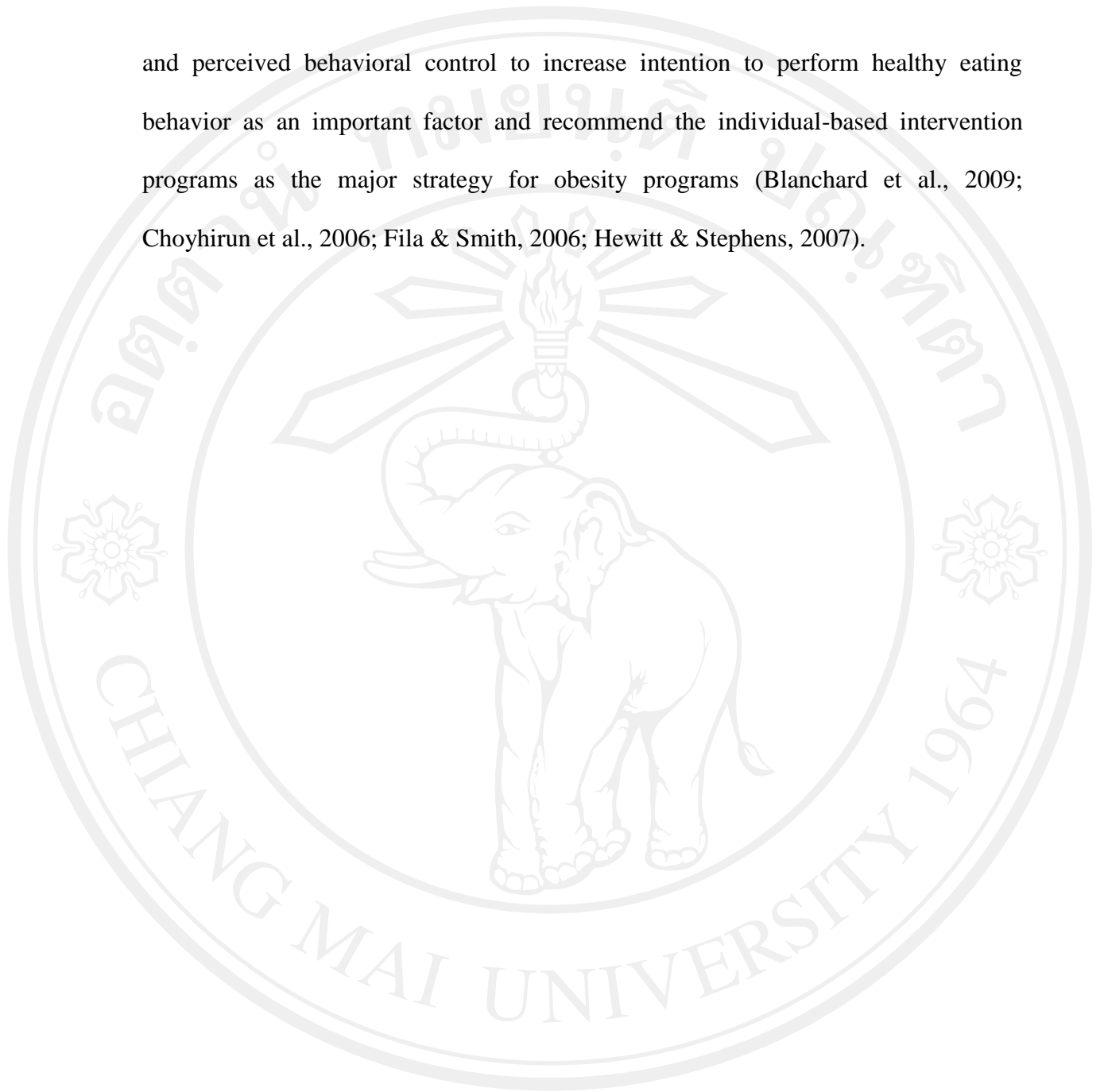
Furthermore, the results from the modification of attitude toward behaviors, modification of subjective norms, and modification of perceived behavioral control also showed an improvement in eating behavior for weight control. This modified eating behavior by providing activities in four modules which composed of 1) the benefits of the five food groups, eating three meal a day, food labeling; 2) traffic light food items, the Thai Nutritional Flag; and 3) the effect of eating a high sugar diet, a high fat diet, a high sodium diet. Overweight children in the experimental group were encouraged to improve eating behavior by planning and setting goals for eating healthy food during the next week and monitoring themselves. In this study, overweight children in experimental group met the researcher everyday to return their self-monitoring dietary record. The researcher checked and reviewed their dietary record. If the record showed that the children were eating a high number of calories and unhealthy food a discussion will follow. Individual feedback and verbal support were given. They were given rewards if they met their weekly goals or plan. It is probable that children encouraged in this would observe their eating behavior in their future daily life. Therefore, when people were provided with the opportunity to observe their behavior carefully, positive changes may occur along side their increased awareness (Morrison & Bennett, 2006). In addition, more than half of the overweight children in the experimental group had increased consumption of vegetables and non-sweet fruit (data from eating behaviors for weight control questionnaire items 7-8) after completing the program. The findings of this study are

congruent with the study of Kellar and Abraham (2005) who conducted s to promote fruit and vegetable intake in children. The results show that the experimental group had stronger intention to increase fruit and vegetable intake and ate the recommended amount of fruit and vegetables more frequently. Similar to the study of Chen (2008), which promoted healthy weight and a healthy life style in children, the strategies were motivational reinforcement, self monitoring, and problem-solving skills aimed to promote healthy eating in each child. A statistically significant increase in healthy weight and healthy life style was observed in this study. Moreover, the study of Chen (2008) found that self-monitoring of eating behavior by recording diet is an important activity for improving healthy eating behavior for weight control. Some changes of behavior will occur as a result of their increased their awareness when they are provided with the opportunity to monitor or observe their behavior carefully (Stegelin et al., 2008). Findings in this study are also consistent with the study of Gratton et al. (2007) who conducted an intervention to promote fruit and vegetable consumption based on TPB. The result indicates that increased fruit and vegetable consumption resulted in more positive attitudes, more subjective norms, and positive behavior. Moreover, the findings in this study are also consistent with the result from Jiang et al. (2007) who conducted a three-year intervention program which focused on reducing the prevalence of obesity in the school age children. The intervention consisted of nutritional education including risk factors for obesity, healthy dietary habits and lifestyle, and methods for preventing obesity. The results showed that prevalence of overweight decreased significantly in the intervention group as compared to the control group.

Moreover, the increase of intention to perform eating behavior for weight control and the improvement of eating behavior in the experimental group also provided a significant improvement in nutritional status. The explanation for this is due to activities which encourage overweight children to assess their weight/height and plot their graph individually. After plotting their own progress, the overweight children knew about their nutritional status and the researcher encouraged them to improve their nutritional status by giving them a reward when they met the evaluation criteria. Moreover, the significant decrease of BMI for age among overweight children among overweight children in the experimental group compared to the control group six weeks after the baseline, and eighteen weeks after the baseline was congruent with the study of Chen (2008) who conducted by promoting healthy weight. The result showed that BMI for age had decreased at the end of intervention. However, this study did not encourage overweight children to reach their normal weight within the short term duration of the because the children in this age group require healthy food for their growth and restricting calorific consumption is not recommended for them.

In addition, this intervention followed the TPB framework. This framework included the modification of attitude toward behaviors, subjective norms, perceived behavioral control, goal setting and improving healthy eating behavior using self-monitoring in recording of diet. In this study, attitude toward behaviors, subjective norms, perceived behavioral control had a significant effect on intention to perform eating behavior for weight control, eating behavior, and nutritional status among overweight children across the intervention time period. These findings were consistent with other studies which suggest that applying attitude, subjective norms

and perceived behavioral control to increase intention to perform healthy eating behavior as an important factor and recommend the individual-based intervention programs as the major strategy for obesity programs (Blanchard et al., 2009; Choyhirun et al., 2006; Fila & Smith, 2006; Hewitt & Stephens, 2007).



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