

# Effect of Weight Control Counselling in Overweight and Obese Young Adults

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## Phimarn, *et al.*: Weight Control Counselling in Young Adults

This study was carried out to compare groups with individual counselling to examine essential outcomes in young adults in a community pharmacy. A randomized controlled trial was conducted from June 2011 to February 2012. A total of 112 overweight and obese participants were randomly assigned to receive group counselling (n=52) or individual counselling (n=56). Clinical outcomes included weight, waist circumference and body mass index. Eating behaviours were evaluated by a theory of planned behaviour questionnaire. Both groups showed significant clinical outcomes. The theory of planned behaviour average sum score significantly increased from baseline in the health dieting behaviour and subjective norm in group counselling. In the individual group (P<0.05), the score increased significantly from baseline only for health dieting behaviour (P<0.05). The logistic regression analysis, factors associated with eating behaviours were: group counselling (OR=4.03, 95% CI: 1.71-9.51), female (healthy dieting behaviour: OR=0.37, 95% CI: 0.15-0.93) and person who attempted to control weight (OR=0.17, 95% CI: 0.03-0.91). Group counselling was not inferior to individual counselling and the group counselling should be used as first line mode for weight control management in young adults.

**Key words:** Obesity, young adults, community pharmacy, body mass index, theory of planned behaviour

Overweight and obesity are major risk factors of several chronic diseases. Prevalence of overweight and obesity is increasing in all age groups<sup>[1,2]</sup>. Recently, the World Health Organisation (WHO) reported that more than one billion adults worldwide are overweight; of these over 200 million men and almost 300 million women were obese. Over 40 million children aged <5 y were overweight in 2011<sup>[3]</sup>.

In Thailand, the prevalence of obesity in adults (body mass index; BMI $\geq$ 25 kg/m<sup>2</sup>) increased to 22.4% in men and 34.3% in women in 2004<sup>[4]</sup>. Especially, there is increasing rate among children and adolescents<sup>[5]</sup>. The national representative data on the status of overweight and obesity in children and adolescents are available for several countries in Asia including Thailand<sup>[6]</sup>.

Lifestyle modification have been reported as the most effective strategy to manage obesity and overweight<sup>[7]</sup>. Understanding patients with healthy eating behaviour is also recommended in identifying a root cause of overweight. Evidence proved that the theory of planned behaviour (TPB) is of use to explain eating behaviour<sup>[8-11]</sup> since this theory is able to explore intention of eating behaviour<sup>[12]</sup>. A previous study in Thailand designed the TPB diet questionnaire in

Thai and suggested this tool was beneficial for health professionals providing lifestyle advice to people who are overweight and obese<sup>[13]</sup>. Even counselling option could be responsible for improved clinical outcomes. The previous studies were conflicting<sup>[14-16]</sup> and most of the studies were performed in adults. Only a few studies have compared group versus individual counselling reducing weight in overweight and obese young adults. The study aimed to examine clinical outcomes, eating behaviour as measured by the TPB diet questionnaire and explore the factors associated with eating behaviour.

## MATERIALS AND METHODS

### Study design:

The study was a parallel group, open labelled randomized controlled trial at a community pharmacy located on the Mahasarakham University campus. The

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trial was undertaken from June 2011 to February 2012. Ethical approval was received from Mahasarakham University. Consent was obtained from all participants.

### **Participants:**

The target population was overweight and obese young adults at the University community pharmacy in Mahasarakham University, located in Northeast Thailand. Optimal sample size was calculated using the following Eqn.,  $n = 2[(Z_{\alpha} + Z_{\beta})\sigma]^2 / (\mu_c - \mu_t)^2$ . Parameters used for calculation were based on standard practice ( $Z_{\alpha}=1.645$ ,  $Z_{\beta}=0.840$ ) and previous research, which reported the change in weight due to intervention ( $\alpha=2.48$ ,  $\mu_c=0$ ,  $\mu_t=-1.5$ )<sup>[17]</sup>. Moreover, 30% of number of participants for loss of follow up was added. This suggested the appropriate number of participants should be at least 45 in each group. Eligible criteria were university students with body mass index (BMI) at least 25 kg/m<sup>2</sup>, having an intention to control their weight, willingness to follow the study protocol and having a physically active lifestyle. Exclusion criteria were those using medications or herbal products known to affect weight, participating in any weight control programs. All participants met criteria were invited to participate. Written informed consent was obtained from all participants. Participant personal information was kept confidential. They were randomly assigned to either the group counselling or the individual counselling.

### **Intervention:**

Two community pharmacists, who provided weight loss advice routinely, developed the weight loss handbook. All participants were given a goal of achieving a 6% weight loss over a 6 mon period. This was based on a goal of 1% weight loss per month. The participants were instructed to maintain their usual physical activity throughout the study. A nutritionally balanced, low calorie diet consisting of approximately 1200-1500 kcal/d for women and 1500 to 1800 kcal/d for men, with approximately 55% of calories from carbohydrate, 30% from fat, and 15% from protein<sup>[18]</sup>. Both groups received the necessary information such as rationale of healthy dieting for weight control, principles of energy intake, food groups, portion size, and principle and strategies of behaviour intervention. This information provided by pharmacist providers lasted for about 1 h. Common local foods that provided high calories from carbohydrate such as sticky rice, dessert and Thai sweet fruits such as banana, mango, and jackfruit were emphasized because these foods

are a major cause of overweight and obesity in the Thai population. Participants were informed that all components of interventions were similar between the two groups, except for mode of interventions.

A weight control handbook was provided to all participants for self-study. The handbook is comprised of four parts: (1) an informational section, which deals with healthy diet, principles of calorie intake, food groups, portion size, and exercise, (2) a patient profile to record personal information and clinical outcomes; weight (kg), height (m), waist circumference (inches), and BMI (kg/m<sup>2</sup>) (3) a daily food record for patients to record their daily meals and (4) a daily exercise record for themselves. Prior to the study, the handbook was provided to the two pharmacists as a standard guide for their use in counselling.

### **Group counselling:**

Participants in the group counselling about weight loss included 8-10 overweight and obese people who were scheduled to visit the community pharmacy on a predetermined day that enabled them to attend the group advisory session together. The group sessions lasted approximately 1 h and covered information about healthy diet, principles of energy intake, food groups, portion size, and exercise. The group counselling sessions were provided at 0, 3 and 6 mon. Outcomes were measured as described below.

### **Individual counselling:**

Participants assigned to the individual counselling were scheduled to visit the selected community pharmacy. At 0 mon, the weight loss handbook was provided to all experimental group participants for self-study. Participants received an individual counselling session at every visit (0, 3 and 6 mon) from the same pharmacist. The counselling sessions lasted approximately 1 h and focused on healthy dieting and exercise. Outcomes were measured as described below.

### **Outcomes and data collections:**

Clinical outcomes included body weight, waist circumference, height and BMI; assessed at all patient visits (0, 3 and 6 mon) using standard medical devices. Waist circumference was assessed at the narrowest point superior to the hip. Amount of dietary intake was evaluated at baseline and 3 mon using 3 d dietary record. The questionnaire was developed based on the theory of planned behaviour (TPB) for healthy dieting behaviour (the TPB diet questionnaire; Thai version)

and was used to assess healthy dieting behaviour, intention to perform healthy dieting behaviour, attitude toward healthy dieting behaviour, subjective norm, and perceived behavioural control at baseline, 8 and 16 w. The questionnaire had good reliability (Chronbach's Alpha of 0.79)

### Data analysis:

Statistical analysis was performed using the statistical package for the social sciences (SPSS) version 16. Descriptive data are presented as mean and standard deviation, or standard error of mean, or percentage as appropriate. For continuous variables, differences within groups were tested by paired t-test. Chi-square test was used for categorical variables. An intention to treat (ITT) analysis was used in which missing data were replaced by the last observation carried forward. For the factor analysis, binary logistic regression was used to determine the association between demographic and health variables and versus BMI and TPB score post intervention. An odds ratio (OR) and its 95% confidence interval (95% CI) were used to interpret the significance of an association, using a  $P < 0.05$  as the cut-off point for significance.

## RESULTS AND DISCUSSION

Initially, 112 participants were included in the study (as two groups with 56 participants each). The remaining 108 eligible participants met the investigators. A total of 52 participants received group behaviour counselling and 56 participants received individual behaviour therapy. No statistically significant difference of baseline characteristics between two study groups was found (Table 1). The average age of the participants was approximately 20 y. Most participants (65%) were female. About 90% had no underlying disease(s). More than 80% of them had previously attempted to control weight. Three-fourths (75%) used diet control. The average BMI at baseline was  $27.55 \pm 3.04$  kg/m<sup>2</sup> for participants (male:  $26.97 \pm 3.21$ ; female:  $27.74 \pm 2.99$  kg/m<sup>2</sup>) who received group counselling and  $26.87 \pm 2.38$  kg/m<sup>2</sup> (male:  $26.21 \pm 1.53$ ; female:  $27.24 \pm 2.68$  kg/m<sup>2</sup>) for those received individual counselling. There were no significant differences among the two groups on any of baseline characteristics.

At baseline, there were no differences in weight, BMI and waist circumference between the two groups. As shown in Table 2, both groups showed improvement in all clinical outcomes at 16 w. Although, both types of counselling were able to decrease the mean weight,

BMI and waist circumference significantly ( $P < 0.05$ ), the decrease in all clinical outcomes was greater when counselling individually. Similar reduction significantly in these outcomes in post-intervention compared to pre-intervention was observed for subgroup analysis. For female analysis, the average weight of individual counselling and group counselling was significantly different,  $71.28 \pm 6.93$  kg and  $75.33 \pm 6.67$  kg, respectively ( $P = 0.012$ ). This phenomenon was not found among males.

The average changes in the intermediate behavioural outcomes from baseline are illustrated in Table 3. No statistically significant differences between groups were found. At baseline, the low score was found in 6 domains of group counselling and five domains of individual counselling. At 6 mon, the average sum score of healthy dieting behaviour of the group counselling increased significantly from  $7.65 \pm 3.95$  to  $9.17 \pm 3.33$  ( $P = 0.005$ ). However, the individual counselling group showed a significant increase of average sum score in 2 domains (healthy dieting behaviour and subjective norm). The score of 3 domains and 5 domains at 6 mon were increased to higher levels for the group and individual counselling, respectively.

The eating behaviour was measured by the TPB diet questionnaire. Three factors had influenced on intention to perform healthy dieting behaviour, attitude toward healthy dieting behaviour, behavioural beliefs and normative beliefs. Group counselling was over 4 times more likely to associate intention to perform healthy dieting behaviour score than individual counselling (OR=4.03, 95% CI: 1.71-9.51) but were less likely to associate with behavioural beliefs. Women were less likely to be associated with attitude toward healthy dieting behaviour score and normative beliefs score than men (OR=0.37, 95% CI=0.15-0.93 and 0.25, 95% CI=0.09-0.57, respectively). People with attempted to weight control were favourable to intention to perform healthy dieting behaviour score (OR=0.17, 95% CI=0.03-0.91). Underlying disease and BMI status were not significantly associated with eating behaviour (Table 4).

This randomized study was conducted to compare the outcomes of two types of counselling; group counselling and individual (one-on-one) counselling at a community pharmacy. At the beginning of the study, 112 participants were enrolled. Four participants in the control group withdrew from the study as shown in fig. 1. The majority of participants were females

**TABLE 1: BASELINE CHARACTERISTICS AND CLINICAL OUTCOMES OF PARTICIPANTS**

Characteristics	Group counseling (n=52)	Individual counseling (n=56)	P-value
Gender			0.77 <sup>a</sup>
Female	39 (66.1)	36 (64.3)	
Age in years, mean±SD	20.87±1.78	20.73±1.72	0.69 <sup>b</sup>
<b>Underlying disease</b>			0.87 <sup>a</sup>
Non Underlying disease	52 (92.9)	52 (92.9)	
Diabetes mellitus	4 (7.1)	3 (5.4)	
Dyslipidemia	0 (0.0)	1 (1.7)	
<b>Attempted to control weight</b>			0.66 <sup>a</sup>
Yes	46 (82.1)	51 (91.1)	
<b>Method used for control weight</b>			0.72 <sup>a</sup>
None	9 (16.1)	5 (8.9)	
Diet control	42 (75.0)	42 (75.0)	
Exercise	3 (5.4)	7 (12.6)	
Herbal use	2 (3.5)	2 (3.5)	
Height (m), mean±SD	1.68±0.58	1.69±0.55	0.59 <sup>b</sup>
Weight (kg), mean±SD	78.23±6.83	76.94±6.25	0.31 <sup>b</sup>
Waist Circumference (cm), mean±SD	93.01±4.29	93.60±3.81	0.38 <sup>b</sup>
BMI in kg/m <sup>2</sup> , mean±SD	27.55±3.04	26.87±2.38	0.20 <sup>b</sup>

Statistical significance was tested by <sup>a</sup>chi-square test and <sup>b</sup>independent t-test

**TABLE 2: CLINICAL OUTCOMES**

Outcomes	Mon 0	Mon 6	Δ	P-value
<b>Weight (kg)</b>				
Group counselling (n=56)	78.23±6.83	74.07±6.85	-4.2	P<0.001 <sup>b*</sup>
Individual counselling (n=56)	76.94±6.26	71.71±6.49	-5.2	P<0.001 <sup>b*</sup>
P-value	0.312 <sup>a</sup>	0.039 <sup>a*</sup>		
<b>BMI (kg/m<sup>2</sup>)</b>				
Group counselling (n=56)	27.55±3.04	26.09±2.99	-1.46	P<0.001 <sup>b*</sup>
Individual counselling (n=56)	26.86±2.37	25.03±2.27	-1.83	P<0.001 <sup>b*</sup>
P-value	0.203 <sup>a</sup>	0.042 <sup>a*</sup>		
<b>Waist circumference (cm)</b>				
Group counselling (n=56)	93.01±2.95	91.71±2.97	-1.30	P<0.001 <sup>b*</sup>
Individual counselling (n=56)	93.57±3.81	91.67±3.99	-1.90	P<0.001 <sup>b*</sup>
P-value	0.377 <sup>a</sup>	0.062 <sup>a</sup>		

Statistical significance was tested by <sup>a</sup>independent t-test and <sup>b</sup>paired t-test, \*P≤0.05

**TABLE 3: AVERAGE SUM SCORE OF EACH DOMAIN OBTAIN FROM TPB QUESTIONNAIRE**

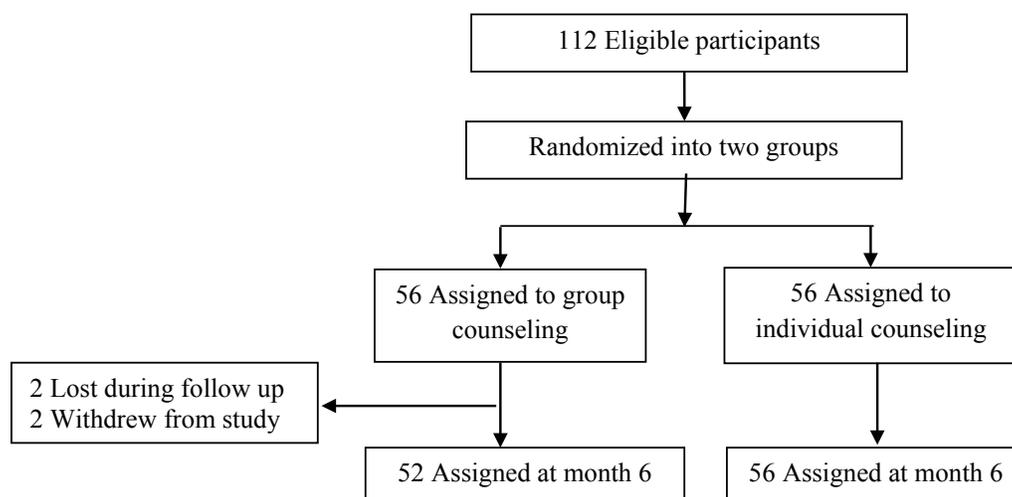
Domain	Group counselling		Δ	P-value <sup>a</sup>	Individual counselling		Δ	P-value <sup>a</sup>
	Pre test	Post test			Pre test	Post test		
Healthy dieting behaviour	7.65±3.95	9.17±3.33	+1.52	0.005*	8.54±4.17	10.32±2.96	+1.78	0.004*
Intention to perform healthy dieting behaviour	14.81±3.43	15.46±4.83	+0.65	0.171	16.44±2.97	16.64±3.26	+0.20	0.713
Perceived behavioural control	18.05±2.85	18.11±2.79	+0.06	0.873	18.05±3.80	18.98±2.38	+0.93	0.120
Attitude towards healthy dieting behaviour	16.15±3.67	16.81±3.62	+0.66	0.162	17.23±2.82	17.63±2.68	+0.40	0.270
Subjective norm	14.77±2.27	14.81±2.18	+0.04	0.913	13.94±2.73	15.36±2.36	+1.42	P<0.001*
Control beliefs	29.92±4.54	31.52±5.04	+1.60	0.108	29.39±3.85	30.46±4.93	+1.07	0.150
Behavioural beliefs	16.63±4.54	16.19±3.84	-0.44	0.423	16.57±3.12	16.79±3.40	+0.22	0.473
Normative beliefs	28.48±4.69	29.59±4.52	+1.11	0.129	29.66±4.41	30.89±3.75	+1.23	0.115

Note: \*P≤0.05, <sup>a</sup>analysed paired t-test, \*P≤0.05

**TABLE 4: ASSOCIATIONS BETWEEN CLINICAL OUTCOMES, PARTICIPANTS' FACTORS AND EATING BEHAVIOR (TPB SCORE)**

Variables	Healthy dieting		Intention		Perceived		Attitude		Subjective norm		Control beliefs		Behavioral beliefs		Normative beliefs	
	OR	95% CI	OR	95% CI	OR	95%CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Counselling</b>																
Individual	1	0.12-	1	1.71-	1	0.87-	1	0.39-	1	0.38-	1	0.34-	1	0.04-	1	0.74-
Group	0.96	0.67	4.03*	9.51	2.56	7.52	0.97	2.37	0.87	1.97	1.04	3.19	0.16*	0.62	1.69	3.83
<b>Gender</b>																
Male	1	0.07-	1	0.32-	1	0.12-	1	0.15-	1	0.54-	1	0.56-	1	0.06-	1	0.09-
Female	0.74	8.25	0.79	1.98	0.36	1.06	0.37*	0.93	1.29	3.15	1.82	5.90	0.28	1.43	0.23*	0.57
<b>Underlying disease</b>																
Yes	1	0.16-	1	0.39-	1	0.09-	1	0.05-	1	0.10-	1	0.07-	1	0.17-	1	0.36-
No	0.20	2.63	1.96	9.95	0.83	7.52	0.45	3.91	0.44	1.92	0.38	2.24	1.73	16.97	1.62	7.26
<b>Attempted to weight control</b>																
Yes	1	0.29-	1	0.03-	1	0.10-	1	0.19-	1	0.18-	1	0.08-	1	0.44-	1	0.14-
No	0.48	3.37	0.17*	0.91	0.46	2.07	0.84	3.58	0.74	3.01	0.65	5.68	2.13	10.34	0.53	1.98
<b>BMI status</b>																
Overweight	1	0.37-	1	0.19-	1	0.22-	1	0.25-	1	0.41-	1	0.20-	1	0.67-	1	0.56-
Obesity	3.81	39.35	0.52	1.08	0.62	1.78	0.63	1.53	0.93	2.12	0.64	1.98	2.18	7.08	0.88	2.91

\*P≤0.05

**Fig. 1: Flow of participants in the trial**

(~60%), in agreement with previous studies, which reported higher prevalence of overweight and obesity in female university students<sup>[19]</sup>. An effect of individual counselling was superior to group counselling for weight loss and BMI. However, both interventions produced significantly improved clinical outcome at the end of trial.

Approximately 6% weight loss at 6 mon was impressive considering that most previous studies have shown 5-10% weight loss along with well documented positive effects on biomarkers for cardiovascular disease<sup>[20]</sup>. Effect on weight loss (4.20% in group counselling and 5.20% in individual counselling) was consistent with the other studies using the intervention

based on counselling. Both interventions lost more weight than pre-intervention. However, individual counselling significantly decreased weight and BMI greater than group counselling. Our findings are in disagreement with previous studies that have compared group counselling and individual counselling in the obesity and overweight population<sup>[21]</sup>. One study in Thailand performed group counselling intervention compared to individual counselling and reported that both types of counselling during a 1 y period did not significantly improve clinical outcomes<sup>[14]</sup>. On the other hand, Renjilian *et al.*<sup>[16]</sup> reported that group counselling produced significantly greater reductions in weight and BMI than individual counselling. These

results consisted of one RCT in Thailand conducted by Smanchart *et al.* This study used an individual advice which found that individual weight-loss counselling in university students is not effective in 6 mon<sup>[17]</sup>. Comparing to ours, the Samanchart study<sup>[17]</sup> had the weight loss attempt and subjective norm score at the baseline lower than the control group significantly. This may cause failure to achieve weight loss. In the subgroup analysis, women maintain significant weight loss in 6 mon. The possible explanation was the differences in fat metabolism and storage between male and female subjects<sup>[22]</sup>.

Our study showed an improvement in average TPB scores. The group counselling can achieve changing healthy dieting behaviour. Individual counselling can successfully change healthy diet and subjective norm. Our study disagrees with a previous study in university students which found that individual counselling can increase TPB domain at 6 mon<sup>[17]</sup>. However, our findings agree with several other studies which found that university students have higher scores of eating behaviour especially; attitude and perceived behavioural control<sup>[23]</sup>. The possible cause of not seeing the TPB scores change significantly from baseline may be due to personality traits which are hard to change<sup>[14]</sup>. Our study has investigated the factors associated with TPB score including type of counselling, gender and attempt at weight control. Group counselling was found to be associated with intension score. This agrees with a previous study<sup>[24]</sup>. The possible reason was that group counselling may create an environment that helps people accept their disease and facilitates behaviour changes. Moreover, therapeutic factors like group learning and group optimism probably help create this positive environment<sup>[25]</sup>. Our study found that males are associated with good attitude of eating behaviour. Other studies have found no relationship between gender and attitudes toward obesity<sup>[26]</sup>. From this study it is shown that gender differences may require the need for separate programs or at least special considerations for male and female. Attempted at weight control is significantly associated with intention score. This finding agrees with previous studies that reported attempts to lose weight interpreted as intention to lose weight<sup>[27]</sup>.

No adverse effects were found during the study. This study did not exclude the under controlled patients with chronic diseases such as diabetes mellitus and dyslipidemia which are highly prevalent in the overweight and obese population. Generally, these

patients received a recommendation from their physician to control their diet and weight to improve disease management and decrease health risks.

Several limitations of this study are noted which include the small sample size, and a short duration (6 mon). We have evaluated clinical outcomes only among young adults, who may have more intention to lose weight. This possibly led to positive impact of the program. Thus, our results may not be generalized to the other age groups.

In conclusion, it is clear that both group and individual counselling are effective in reducing weight, BMI and waist circumference of young adults. Since, the effect of both groups was not significantly different; we suggest using group counselling due to less cost and time. However, further study over a longer period of time with a larger number of subjects is needed to verify these results and enhance generalizability to other age groups.

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#### **Conflict of interest:**

There are no conflicts of interest.

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