



## **Gender Differences in the Attitude and Strategy towards Weight Control among Government Employees in Penang, Malaysia**

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### **Abstract**

**Background:** This was a cross-sectional study on the gender differences in weight-control behavior. The strategies used, weight status, weight satisfaction, and proportion of individuals attempting to lose weight among 233 government employees (104 men and 129 women) working in the Federal Government Building in Penang, Malaysia, were assessed.

**Methods:** Anthropometric indicators such as body mass index, waist-to-hip ratio, and body fat percentage were measured to determine the subjects' body weight status. A questionnaire covering the following items was used to assess weight-control behavior: social support, self-monitoring, self-efficacy, outcome expectations, planning, preparation/buying, portion control, social interactions, and cognitive behavioral strategies.

**Results:** About 50% of the subjects were classified as overweight. Based on percent body fat percentage, 70% of them were classified as having unhealthy levels of body fat. Women were found to be more dissatisfied with their current weight, and were more likely to attempt weight reduction compared to men. Women reported higher levels of social support for dieting and had better expectations for diet and exercise ( $P < 0.05$ ). They also reported higher use of weight control strategies. For self-monitoring, although no gender-dependent differences ( $P > 0.05$ ) were observed, women reported more frequent self-monitoring of diet, whereas men reported more frequent self-monitoring of exercise.

**Conclusion:** Health care professionals and researchers should be aware of the different strategies used by men and women in order to plan and/or implement community-wide weight management programmes.

**Keywords:** Weight Control, Body Weight Status, Diet, Exercise, Gender Differences

### **Introduction**

Weight-control behavior refers to actions taken in order to lose weight, gain weight or maintain an ideal body weight and common weight-control behaviors include special diets, increased exercise, irregular use of weight-loss pills, attending weight-loss courses, and other therapies (1). With recent increases in the awareness of health issues and obesity-related problems among the public, it is well accepted

that the practice of losing weight is gaining popularity. Weight loss is an important part of managing and reducing obesity problems and provides many health benefits (2).

In Malaysia, overweight and obesity (among individuals aged  $\geq 18$  years) as recorded in the Second National Health and Morbidity Survey (NHMS II) conducted in 1996 were 16.6% and 4.4%, respectively (3). The prevalence of

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overweight and obesity increased to 29.1% and 14.0%, respectively, in the Third National Health and Morbidity Survey (NHMS III) conducted in 2006 (4).

The increasing prevalence of obesity is accompanied by increasing attention to behavioral issues associated with diet and physical activity (5). A study on 1032 Malaysians revealed that almost 38% of the subjects reported attempts to lose weight. Dieting was found to be the most common method of weight loss, followed by exercise and the use of slimming teas (6). However, studies on gender differences related to weight-control behaviors that are specific to diet and physical activity have not been well discussed or documented, especially among adults in Malaysia.

While previous studies have examined weight-control practices of adolescents (7-9), few have focused on the weight-control attitudes and strategies used by adults. This measure is important for tackling the growing number of Malaysian adults with weight problems. This study aimed to examine weight-control behaviors, attitudes, and strategies applied by both men and women working in the Federal Government Building in Penang, Malaysia. This study also measured the level of satisfaction of each subject with regard to his/her current body weight and intention to lose weight. Certain populations have unique behaviors, and the findings of one study should not be generalized to other populations. The findings from this study can be used to plan and implement strategies to combat problems related to overweight and obesity, especially in Malaysia.

## Materials and Methods

A cross-sectional survey using a random sampling technique to recruit subjects was performed. Data were collected from May to July 2009 from the employees working in the

Federal Government Building in Penang, Malaysia. The minimum number of subjects needed for this study was calculated according to the following formula (10):

$$n = \frac{(Z_{1-\alpha/2})^2 (P) (1 - P)}{d^2}$$

Where,  $\alpha$  = probability of making a type 1 error (0.05)

$Z_{1-\alpha/2}$  = confidence level (1.96 for a 95%)

$P$  = prevalence of trying to lose weight (0.38) derived from survey by Kong *et al.* (6)

$d^2$  = level of precision (0.10)

$$n = \frac{(1.96)^2 (0.38) (1 - 0.38)}{(0.10)^2}$$

$$= 91 \text{ subjects}$$

There are 20 departments in the Federal Government Building in Penang. Permission was requested from all departments, and only 17 departments permitted their employees to participate in this study. All employees who met the inclusion criterion were invited to participate in this study. The inclusion criterion was that the individuals had to be Malaysian men or women aged 18–60 years. The exclusion criteria were physical disabilities or pregnancy. Permission was obtained from the head of each department to carry out this study. Consent forms were obtained from the subjects once they agreed to participate in this study. A total of 330 subjects were eligible to participate in the present study, of which 233 agreed to participate (Fig. 1). This study was approved by the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

Anthropometric measurements were conducted by measuring the weight, height, waist and hip circumferences, and body fat percentage of each subject. The weight and body fat percentages of the subjects were measured

using a TANITA Body Composition Analyzer (TBF-306; Japan). The body weight of each subject was measured to the nearest 0.1 kg. The height, measured using a SECA Body Meter (Vogel & Halke GmbH & Co., Germany), was recorded to the nearest 0.1 cm. The waist and hip circumferences were measured using an unstretchable measuring tape. The waist circumference was measured at the mid-point between the lower border of the rib cage and the iliac crest at the end of normal expiration. The hip circumference was measured at the widest level over the greater trochanters.

Body mass index (BMI), a ratio of body weight (in kilograms) to height squared (in metres), was used to define body weight status. BMI was classified based on the guidelines provided by the World Health Organization (11).

A set of questionnaire was used to determine background and socio-demographic information of the subjects and a questionnaire adapted from the Diet and Exercise Self-Management Survey (5) was used to determine weight-control behaviors of the subjects in this study. The questionnaire covers 16 aspects of weight-control characteristics that focus mainly on diet and exercise skills, including social support for diet and exercise; self-monitoring of diet and exercise; self-efficacy of diet skills and adherence, and of exercise adherence; diet and exercise outcome expectations; planning; preparation/purchasing; portion control; social interactions for diet and exercise; and cognitive strategies for diet and exercise. The last 2 items addressed the issues of body weight satisfaction and attempts to lose weight. The subjects were asked to recall their behaviors during the past month in providing answers to each question.

Questions related to social support for diet and exercise required the subjects to indicate whether people around them encouraged or advised them to eat healthy and exercise. Questions related to self-monitoring of diet and exercise consisted of 10 items with regard to how frequently they reminded themselves to consume healthy food and be physically active.

The subjects were asked to report their level of confidence with respect to certain health-related behaviors, and adherence to a healthy eating plan and exercise programme in response to the questions related to the self-efficacy of diet skills. Regarding the diet and exercise outcome expectations, the subjects were required to report their level of agreement with the statements about healthy diet and regular exercise. The section on planning, preparation/buying, and portion control, comprised 16 questions regarding the frequency of certain diet- and exercise-related behaviors. In the section regarding social interactions for diet and exercise, the subjects indicated how often they bought and served healthy foods, and encouraged their spouses to be physically active at family/social gatherings. In the section on diet- and exercise-related cognitive behavioral strategies, the subjects were asked to comment on how often they praised and rewarded themselves when they ate healthy foods and were physically active. Forward and backward translation validation was performed prior to administration of the questionnaire in this study. The questionnaire was translated into Malay language with a forward and backward translation validation procedure prior to administration of the questionnaire in this study. All questions were positively framed. For each scale, higher scores indicated that the subjects were taking positive steps to control their weight via diet and exercise. The scoring system used in this questionnaire was based on the Diet and Exercise Self-Management Survey (5). The Cronbach  $\alpha$ -coefficient suggested that the weight-control behavior scale ranged between 0.83 and 0.85, suggesting very good to excellent internal consistency.

### *Data analysis*

The Statistical Package for Social Sciences (SPSS) Version 17.0 was used to analyse the data. Descriptive statistics such as frequencies, means, standard deviations, and percentages were used to characterize the study sample and

scale. An independent sample t-test was used to compare demographic factors, and to scale the scores between men and women. A Pearson correlation was calculated to determine the relationship between study variables. A statistical probability level of  $P < 0.05$  was considered significant.

## Results

The distribution of subjects according to socio-demographic and anthropometric characteristics, body weight satisfaction, and attempts to lose weight are presented in Table 1. As indicated, 233 subjects (104 men (44.6%) and 129 women (55.4%)) were recruited for this study. A majority of the subjects (53.2%) were in the 18–29 years age range, with a mean age of 32.45 (10.46) years. A total of 65.7% subjects were married. With regard to education, 47.3% subjects were high school graduates, and 35.6% attended university. Most of the subjects (68.2%) had a total household income of  $\leq$  RM1999; the mean total household income was RM 1790.19 (910.27).

Based on anthropometric measurements, about 50% of subjects were classified as overweight and obese. The proportions of men classified as underweight, overweight, and obese were higher than those of women. According to the waist-to-hip ratio, 5.8% of the men and 21.7% of the women were identified to be at risk. In terms of fat percentage, more than half of the women (72.9%) and men (66.3%) were categorized as unhealthy by having an extremely high body fat percentage.

More than 70% of subjects were dissatisfied with their current body weight. The percentage of women dissatisfied with their current weight was higher than men (79.3% vs. 65.4%). The majority of the subjects (74%) in this study reported that they were trying to lose weight; this percentage was much higher among women than men (82.2% vs. 63.5%).

The differences in weight-control behavior and strategies adopted by men and women are presented in Table 2. A significant difference emerged between men and women with respect to diet outcome expectations ( $t = -3.13$ ,  $P = 0.002$ ) and exercise outcome expectations ( $t = -2.77$ ,  $P = 0.006$ ) as well as in social support for diet ( $t = -2.14$ ,  $P = 0.033$ ), wherein the women had higher scores than did the men. Although there were no differences with regard to self-efficacy of diet skills ( $t = 0.06$ ,  $P = 0.952$ ), self-efficacy of adherence to diet ( $t = 0.709$ ,  $P = 0.479$ ) and exercise ( $t = 1.052$ ,  $P = 0.294$ ), and social support for exercise ( $t = 0.89$ ,  $P = 0.376$ ), men reported higher scores. In contrast, women reported more frequent self-monitoring of diet ( $t = -1.915$ ,  $P = 0.057$ ), planning ( $t = -1.253$ ,  $P = 0.211$ ), preparation/buying ( $t = -1.318$ ,  $P = 0.189$ ), and portion control ( $t = -1.89$ ,  $P = 0.06$ ) compared to men, although there were no differences between the strategies adopted.

Table 3 shows the relationship between the weight-control behavior of the subjects and the status of their body weight. On the basis of the results, it appears that a significant relationships exists between BMI and social support for diet ( $r = 0.229$ ,  $P = 0.000$ ), social support for exercise ( $r = 0.136$ ,  $P = 0.038$ ), and social interactions for diet ( $r = 0.141$ ,  $P = 0.031$ ). These findings suggest that subjects who have greater social support for diet and exercise and social interactions for diet have higher BMIs. However, these relationships were generally weak. A significant relationship also emerged between body fat percentage and diet outcome expectations ( $r = 0.176$ ,  $P = 0.007$ ), social support for diet ( $r = 0.244$ ,  $P = 0.000$ ), and planning strategies ( $r = 0.183$ ,  $P = 0.005$ ). These findings revealed that the subjects' body fat percentage increased with the diet outcome expectation, social support for diet, and planning strategies. No relationship was reported between the weight-control behavior and waist-to-hip ratio of the subjects.

**Table 1:** Distribution of subjects according to socio-demographic and anthropometric characteristics, body weight satisfaction, and attempts to lose weight

Characteristics	Men (n = 104) n (%)	Women (n = 129) n (%)	Total (n = 233) n (%)
<b>Age (yr)</b>			
18–29	48 (46.1)	76 (58.9)	124 (53.2)
30–39	24 (23.1)	31 (24.0)	55 (23.6)
40–49	16 (15.4)	10 (7.8)	26 (11.2)
50–59	16 (15.4)	12 (9.3)	28 (12.0)
<b>Status</b>			
Single	34 (32.7)	41 (31.8)	75 (32.2)
Married	70 (67.3)	83 (64.3)	153 (65.7)
Divorced/widowed	0 (0.0)	5 (3.9)	5 (2.1)
<b>Education level</b>			
Primary and secondary school	22 (21.2)	18 (14.0)	40 (17.1)
High school/equivalent certificate	56 (53.8)	54 (41.8)	110 (47.3)
University/equivalent certificate	26 (25.0)	57 (44.2)	83 (35.6)
<b>Total household income (RM*)</b>			
≤1999	70 (67.3)	89 (69.0)	159 (68.2)
2000–2999	25 (24.0)	26 (20.1)	51 (21.9)
≥3000	9 (8.7)	14 (10.9)	23 (9.9)
<b>BMI</b>			
Underweight	5 (4.8)	6 (4.7)	11 (4.7)
Normal	46 (44.2)	59 (45.7)	105 (45.1)
Overweight	31 (29.8)	38 (29.5)	69 (29.6)
Obese	22 (21.2)	26 (20.1)	48 (20.6)
<b>Waist-hip ratio</b>			
<b>Men</b>			
<1.0 (acceptable)	98 (94.2)	-	98 (94.2)
≥1.0 (at risk)	6 (5.8)	-	6 (5.8)
<b>Women</b>			
<0.85 (acceptable)	-	101 (78.3)	101 (78.3)
≥0.85 (at risk)	-	28 (21.7)	28 (21.7)
<b>Fat percentage (%)</b>			
Unhealthy (too low)	0 (0)	0 (0)	0 (0)
Acceptable range (lower end)	7 (6.7)	8 (6.2)	15 (6.4)
Acceptable range (upper end)	28 (27.0)	27 (20.9)	55 (23.6)
Unhealthy (too high)	69 (66.3)	94 (72.9)	163 (70.0)
<b>Body weight satisfaction</b>			
Satisfied	37 (35.6)	28 (21.7)	65 (27.5)
Dissatisfied	67 (64.4)	101 (78.3)	168 (72.5)
<b>Trying to lose weight</b>			
Yes	66 (63.5)	106 (82.2)	172 (73.8)
No	38 (36.5)	23 (17.8)	61 (26.2)

\*USD1=RM3



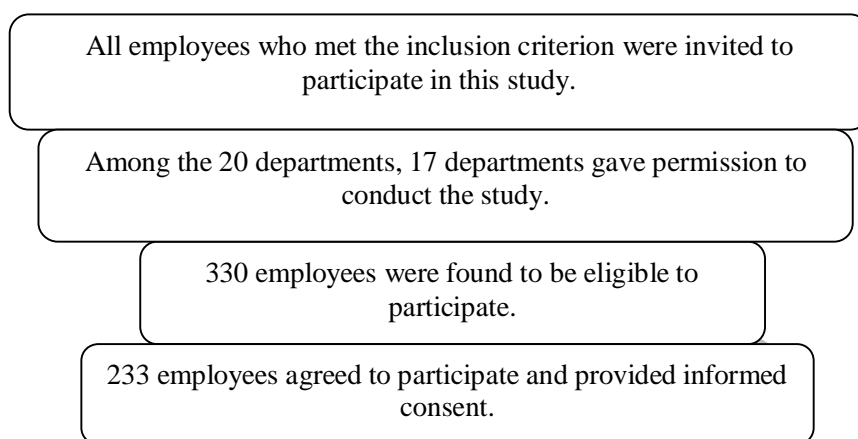
**Table 2:** Mean (SD) of scores for attitudes and strategies of weight-control behavior among male and female subjects

Characteristics	Men (n = 104) Mean (SD)	Women (n = 129) Mean (SD)	P value <sup>a</sup>
<b>Attitudes</b>			
Self-efficacy, diet skill	6.48 (1.98)	6.47 (1.99)	0.952
Self-efficacy, adherence to diet	10.42 (3.33)	10.12 (3.08)	0.479
Self-efficacy, adherence to exercise	6.17 (2.09)	5.88 (2.09)	0.294
Outcome expectation, diet	31.35 (6.92)	34.19 (6.86)	0.002*
Outcome expectation, exercise	33.05 (6.45)	35.46 (6.72)	0.006*
Social support, diet	6.59 (1.98)	7.17 (2.08)	0.033*
Social support, exercise	14.32 (3.43)	13.87 (4.14)	0.376
<b>Self-monitoring</b>			
Self-monitoring, diet	11.13 (3.41)	12.02 (3.62)	0.057
Self-monitoring, exercise	8.33 (2.35)	8.06 (2.31)	0.372
<b>Other strategies</b>			
Planning	10.39 (2.76)	10.82 (2.44)	0.211
Preparation/buying	14.05 (4.19)	14.71 (3.43)	0.189
Portion control	11.85 (2.68)	12.50 (2.56)	0.060
Social interaction, diet	5.85 (1.80)	5.64 (1.77)	0.388
Social interaction, exercise	8.13 (2.22)	7.66 (2.23)	0.114
Cognitive strategies, diet	10.76 (2.96)	11.20 (3.34)	0.600
Cognitive strategies, exercise	10.36 (2.80)	10.16 (2.98)	0.292

\* $P < 0.05$ , significantly different<sup>a</sup>Independent sample *t*-test**Table 3:** Relationship between the weight-control behavior and weight status of the subjects

Characteristics	BMI <sup>b</sup> (R value)	WHR <sup>b</sup> (R value)	Fat % <sup>b</sup> (R value)
<b>Attitudes</b>			
Self-efficacy, diet skill	0.052	0.003	0.049
Self-efficacy, adherence to diet	0.076	0.079	0.047
Self-efficacy, adherence to exercise	0.032	0.119	-0.014
Outcome expectation, diet	0.102	-0.083	0.176*
Outcome expectation, exercise	0.043	-0.100	0.117
Social support, diet	0.229*	0.025	0.244*
Social support, exercise	0.136*	0.103	0.064
<b>Self-monitoring</b>			
Self-monitoring, diet	0.057	-0.016	0.097
Self-monitoring, exercise	0.050	0.022	0.006
<b>Other strategies</b>			
Planning	0.087	0.021	0.183**
Preparation/buying	0.073	0.024	0.102
Portion control	0.017	-0.043	0.095
Social interaction, diet	0.141*	0.076	0.110
Social interaction, exercise	0.005	0.012	-0.032
Cognitive strategies, diet	0.045	-0.050	0.100
Cognitive strategies, exercise	0.100	0.035	0.061

\* $P < 0.05$ , significantly different (2-tailed); <sup>b</sup>Pearson coefficient



**Fig. 1:** Flow chart of the sampling design and recruitment of subjects

## Discussion

In the present study, no statistically significant difference was observed in the body mass index of men and women subjects ( $26.10 \pm 5.05 \text{ kg/m}^2$  vs.  $25.85 \pm 5.64 \text{ kg/m}^2$  respectively,  $t=0.34$ ,  $P>0.05$ ). The percentage of women attempting to lose weight was higher than that of men. The percentage of women dissatisfied with their current weight and attempting to lose weight was also higher than that of men. This is in line with the results of a previous Malaysian study, which found that the proportion of subjects trying to lose weight was higher among women (6). This may be explained by the common desire for a perfect body and thinness among women. Moreover, thinness was equally rated with beauty, achievement, and success (12).

The results of the present study reveal that women were more likely to apply more strategies in their weight-control practices than men. Significant differences that emerged between men and women in diet and exercise outcome expectations and social support for diet revealed that women tend to expect benefits from a healthy diet and exercise plan in order to achieve an ideal body weight. A similar result was obtained in a study by

Nothwehr Snetselaar, and Wu (13), which revealed that women in their study tended to plan, prepare, and control their portions as a method to control weight. Moreover, it was reported that women who were attempting to lose weight more likely to participate in weight control practices such as goal-setting and dieting strategies (14).

Our study found that men reported greater diet-related but not exercise-related social support, suggesting that they tend to be advised and encouraged by family and friends regarding their daily dietary behaviour. This finding was supported by Thrasher et al. (15). This study indicated that men obtain a high percentage of social support from their spouse or partner when adopting healthy eating habits and increasing their level of physical activity, compared to the women. However, some studies have revealed that social support from friends and family has a maximum effect on promoting the benefits of participation in physical activity among sedentary women (16). The relationship between the strategies used and the anthropometric measurements revealed that compared to physical activity-related

strategies, diet-related strategies had a stronger relationship with body weight status among subjects. Subjects who had greater social support for diet had higher BMIs and body fat percentages, while subjects who had greater social support for exercise had higher body fat percentages (significantly positive relationships were noted). In contrast with the finding of this study, Nothwehr, Dennis, and Wu (5) reported negative relationships between the strategies used and the subjects' anthropometric characteristics. One possible explanation for this disparity is the differences in the BMI, body fat percentage, and social support regarding healthy eating habits and lifestyle.

Several limitations should be taken into consideration when interpreting the findings of this study. First, the data obtained from the self-report questionnaire relied on each respondent's understanding of the questionnaire, his/her honesty, and his/her co-operation. The subjects' ability to recall weight-control behavior practiced over the last month prior to the administration of the questionnaire may have also influenced the results obtained. These results cannot be generalized to other populations because this study focused on Malaysian government employees aged 18–60 years working in the Federal Government Building in Penang, Malaysia.

The findings of this study suggest that women more weight control practices (planning, preparation/buying, and portion control) and have higher expectations with respect to healthy diet and physical activity. The percentage of women dissatisfied with their weight and who were trying to lose weight was higher than that of men. The percentage of subjects who were classified as overweight or obese in this study was high. Therefore, intervention programmes on the benefits of physical activity and healthy eating were recommended in order to combat this problem. Health care professionals and future researchers should be aware of the different strategies used by men and women in Malaysia to plan and implement weight-control and health intervention programmes.

## Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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