Mal J Nutr 17(1): 67 - 75, 2011

Gender Differences in Body Mass Index, Body Weight Perception and Weight Loss Strategies among Undergraduates in Universiti Malaysia Sarawak

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ABSTRACT

Introduction: This study was carried out among undergraduate students in Universiti Malaysia Sarawak with the objective of examining gender differences in body mass index (BMI), body weight perception, eating attitudes and weight-loss strategies. **Methods:** Subjects consisted of 600 undergraduates (300 males and 300 females) recruited from the various faculties between September 2008 until mid-November 2008. The Original Figure Rating Scale: Body Weight Perception, Body Shape Questionnaire (BSQ) and Eating Attitudes Test-26 (EAT-26) were used as assessment tools. **Results:** Overall, 52.8% of students had normal BMI, with approximately an equal number of both sexes. More males than females were overweight (33.7%), while more females were underweight (25.3%). Males were more likely to perceive themselves as overweight, and fail to see themselves as underweight. More than half of the females preferred their ideal figure to be underweight, whereas about 30% males chose an overweight figure as their ideal model. Females were generally more concerned about body weight, body shape and eating than males. They diet more frequently, had self-induced vomiting, and used laxatives and exercise as their weight-loss strategies. **Conclusion:** Issues pertaining to body weight perception, eating attitudes and weight-loss strategies exist with differences among male and female undergraduates. Thus, in order to correct misperceptions among young adults, a more tailored intervention programme and more in-depth studies into the various factors involved are required.

Keywords: BMI, body weight perception, eating attitudes, gender differences, weight loss strategies

INTRODUCTION

Malaysia is in a state of a lifestyle transition between traditional and sedentary, with increasing amounts of consumption of fat and calories. Teenagers who are in the period of change and growth in the physical, mental and social aspects may be predisposed to be overweight and obese along with other factors such as genetics, daily routine, metabolics and environmental factors (Pon *et al.*, 2004).

The prevalence of obesity in Malaysia is increasing. The prevalence of obesity in adults 18 years and above as reported in the Second National Health and Morbidity

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Survey in 1996 was 4.4%. Rampal *et al.* (2007) found an overall prevalence of obesity of 12.3% in 2004, which represents an increase of 280%. They also reported a higher prevalence of obesity in females compared to males, while a study among university students by Khor, Lynne & Grace (2002) found a higher prevalence of overweight among males and a higher prevalence of underweight among females.

Gender differences in the perception of body weight have been well documented worldwide (Veggi *et al.*, 2004; Yan *et al.*, 2009). In general, males tend to underestimate their body weight, while females tend to overestimate their body weight. However, some studies such as that of Bhuiyan *et al.* (2003) in the United States found no gender differences in body image perception. Appreciation of the reasons for these gender differences may assist health professionals to make appropriate decisions on weight control strategies.

Cheung *et al.* (2007) reported that female adolescents were motivated to adopt a variety of weight control behaviours by their body perception, rather than their actual body mass index (BMI). Females who perceived themselves to be overweight were more likely to exercise, restrict calorie intake, self-medicate, or purge. Weight control behaviour in males was less of a concern, in that they exercise or restrict calorie intake but do not self-medicate or purge. In a study among 588 Malaysian secondary school females, Pon *et al.* (2004) found that all of them have insufficient knowledge on the management of weight.

This study was conducted among undergraduate students with the objective of examining gender differences in BMI, body weight perception, eating attitudes and weight-loss strategies. Knowledge of the association between BMI, body weight perception, eating attitudes and weight loss strategies would be useful for nutrition improvement intervention efforts among young adults.

METHODS

Study design

This is a cross-sectional study involving subjects selected from undergraduate students in Universiti Malaysia Sarawak. As of July 2008, there were 5,974 undergraduate students enrolled in eight faculties. Information describing the studies and inviting students to participate was circulated to the various faculties. Permission to conduct the study was obtained from the respective deans.

A total of 600 volunteers with an equal number of males and females were recruited from early September till mid-November 2008, using the convenience sampling method. Written consent was obtained from each subject. Each participant was required to complete 3 sets of self-administered questionnaires: The Figure Rating Scale (FRS), adapted from Stunkard, Sorensen & Schulsinger (1983), Body Shape Questionnaire, adapted from Cooper *et al.* (1987) and Eating Attitudes Test-26, adopted from Garner *et al.* (1982). In order to maintain an unbiased environment and to reduce distraction, all participants were prohibited from engaging in any form of discussion during the session. Subsequently, anthropometric measurements were taken from all subjects.

The Figure Rating Scale (FRS)

This inventory is adapted from Stunkard *et al.* (1983). Participants were asked to rate how they perceived their current body weight by choosing an image that corresponds to their figure on a scale ranging from 1 to 7. The seven scales that were used were : extremely underweight, moderately underweight, slightly underweight, neither underweight nor overweight, slightly overweight, moderately overweight and extremely overweight. The participants were also required to state the 'ideal' figure they desire.

Body Shape Questionnaire (BSQ)

This inventory was adapted from Cooper *et al.* (1987). BSQ is a self-applied questionnaire with 34 items assessing the level of preoccupation with weight and body shape over the past four weeks. Responses to the items were ranked using a 6-point Likert scale ('never', 'rarely', 'sometimes', 'often,' 'very often,' 'always'). Higher BSQ scores were expected from subjects who were more concerned about their weight and shape (Cooper *et al.*, 1987. The sum of the response generated a score which was interpreted as below:

Score	Indication
≤80	No pre-occupation
81-110	Slight pre-occupation
111-140	Moderate pre-occupation
>140	Severe pre-occupation

A disturbed or negative body image suggested by a BSQ score of more than 80 indicates a risk for the development of eating disorders. Subjects with scores of >140 have the highest risk and should be referred to a physician for further investigations. The Body Shape Questionnaire (BSQ) is found to correlate with the Eating Attitudes Test (EAT).

Eating Attitudes Test-26

The Eating AttitudesTest-26 (EAT-26) is used as an assessment of disordered eating and this test is highly reliable and valid apart from being economic (Garner *et al.*,1982). It is also used to evaluate different types of attitudes and behaviours associated with anorexia nervosa and bulimia nervosa (Garner *et al.*, 1982). EAT-26 is a screening tool for symptoms of disordered eating, and not a diagnostic tool for clinical problems as eating disorders.

The EAT-26 contains 26 items which form three different subscales to reveal patients' eating disorders in relation to aspects of psychology, attitude and behaviour (Garner *et al.*, 1982). The first subscale is the dieting scale which consists of items 1, 6, 7, 10, 11, 12, 14, 16, 17, 22, 23, 24 and 25. The second subscale is the bulimia and food preoccupation scale which consists of items 3, 4, 9, 18, 21 and 26. The third subscale is the oral control scale which consists of items 2, 5, 8, 13, 19 and 20. The score for each item is put in a box to the right of each item. The scoring for this EAT-26 method is as follows:

	Items 1-25	Item 26
Always	3	0
Usually	2	0
Often	1	0
Sometimes	0	1
Rarely	0	2
Never	0	3

The subscale scores are then summed up according to the scores above. The final scores are then classified into two categories (Garner *et al.*, 1982) given below:

EAT-26 Score	Interpretation
20 or Higher	Indicates HIGH concerns about body weight, body shape and eating. May indicate risk of an eating disorder, when considered with weight control behaviour questions and BMI. Please see a qualified professional for an interview and follow-up evaluation.
Below 20	Indicates LOW concerns about body weight, body shape, and eating. People who have an eating disorder but are in denial may have a low score, so collateral information should also be considered.

Table 1. Differences in BMI between males and females

Subjects	*Classification of BMI (kg/m²)*		
	N (%)		
	Underweight	*Normal range*	*Overweight*
Female (n=300)	77 (25.7)	157 (52.3)	66 (22.0)
Male (n=300)	41 (13.7)	157 (52.3)	102 (34.0)
Total (n=600)	118 (19.7)	314 (52.3)	168 (28.0)

Chi-square χ^2 = 18.697, df =2, p<0.001

A score of 20 or higher denote concerns regarding body weight, body shape and eating, and when considered with BMI and Body Shape Questionnaire (BSQ), may indicate the presence of eating disorders. However, individuals who score less than 20 in this test can still have clinically significant eating disorder symptoms or a formal eating disorder.

Validation of instruments

The Original Figure Rating Scale: Body Weight Perception, Body Shape Questionnaire and Eating Attitudes Test-26 were validated by administering them to a pilot sample of 20 UNIMAS undergraduates. An interview-based approach was used to note down if the participants had any doubts or difficulties when answering the questionnaires. The Cronbach's Alpha for reliability was determined using the Statistical Package for Social Sciences (SPSS). The Cronbach's Alpha for BSQ was 0.948 (0.960) while for EAT-26, it was 0.649 (0.839). The Cronbach's Alpha for the BSQ and EAT-26 for the 600 study subjects were 0.960 and 0.839, respectively, confirming the internal reliability of the questionnaires.

Anthropometric measurements

All participants were measured for height (in meters) and weight (in kilograms). Body weight was taken using an analog weighing scale (Camry, Malaysia) to the nearest 0.5kg. Subjects were weighed bare-footed with light indoor clothing. Height was recorded to the nearest 0.01 meter using a 1.50 meter measuring tape (Goldfish Brand, China) suspended on the wall 1.40 meters above the ground. The subjects' Body Mass Index (BMI) was calculated and classified based on the Asian categorisation of BMI from the Malaysian Clinical Practice Guidelines on Management of Obesity (2004).

Data analysis

The data was analysed using the Statistical Package for Social Sciences (SPSS) for Windows Version 14. The Chi-square χ^2 test of independence was used to compare group differences in categorical data (BMI, BSQ score and EAT score). The relationship between BMI and body weight perceptions was analysed using Pearson's Product-Moment Correlation. Statistical significance was set at $p<0.05$.

RESULTS

A higher proportion of the respondents was from the science field (25.3%, F=101, M=51, n=152), followed by medicine and nursing (22.8%, F=52, M=85, n=137), arts and social sciences (19.5%, F=74, M=43, n=117), engineering (19.0%, F=27, M=92, n=114) and business (13.3%, F=51, M=29, n=80).

The mean BMI was 21.1 kg/ m^2 for females and 22.0 kg/ m^2 for males. The differences in BMI between the sexes are given in Table 1. Overall, 28% of the students

were overweight with more males (34%, n=102) compared to females (22%, n=66). Just over half (52.3%) of the students had BMI within the normal range, comprising an equal number of females and males. About one-fifth of them can be classified as underweight, with more females (25.7%, n=77) than males (13.7%, n=41) in this category. The sex differences in BMI was statistically significant (χ^2=18.697, p<0.001).

Relationship between BMI and Body Weight Perception

The relationship between and body weight perception between the sexes is given in Table 2. Most subjects with normal BMI perceived their weight to be neither underweight nor overweight, with approximately an equal proportion of males (46.5%, n=73) and females (45.9%, n=72). More males (31.2%, n=49) compared to females 24.2%, n=38) with normal BMI perceived themselves to be slightly underweight, while more females (14.0%, n=22) than males 7.0%, n=11) perceived themselves to be moderately underweight. About an equal numbers of males (14.6%, n=23) and females (15.3%, n=24) with normal BMI perceived themselves to be slightly overweight.

Among subjects in the overweight category of BMI, a higher percentage of females (54.5%) compared to males (48.0%) perceived themselves to be slightly overweight; however, more males (33.3%) than females (12.1%) perceived themselves to be moderately overweight. Also, more females (27.3%) than males (10.8%) in this category perceived themselves to be neither underweight nor overweight. None of the subjects who were underweight perceived themselves to be overweight.

Perception of Ideal Body Figure by Sex

Overall, more females preferred underweight as ideal figure (55.7%) than overweight (2.0%). On the other hand, more males preferred overweight as their ideal figure (30.7%) than being underweight (9.0%). However, more males (60.3 %, n=181) than females (42.3%) chose neither underweight nor overweight as their ideal figure (Table 3).

Body Shape Perception by Sex

The majority of the males (77.0%) were not worried about their body shapes, while a lower proportion of the females (47.7%) were not worried about their body shapes. More females (30.3%) were somewhat worried about their body shape compared to the males (16.7%). Also, more females (18.3%) were moderately worried about their body shape than males (5.7%). More females (3.7%) were extremely worried about their body shape than males (0.7%). The difference in BSQ scores between the sexes was statistically significant (χ^2=58.91, p<0.05).

Eating Attitude Test (EAT-26) by Sex

Table 5 presents the differences in EAT-26 scores and its indications by sex. The majority of the males (94.4%) and females (86.3%) had low concerns about body weight, body shape and eating. More females (13.7%) had very high concerns about body weight, body shape and eating than males (5.6%). The difference for the EAT-26 scores between females and males was statistically significant (χ^2= 8.05, p<0.05).

Gender Differences in Weight-loss Strategies

More females thought they should diet out of concern for their body shape. More females than males said they do go on a diet. More females than males had been worried about themselves and felt that they needed to exercise. Slightly more females had taken laxatives in order to feel thinner.

DISCUSSION

About half of the total 600 respondents had a normal BMI range with approximately

Table 2. Relationship between BMI and body weight perception by sex

Self-perceived body weight	*BMI*							
	Underweight n=118		*Normal n=314*		*Overweight n=168*		*Total n=600*	
	Female n (%)	*Male n (%)*	*Female n (%)*	*Male n (%)*	*Female n (%)*	*Male n (%)*	*Female n (%)*	Male *n (%)*
Extremely underweight	19 (24.6)	4 (9.8)	1 (0.64)	1 (0.64)	0	0	20 (6.7)	5 (1.7)
Moderately underweight	28 (36.3)	13 (31.7)	22 (14.0)	11 (7.0)	0	0	50 (16.7)	24 (8.0)
Slightly Underweight	22 (28.5)	17 (41.5)	38 (24.2)	49 (31.2)	0	0	60 (20.0)	66 (22.0)
Neither underweight nor overweight	8 (10.4)	7 (17.1)	72 (45.9)	73 (46.5)	18 (27.3)	11 (10.8)	98 (32.7)	91 (30.3)
Slightly overweight	0	0	24 (15.3)	23 (14.7)	36 (54.5)	49 (48.0)	58 (19.3)	72 (24.0)
Moderately overweight	0	0	0	3 (1.9)	8 (12.1)	34 (33.3)	8 (2.7)	37 (12.3)
Extremely overweight	0	0	0	0	4 (6.1)	8 (7.8)	4 (1.3)	8 (2.7)

R = 0.817, p<0.01

Table 3. Perception of ideal body figure by sex

	Ideal body figure						
	Extremely underweight	*Moderately underweight*	*Slightly underweight*	*Neither underweight nor overweight*	*Slightly overweight*	*Moderately overweight*	*Extremely overweight*
	←			*n (%)*			→
Female n= 300	4 (1.3)	47 (15.7)	116 (38.7)	127 (42.3)	4 (1.3)	2 (0.7)	0
Male n= 300	1 (0.3)	3 (1.0)	23 (7.7)	181 (60.3)	82 (27.3)	8 (2.7)	2 (0.7)

Table 4. Body shape perception by sex

Gender	*BSQ Class*			
	Not worried about body shape (≤80) n = 374 n (%)	*Slightly worried about body shape (81-100) n = 141 n (%)*	*Moderately worried about body shape(111-140) n = 72 n (%)*	*Extremely worried about body shape (>140) n = 13 n (%)*
Female(n=300)	143 (47.7)	91 (30.3)	55 (18.3)	11 (3.7)
Male(n=300)	231 (77.0)	50 (16.7)	17 (5.7)	2 (0.7)

Chi-square χ^2 = 58.91, df =3, p<0.05

Table 5. Eating Attitude Test (EAT-26) among the sexes

Gender	*EAT-26 Class*	
	Very high concerns about body weight, body shape and eating (≥ 20) n (%)	*Low concerns about body weight, body shape, and eating (< 20) n (%)*
Female(n=300)	41 (13.7)	259 (86.3)
Male(n=300)	20 (5.6)	280 (94.4)

Chi-square χ^2 = 8.05, df =1, p<0.05

equal proportions among the females (53.0%) and males (52.7%). Generally more females were underweight whereas more males were overweight. A high percentage of the subjects misperceived their body weight status. More than half of the males (53.5%) and females (54.1%) with normal BMI, placed themselves in the weight categories that were not in accordance with their actual BMI. About the same proportions of males and females with BMI in the normal range perceived themselves as underweight. The proportion of females with BMI in the normal range who perceived themselves as moderately underweight was twice that for the males. For both sexes, none in the underweight category perceived themselves as slightly overweight. None of the males who were in the underweight category saw themselves as being overweight. Meanwhile, more males who were underweight failed to see themselves as what they were, compared to the females. These finding differ from the studies by Veggi *et al.* (2004), Cheung *et al.* (2007), and Yan *et al.* (2009).

Overall, more females preferred to be slightly underweight as their ideal figure. This may be driven by media influences that portray thin figures as ideal for females. On the other hand, more males preferred their ideal figure to be somewhat overweight. The aspiration of choosing an ideal body shape which is well-built and muscular may have influenced the males to have negative perceptions towards their own body shape as they desire to be heavier in weight (Patricia & Arnold, 2002).

While the majority of the respondents, both males and females, said they had a low concern for body weight, body shape and

eating, more females than males expressed high concerns about their body weight and body shape. Such concerns may translate into unhealthy eating habits. While Edman & Yates (2004) showed no gender differences in disordered eating attitudes among Malaysian college students**,** Chin *et al* (2008) found body image to correlate with risk of eating disorders and self-esteem among Malaysian female adolescents. Indeed this study found some females reporting various weight reduction approaches including self-induced vomiting, taking of laxatives and exercise. A serious outcome of having distorted body images is anorexia, where it is known that anorexics detrimentally overestimate their own body size and shape (Gilbert, 2005).

CONCLUSION

Issues pertaining to body weight perception, eating attitudes and weight-loss strategies prevailed with significant differences between male and female undergraduates in Universiti Malaysia Sarawak. More in-depth studies should be done to identify socio-cultural factors that may influence weight perceptions among young adults.

ACKNOWLEDGEMENTS

We would like to acknowledge and thank Dr Chris Evans, Professor of Psychotherapy, Nottingham University and Melanie J. Taylor, for their permission and advice in using the Body Shape Questionnaire (BSQ) in this study. We would also like to express our sincere gratitude to Ms Tay Siow Peng, Madam Cheah Whye Lian, Ina Law, Dr. Helmy Hazmi and Dr Md Mizanur Rahman for their input in the research methodology and statistical analysis.

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