Validity and Reliability of the Multidimensional Body Image Scale in Malaysian University Students

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ABSTRACT

Introduction: This study aimed to evaluate the validity and reliability of the Multidimensional Body Image Scale (MBIS), a seven-factor, 62-item scale developed for Malaysian female adolescents. This scale was evaluated among male and female Malaysian university students. **Methods:** A total of 671 university students (52.2% women and 47.8% men) completed a self-administered questionnaire on MBIS, Eating Attitude Test-26, and Rosenberg Self-Esteem Scale. Their height and weight were measured. **Results:** Results in confirmatory factor analysis showed that the 62-item MBIS reported poor fit to the data, χ^2/df = 4.126, p < 0.001, CFI = 0.808, SRMR = 0.070, RMSEA = 0.068 (90% CI = 0.067, 0.070). After re-specification of the model, the model fit was improved with 46 items remaining, χ^2/df = 3.346, p < 0.001, CFI = 0.903, SRMR = 0.053, RMSEA = 0.059 (90% CI = 0.057, 0.061), and the model showed good fit to the data for men and women separately. This 46-item MBIS had good internal consistency in both men (Cronbach's alpha = 0.88) and women (Cronbach's alpha = 0.92). In terms of construct validity, it showed positive correlations with disordered eating and body weight status, but negative correlation with self-esteem. Also, this scale discriminated well between participants with and without disordered eating. **Conclusion:** The MBIS-46 demonstrated good reliability and validity for the evaluation of body image among university students. Further studies need to be conducted to confirm the validation results of the 46-item MBIS.

Keywords: Body image, construct validity, reliability, university students

INTRODUCTION

Emerging adulthood is the period from the late teens through the twenties, with the ages 18 to 25 being a key time span (Arnett, 2000). Within this group of emerging adults, young women are at particularly high risk of developing body image disturbance (Wardle, Haase & Steptoe, 2005). However, while many previous studies on body image focused on women, more and more recent studies have shown that men do experience body image disturbance as well (Bardone-Cone, Cass & Ford, 2008; McCabe & Ricciardelli, 2004). Young men are increasingly concerned about their appearance by desiring to have a more muscular body (Raevuori *et al.*, 2006). Young

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men want to gain weight while young women want to lose weight in their pursuit to achieve an ideal body shape (Shih & Kubo, 2002). In a study examining perception of body weight status, female students were more likely to perceive themselves as 'too fat' while male students were more likely to perceive themselves as 'too thin' at a normal body weight status (Mikolajczyk *et al.*, 2010). Therefore, it is important to examine body dissatisfaction among young men as well and not only focus on women.

Previous published studies in Malaysia focused more on adolescents (Khor *et al.*, 2009; Mellor *et al.*, 2009; Pon, Mirnalini & Mohd Nasir, 2004) but not on university students. A study by Khor *et al.* (2009) on 2050 Malaysian adolescents reported that 87% were concerned with their body shape. Another study by Pon *et al.* (2004) found that significantly more normal weight than overweight adolescent girls had incorrect perceptions on their current weight status. However, the situation of body image among university students is unknown. There is a limited body of knowledge on body image of Malaysians particularly of university students.

Body image is a multidimensional construct (Cash, 2005). Most research on body image lacks a comprehensive approach and defines body image based only on the study interest. Consequently, many body image scales were developed to measure only certain dimensions of body image but not its overall dimensions. Numerous body image scales with established validity and reliability have been used in studies on university students, including the Body Shape Questionnaire, the Body Satisfaction Scale, the Contour Drawing Rating Scale, the Multidimensional Body-Self Relations Questionnaire-Appearance Scales, the Body Change Inventory, and many more. It is uncertain whether these available scales developed to measure western populations are applicable to the Malaysian population given the different cultural background and different languages used between western and Asian countries.

Many researchers have translated and validated the scales developed in western populations for use within their local contexts. However, these translated scales may be insensitive and not appropriate for use in local contexts. Any of these scales used in Asian populations should be culturally adapted. In addition, cross-cultural differences may exist in which attitudes towards one's own body might be different across cultures (Swami & Chamorro-Premuzic, 2008). Hence, it is imperative to utilise a culturally sensitive and locally validated scale which can be more accurate in assessing the body image constructs of non-Western samples, compared to the Western developed scales (Swami, 2009). Developing a comprehensive scale to assess body image may reveal its multidimensional constructs as well as identify those who are potentially at risk of body image disturbance. Furthermore, a valid and reliable scale that measures body image disturbance among young adults is required to identify the approach to be used in future interventions to promote positive body image.

The Multidimensional Body Image Scale (MBIS) is a newly developed scale used to measure body image of adolescent girls (Chin *et al.*, 2008). This scale is the first body image scale developed for Malaysian female adolescents and it includes multidimensional factors of body image. This scale was developed based on multiple measures of body image which had been widely used to assess body image among Malaysians. The selected multiple scales were examined through factor analysis from which 62 items with seven subscales that measured preoccupation with thinness and dieting behaviour, appearance and body satisfaction, body importance, appearance importance, muscle increasing behaviour, extreme dieting behaviour, and perception of body size and shape were retained. These

seven factors accounted for 53.4% of the total variance explained in body image disturbance. The MBIS is reliable with a Cronbach's alpha coefficient of 0.93. The MBIS is valid and reliable for use among Malaysian female adolescents (Chin *et al.*, 2008).

Although the initial MBIS provided evidence on its reliability and validity in supporting its utility as a body image scale for female adolescents, several limitations need to be noted. There is no report on the psychometric properties of MBIS on adolescent boys as well as emerging adults. Moreover, only the convergent validity of the MBIS was tested in the previous study. Overall, the need for a valid and reliable scale to measure body image among Malaysians further substantiated the purpose of this study. This study aimed to examine the factor structure, internal consistency and construct validity of the MBIS in university students. Construct validity was assessed by testing several hypotheses. The MBIS and its subscale scores were hypothesised to have positive correlations with disordered eating and body weight status, while negative correlations were expected with self-esteem. Furthermore, it was hypothesised that the group with disordered eating would report higher body image disturbance as compared with the group without disordered eating.

METHODS

Study subjects

This cross-sectional study was conducted among university students. A multistage stratified random sampling method was used to select the participants. First, a list of universities in the Klang Valley was obtained from the Ministry of Higher Education, Malaysia. The Klang Valley was chosen because most of the universities in Malaysia are located within this area. Two universities were randomly selected from the list. Secondly, the sample from these universities was stratified based on their fields of study which were the arts, sciences, and technical fields. These three fields were based on the categorisation of the fields of study in a university by the Ministry of Higher Education, Malaysia. Within each field of study, one faculty was randomly selected. Lastly, all students in each selected faculty were invited to participate in this study.

A total of 671 university students (52.2% women and 47.8% men) ranging in age from 18 to 24 years (men: 20.5 ± 1.8 years, women: 20.6 ± 1.5 years), were recruited for the present study. Approximately 61.7% of the participants were Malay, 26.3% Chinese, 10.6% Indian, and 1.4% were of other ethnic groups. In terms of fields of study, 37.4% were from the arts, 28.0% from the sciences and the remaining 34.6% from technical fields. Body mass index (BMI) for men ranged from 14.84 and 39.34 kg/m² (22.64 ± 4.07 kg/m²), while for women, it ranged from 13.59 to 44.20 kg/m² (21.58 ± 4.05 kg/m²).

Measures

Demographic background

A Malay language self-administered questionnaire was used in this study. Demographic information including date of birth, age, ethnicity, sex, field of study, and academic year were self-reported. Weight and height of the participants were measured using the TANITA Digital Weighing Scale HD306 (TANITA Corporation, USA) and the SECA Body Tape Measure SE206 (SECA, Germany) respectively. BMI was calculated as weight (kilogram) divided by the square of the height (meter²).

Body image

Body image was assessed using the MBIS which contains 62 items loading on seven factors (Chin *et al.*, 2008). The first factor is termed as 'preoccupation with thinness and dieting behaviour', with 14 items assessing fear of weight gain, desire for thinness, and

food avoidance or restriction to lose weight. The second factor is termed as 'appearance and body satisfaction' (15 items), assessing evaluation of one's own appearance and other parts of the body. The third factor is labelled as 'body importance' (10 items), assessing the importance an individual places on body weight, muscle tone, body shape and other body parts in comparison with other things in life. The 'appearance importance' factor contains 6 items, assessing the importance of appearance for an individual. The 'muscle increasing behaviour' factor consists of 6 items on strategies to increase muscle size. The 'extreme dieting behaviour' factor measures the use of laxatives, attempts to vomit, vomiting, smoking, and use of slimming pills/products to lose weight. The last factor is 'perception of body size and shape' which assesses the perception of one's current and ideal body size and shape (6 items). All items were scored using a 5-point scale and scores for all items were summed up. A composite score in percentage for the MBIS was computed as follows:

$$\frac{\text{Total score of all seven dimensions}}{62 \times 5} \times 100\%$$

Higher scores indicate a higher risk of developing body image disturbance (Chin *et al.*, 2008).

Disordered eating

The Eating Attitudes Test-26 (EAT-26) is a 26-item scale used widely to assess 'eating disorder risk' based on attitudes, feelings, and behaviours related to eating and eating disorder symptoms (Garner *et al.*, 1982). It consists of three subscales which are dieting, bulimia and food preoccupation, and oral control, with each item rated from 1 (always) to 6 (never). Scale scores are the sum of all items in each subscale with possible scores ranging from 0 to 78. Participants who scored 20 or more were considered as at risk of disordered eating. The EAT-26 showed good internal consistency in our study (total

sample: Cronbach's alpha = 0.77, men: Cronbach's alpha = 0.78, women: Cronbach's alpha = 0.76).

Self-esteem

The Rosenberg Self-Esteem Scale (RSES) is a 10-item scale which is utilised to measure an individual's overall self-esteem (Rosenberg, 1965). For all items except items 2, 5, 6, 8, and 9, the responses are rated from 0 (strongly disagree) to 3 (strongly agree). Scoring for items 2, 5, 6, 8, and 9 was in the reverse manner. Scale scores were the sum of all items. The total score ranges from 0 to 30 with a higher score indicating a higher self-esteem of the person. The validated Malay version of RSES (Mohd Jamil, 2006) was used in this study. The Cronbach's alpha coefficients of RSES were 0.79 for total sample, 0.77 for men, and 0.81 for women in our study.

Procedures

Data collection was conducted from June to August 2009. The study protocol was approved by the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, and also by the Ministry of Higher Education, Malaysia. Approval letters to enter the selected universities were obtained prior to data collection. Participants were recruited in a variety of ways which included posting advertisements in the student club website and the faculty's notice boards, distributing leaflets, and making announcements during lecture time by the lecturers. Participation in this study was fully voluntary and no monetary reimbursement was made. Participants were given an information sheet explaining the purpose of the study and consent to participate was sought prior to the administration of the questionnaire.

Statistical analysis

A Confirmatory Factor Analysis (CFA) using maximum likelihood estimation method

was performed using SPSS AMOS 18.0 to replicate the multidimensional structure of the MBIS. We tested the seven factors structure hypothesised by Chin *et al.* (2008) which included 62 items of the MBIS. There were four sets of fit indices reported in the CFA analysis results, including the ratio of chi-square and degree of freedom (χ^2/df), comparative fit index (CFI), standardised root-mean square residual (SRMR), and root-mean square error of approximation (RMSEA) with its 90% Confidence Interval (CI). The cut-off values for each of the fit indices were χ^2/df < 5.0, CFI > 0.9, SRMR < 0.10, and RMSEA < 0.08, indicating the model has acceptable fit to the data (Hu & Bentler, 1999). The internal consistency reliability was then estimated by calculating the Cronbach's alpha coefficient and item-to-total correlation for each of the subscale scores as well as the total score. The Cronbach's alpha coefficient should be above 0.70 (Hair *et al.*, 2010) and the item-to-total correlation should be above 0.20 (Streiner & Norman, 2008). Construct validity was evaluated by examining correlations between the MBIS total score with subscale scores of disordered eating, self-esteem, and body weight status. The independent samples *t*-test was used to test for the differences in MBIS total and subscales scores between men and women. Furthermore, the independent samples *t*-test was used to evaluate the ability of the MBIS to discriminate between men and women in the groups at risk and not at risk of disordered eating. The IBM SPSS Statistics 19.0 (SPSS Inc., Chicago, IL, USA) was used for the above analyses. Statistical significance level was set at *p* < 0.05.

RESULTS

Confirmatory factor analysis

As shown in Table 1, the 62-item MBIS did not fit the data well: χ^2/df = 4.126, *p* < 0.001, CFI = 0.808, SRMR = 0.070, RMSEA = 0.068 (90% CI = 0.067, 0.070). The standardised factor loadings for the items onto their proposed subscales ranged from 0.006 to 0.951. A few items had weak loadings (< 0.70). All the items loaded significantly to their respective subscales except for one item in the perception of body size and shape subscale. Moreover, all the factors (i.e. the seven subscales of MBIS) were significantly correlated (*p*<0.001) in their expected directions. However, due to the unacceptable overall fit, a new modification of the model was needed. Re-specification of the model was needed by deleting the items from the model. Deleting the items from the model was found to be the best solution as it made the scale simpler and did not change the factor meaning (Hair *et al.*, 2010). Items with the lowest standardised factor loading were deleted one at a time.

The model fit was improved with 46 items remaining: χ^2/df = 3.346, *p* < 0.001, CFI = 0.903, SRMR = 0.053, RMSEA = 0.059 (90% CI = 0.057, 0.061). All the standardised

Table 1. Results of confirmatory factor analyses

Models	χ^2	df	χ^2/df	p-value	CFI	SRMR	RMSEA (90% CI)
MBIS-62							
Total sample	7459.3	1808	4.126	< 0.001	0.808	0.070	0.068 (0.067 – 0.070)
MBIS-46							
Total sample	3238.9	968	3.346	< 0.001	0.903	0.053	0.059 (0.057 – 0.061)
Men	2337.5	968	2.415	< 0.001	0.901	0.059	0.066 (0.063 – 0.070)
Women	1937.17	968	2.001	< 0.001	0.916	0.050	0.054 (0.050 – 0.057)

MBIS = Multidimensional Body Image Scale; df = degree of freedom; CFI = comparative fit index; SRMR = standardised root-mean square residual; RMSEA = root-mean square error of approximation; CI = confidence interval.

factor loadings of the items (> 0.70) were significant, indicating good convergent validity (Anderson & Gerbing, 1988). This new seven-factor model consisted of 46 items of the MBIS with 10 items in preoccupation with thinness and dieting behaviour subscale, 10 items in appearance and body satisfaction subscale, 9 items in body importance subscale, 6 items in muscle increasing behaviour subscale, 4 items in extreme dieting behaviour subscale, 4 items in appearance importance subscale, and 3 items in perception of body size and shape subscale. In addition, the model also showed good fit for men, $\chi^2/df = 2.415$, $p < 0.001$, CFI = 0.901, SRMR = 0.059, RMSEA = 0.066 (90% CI = 0.063, 0.070), and women, $\chi^2/df = 2.001$, $p < 0.001$, CFI = 0.916, SRMR = 0.050, RMSEA = 0.054 (90% CI = 0.050, 0.057).

Internal consistency

The reliability of the new 46-item MBIS for both men and women was acceptable. For men, the MBIS total score showed excellent internal consistency (Cronbach's alpha = 0.88), ranging from 0.84 to 0.95 for the seven subscale scores. For women, the MBIS total score also showed excellent internal consistency (Cronbach's alpha = 0.92) and the Cronbach's alpha coefficients for all the seven subscale scores ranged from 0.86 to 0.95. The ranges of item-to-total correlations were in the acceptable values ($r > 0.20$) for all the items in each subscale for both sexes. Overall, the Cronbach's alpha coefficient values of the 46-item MBIS were in the acceptable range for reliability for both sexes.

Construct validity

In order to examine construct validity of the MBIS, inter-correlations among the seven subscales and the correlations between body image disturbance and disordered eating, self-esteem, and body weight status were determined for both men and women. Table 2 shows the inter-correlations among the seven subscales of MBIS. The seven subscales

were inter-correlated but the strengths of the correlations were weak, indicating that each subscale measured a specific dimension of body image.

Table 3 shows the correlations between the MBIS and disordered eating, self-esteem, and body weight status which are known to correlate with body image disturbance for both sexes. The MBIS scores correlated positively with disordered eating in men ($r = 0.43$, $p < 0.01$) and women ($r = 0.43$, $p < 0.01$), indicating those who have body image disturbance were more likely to be at risk of disordered eating. Overall, both men and women who desired to be thinner, were involved in dieting behaviour, were dissatisfied with their appearance and body, placed greater importance on their body as compared to other things in their life, and desired to increase their muscle size, were more likely to be at risk of disordered eating. Furthermore, women, but not men, who placed greater importance on their appearance, practised extreme dieting behaviour and who perceived a smaller body size and shape, were more likely to be at risk of disordered eating compared to women who do not.

An inspection for relationships revealed that the MBIS scores correlated weakly and negatively with RSES scores among men ($r = -0.26$, $p < 0.01$) and women ($r = -0.21$, $p < 0.01$), indicating those with body image disturbance were more likely to have low self-esteem. Overall, results showed that university students who desired to be thinner, were involved in dieting behaviour, and were dissatisfied with their appearance and body were more likely to have low self-esteem compared to those who did not. Men who placed greater importance on their body, practised extreme dieting behaviour and engaged in strategies to increase their muscle size were also more likely to have low self-esteem. Conversely, women who perceived a bigger body size and shape were more likely to have low self-esteem. The MBIS total score and BMI correlated moderately

Table 2. Intercorrelations among the MBIS for men (below diagonal) and women (above diagonal)

MBIS subscales	F1	F2	F3	F4	F5	F6	F7
F1: Preoccupation with thinness and dieting behaviour	1	0.50**	0.25**	0.03	0.14**	0.20**	0.57**
F2: Appearance and body satisfaction	0.22**	1	0.16**	-0.04	-0.01	0.12*	0.51**
F3: Body importance	-0.03	-0.05	1	0.22**	0.18**	0.09	0.09
F4: Appearance importance	-0.13*	-0.15**	0.23**	1	0.05	-0.01	-0.09
F5: Muscle increasing behaviour	0.18**	-0.06	0.21**	0.10	1	0.22**	0.10
F6: Extreme dieting behaviour	0.09	0.01	-0.06	-0.06	0.17**	1	0.12*
F7: Perception of body size and shape	0.54**	0.13*	0.04	-0.11*	0.01	-0.04	1

MBIS = Multidimensional Body Image Scale
*$p < 0.05$; **$p < 0.01$

Table 3. Correlations between MBIS, EAT-26, RSES, and BMI for men and women

	EAT-26		RSES		BMI	
	Men	Women	Men	Women	Men	Women
F1: Preoccupation with thinness and dieting behaviour	0.27**	0.35**	-0.23**	-0.22**	0.73**	0.83**
F2: Appearance and body satisfaction	0.12*	0.31**	-0.36**	-0.25**	0.50**	0.70**
F3: Body importance	0.21**	0.19**	0.12*	-0.02	0.41**	0.55**
F4: Appearance importance	0.08	0.11*	0.20**	0.19**	0.11*	0.20**
F5: Muscle increasing behaviour	0.38**	0.20**	-0.12*	-0.10	0.49**	0.39**
F6: Extreme dieting behaviour	0.10	0.21**	-0.17**	-0.05	0.19**	0.31**
F7: Perception of body size and shape	0.09	0.18**	-0.02	-0.11*	0.47**	0.61**
Multidimensional Body Image Scale (MBIS)	0.43**	0.43**	-0.26**	-0.21**	0.42**	0.45**

EAT-26 = Eating Attitudes Test-26; RSES = Rosenberg Self-Esteem Scale; BMI = Body Mass Index
*$p < 0.05$; **$p < 0.01$

in both women ($r = 0.45$, $p < 0.001$) and men ($r = 0.42$, $p < 0.001$), indicating women and men who were having body image disturbance were more likely to have high body weight status.

As expected, women (59.38% ± 9.76%) showed significantly higher body image disturbance than men (56.44% ± 8.28%, $t = -4.21$, $p < 0.001$). Among the MBIS subscales, women scored higher on the subscales of preoccupation with thinness and dieting behaviour, appearance and body satisfaction, body importance, appearance importance, and perception of body size and shape, whereas men scored higher on the subscales of muscle increasing behaviour, and extreme dieting behaviour (Table 4).

Furthermore, differences in the MBIS subscale scores were investigated between participants with and without disordered eating in men and women separately for testing discriminant validity (Table 4). Results showed that the MBIS was able to discriminate between participants with and without disordered eating. As expected, participants with disordered eating showed significantly higher mean scores of MBIS as compared to participants without disordered eating. Among men, participants with disordered eating achieved significantly higher mean scores in the subscales of preoccupation with thinness and dieting behaviour, body importance, and muscle increasing behaviour. Among women, participants with disordered eating achieved significantly higher mean scores in all the MBIS subscales as expected, except for the appearance importance subscale.

DISCUSSION

The psychometric properties of the Multidimensional Body Image Scale (MBIS) were examined in a sample of male and female Malaysian university students. The 46-item MBIS in our study showed good factor structure, internal consistency and provided preliminary support for construct validity among university students. Thus, our study supports the utility of the 46-item MBIS in both men and women in order to assess their body image.

Our study extends the work of Chin *et al.* (2008) in several ways. First, the results of the CFA revealed modest support for the 62-item original model of the MBIS. Removal of 16 items improved the model. It showed that this seven-factor modified solution of the MBIS is the best fit model that has been verified for use among the sample of Malaysian university students. CFA confirmed the multidimensionality of body image. Second, our study highlighted the suitability and appropriateness of using MBIS as an assessment tool in measuring body image not only in female but also in male university students. Among young men, the MBIS not only supported its multidimensional factor structure and showed good internal consistency but also provided preliminary support for construct validity.

Although the MBIS is developed for adolescents girls, it can be used in men because it fulfilled the characteristics suggested by Cafri & Thompson (2004) in assessing male body image. They proposed three guidelines to assess male body image which were to evaluate muscular appearance, to include items related to muscularity in measurements of body appearance, and to include upper torso in items focusing on attitudes toward specific body parts. Three out of seven subscales in the MBIS, which are the subscales of appearance and body satisfaction, body importance, and muscle increasing behaviour, measure these characteristics. Our study is the first to evaluate the use of MBIS among young men in Malaysia. The findings of reliability and validity in the male students showed that MBIS can be used to assess body image among men. However, further studies are needed to further confirm the psychometric properties of the MBIS in a larger sample and in different male age groups.

Table 4. Means and standard deviations of the MBIS and its subscales for men (n = 321) and women (n = 350)

	Mean (SD)					
	Men			Women		
	EAT-26 < 20 (n = 277)	EAT-26 ≥ 20 (n = 44)	Total (n = 321)	EAT-26 < 20 (n = 266)	EAT-26 ≥ 20 (n = 84)	Total (n = 350)
F1: Preoccupation with thinness and dieting behaviour [a]***, [b]**, [c]***	44.85 (20.58)	54.73 (16.43)	46.21 (20.33)	55.35 (19.03)	69.76 (21.99)	58.81 (20.69)
F2: Appearance and body satisfaction [a]***, [c]***	57.25 (15.94)	60.68 (17.84)	57.72 (16.23)	59.11 (14.90)	69.33 (18.09)	61.57 (16.29)
F3: Body importance [a]**, [b]*, [c]**	74.69 (14.38)	80.91 (17.21)	75.54 (14.93)	77.46 (13.60)	83.02 (14.31)	78.79 (13.96)
F4: Appearance importance [a]**	74.35 (14.52)	75.35 (16.45)	74.50 (14.78)	77.18 (15.05)	80.00 (16.81)	77.86 (15.51)
F5: Muscle increasing behaviour [a]***, [b]***, [c]**	49.16 (18.98)	62.12 (18.10)	50.93 (19.36)	36.18 (16.92)	42.70 (20.00)	37.74 (17.90)
F6: Extreme dieting behaviour [c]*	23.38 (11.33)	26.49 (11.55)	23.82 (11.39)	21.88 (7.96)	25.36 (12.96)	22.71 (9.50)
F7: Perception of body size and shape [a]***, [c]**	58.94 (16.57)	62.73 (18.98)	59.46 (16.94)	61.75 (15.77)	67.78 (18.10)	63.20 (16.54)
Multidimensional Body Image Scale (MBIS) [a]***, [b]***, [c]***	55.56 (8.09)	61.99 (7.34)	56.44 (8.28)	57.40 (8.79)	65.63 (10.10)	59.38 (9.76)

EAT-26 = Eating Attitudes Test-26

*p < 0.05; **p < 0.01; ***p < 0.001

[a] Significant differences between sexes by t-test

[b] Significant differences between men with and without disordered eating by t-test

[c] Significant differences between women with and without disordered eating by t-test

The 46-item MBIS was generally well supported and showed good alpha scores in the seven subscales for both sexes, indicating that the MBIS is an internally reliable scale for the assessment of body image in a university student sample. Furthermore, our study provides preliminary support for construct validity of the MBIS in the university student sample. The seven subscales were inter-correlated but the strengths of the correlations were weak, indicating that each subscale measured a specific dimension of body image. The results of CFA and internal consistency reliability supported the multidimensionality of the MBIS. Furthermore, numerous recent cross-sectional and longitudinal studies found body image to be positively related to disordered eating (Ivezaj *et al.*, 2010; Yeh *et al.*, 2009). In addition, previous studies also revealed that body dissatisfaction has been found to be associated with low self-esteem (Green *et al.*, 2009; Mellor *et al.*, 2010). The present findings seem to be consistent with other studies which found that university students who were more likely to have body image disturbance were more likely to have low self-esteem and be at risk of disordered eating.

Specifically, women who were at risk of disordered eating tend to have the desire to be thinner and were involved in dieting behaviour. This finding is consistent with Eapen, Abdel Azim & Salem (2006) who found that high EAT scores were associated with the drive for thinness. The present study found that men who were at risk of disordered eating were more likely to engage in strategies to increase muscle size. McCreary & Sasse (2000) found that women tend to engage in dieting behaviour to lose weight, whereas, men were more likely to diet to gain muscle. University students who were dissatisfied with their appearance and body seemed to have low self-esteem.

Consistent with Cash *et al.* (2004), women revealed higher body image disturbance than men, and higher body image disturbance was associated with higher body weight status. A study by Mellor *et al.* (2010) also found that women had higher body image disturbance than men. On the other hand, men were more likely to engage in muscle increasing behaviours than women. These results are consistent with other studies (McCabe & Ricciardelli, 2004; Oehlhof *et al.*, 2009) and suggest that men desire a more muscular body.

With regard to MBIS's ability to discriminate between participants with and without disordered eating, the findings are in agreement with the hypothesis demonstrating that participants with disordered eating reported higher scores in most of the MBIS subscales. This finding is in agreement with a previous study which reported that male and female students with a high risk of disordered eating were more likely to have body dissatisfaction than students with low risk (Sepulveda, Carrobles & Gandarillas, 2008). A study among female university students in Taiwan also showed that students in the group of at risk of disordered eating reported higher scores in body dissatisfaction than students in the group without risk of disordered eating (Yeh *et al.*, 2009).

This study has several limitations. It relied solely on self-reports and thus bias in reporting may be introduced. Besides, self-selection bias may have affected the findings as well since the participants were volunteers. In addition, the findings may not be generalised to the whole population of university students in Malaysia. Moreover, the sample of this study consisted solely of university students. Thus, the results may not be extended to emerging adults who do not attend university. It is suggested that the psychometric properties of MBIS be tested on those who do not enter universities as well. The psychometric properties of MBIS could also be tested on other populations such as children, athletes, and patients with eating disorders. No test-retest reliability of the MBIS was conducted in our study.

Further research on test-retest reliability could be established to provide more evidence on its stability over time.

CONCLUSION

The 46-item MBIS demonstrated good factor structure, internal consistency, provided preliminary support for construct, and successfully differentiated between participants in the groups with and without disordered eating. It is a scale that could be used to measure body image among Malaysian university students. Since the MBIS is specifically developed and valid for the Malaysian population, the findings of this study are valuable to this particular population. A valid and reliable scale could enable the early detection of individuals at risk of body image disturbance. To date, the MBIS has only been validated with adolescent girls. Our study is the first to validate MBIS among university students. However, as this study only provides preliminary support for construct validity, more studies need to be conducted in order to further confirm the validity of the MBIS among university students.

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