

Weight Status, Body Image Perception and Physical Activity of Malay Female College Students in Kota Bharu, Kelantan, Malaysia

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Abstract

The purposes of this study were to determine the weight status, body image perception and physical activity among female college students in Kota Bharu, Kelantan. Body Mass Index (BMI) and waist circumference were the taken anthropometric measurements. To assess the body image dissatisfaction and physical activity patterns of college female students, figure rating scale and International Physical Activity Questionnaire (IPAQ) were used, respectively. Data collected were analysed using Statistical Package for Social Science (SPSS). A sample of 215 female college students aged between 18-25 years old completed the questionnaires. The prevalence of obesity and overweight recorded 6.0% and 15.8%, respectively. Meanwhile, 63.3% of the university female students were categorized as having normal weight. Furthermore, 12.6% of the female college students were found to be at risk of abdominal obesity. There was a significant correlation between body image dissatisfaction with BMI ($r=0.582$, $p<0.01$). Regarding physical activity, the result indicated that 53.0% of the female college students were categorized under low physical activity level. However, no significant correlation was found between BMI and physical activity. Altering body image perception and required moderate-intensity physical activity should be promoted within weight loss program among college female students.

Keywords: Weight Status; Body Image; Physical Activity; College Female Students

Introduction

In Malaysia the rate overweight and obesity as one of the non-communicable disease factors have had a shocking growth. In 2007, a national study on 16,127 Malaysian adults showed that the rate of obesity was 12.3% and it has grown three times the growth rate of 4.4% that has been reported in the concluding report of the National Health and Morbidity Study (NHMS) II in 1996 [1]. In Malaysia, the prevalent obesity rate for males is between 21.6% and 36.5% and females, while for females it is between 17.8% and 41.8%. These figures are far ahead when compared with those of other developed Asian nations like Japan and Singapore, where the prevalent rates range from 1.3% to 1.8% for males and 1.5% to 1.9% for females [2].

These data show that obesity related diseases such as cardiac and pulmonary circulation diseases (15.7%), cancer (10.6%), and cerebrovascular diseases (hypertension and stroke 8.5%) are responsible for more than one-third of the medically treated diseases in Malaysia [3]. Currently, overweight and obesity are considered as the main worries of the communities not only in Asian countries, but also in western countries because it involves the problem of the well-being on nations [4]. Ogden et al. [5] reported that based on the data from the National Health and Nutrition Examination Survey 1999-2004, nearly one-third of the adult population in the United States are obese. Meanwhile overweight is prevalent in two-thirds of them ($BMI \geq 25.0$ kg/m²).

The International Obesity Task Force (IOTF) reported that

it is estimated that 10.0% to 27.0% of males and 38.0% of the males in European countries are obese [6]. Therefore, the marked difference in the numbers between gender, shows that there is a bigger weight impact and a higher rate of obesity on females compared with on males [7]. In Malaysia, as a result of rapid socio-economic growth, the Malaysian lifestyle has changed within the past two decades. These changes have affected the Malaysian dietary habits and physical activities. For example, the dietary patterns of the majority of families has changed where they prefer to eat out, while busy managers skip meals, and young individuals are willing to miss breakfast, preferring to consume more kinds of fast foods. Moreover, adopting a more inactive lifestyle has become common among societies. There are more chances that women are taking available food in larger quantities as conventionally, they are involved in cooking for other family members [8].

Even then, nowadays, women are interested to eat out of home and to buy home-made foods from fast food centres, restaurants and food outlets for their households [9]. As a result of the change in dietary behaviours and wrong food intake among the community, the rate of obesity, therefore, are elevated along with other unwelcome disorders like cancers, cardiac disease and type II diabetes [10].

Body image perception is subjective and is based on how body size is perceived and how strongly it is affected by personal, familial, and cultural factors. Women have been reported to be more dissatisfied than men [10]. Weight status also affects individual's body image perception. BMI is significantly and negatively associated with satisfaction of current body shape, which mean individual with higher BMI are more dissatisfied than individual with lower BMI [11]. The assessment of body image perception in relation with weight status is important to understand the likelihood of an individual to engage in healthy behaviour.

Physical activity is one of the special factors that contribute to overweight and obesity because the level of physical activity has an impact on energy balance [12]. In Malaysia, sedentary lifestyle has been increasing due to a rapid industrialization and urbanization in the past several decades [13]. Based on a survey by NHMS II, doing regular physical activity was common among 11.6% of Malaysian adults [14], while it was higher among men compared to women (16.2% vs. 7.7%). However, only data on exercise reported by NHMS II, but not physical activity level and intensity. In addition, provided physical activity data by NHMS III survey using the International Physical Activity Questionnaire (IPAQ) [15] indicated that 43.0% of adults were not involved in physical activity, in which, 35.3% of males and 50.5% of females were classified as inactive [16]. Individuals who have higher leisure time physical activities, such as jogging, aerobics, and swimming, tend to have their BMI in a normal range [17]. Variations in physical activity have

also been observed in various age groups and geographical regions. With regard to the shift from adolescents into young adulthood, there is an important time for college students to have recognition in preventing of disease and health advancement [18]. However, nowadays, having a poor dietary habits is well documented among university students [19,20]. Therefore, understanding the factors that contribute to overweight and obesity is critical. However, in-depth studies on factors that contribute to the problem of overweight in college female students are scarce. Therefore, this study aims to examine two potential factors, namely the body image perception and physical activity, and their relationship with body weight status among college female students in Malaysia.

Materials and Methods

Recruitment of Subjects

This cross-sectional study was carried out on four multi-ethnic, residential academic centres, namely Universiti Sains Malaysia, Universiti Malaysia Kelantan, Kolej Kubang Kerian, and Kolej Poly-Tech Mara in Kota Bharu, all in the state of Kelantan. Inclusion criteria for this study included college female students aged between 18 and 25 years, who were physically healthy (able to walk or perform regular physical activity), and living on campus. While those who lived off campus, pregnant, and physically disabled were excluded.

Data Collection

Data collection was carried out from 15 July until 15 September, 2013. Data were collected through college-to-college visits. Face-to-face interviews were employed and the questionnaires consist of socio-demographic, physical activity questionnaire (IPAQ) [15] and contour drawing rating scale (CDFRS). After signing an informed consent form, the subjects were interviewed and their anthropometric measurements were taken.

Questionnaires

The socio-demographic questions (e.g., age, race, father's and mother's occupation, and education background) were administered in English to the subjects to obtain their background information. Body image perception was assessed using a modified version of contour drawing rating scale (CDFRS) comprising 9 line pictures of women's bodies, which were arranged and numbered from 1 = *smallest* to 9 = *largest* (Figure 1). This method has been reported to be reliable and valid for the evaluation of body image perception [21].

Based on the drawing, the subjects were required to choose the silhouette that represents their current and ideal body shape. A body dissatisfaction score was created by taking the absolute value of the difference between ideal body image and current

body image. The answers were given as a continuous variable, and a value closer to zero indicates a lower dissatisfaction [22].

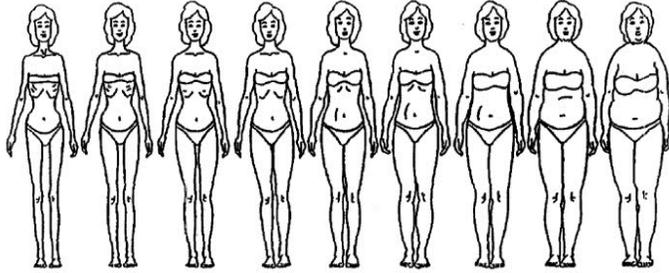


Figure 1. Modified contour drawing rating scale [23].

Physical activity pattern consists of 7 questions adapted from International Physical Activity Questionnaire (IPAQ) [15]. The reliability and validity of the instrument has been established in previous studies [24]. In this section, participants were required to recall the type, the frequency (days per week), and the duration (hours and minutes per day) of each activity they performed during the last seven days. The assessment was based on the intensity of physical activities classified as vigorous (e.g., aerobic walking, jogging, and running), moderate (e.g., brisk walking, general home exercises, recreational swimming) and just normal walking. The level of physical activities is categorized as low, moderate, and high based on metabolic energy (MET)-min per week (Table 1 & 2). MET for walking is 3.3, moderate activity is 4.0, and vigorous activity is 8.0 [15].

Table 1. Calculation of physical activity in MET-min per week

Description	Calculation (MET-min/week)
Walking	= 3.3 x walking minutes x walking days
Moderate	= 4.0 x moderate-intensity activity minutes x moderate days
Vigorous	= 8.0 x vigorous-intensity activity minutes x vigorous-intensity days
Total physical activity (MET-min/week)	= Sum of walking + moderate + vigorous MET -min/week

Guidelines for Data Processing and Analysis of IPAQ, 2005.

Table 2. Level of intensity of physical activity

Category	Criteria
Low	No activity is reported
Moderate	3 or more days of vigorous activity for at least 20 min per day, <i>OR</i> 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving at least 600 MET-min/week
High	Vigorous-intensity activity on at 3 days and accumulating at least 1500 MET-min/week, <i>OR</i> 7 or more days of any combination of walking, moderate or vigorous-intensity activities, accumulating at least 3000 MET-min/week

Guidelines for Data Processing and Analysis of IPAQ, 2005.

2.4 Anthropometric and Body Composition Measurements

Respondents' body weight was measured using TANITA body composition analyzer model TBF-306 (Japan). It was taken to the nearest 0.1kg after removing shoes, pockets, and was wearing light clothing. The height measured using portable SECA body meter Model 213, Germany. Height meters set against the wall, by ensuring of subject's accurate posture before reading the fixed marker. The precision of this instrument is up to 0.05 centimeter. BMI (kg/m^2) was calculated by dividing weight (kg) by the height squared (m^2). Classification of BMI is based on guidelines released by WHO [25]. Waist circumference was measured in triplicate by using standard measuring tape to determine the abdominal obesity. The narrowest point below the ribs or half way between the lowest rib and iliac crest were measured [26]. The classification of waist circumference was based on World Health Organization/International Association. For the study of Obesity/International Obesity Task Force classification of Asian ($\leq 90\text{cm}$ for men and $\geq 80\text{ cm}$ for women) are at risk for abdominal obesity [27].

Data Analysis

Data for this study were analysed using Statistical Package for the Social Sciences (SPSS) version 22.0. Means and standard deviations were used to present the descriptive statistics. Pearson's correlation and Spearman's rank correlation coefficient were used to study the correlation between two variables. Differences were considered significant at $p < 0.05$.

Results

The group of 215 college female students who participated in this study had a mean age of 19.7 years, with a mean BMI and waist circumference of 22.8 cm and 68.7 cm, respectively (Table 3). According to the BMI calculations, 14.9% of the subjects were underweight ($< 18.5\text{ kg}/\text{m}^2$), 63.3% of subjects were in normal weight ($18.5\text{-}24.9\text{ kg}/\text{m}^2$), 15.8% were considered as overweight ($25.0\text{-}29.9\text{ kg}/\text{m}^2$), and 6.0% of the subjects were considered as obese ($\geq 30.0\text{ kg}/\text{m}^2$) (Figure 2). To access abdominal obesity, waist circumference was measured. Figure 3 indicates that 12.6% of subjects were at risk of abdominal obesity ($\geq 80\text{ cm}$).

Table 3. Subjects' socio-demographic and anthropometry data

Variable	Mean \pm SD
Age in years	19.7 \pm 1.08
Weight (kg)	53.8 \pm 11.7
Height (cm)	155.7 \pm 6.0
Body Mass Index (kg/m^2)	22.8 \pm 4.5
Waist circumference (cm)	68.7 \pm 8.9

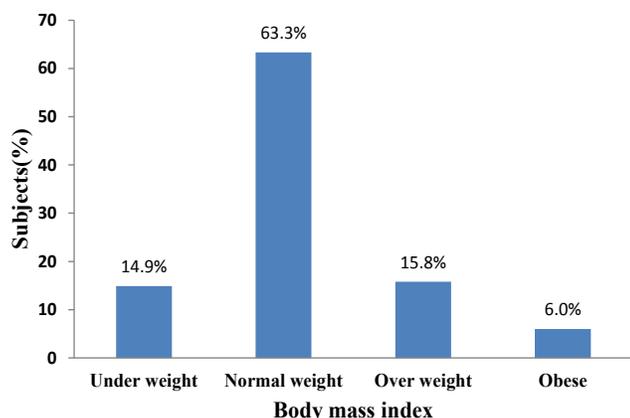


Figure 2. The body weight status of subjects according to BMI.

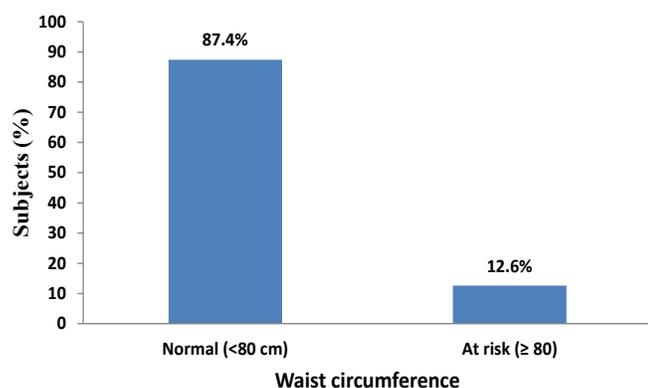


Figure 3. Abdominal obesity risk according to waist circumference.

Table 4 shows that 76.6% of the female college students were dissatisfied with their bodies. The majority of dissatisfied subjects ($n = 96$) were categorized in normal body weight (BMI = 18.5-24.9 kg/m^2). Next in the level of those who were dissatisfied, were students in the overweight category (BMI = 25.0-29.9 kg/m^2) and followed by those in the underweight category (< 18.5 kg/m^2).

Table 4: body image perception among college female students (N=215).

Body image feeling	BMI				Total
	<18.5 UW	≥30.0 Obese	18.5-24.9 NW	25.0-29.9 OW	
Dissatisfied	24	13	96	32	165
Satisfied	8	0	40	2	50
Total	32	13	136	34	215

UW= underweight; NW=normal weight; OW= overweight

Body image dissatisfaction score was assessed by calculating the absolute value of discrepancy score between the ideal and current body images. The average of body image discrepancy score reported was 1.1 ± 1.3 . Regarding perception of body

image dissatisfaction, 66.5% of subjects revealed their desire to be thinner, while 9.7% desired to be fatter. Based on the data obtained, 40.4% of female participants who were in the normal weight group have overestimated their body size. However, the body discrepancy for majority of them ($n = 45$) was in score 1, implying a minimum level of overestimation. As for the overweight and obese groups, this discrepancy scores were higher, in which 6.4% of overweight subjects selected a score of 2, while 2.7% of obese subjects selected a score of 3, respectively. A negative discrepancy score was selected by participants who were in underweight and normal weight groups. Out of 13 underweight subjects, 10 (4.6%) of them wished to be bigger, while out of 12 normal weight subjects, 6 (2.7%) of them wished to be bigger by choosing larger ideal body image perception than their current body image perception. The results also showed that body dissatisfaction score increases with BMI ($r = 0.592, p < 0.01$) (Table 5).

Table 5. Body image discrepancy scores of subjects according to their body weight status (N=215).

Body image discrepancy	BMI				Total
	<18.5 UW	≥30.0 Obese	18.5-24.9 NW	25.0-29.9 OW	
-3.00	1	0	0	0	1
-2.00	2	0	2	0	4
-1.00	10	0	6	0	16
.00	8	0	41	2	51
1.00	8	1	45	6	60
2.00	1	4	34	13	52
3.00	1	6	8	9	24
4.00	1	1	0	3	5
5.00	0	1	0	1	2
Total	32	13	136	34	215

UW= underweight; NW=normal weight; OW= overweight

Table 6 presents the average MET-min per week of walking, moderate- and vigorous-intensity, and total physical activity. In the table, physical activity was divided based on low, moderate, and high categorization. The results showed that weekly metabolic equivalence for walking was in the highest level with mean value of 419.9 ($SD = 307.1$). Meanwhile, vigorous and moderate intensities were in the second and third place in terms of weekly energy cost with mean values of 208.0 ($SD = 357.0$) and 104.0 ($SD = 178.5$), respectively. The result showed that 7.5% of the subjects were categorized as highly active, and the majority of the subjects were categorized as lowly active (53.0%) and moderately active (39.5%) (Table 7). Based on the findings, no significant relationship was found between BMI and total physical activity reported ($r = 0.052, p > 0.05$).

Table 6. Average MET-min per week of walking, moderate and vigorous intensity physical activity (N=215).

Description	MET-min per week (Mean ± SD)
Walking	420.0±307.1
Moderate intensity	104.0±178.5
Vigorous intensity	208.0±357.0
Total physical activity	692.2±507.0

Table 7. Percentage of physical activity level among subjects (N=215).

Level of physical activity	Percentage
Low	53.0
Moderate	39.5
High	7.5

Discussion

In this study, the prevalence of overweight was 16.0%, and obesity was 6.0%. The prevalence of overweight and obesity among college female students was higher than reported in a previous study, which reported the phenomena among college female students in Kota Bharu [28]. The majority of female college students in the present study were in normal weight (63.0%) and the problem of underweight was lower in the present study compared with the figures reported in the previous study by Siti [28]. This may due to the small sample size and the study age group was until age 25. Besides, majority of the study population was in the first semester of first academic year, and college environment may not have influenced their dietary behaviour and life style yet. For example, over consumption of readily available high calorie foods may contribute to the college environment, particularly for those students who live on campus and purchase a meal plan [29,30].

However, in the current study, lower risk of some diseases owing to obesity may confirmed by the data on waist circumference, which indicated that only 12.6% of the female college students were at the high risk of abdominal obesity. Risk of metabolic complications was shown to increase among women with waist circumference ≥ 80 cm [31]. The result was almost similar to the measurement values reported by Gan (2011), who indicated that 12.3% of Malaysians female college students were at risk of abdominal obesity. In terms of body size perception, body discrepancy of majority of normal weight group was shown to be at a minimum level of overestimation (score = 1). However, overestimation among normal weight group showed a higher score compared with other BMI classifications. In fact, this group with a normal weight perceived themselves as heavy based on their selections of current and ideal body image. Considering this overestimation in normal weight females, there could be unhealthy trends to begin unnecessary weight reduction activities. This may turn normal weight people who are already in the lower end of the normal weight range to be underweight. College female students were

more likely to select a thinner body size for their ideal image than their current body image. This finding supports that females are more likely to select thinner body figure as the ideal body image, which has been consistently reported [32].

College female students in this population of the current study perceived their current and ideal image differently compared with women from African-American, who tend to select larger body size to represent their current and ideal body image. Therefore, African-American women select an ideal body image larger than their current body image [33]. This will be shown in greater scores in body image discrepancy of overweight and obese females. Hence, it could be speculated that because of large body, these girls were under pressure from their families and friends since childhood days to reduce their body size. Therefore, because of this unfair treatment they received, they figured an image of themselves as being even larger [34].

In the present study, a few of the underweight ($n = 13$) and normal weight ($n = 8$) females wanted to increase their weight. These findings are in line with those of other authors who found a tendency among underweight male and female adolescents to put on weight after having a perception of their body image [35]. In a study done in Pakistani on dissatisfied individuals, 54.4% of respondents perceived their selves as too thin and they desired to gain weight [36]. Further analysis was carried out on body dissatisfaction among college female students. Body dissatisfaction was found to increase with BMI. This finding supported the results of previous studies which showed that BMI influences dissatisfaction on body image, and that it is the strongest positive predictor of body dissatisfaction [11].

Body dissatisfaction is significantly related to the standards on how a woman places herself, regardless of her actual body size [37]. Furthermore, a woman who views herself from an ideal size, the more likely that she will build body dissatisfaction [38]. Therefore, body dissatisfaction is not simply the result of a person's weight [38]. This could explain the reason why normal weight individuals also experience body dissatisfaction. Low self-esteem can cause some degree of body dissatisfaction. Thus, improving self-esteem through physical activity is confirmed. Therefore, it is expected that college female students, who are dissatisfied of their body image are more likely to be motivated to involve themselves in physical activities.

The result of this study has shown that the majority of participants were involved in low level of physical activity such as walking. Based on self-reported IPAQ questionnaire, the mean value of walking was higher compared with vigorous and moderate physical activities. Therefore, with respect to the so many areas in the campus equipped sport facilities, but not used by college students for their leisure time physical activity such as

jogging, playing tennis, biking, the issue is still arguable. In the present outcomes, 53.0% of the participants were involved in the low activity category and 39.5% of participants were in the moderate physical activity, while those involved in vigorous physical activity were about 7.5% only. Montasser et al. [39] using IPAQ, reported almost the same results when they found that 9.8% of college students in Egypt were vigorously active. In line with the present study, a cross-sectional study was conducted on Malaysian university students for over six months has shown that more than half of participants were physically inactive [40]. Therefore, it can be concluded practicing an insufficiently healthy lifestyle can be considered as the main reason that made university students to be physically inactive. Therefore this study recommends that the authorities need to establish courses in healthy lifestyles to increase knowledge in preventing diseases among university students.

Some studies have shown that Asian female college students seem to be more inactive. For example, in a study by Yoh et al. [41], the average physical activity performed by Asian female students has been approximated to be only 1.3 hours per week, which is less than those performed by female college students from North America, Europe, South America, and Africa whose average hours of physical activities are 3.3, 2.3, 2.2, and 2.1 hours per week. In other words, the only half (52.0%) of the recommended amount of moderate-to-vigorous physical activity was fulfilled by Asian women to obtain considerable health benefits (> 2.5 hours per week). Thus, overall, they were considered in the least active group [42].

Downs and Ashton [43] revealed that the rate of adequate amounts of vigorous physical activity (VPA) among students has experienced a downturn from 77.6% - 81.3% to 64.8% - 67.2% throughout their college time. This declining trend in VPA may be a result of the higher encouragement in sports participation during their high school study. However, negative effects of cognitive demands and social pressure on ability of college students to maintain a reliable exercise programme is still well recognized [43].

In contrast, Razak et al., [44] who compared Malaysian and Libyan college students in terms of physical activities revealed a higher mean average of vigorous time spent in exercising among Malaysian students. The authors believed that Malaysian students are more active because there are many stadiums and sport areas in the country. These facilities, therefore, motivate them to get themselves involved in more physical activities. Meanwhile, Libyan participants are more interested to spend more time in activities which are linked to walking because in Libya, Farming Is The Region's Predominant Agricultural Activities That Encourages Them To Do More Walking Activities [44].

Conclusion

Despite the low prevalence of overweight and obesity among college students in the present study, a high rate of body image dissatisfaction with vigorous intensity physical activity have been reported among college female students. Therefore, there is room for the health authorities and health-care professionals to promote healthy living and weight status in this particular group of population as the negative effects of distorted body image can cause unhealthy eating habits in the future. Altering body image perception and required moderate-intensity physical activities should be promoted within weight loss programmes among college female students.

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