

ORIGINAL ARTICLE

BODY COMPOSITION AND NUTRITIONAL HABITS AMONG FIRST YEAR MEDICAL STUDENTS IN A MALAYSIAN PUBLIC UNIVERSITY

Narimah AHH¹, Adlina S¹ & Hakimi ZA²

¹ Faculty of Medicine, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

² Faculty of Medicine, MAHSA College, Millenium Court, Jalan Elmu, Off Jalan Universiti, 59100 Kuala Lumpur, Malaysia

ABSTRACT

Various studies have reported that excess body weight may increase the risk to various diseases and death. A study reported that adolescents who were overweight were almost 18 times more likely than their leaner peers to be obese in early adulthood and were 8.5 times more likely to have hypertension as young adults. Therefore, this study was conducted to determine the body composition and four dietary factors i.e., prudent diet habits, calorie control habits, dietary fat/cholesterol and sodium/salt control which may affect blood pressure and the risk of heart disease among year 1 medical students in a public university in Selangor. Body composition was determined by measuring the body mass index (BMI) and body fat percentage. None of the female students showed excellent/good eating habits while majority were fair (37.7%) and poor/very poor (62.3%). Nearly half of the male students showed excellent/good eating habits (42.5%), but more than half (57.5%) were poor/very poor. Majority of the female (85.7%, 85.7% and 94.8% respectively) and male students (80.9%, 57.5% and 93.6% respectively) showed excellent/good eating habits in calorie, dietary fat and salt control. Majority of the students (64.9% female and 61.7% male) have normal BMI values while 24.7% of female and 10.6% of male students were underweight (BMI values less than 18.5). Only a small number of female students were overweight (5.2%) and obese (5.2%). However 14.9% of male students were overweight and another 12.8% were obese.

Key words: body composition, nutritional habits, medical students

INTRODUCTION

The National Institutes of Health (NIH) and the World Health Organization (WHO) used body weight guidelines for the identification, evaluation and management of overweight and obesity among adults. Values of body weight adjusted for height is referred to as Body Mass Index (BMI in kg/m²). BMI values of: < 18.5 are considered as underweight, 18.5 to 24.9 as normal, 25.0 to 29.9 as overweight and 30 as obese^{1,2}. The main assumption of BMI guidelines is that body mass adjusted for stature squared, is closely associated with body fatness and consequent morbidity and mortality^{3,5}. The percentage of body fat identified the health fitness and high physical fitness category for individuals who wish to do moderate to vigorous physical activity without undue fatigue. For a 19 year-old male, percentage of body fat of 12 is considered as excellent, 12.1 to 17.0 as good, 17.1 to 22.0 as moderate, 22.1 to 27.0 as overweight and > 27.1 as obese. For a 19 year-old female, percentage of body fat of 17 is considered as excellent, 17.1 to 22.0 as good, 22.1 to 27.0 as moderate, 27.1 to 32.0 as overweight and > 32.1 as obese. Therefore, the recommended health-fitness standard for a 19 year-old male and female is ≤ 22.0 and ≤ 27.0 respectively. The high physical fitness for him would be between 12% and 17% and for her between 17% and 22%⁶.

The increase in body fat mass in most obese persons correspond mainly an increase in the size of fat cells, although the number

of fat cells may also increase in people with childhood onset obesity^{7,8}. The specific distribution of excess fat can influence the relationship between obesity and cardiac disease. Excess abdominal adipose tissue, particularly visceral fat was associated with impaired ventricular function and increased coronary heart disease^{7,9,10}. Weight loss decrease both systolic and diastolic blood pressure in a dose-dependent manner and generally is associated with improvement in blood pressure^{11,12}. Modest weight loss in obese persons can improve diastolic function and affect the entire cluster of coronary heart disease risk factors⁷.

On the other hand, malnutrition is a major risk factor contributing to the high prevalence of bacterial and parasitic diseases in developing countries^{13,14}. It was the direct cause of about 300 000 deaths per year and was indirectly responsible for about 53% of all deaths in young children¹⁵.

A healthy diet is critical to (i) maintain health by preventing loss of muscle strength, bone mass, and vitamin deficiency states, (ii) prevent diseases such as heart attacks, strokes, obesity, osteoporosis, and certain cancers, and (iii) help control and/or treat diseases such as high blood pressure, diabetes mellitus, and celiac disease¹⁶.

This study was conducted to assess the body composition, prudent diet habits referring to general nutritional balance, calorie control habits pertaining to weight loss and gain, dietary

fat/cholesterol referring to habits that affect cholesterol in the diet and sodium/salt control which may affect the risk of blood pressure and heart disease among the first year medical students in a public university in Selangor, Malaysia.

METHODOLOGY

A cross-sectional study was conducted at a public university in Selangor to assess the body composition, prudent diet, calorie control, dietary fat/cholesterol, sodium/salt control and eating habits among 124 first year medical students (universal sampling). All year 1 medical students present during the nutritional practical session in Gastrointestinal System and Clinical Nutrition Modules were taken as samples. The structured questionnaire used in this study was compiled from questionnaires used in published papers¹³ and the modified version of Los Angeles Trade-Tech College, California, USA¹⁷. The assessment of the body mass index (BMI) was conducted by measuring the weight (kg) and height (m) while the percentage of body fat was determined by measuring the midarm circumference (cm) and triceps skinfold thickness (cm). The data regarding the prudent diet, calorie control, dietary fat/cholesterol control, sodium/salt control and eating habits were scored as excellent (6-8 points), good (9-12 points), fair (13-16 points), poor (17-20 points) and very poor (21-24 points) to evaluate the nutritional habits among the students. The data collected were analyzed using SPSS version 13.0. The results are presented in form of graph and tables.

RESULTS

Socio Demographic Data

A total of 77 (60.0%) female and 47 (36.7%) male year 1 medical students participated in this study. They were between the aged of 18 to 19 years old.

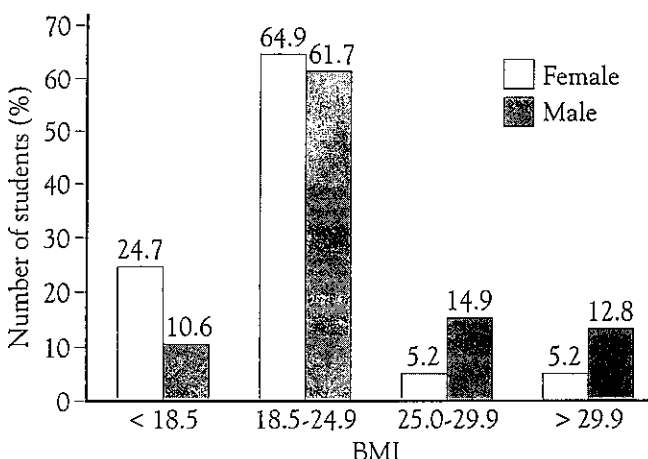


Fig 1. Students' body mass index (BMI) in the female and male.

Figure 1 shows the students' body mass index (BMI). Majority (64.9% female and 61.7% male) have normal BMI values in the range of 18.5 to 24.9. A quarter of the female (24.7%) and 10.6% of male students were underweight (BMI values less than 18.5). Only a small number of female students were overweight (5.2%) and obese (5.2%). However 14.9% of male students were overweight and another 12.8% were obese. The Chi square test for BMI among the female and male students was 6.02 ($p < 0.05$), therefore there was a significant difference in the BMI among them (Fig 1).

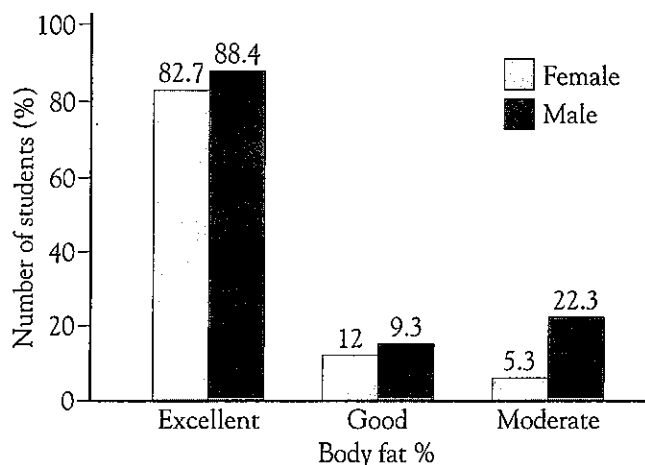


Fig 2. Students' body fat percentage in the female and male.

Fig 2 shows the students' body fat percentage. The recommended health-fitness standard for a 19 year-old male and female is ≤ 22.0 and ≤ 27.0 respectively while the high physical fitness would be in the range of 12% to 17% and 17% to 22% respectively⁶. However it is important to remember that 3% essential fat for men and 12% for women seem to be the lowest limits in order to maintain good health. Body fat below these percentages can result in the serious impairment of normal physiological function¹⁸. Majority of the students (82.7% female and 78.7% male) have excellent body fat percentage, one tenth (12% and 9.3% respectively) were categorized as good while the others (5.3% and 2.3% respectively) have moderate body fat percentage. All the students were categorized as individuals who were fit to do moderate physical activities without undue fatigue. The Chi square test for body fat percentage among the female and male students was 1.18 ($p < 0.5$). Therefore, there was no significant difference in the body composition according to fat percentage among them.

Table 1-4 show the students' nutritional assessments involving four key dietary factors i.e., prudent diet habits referring to general nutritional balance, calorie control habits pertaining to weight loss and gain, dietary fat/cholesterol referring to habits that affect cholesterol in the diet and sodium/salt control which may affects blood pressure. The student's who scored 6-8 points were categorized as excellent, 9-12 points as good, 13-16 points as fair, 17-20 points as poor and 21-24 points as very poor in the above dietary factors. Interestingly, none of the female students showed excellent/good eating habits,

Table 1. Prudent diet assessment

Prudent diet	Female		Male		Total
	Frequency	%	Frequency	%	
Excellent/Good	0	0	20	42.5	20
Fair	29	37.7	0	0	29
Poor/very poor	48	62.3	27	57.5	75
Total	77	100	47	100	124

Table 2. Calorie control assessment

Calorie control	Female		Male		Total
	Frequency	%	Frequency	%	
Excellent/Good	66	85.7	38	80.9	104
Fair	11	14.3	8	17	19
Poor/very poor	0	0	1	2.1	1
Total	77	100	47	100	124

Table 3. Dietary fat assessment

Dietary fat	Female		Male		Total
	Frequency	%	Frequency	%	
Excellent/Good	66	85.7	27	57.5	93
Fair	9	11.7	18	38.3	27
Poor/very poor	2	2.6	2	4.2	4
Total	77	100	47	100	124

Table 4. Salt control

Salt control	Female		Male		Total
	Frequency	%	Frequency	%	
Excellent/Good	73	94.8	44	93.6	117
Fair	4	5.2	3	6.4	7
Poor/very poor	0	0	0	0	0
Total	77	100	47	100	124

37.7% were fair while majority (62.3%) were poor/very poor. On the other hand, nearly half of the male students (42.5%) showed excellent/good eating habits, however more than half (57.5%) were poor/very poor. Majority of the students (85.7% female and 80.9% male) showed excellent/good calorie control habits pertaining to weight loss and gain, while 14.3% of the female and 17% of the male students showed fair calorie control habits. Only 2.1% of the male students were poor. In the dietary fat/cholesterol assessment factor referring to habits that affect cholesterol in the diet, majority (85.7% female and 57.5% male) were excellent/good, while 11.7% of the female and 38.3% of the male students were fair. Only a small number of students had poor dietary fat control (2.6% female and 4.2% male). In the sodium/salt control, almost all (84.8% female and 93.6% male) and a small number (5.2% female and 6.4% male) were fair.

The Chi square test for prudent diet and dietary fat assessments between the female and male students were 36.78 ($p < 0.001$) and 13.42 ($p < 0.005$) respectively. Therefore, there was a significant difference in the prudent diet and dietary fat among them (Table 1 and 3). For calorie and salt control

between the two groups, the Chi square test were 1.80 ($p < 0.5$) and 0.06 ($p > 0.5$) respectively. Therefore, there was no significant difference in the calorie and salt control among them (Table 2 and 4).

DISCUSSION

In this study, we assessed the body composition of our respondents based on body mass index (BMI) and body fat percentage. Majority (64.9% female and 61.7% male) have normal BMI values, while 10.4% and 27.7% were overweight/obese respectively. In a study by George Bertias *et al.*¹⁹ on 989 third year medical students, it was found that 40% of men and 23% of women had BMI greater than 25 kg/m². This study on first year medical students found 27.7% men and 10.4% women had BMI greater than 25 kg/m² and the difference was significant. Our study also found that 24.7% of women and 10.6% of men were underweight. This study also found that none of the female students had excellent/good eating habits while majority were poor/very poor (62.3%) and only 37.7% were fair. Interestingly, nearly half of the male students showed excellent/good eating habits (42.5%), however more than half (57.5%) were poor/very poor. In a published report by Jennifer L. Sears, she states that first year medical students are beginning the transition into feeding for themselves and eating healthy becomes a difficult task in the high stress environment. Another explanation for poor diet could be that the available dietary options are sometimes poor in a college campus²⁰.

CONCLUSION

In conclusion, this study found that majority of the first year medical students is of normal BMI but have poor dietary habits. Further study has to be conducted to find out if this finding is similar to other first year university students. This is because a healthy diet is a vital determinant in the amount of energy a student will have for studying and their level of focus throughout the day.

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