Nutrition & Food Science

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Comparison of nutritional status of university students of two Asian countries

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Abstract

Purpose – The purpose of this paper is to compare energy and macro-nutrients intake in university hostel students in two countries of Asia.

Design/methodology/approach – Female students from the hostels of International Islamic University, Malaysia (IIUM), Kuantan Campus and NWFP, Agricultural University Peshawar, Pakistan were assessed for energy and macro-nutrients intake. A total of 140 students were registered who volunteered to participate in this study. The age range of the registered students was 22-26 years. On the day of the registration, age, height and weight were recorded; also, food frequency questionnaires (FFQs) were provided. The participants were asked to record alternately for three days whatever they ate during the prescribed week. Out of 140 students 139 returned the FFQs. From the anthropometry, the BMI was used to assess the under, ideal, over-weight and obese students. From the FFQs, energy and nutrient intakes were calculated using the food composition tables for Malaysia and Pakistan and compared with the recommended nutrients intakes (RNIs).

Findings – The body weight for the required height among the Malaysian students was lower by 7.81 per cent than the reference value, whereas the body weight of Pakistani students matched to the reference weight for height. The Malaysian students were 28.0, 61.0, 5.5 and 0.9 per cent under, ideal, over-weight and obese, respectively, whereas Pakistani students were 100 per cent in the category of ideal-body weight. The total energy consumption was higher among Malaysian students by 9.93 per cent compared to the reference requirements, whereas the Pakistani students claimed to meet the requirements. In terms of nutrients balancing the Malaysian students were having the ideal combination of the macro-nutrients and it was within the recommended range of 55-60, 15-20 and 25-30 per cent for carbohydrates, protein and fat, respectively; whereas the balancing of the macro-nutrients was poor among the Pakistani students and met the energy requirements at the expense of fat consumption.

Originality/value – The paper suggests that there is imbalance in macro-nutrients intake among the students.

Keywords Malaysia, Pakistan, Universities, Students, Women, Nutrition, Diet

Paper type Research paper

Nutrition & Food Science
Vol. 42 No. 5, 2012
pp. 332-338

0034-6659
DOI 10.1108/00346651211266845

The authors would like to acknowledge the students of the International Islamic University Malaysia (IIUM) Kuantan Campus and Agricultural University, Peshawar-Pakistan.

Introduction

Nutritional status assessment is an important determinant for the well being of individuals and age groups and communities as well. Nutritional status t can be assessed from bodily measurements or anthropometry, blood metabolites, food or meal intakes, food frequency questionnaires (FFQs) and many more. All these methods of assessment nutritional status are equally important but used in different situations. The university students nutritional status have been measured using different approaches for example 24-hours recall or 24-hours menu, meal intakes and frequency of meals (Wyka and Zechałko-Czajkowska, 2007; Skibniewska *et al.*, 2007; Marjan *et al.*, 1999), FFQs (Chiplonkar *et al.*, 1993; Williams, 1999), macronutrients analysis through software (Šatalić *et al.*, 2007; Tengvall and Ellegard, 2007; Sanlier and Unusan, 2007) food records and composite sample method (Khattak and Khan, 2008; Marjan *et al.*, 1999; Peterson *et al.*, 2007). The question is why the university students have been the subjects of various research papers? Perhaps the reason is that the university students in hostel develop faulty food habits (Skibniewska *et al.*, 2007; Khattak and Khan, 2008; Wyka and Zechałko-Czajkowska, 2006; Chiplonkar *et al.*, 1993). These faulty foods habits have been reported to be associated with lower or imbalance nutrients (Skibniewska *et al.*, 2007). Furthermore, this may be associated unnecessarily with higher or lower intake of nutrients intakes in the university students' in particular male have higher energy and protein intake (Wyka and Zechałko-Czajkowska, 2006; Šatalić *et al.*, 2007). This kind of trend is observed in both sexes (Khattak *et al.*, 2002). Therefore, the present study designed to asses and compare nutritional status of Malaysian and Pakistani female students and the assessment was performed through anthropometry and, energy and macronutrients intakes.

Methodology

In total 140 female students were registered from the female hostel of the International Islamic University, Malaysia (IIUM), Kuantan Campus and Agricultural University-Peshawar-Pakistan for the assessment and comparison of nutritional status. A total of 140 students (age range 22-26 years) were registered who volunteered to participate in this study. On the day of the registration, age, height and weight were recorded; also, FFQs were provided. The participants were asked to record alternately for three days whatever they ate during the prescribed week. The questionnaires provided were collected back from the students at end of the week. Out of 140 students 139 returned the FFQs and one of the students failed to return therefore excluded from the study. From the body weight and heights of the students the Body Mass Index (BMI) was determined according to the formula; weight in kgs/(height in meters)^2. From the anthropometry, the BMI was used to assess the under, ideal, over-weight and obese students (Jelliffe, 1996). From the FFQs, macronutrients (carbohydrates, fats and protein) intakes were calculated using the food composition tables for Malaysia and Pakistan (Tee *et al.*, 1997; Hussain, 1985) and compared with the recommended nutrients intakes (RNIs). The energy values were determined by multiplying the mean daily recorded protein, carbohydrates and fats with 4, 4 and 9, respectively (Williams, 1999; Goplan *et al.*, 1981). The anthropometric and dietary intakes were compared with the international norms namely American Dietetic Association (ADA, 1996a, b) World Health Organization and Food and Agriculture Organization (WHO, 1985, 1990, 1995; FAO, 1985, 2001) and Health Welfare Canada

Nutrition Recommendation (HWCNR, 1990). Based on ADA, the reference energy of the Malaysian and Pakistani students was determined by multiplying the mean body weights (kgs) by 40 Kcal/day, the reference protein of the students was determined by multiplying the mean body weights (kgs) by 0.8 g/kg body weight/d (ADA, 1996a, b). According to the WHO/FAO, the reference energy and protein requirements of the students were determined from the reference values for Asian population for the given weight. The protein energy requirement was 1,753 Kcal/d and 45.0 g/d, respectively (WHO, 1985, 1990, 1995; FAO, 1985, 2001). Similarly, based on the HWCNR, the energy contribution of macronutrients was determined and the reference values of protein, carbohydrates and fats were taken as 15, 55 and 30 g/d, respectively (HWCNR, 1990). The means were compared for the various parameters with the aforementioned norms as appropriate. Descriptive statistics was performed for various comparisons using a statistical package MINITAB (release 8.2) Inc., State College, USA.

Results

The results of the study are provided in Tables I-V in comparison to the reference values for all the parameters observed. The body weight for the required height among the Malaysian students was lower by 7.81 per cent than the reference value whereas the body weight of Pakistani students matched to the reference weight for height (Table I).

Table I.
Comparison of anthropometry of university students of two Asian countries

Country	Body weight (kgs)	Reference weight (kgs)	Per cent increase (↑) or (↓) decrease over reference
Malaysian students	50.7 ± 7.46	55	↓ 7.81
Pakistani students	54 ± 5.91	54	0

Table II.
Comparison of BMI of university students of two Asian countries

Description	BMI range	Country: Malaysia ($n = 110$/%)	Country: Pakistan ($n = 29$/%)
Under weight	< 18.5	31(28)	0
Ideal weight	18.5-24.9	72(61)	29(100)
Over-weight	25.0-29.9	6(5.5)	0
Obese	> 30.0	1(0.9)	0

Table III.
Comparison of protein intakes of university students of two Asian countries

Country	Reference	Protein intake (g)	Per cent increase (↑) or (↓) decrease over required energy
WHO/FAO			
Malaysian students	53	61 ± 26	(↑) 15.68
Pakistani students	53	51 ± 7.0	(↓) −3.77
ADA			
Malaysian students	41	61 ± 26	(↑) 48.8
Pakistani students	42.8	51 ± 7.0	(↑) 21.4

As mentioned earlier, BMI was used for the classification under, ideal, over-weight and obese. It was observed that among the Malaysian students 28, 61, 5.5 and 0.9 per cent were under, ideal, over-weight and obese, respectively, whereas Pakistani students were 100 per cent in the category of ideal-body weight (Table II).

Based on WHO/FAO recommendations protein consumption among the Malaysian students was higher by 16 per cent whereas it was lower among the Pakistani students by 3.77 per cent. When the protein consumption was assessed according to ADA recommendations (i.e. 0.8 g/kg body weight/d) both the countries Malaysia and Pakistan had higher intakes by 48.8 and 21.4 per cent, respectively (Table III).

Similarly, based on WHO/FAO recommendations the total energy consumption was higher among Malaysian students by 9.93 per cent compared to the reference requirements whereas the Pakistani students claimed to meet the requirements. When the energy consumption was assessed according to ADA recommendations (i.e. 40 Kcal/kg body weight/d) both the countries Malaysia and Pakistan had lower intakes by 3.65 and 18.84 per cent, respectively (Table IV).

In terms of nutrients balancing the Malaysian students were having the ideal combination of the macronutrients and it was within the recommended range of 55-60, 15-20 and 25-30 per cent for carbohydrates, protein and fat, respectively; whereas the balancing of the macronutrients was poor among the Pakistani students and mostly met the requirements at the expense of fat consumption (Table V).

Discussion

There have been numerous studies on the assessment of nutritional status of university students. Studies conducted on university student report the existence of malnutrition in the hostel students. The available research reports attribute the existence of malnutrition to various factors. However, whatever the cause and factors are, the large number of research reports indicates and signify the problems of malnutrition among

Table IV. Comparison of macronutrients intakes of university students of two Asian countries

Country	Energy required (Kcal)	Energy intake (Kcal)	Per cent increase (↑) or (↓) decrease over required energy
WHO/FAO			
Malaysian students	1,753	1,927 ± 228	(↑) 9.93
Pakistani students	1,753	1,753 ± 127	0.0
ADA			
Malaysian students	2,000	1,927 ± 228	(↓) 3.65
Pakistani students	2,160	1,753 ± 127	(↓) 18.84

Table V. Comparison of macronutrients intakes of university students of two Asian countries

Country	CHO intake (g)	Protein intake (g)	Fat intake (g)	Per cent contribution of macronutrients CHO	Protein	Fat
Malaysian students	206 ± 55	61 ± 26	62 ± 7.3	56 ± 9.8	15 ± 4.3	29 ± 7.2
Pakistani students	212 ± 118	51 ± 7.0	80 ± 11	48 ± 3.5	12 ± 1.4	40 ± 3.4

the students around the world. Most of the studies, report lower or higher intake of energy, imbalance of macronutrients, i.e. protein, carbohydrate and fats and obviously the micronutrients, i.e. minerals and vitamins. These imbalances happen as a result of faulty food habits that the students develop in hostels. These faulty food habits include the choices of food being less dense in energy and nutrients. As mentioned earlier, the present study conducted on the female students residing in the hostels of two universities in different countries, i.e. Malaysia and Pakistan were assessed and compared for the adequacy of energy and macronutrients with the available norms. In the present study, based on comparison with WHO reference protein for the given age group the consumption of protein was higher in Malaysian and lower in Pakistani students. However, when compared to the ADA recommendation (0.8 g protein/kg body weight/day) the intake in both countries was higher than the reference protein for the given body weight. Other studies, conducted on the university students have also indicated higher intakes of protein among university students. Previously, it was observed that Pakistani male and female students residing in the university hostels male had lower female had the required intakes compared respective age group reference (Khattak and Khan, 2008; Khattak *et al.*, 2002). However, this is not always the case in most studies the amount of protein intake is much higher than the reference intakes (Khattak and Khan, 2008). This is still not known for Malaysian students and this is first paper considering the energy and macronutrients intakes. There have been studies on adult nutrition status and in students on the validation of methods, i.e. 24-hour recalls and weighed record method (Marjan *et al.*, 1999; Mirnalini *et al.*, 2008). The reported results mentioned earlier (Marjan *et al.*, 1999), if compared with the current study and the reference intakes their reported intakes are much lower both from current study and the reference intakes for the said age group. The present study clearly indicates that, the total energy consumption was higher among Malaysian students by 9.93 per cent compared to the reference requirements whereas the Pakistani students claimed to meet the requirements. In terms of nutrients balancing the Malaysian students were having the ideal combination of the macronutrients and it was within the recommended range of 55-60, 15-20 and 25-30 per cent for carbohydrates, protein and fat, respectively; whereas the balancing of the macronutrients was poor among the Pakistani students and meet the energy requirements at the expense of fat consumption.

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