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Energy and Nutrient Intake and Food Diets among Iranian University Students

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ABSTRACT

The increased prevalence of overweight in Iranian students has stimulated interest in their lifestyle behaviours. The purpose of this research was to investigate dietary intake and food behaviours of Iranian students. Males and females from grades 20 to 24 were recruited from a stratified random selection of university from Iran. Food consumption of 40 male students in Ramin University, Iran was recorded for 7 days. Foods most frequently consumed were selected for analysis of nutrients content. The mean daily intakes of energy, protein, carbohydrate and fat among the students are 1769 kcal, 56, 258 and 57 g, respectively. This diet contributed 17.97 mg Fe, 12.37 mg Ca and 14.4 mg P day^{-1} which were lower than the WHO, FAO, Health and Welfare Canada Nutrition Recommendation, USA and Iranian RDAs. The main sources of these minerals in the student's diet were rice, rice products, meat and animal products. This study indicated concern regarding the low intake of the essential vitamins and minerals on long term basis among the students. It is proposed that the students should eat fruits, vegetables and dairy products in their diets.

Key words: Students diets, essential nutrients, nutritional values

INTRODUCTION

There has been a remarkable expansion in the knowledge of the significance of minerals and vitamins and the effect of its absence on human health. Reilly (1985) reported that the metal content of food was generally related to metal in immediate contact with food that is the cooking utensils and the domestic water supply. Proper nutrition is important in improving the community health in general and of the risk groups in particular. Balance nutrition can protect against many diseases/disorders resulting from nutrient deficiencies or excess (WHO, 1983). The consumption of more sugar and fat (particularly saturated fat) is associated with the development of diabetes (Jenkins *et al*., 1978) and heart diseases, respectively (Gurr, 1984). The minerals and vitamins deficiencies result in many biochemical and physiological defects. It is just possible that minerals and vitamins may have role in the utilization of the major nutrients (protein, carbohydrates and fats). The knowledge of the nutritional status of a community is important for proper planning in the health sector. Nutritional status of an individual's is determined by anthropometric measurements, comparison of nutrient intakes with reference values or by biochemical investigations of nutrients related parameters. The anthropometric measurements and comparison of nutrient intakes with reference values are easy and noninvasive, economical and sufficiently reliable method for the determination of nutritional status (McMahan and Bistrain, 1991).

According to some recommendation, the combination of the macro-nutrient should be in such a way that protein, carbohydrate and fat provide 15, 55 and 30% energy, respectively of the total body required energy (Health and Welfare Canada, 1990). Food provides not only essential nutrients needed for life but also other bioactive compounds for health promotion and disease prevention (Liu, 2003). Fruits and vegetables are essential part of balanced diet. Fruits and vegetables contribute a healthy diet. People are becoming obese by using empty caloric foods. By this study the researchers wanted to find out the daily intake of fruits and vegetables in the universities students. By sharing the information we can promote the good eating habits and healthy life style. The major objective of this study was to find out the students balanced diet depends upon seven food groups. Each and every food groups have its own importance and recommended servings. By this study we informed the servings are required of fruits and vegetables in daily diet. Eating 3-5 servings of colorful fruits and vegetables a day was important because deeply hued fruits and vegetables provide the wide range of vitamins, minerals, fiber and phytochemicals which body needs to maintain good health (Khalid *et al.*, 2011). Non-communicable diseases such as obesity, diabetes and cardiovascular disorders have been traditionally associated with developed countries. However, in recent decades the prevalence of these diseases and their antecedent risk factors has rapidly increased in developing countries. These changes are caused to a large extent by dietary changes in relation to socio-economic and living environmental conditions (Afoakwah and Owusu, 2011).

The research done by Aktas *et al.* (2009), revealed that there is significant different between the educational level of the university graduated students and the criteria they concern while purchasing like package, brand, contents, production date, expiry date, nutritional value and healthfulness. However, this study shows that expiry date was the higher factors when buying food product among students followed by taste, ingredient, price, nutrient content and lastly was packaging (21.6%). This may because of the students more aware about the safety of the food compared to taste and price which may not healthy and costly. It can see that nutrient content of the food not the higher factors during buying.

But according to Onay *et al.* (2011) stated that those customers with lower educational levels were found to display more conscious consumer attitudes during food purchasing decision.

But another research done by Ahmadi *et al.* (2009), Al-Numair (2004) and Ozcelik *et al.* (2007) found that physicians do not have enough knowledge about nutrition and thus they need more education in nutrition to facilitate them during using nutritional information.

Hidayah and Syahrul Bariah (2011) showed higher prevalence on the risk of developing eating disorder and very concern about their physical appearance, body figure and it will reflects how they control with food intake and continuously affects their eating habits.

The present study was designed to assess the nutritional status of the students of Ramin University in Iran and comparing nutrients contents in diet with the acceptable daily intake (ADI) established by world standard diets.

MATERIALS AND METHODS

Subjects: This study involved 40 Iranian male students aged between 20-24 years staying in University where there were cooking facilities. Hence all these students took most of their meals in the cafeteria.

Methods: The students were given a briefing on the objectives of the study. They were requested to keep a one week dietary intake record that is recording all foods consumed for that duration.

Table 1: Food samples selected for analysis

No.	Sample	No.	Sample
1	Cooked white rice	13	Lentil
2	Macaroni - noodle made from flour	14	Fresh milk
3	Cheese	15	Fried fish (Iranian Mackerel)
4	Cooked egg	16	Fried chicken.
5	Fried sausages	17	Chicken fried in soy sauce
6	Cooked potato	18	Chicken soup
7	Bread	19	Fried calf meat
8	Yoghurt	20	Fried vegetables
9	Pea	21	Fried cabbage
10	Cooked tomato	22	Bread
11	Cooked bulb	23	Crackers
12	Cooked bean	24	Tea

Sincerity and accuracy of keeping records was stressed. The subjects were asked to estimate the foods they eat based on household measures, serving size and cost of the food. The weight of food estimated was validated by purchasing the foods from the same place the subjects bought their foods and actually weighing them. From the dietary record, intake of major nutrients such as energy, protein, carbohydrate and fat were calculated based on Nutrient Composition of Iranian Foods (Tee *et al*., 1988). Frequency of intake were listed and samples were purchased for minerals analysis based on foods consumed more than three times per week. Table 1 lists the 24 food samples selected for analysis. The food samples were not duplicate diets consumed by the students. However these foods were served at the cafeteria daily by the same contractor. These were foods available to the student groups for as long as they are staying at the dormitory. Moreover, the one week food intake record provides accurate enough information on the types of foods selected and consumed daily. A few food samples were purchased at a time based on what was available in the cafeteria. Each food samples were bought on three separate occasions. Precautions were taken to avoid environmental contamination. A duplicate 5 g homogenized samples of each food were dried at 100°C to constant weight. The dried samples were then ashed in porcelain crucibles at 525 °C in a muffle furnace for 24 h or until a white ash was obtained. The ash was dissolved in concentrated HCl and analyzed using atomic absorption spectrophotometer Pye Unicom Model 5P9 (AOAC, 1984). The results were used to calculate trace element intake from daily diets selected by the students instead of using results from the nutrient composition of Iranian foods which do not contain values for Zn, Ca and P.

Statistical analysis: Results are presented as Mean±SD and range. Contribution of minerals from different sources is given as percentage of total daily intake.

RESULTS AND DISCUSSION

The mean daily intake of major nutrients and percentage contribution of protein, fat and carbohydrate to energy intake are shown in Table 2. Energy intake among the students ranges from (860-2180 kcal) with a mean of (1769 kcal). Percentage of students with intake lower than RDA for energy is 90% and protein is 2%. Contribution of protein, fat and carbohydrate to energy is 15, 27 and 58%, respectively. Intakes of Fe, P and Ca from the daily diet are presented in Table 3. Mean intake of Fe, Ca and P are lower than RDA. Rice, rice dishes, noodles, fish and meat

Table 2: Mean daily intake of major nutrients among the students (n = 40)

Nutrients	Mean±SD	Range	Percentage contribution to calorie
Energy (kcal)	1769±330	860-2180	–
Protein (g)	56±19	31-88	15
Fat (g)	57±12	20-65	27
Carbohydrates (g)	258±55	105-340	58

Table 3: Intake of iron, calcium and phosphorus in from diet

Nutrients	Mean±SD	Range	RDA*
Iron (mg day $^{-1}$)	17.97±6.3	12-31	28
Calcium (mg day^{-1})	12.37±3.8	400-800	1000
Phosphorus (mg day $^{-1}$)	14.4±4.1	400-800	1000

*RDA USA (National research council (NRC), 1989)

Table 4: Main sources of iron in the student diet

	Amount per person per day of Fe daily intake	
Food	mg day^{-1}	%
Rice	5.5	28.1
Dishes, noodles fish	3.4	17.3
Sea-foods meat	3.8	19.4
Vegetables	2.6	13.3
Drinks	2.5	12.7
Others	1.8	09.2
Total	19.6	100.0

are the main source of these minerals (Table 4). About 28%, of daily intake of Fe comes from rice and noodles, meat and sea foods.

The mean daily energy intake of the 40 male students studied was lower than RDA. The values range from 860-2180 kcal with 90% of the subjects taking energy below RDA (Table 2). Other studies in Iran have reported similar findings (Zawiah *et al*., 1990). The ratio of 15, 27, 58% contribution to energy from protein, fat and carbohydrate, respectively is in accordance with the healthy diet guidelines. Several studies have shown protein intake to be adequate or higher than recommended. In the present study only two percent of the subjects showed protein Intake lower than RDA. This study did not differentiate contribution of protein intake from animal and plant sources. Intake of Ca were lower than the RDA for both trace minerals (Table 3). Fe intake showed a wide range of 12-31 mg day^{-1} with a mean of 17.97 mg day^{-1}. Previous study on students reported a lower average intake of 15.5±2.5 mg day^{-1} (Zawiah *et al*., 1990). Other studies have reported values between 13.7 -18.7 mg day^{-1} in pregnant women and diabetic patients (Arshad, 1984; Zawiah *et al*., 1990; Norimah and Abu Bakar, 1993). Meanwhile, mean intake for Ca is lower than the range provided for RDA. From the results obtained the amount of P from the diet is not acceptable from the nutritional point of view. A study on trace elements in total diets in The Netherlands reported Fe and Ca to be on the low side of the recommendation. In the case of Fe, the amount consumed can be considered adequate when compared to the USA recommended intake (NRC, 1989). The highest percentage of Fe intake were provided by rice and noodles dishes followed by fish and meat dishes despite having higher content of Fe (Table 4). This is due to the larger amounts of rice and noodles being consumed as compared to the meat or fish dishes. For instance up to 300 g of rice was consumed per day. It was reported that the main source of Fe in

the UK diet was cereal and meat which provide 4.4 mg person^{-1} day^{-1} or 39% of the daily intake and 2.7 mg person^{-1}day^{-1}, respectively (Ministry of Agriculture, Fisheries and Food, 1980). With reference to the present study with a mean protein intake of 56 g, it can be seen that Zn status in the students maybe low using protein evidence of 1 mg Zn for 10 g protein in diet, assuming 1/2 - 2/3 protein comes from animal source.

CONCLUSION

In conclusion, the energy intakes among male students are lower than recommended. Protein in the diets however exceed the recommendation and the percentage contribution of energy from protein, fat and carbohydrate is desirable. However intake of essential trace elements such as Fe and Ca from the selected diets should be of concern if similar diet selection is to be practiced over a long period. One recommendation is to educate the students to enable them to make a wiser selection of foods available in the cafeteria.

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