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THE NUTRITIONAL AND HEALTH PROFILE OF THE WEIGHTLIFTING TEAM'S STUDENTS AT THE ELEMENTARY SCHOOL: A PILOT STUDY

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Abstract

Purpose In this study, the effects of one-month nutrition education programme on the nutrition knowledge level were determined. For this reason, nutrition habits, food consumption, anthropometric measures and biochemical findings of the weightlifting team's students who were studying at the elementary school, were assessed.

Methods Ten male weightlifting team's students (between ages 11-15) who were studying at an elementary school in Ankara province participated in this study. The students' body composition analysis (Tanita BC-418) had been taken with some biochemical measures (complete blood count, urine tests), also knowledge about nutrition habits were collected through questionnaires and nutritional status were evaluated (≤ 3 bad; 4-7 medium, ≥ 8 good) by the application of healthy eating index (KIDMED). Total energy, macro and micro nutrient consumption were evaluated by taking three days food consumption records and analyzing the nutrition knowledge programme (BEBIS). Changes in the level of nutrition knowledge were evaluated before and after the education programme by using nutrition knowledge test which consisted of 40 questions. The statistical evaluation of all obtained data was made with SPSS 15.0 statistical package programme, kruskal wallis, mann-whitney U testing, kikare tests were made by taking the mean and standard deviation values.

Results: The students' age, body height, body weight, body mass index (BMI), body fat percentage, body fat weight and body fat free weight averages were found respectively; 13.1±1.3 years, 1.52±0.1 m, 51.4±13.0 kg, 22.0±3.5 kg/m^2, 20.9%±4.6, 10.8±3.8 kg, 40.6±10.1 kg. It was identified that eight students' body weight were more than their competition weight (1.9±0.7 kg), two students' body weight were lower than their competition weight (1.7±0.7 kg). Also it was identified that their sport ages were 2.0±0.7 years, frequency of training was 5.8±0.4 days per week, 2.7±0.5 hours per day. All of the students reported that they did not receive any nutrition education before, their mothers were responsible from their diets at home and their coaches were responsible during training. According to evaluation of healthy eating index, 30% of students diet quality was poor, 50% of them were medium quality, 20% of them were good, and also it was identified, that the nutrition knowledge increased 58% as a result of the nutrition knowledge test evaluation which was made at the beginning (pre-test) and (last test) end of the education program. There were no significant relationship between the KIDMED values and fat percentages (x^2;2.56, $p>0.05$) and BMI values (x^2;1.14, $p>0.05$). Two students' hemoglobin values were determined as low, and as a result of the urine tests it was decided by physician, that the detailed kidney function analysis should be done for these two students. There were no significant relationship between the hemoglobin values and iron consumption ($p>0.05$). The daily energy, protein, carbohydrate and fat consumption averages of the students whose ages were between 11 and 13 were respectively; 1578.7±404.4 kcal, 1.3±0.2 g/kg (16%±2), 4.7±1.7 g/kg (53.3%±9.6), 1.1±0.5 g/kg (30.6%±10.5). However, the averages of the students whose ages were between 14 and 15 were respectively, 1832.7±319.9 kcal, 1.0±0.3 g/kg (14.5%±1), 4.1±1.7 g/kg (51.2%±6.7), and 1.1±0.4 g/kg (34.2%±6.0). Also it was determined that all the students did not consume calcium, potassium, folic acid and fiber sufficiently. There were no significant relationship between the students' energy, macro, and micro nutrient intake, and energy distribution percentages with KIDMED values ($p>0.05$).

Conclusions: In the end of this study, it was reported that all of the students did not consume energy, some macro and micro nutrient sufficiently although they did active sports. It was concluded that nutrition education program increased the level of nutrition knowledge but education needed to be done more frequently and consistently.

Key words: Weightlifting, nutrition, health

Introduction

As the World Health Organization (WHO) defines, adolescence is a special period that comprises the group at 10-19 ages in which quickest growth and development and developing from a child into an adult occur (E. Demirezen et al., 2005; E. Geçkil et al., 2004).In this period, adolescences are in a search of identity. They struggle to be independent and get accepted by the society. They are very interested in their appearance. They don't have regular meals, instead of this they prefer to consume fast food outside. These are their typical characteristics. These characteristics are usually influenced by the factors like friends, family and the media. (H. Demir, 2008; E. Demirezen et al., 2005). With an adequate and balanced nutrition, the expected growth and development of the children and adolescents are provided, and also their resistances against the diseases

increase, and increases in their cognitive abilities and school performances occur besides their bone and physical ability developments (E. Demirezen et al., 2005; G. Ersoy, 2006).

An increase is seen in the energy need of the adolescents who play sports as parallel to the sport played. However, it is not easy to determine the daily energy need because there are great personal differences among the adolescents. Especially the quick increase in growth speed and energy need is an important factor. The adolescent's age, height, weight, sex, body composition, intensity and duration of the physical exercise are important factors affecting their daily energy need (S.A.Yildiz, 2004).

Weightlifting is one of the most difficult sport activates and it is being known as a power sport, different from many branches of sport. It needs short time activity depending on power. Because of energy need and aims of exercise is different from endurance sports. For a successful weightlifting performance, a suitable nutrition is necessary (energy, macro, micro nutrients and adequate fluid intake) suitable physiology profile, power of muscle, endurance and flexibility of muscle (A.C. Fry et al., 2006).

In this study, the nutrition knowledge levels of the students, who were in growth period adolescent, do a sport branch like weightlifting that needed much energy and power, were determined. The health profiles of these students and the effects of one-month nutrition programme to the nutrition knowledge levels were also determined.

Method

Ten male weightlifting team's students (between ages 11-15) who were studying at the elementary school in Ankara province participated in this study. Nutrition questionare and anthropometric measures of students were analyzed by the dietician.

Measuring of height had been done with nonflexible plastic meter whose wideness and length were 1.5 cm and 150 cm, respectively. The students' body composition analysis (body weight, fat percentage, fat free mass) had been measured by digital scale balance (TANITA BC-418 Body Fat Monitor) to the nearest 100 g. Subjects were measured without shoes and wearing light-weight clothes. Students' BMI (Body Mass Index-kg/m^2) values had been calculated and they had been compared with standard BMI data of the same year groups (G. Figan et al., 2002).

After nearly 12 hours hunger student's blood had been taken by laboratory health employees and their blood (hemoglobin, hematocrit, MCH, MCV, and MCHC) and urea evaluations had been examined.

Three days food consumption records were taken to determine food consumption status of the students. Energy and nutrients were calculated by using "Nutrition Knowledge System (BEBIS)" programme after calculating the portion amounts of the eaten meals. The status of the nutrients to meet their requirements was evaluated by comparison with standard values (Dietary Reference Intakes- DRI) (P. Insel et al., 2004).

A questionnaire of 16 questions including personal characteristics in the technique of face off interview, nutrition applications, nutrition habits, healthy eating index (Mediterranean Diet Quality Index) (KIDMED) had been filled by the participants. According to the points obtained from the application of the healthy eating index (KIDMED), it is evaluated that point $\geq$8 corresponded to optimal diet quality, between 4-7 was medium quality, and a value of $\leq$3 was very low (L.S. Majem et al., 2003). Changes in the level of nutrition knowledge were evaluated before and after the education programmes by using nutrition knowledge test which consisted of 40 questions.

The statistical evaluation of all obtained data was made with SPPS 15.0 statistical package programme, kruskal wallis, mann-whitney U testing, kikare tests were made by taking the mean and standard deviation values.

Results and discussion

Student's ages and sport ages averages were determined as 13.1±1.3 and 2.0±0.7 years, respectively. Also exercise days and hours were found as 5.8±0.4 days/week and 2.7±0.5 hours/days, respectively. Their body height, body weight, body mass index, and body fat percentage averages were 1.52±0.1 m, 51.4±13.0, 22.0±3.5 kg/m^2, 20.9%±4.6, respectively (Table 1). According to the BMI classification, the rate of the students were divided into three main categories; underweight (10%), normal body weight (10%) and overweight groups (80%), respectively. In a different study, anthropometric measures of elite weightlifters (age averages; 14.8 ± 2.3 year) were determined by A.C. Fry et al (2006). Their body weight and body fat mass averages were 67.3±10.4 kg, 4.5±2.5 kg, respectively. A result of, it may be concluded that the students in this study are not professional athletes and their nutrition knowledge was insufficient.

There was no significant relationship between the rates of BMI and sport ages (x^2; 0.57, $p>0.05$). In another study, it was found significant relationship between playing sport ages and BMI values (E.S. Farias et al., 2009).

Table 1: Anthropometric measures of the students

Variables	Students (n=10)		
	Average (X) (the lowest- the highest)		Standard deviation (SD)
Age (year)	13.1	(11-15)	1.3
Sport age (year)	2.0	(1.0-3.0)	0.7
Exercise day/week	5.8	(5-6)	0.4
Exercise hour/day	2.7	(1.5-3.5)	0.5
Anthropometrics parameters			
Height (m)	1.52	(1.34-1.67)	0.1
Body weight (kg)	51.4	(37.1-82.7)	13.0
Body mass index (kg/m^2)	22.0	(17.2-29.7)	3.5
Body fat percentage (%)	20.9	(15.1-27.2)	4.6
Body fat mass (kg)	10.8	(6.3-19.5)	3.8
Body fat free mass (kg)	40.6	(29.7-63.2)	10.1

It was identified, that body weights of eight students were more than their competition weights (1.9±0.7 kg), two students' body weights were lower than their competition weight (1.7±0.7 kg).

70% of the students' mothers and 50% of the students' fathers were graduated from elementary school. 10% of the students' mothers and fathers were graduated from higher education institutes.

According to KIDMED assessment, 30% of students were poor diet quality, 50% of them were medium quality, 20% of them were good. There were no significant relationship between the KIDMED values and fat percentages (x^2;2.56, p>0.05), BMI values (x^2;1.14, p>0.05) and sport ages (x^2;0.31, p>0.05) (Table 2). In the other studies, it is determined that there was a reverse relationship between BMI and KIDMED values (E. Demirezen et al., 2005, G. Samur et al., 2008). In another study that was done on 785 male students (between 11-14 aged) who played basketball according to evaluation of healthy eating index, 55.7% of the participators are in poor diet quality. Although diet quality of the participators is in medium and good level (E. Erol et al., 2010). E. Köksal et al. study, at 624 children and adolescents (between ages 7-12), it is found that 15.1% of the participators has low, 59.3% of them has medium and 25.6% of them has good diet quality index according to KIDMED evaluation (E. Köksal et al., 2008). In another study, it is determined that only 16.9% of 225 individuals between 12-18 ages have adequate nutrition level (E. Köksal et al., 2008).

Table 2: Evaluation of healthy eating index (KIDMED) of the students

Healthy eating index (KIDMED)	n	%	BMI-KIDMED	Fat percentage-KIDMED	Sport ages-KIDMED
Poor (≤3)	3	30.0	x^2; 1.14 p>0.05	x^2; 2.56 p>0.05	x^2; 0.31 p>0.05
Medium (4-7)	5	50.0			
Good (≥8)	2	20.0			
Total	10	100.0			

There are some expressions on some nutritional ergogenic aids as "it increases performance, changes appearance, develops muscles" in order to attract attention of especially athletes and adolescents (K.M. Babu et al., 2005; A. Petróczi et al., 2007). In this study, it was determined that there was only one student who use ergogenic product. Also the results of urine tests showed that a detailed research related to the kidney should be done. While determining that the ergogenic product was the amino acid supplement, the used dosage could not be determined correctly. In another study, it was determined that 26% of 756 adolescents used ergogenic product and most of products were fish oil (14.8%) and multivitamin (5.2%) (E. Erol et al., 2010). In another study, 34% of 828 children and adolescents between 2-17 ages use vitamin and mineral supplements (U. Shaikh et al., 2009). If the person is not sure that his nutrition is adequate and if he has a nutrition deficiency, this deficiency should be first determined by experts (physician or dietician) and he should use supporter product according to their suggestions.

Average energy, macro and micro nutrients obtained from the result of data about nutrition intake of students intakes are given in Table 3. The energy, macro and some micro nutrient intake of students were inadequate. The daily energy, protein, carbohydrate and fat consumption averages of the students whose ages were between 11 and 13, were respectively; 1578.7±404.4 kcal, 1.3±0.2 g/kg (16%±2), 4.7±1.7 g/kg (53.3%±9.6), 1.1±0.5 g/kg (30.6%±10.5). However, the averages of the students whose ages were

between ages 14 and 15, were respectively, 1832.7±319.9 kcal, 1.0±0.3 g/kg (14.5%±1), 4.1±1.7 g/kg (51.2%±6.7), 1.1±0.4 g/kg (34.2%±6.0). It was determined that consumption of energy was not enough for both age groups and the protein was taken insufficiently. All the students did not consume calcium, potassium, folic acid and fiber sufficiently. There were no significant relationship between energy, macro, and micro nutrient intakes of the students, and the energy distribution percentages with KIDMED values ($p>0.05$). In another study results was found similar (İ. Pehlivan, 1990). In study which was made on wrestlers; energy inhibition was significantly decreasing the anaerobic performance on wrestlers and it has determined that performance was fixed with high carbohydrate diet (J.W. Rankin et al., 1996).

Table 3: Energy, macro and micro nutrient consumption of the students (n=7)

Energy and nutrients	11-13 year groups (n=3)		14-15 year groups (n=4)	
	X	SD	X	SD
Energy (kcal)	1578.7	404.4	1832.7	319.9
Proteins (g)	60.6	12.0	64.0	7.6
Protein intake with diet g/kg	1.3	0.2	1.0	0.3
Protein percentage (%)	16.0	2.0	14.5	1.0
Essential amino acid (g)	28.1	4.4	29.6	3.8
Nonessential amino acid (g)	30.8	7.3	32.4	4.3
Vegetable protein (g)	36.6	4.7	35.5	9.5
Fats (g)	51.1	16.7	69.0	12.3
Fat intake g/kg	1.1	0.5	1.1	0.4
Fat percentage (%)	30.6	10.5	34.2	6.0
Saturated fatty acid (g)	15.3	6.7	22.9	7.9
Monounsaturated fatty acid (g)	16.2	4.8	22.2	4.8
Polyunsaturated fatty acid (g)	15.5	8.9	18.2	1.9
Cholesterol (g)	280.6	34.6	335.3	103.0
Carbohydrates (g)	214.0	76.0	235.8	6.4
Carbohydrate intake g/kg	4.7	1.7	4.1	1.7
Carbohydrate percentage (%)	53.3	9.6	51.2	6.7
Fiber (g)	213	7.5	19.1	6.6
Vitamin A (µg)	997.0	1080,7	661.4	257.8
Vitamin E (mg)	12.1	7.6	11.4	5.8
Vitamin B_1 (mg)	0.8	0.1	0.9	0.3
Vitamin B_2 (mg)	0.9	0.3	0.9	0.2
Niacin (mg)	7.8	2.7	8.2	1.6
Pantothenic acid (mg)	3.6	0.8	3.3	0.4
Vitamin B6 (mg)	1.0	0.3	1.0	0.2
Biotin (µg)	29.8	0.4	27.4	5.0
Folic acid (µg)	101.9	27.9	85.3	11.9
Vitamin B_{12} (µg)	2.6	1.9	2.8	0.8
Vitamin C (mg)	56.4	42.4	51.1	16.0
Sodium (mg)	2413.6	878.2	3771.5	1565.6
Potassium (mg)	2044.6	1171.2	1712.9	232.0
Calcium (mg)	427.2	332.6	420.5	242.1
Magnesium (mg)	231.4	99.2	203.4	20.9
Phosphorus (mg)	1012.5	177.6	946.9	75.1
Iron (mg)	11.4	1.6	9.8	1.5
Zinc (mg)	9.5	1.4	9.0	1.1

Some blood parameters of student intakes are given in Table 4. Two students' hemoglobin values were determined as low, and as result of the urine tests it was decided by physician, that the detailed kidney function analysis should be done for these two students. There weren't significant relationship between the hemoglobin ($U=1.0$, $p>0.05$) and hematocrit values ($U=0.0$, $p>0.05$) and iron consumption. Despite there is no relationship with the consumption of iron, it was determined that two students had low rates of hemoglobin. A more detailed measure should be done. In another study about 45 male wrestlers whose ages were 17-25 years, the found 54.6% percent of the wrestlers' hemoglobin level was low (G. Kasap, 1979).

Table 4: Some blood value of the students

Variables	Average (X) (the lowest-the highest)	Standard deviation (SD)

According to the results of pre and last tests, the average rate of the students' points was showed on the Table 5. After nutritional education there were increase on both nutrition and sport nutrition knowledge of the students. While 37% of the participators' nutrition habits is inadequate level in a study on 532 adolescents whose average age is 15 (G. Turconi et al., 2008), nutrition habits are inadequate in another study (AR. Burrows et al., 2008). In another study resuts, 369 adolescents aged 12-18 years about health information.Large percentage of adolescents, especially boys, are insufficiently informed on major health issues (C.I. Vardavas et al., 2009)

Table 5: Nutrition and sports nutrition knowledge levels of the students (pre-test and last test point)

Test results	Nutrition knowledge level	Sports nutrition knowledge level

Conclusions

It was determined that the students who did weightlifting which is a high active sport branch and needs a quite high energy, macro and micro nutrients, did not consume macro and micro nutrient sufficiently although they were in the period of the growth and development period. In the KIDMED assessment, it was also found that the rate of the students, who had a balanced and adequate nutrition habit, was not enough. As a result of nutrition education program, it was concluded that the level of nutrition knowledge increased, but education needed to be done more frequently and consistently, parents and coaches who played an important role in the students' nutritional habits, should attend the education program.

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