Anthrop. Közl. *48;* 45–52. (2007)

FOOD INTAKE HABITS, SOCIOECONOMIC VARIABLES AND NUTRITIONAL STATUS IN YOUNG HUNGARIAN MALES

Gyula Gyenis[1], Kálmán Joubert[2] and László Radnóti[3]

[1]Eötvös Loránd University, Department of Biological Anthropology, Budapest, Hungary,
[2]Hungarian Central Statistical Office, Demographic Research Institute, Budapest, Hungary,
[3]Hungarian Central Statistical Office, Budapest, Hungary

Abstract: *Representative sample of young Hungarian males was taken from the cohorts born in 1980 during the military conscription in 1998 (N=8002). The relationship among the food intake habits, socioeconomic variables and nutritional status was analysed in the sample. Significant differences were found in the subjects according to the intake frequency of the regularly consumed "healthy" and "unhealthy" food and drinks, socioeconomic variables and nutritional status.*
Keywords: *18-year-old Hungarian males; Food and drinks intake habits; Nutritional status; Socioeconomic variables.*

Introduction

Overweight and obesity have shown an increasing tendency in most of the developed and developing countries of the world in the last two decades of the 20th century (WHO TRS 2000). They are the consequence of an energy imbalance where energy intake exceeds energy expenditure over a considerable period. Overweight and obesity together with smoking, stressful environment, excessive alcohol consumption and lack of physical activity are the major determinants of the so-called noncommunicable diseases like cardiovascular diseases, cancer, diabetes, chronic rheumatic and respiratory diseases, oral diseases, gallbladder disease, genetic disorders and genetic predisposition to diseases (WHO Features 1996).

Overweight and obesity are influenced both by genetic factors (Rankinen et al. 2006) and socioeconomic variables (Sobal and Stunard 1989, Gordon-Larsen and Adair 2003). Among the several socioeconomic variables food intake habits and taste preferences play also an important role (Drewnowski 1997, Nasser 2001).

In Hungary Bíró (1994) was the first who studied in adults the relationship between the nutritional habits and the prevalence of obesity.

The goal of this study is to investigate the relationship among the food intake habits, socioeconomic variables and nutritional status of young Hungarian males.

Material and Methods

Representative sample was taken from the cohorts of the 18-year-old males during the military conscription in 1998. The conscripts lived in different settlements of six counties of the nineteen in the country, as well as in four large towns (Miskolc, Debrecen, Szeged and Pécs) and in Budapest. The six counties represent economically different regions of the country. The sample consists of 8,002 conscripts (about 10 per cent of the 18-year-old males in 1998) and anthropometric, psychic, medical and socioeconomic data were collected during the survey (Joubert and Gyenis 2001, Gyenis and Joubert 2002).

The body measurements were taken by one of the authors (G. Gyenis) and by other anthropologist working in different institutions, mainly in universities and colleges of the country. The psychological tests (Raven's Progressive Matrices) were measured and analysed by psychologists, the medical surveys were made by physicians and the questionnaires of the socioeconomic data were collected by the staff of the military centres of the survey areas.

BMI (weight [kg] / height $[m]^2$) was used to assess the nutritional status of the conscripts. Among the several socioeconomic variables only the educational level of the mother (ELM) and the place of residence (PR) of the conscripts (at the time of birth of the conscripts) were taken into consideration in the study.

In case of the PR, the settlements were classified into 5 categories according to their population size and urbanization level: 1 – Budapest (population about 2 million), 2 – large towns (population over 100,000), 3 – medium size towns (population between 100,000–25,000), 4 – small towns (population below 25,000), 5 – rural settlements (villages and farms without urban administrative status).

Two points of view were the reason why the ELM was used in the analysis from the parental educational status. First, the proportion of the conscripts who did not remember exactly the educational level of the father was higher than those who did not know the ELM. Second, the effect of the ELM is definitely stronger on the body measurements of males than that of the father (Bielicki and Szklarska 1999). The ELM was divided into five categories: 1 – less than 8 school years, 2 – 8 school years (elementary school completion, 3 – 8 school years+vocational school, 4 – 9 to 12 school years (with no completion and with high school completion together), 5 – 13 to18 school years (some college with no degree and bachelor's or master's together).

The frequency of the consumption of food and drinks was classified also into five categories: 1 – more than once a day, 2 – once a day, 3 – once a week, 4 – rare, 5 – never. But, in this study we used only the combined category of the frequently (regularly) consumed nourishment (1+2+3). Among the food and drinks fruits, vegetables, brown bread, milk and diary products, chicken, fruit juices, fish and margarine was considered as "healthy" nourishment and coffee, coke, sweets, nuts, fried potatoes, chips, hamburger and hot dogs, fat bacon, white bread, bread & drippings and butter as "unhealthy" ones.

Statistical analysis (ANOVA, Scheffé post hoc test and chi-square test) was made by the SPSS v. 12.0 (2003) programme-pocket.

Results and Discussion

7.5 per cent of the mothers of the conscripts did not complete the elementary school (less than 8 school years) and 8.1 per cent belonged to the highest (5th) category of the ELM (13 to 18 school years: some college with no degree and bachelor's or master's together). The great majority of those mothers who did not complete the elementary school lived in villages and farms (58.6%) and in small towns (22.4%). Among the conscripts whose mother was on the highest educational level 35.0 per cent lived in Budapest and 19.6 per cent in villages and farms, but only 14.8 per cent in the large and 8.9 per cent in the medium size towns. The relative high frequency of the mothers on the highest educational level in the villages and farms may be explained by the fact that the people on higher educational level (and in general together with higher income) usually move from the towns to the green area in the neighbourhood of them. However, the relative majority of the mothers (41.3%) completed only the elementary school (8 school years; Table 1).

There were large differences in the relative frequency of the choice of the conscripts in the regularly consumed food and drinks (Fig. 1). The lowest frequencies were found in the case of nuts (0.16), fish (0.18), coffee (0.22) and bread & drippings (0.22), while the highest frequencies appeared at white bread (0.92), milk and diary products (0.91), fruits (0.86) and chicken (0.84).

Table 1. Distribution of the categories of ELM according to the PR of the conscripts.

	Educational level of the mothers (ELM)																	
	0 to 7 school years			8 school years			8 school years + voc. school			9 to 12 school years			13 to 18 school years			Altogether*		
PR	N	%[c]	%[r]	N	%[c]	%[r]	N	%[c]	%[r]	N	%[c]	%[r]	N	%[c]	%[r]	N	%[c]	%[r]
BP	30	6.3	2.9	274	10.5	26.3	141	13.5	13.6	415	24.6	39.9	180	35.0	17.3	1040	16.4	100.0
LT	29	6.1	4.6	213	8.1	33.8	108	10.3	17.1	204	12.1	32.4	76	14.8	12.1	630	9.9	100.0
MT	31	6.6	4.8	243	9.3	37.6	126	12.0	19.5	201	11.9	31.1	46	8.9	7.1	647	10.2	100.0
ST	106	22.4	7.5	563	21.5	39.8	248	23.7	17.5	387	22.9	27.3	112	21.7	7.9	1416	22.3	100.0
V	277	58.6	10.6	1324	50.6	50.8	423	40.4	16.2	481	28.5	18.5	101	19.6	3.9	2606	41.1	100.0
T*	473	100.0	7.5	2617	100.0	41.3	1046	100.0	16.5	1688	100.0	26.6	515	100.0	8.1	6339	100.0	100.0

*: Differences are significant by chi-square test on the level $p<0.001$

PR: place of residence, BP: Budapest, LT: large towns, MT: medium size towns, ST: small towns, V: villages, T: total, voc. school: vocational school, %[c]: percentage by column, %[r]: percentage by row

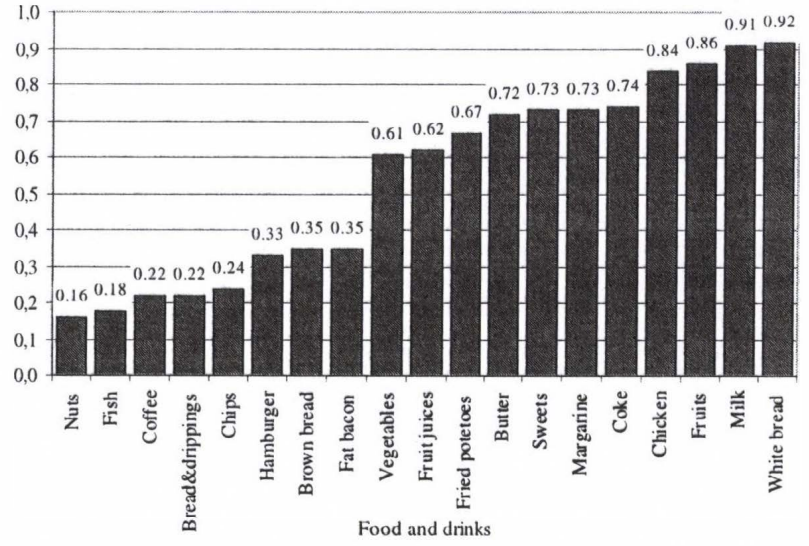

Figure 1: Relative frequency of the intake of regularly consumed food and drinks.

This food and drinks intake choice showed characteristic differences according to the socioeconomic variables. By the ELM significant differences were found in the consumption of the majority of the "healthy" and "unhealthy" nourishments. E.g. the consumption of fruits, vegetables, brown bread, milk and diary products, chicken meat, fruit juices, and margarine was higher in the conscripts whose mother was on higher educational level, while the intake of coffee, coke, chips, fat bacon, white bread, bread and drippings and butter was higher in the conscripts whose mother achieved only low

educational level (Table 2). At the same time, by the PR of the conscripts significant differences were also found in the consumption of the "healthy" and "unhealthy" food and drinks. The intake of the "healthy" vegetables, milk and diary products, brown bread, fruit juices and margarine was usually higher in conscripts who lived in Budapest, while the intake of the "unhealthy" coffee, coke, fat bacon, white bread, bread and drippings and butter was higher in the conscripts who lived in villages and farms (Table 3).

In the BMI of the conscripts differences appeared also between the two socioeconomic variables (Table 4). In both cases the lowest and the highest values were shown in the outside categories, but with the opposite tendency.

While according to the ELM the lowest values of BMI were found in the lowest and highest categories (0 to 7 school years and 13 to 18 school years), until in the case of the PR the highest values of BMI were detected in Budapest, the largest city of the country and in the smallest settlements, the villages and farms (Table 4).

The high level of BMI in the majority of the conscripts who lived in the villages and farms can be explained by the "paradox of obesity and hunger". E.g. in the U.S. families with less money to buy enough food often rely on cheaper, high calorie foods because the limited money for food and stave off hunger. Poor families try to maximize caloric intake for each dollar spent that can lead to over consumption of calories and a less healthful diet.

The consequences of high caloric intake usually are the overweight and obesity, therefore poverty and obesity are linked each other (Drewnowski and Specter 2004). The income of the great proportion of the families in the villages and farms of Hungary is very low, therefore they usually also buy cheap and "unhealthy" nourishment with high caloric intake.

However, the low level of BMI both in the sons of the mothers who attached only the lowest educational level and in the sons of the mother on highest educational level may require another explanation. The families with a mother on the lowest educational level usually form the poorest stratum of all the society, therefore hunger is a general phenomenon among these people. Contrary to that, the highest educated people can control easily their nutrition, they consume more "healthy" food and drinks, therefore overweight and obesity are less common in these people (Drewnowski and Specter 2004).

In Hungary Németh et al. (2000) also found significant relationship between the food intake habits of schoolchildren in the pubertal age and the parental educational level and place of residence. Antal et al. (2003) studied the nutritional habits of the Hungarian adolescents and they showed that the daily consumption of milk, diary products, fruits, fresh vegetables and vegetable dishes was insufficient. Bodzsár et al. (1998) analysed the relationship between animal protein (meat and eggs) consumption and the growth and development of some body parameters (height, weight and lean body mass) in elementary schoolchildren. The results indicated that the more the meat consumption the faster the growth tempo, and the body composition of the more eggs consumers were turned to the overweight and obesity. Lichthammer et al. (2007) studied the differences of the protein, fat and carbohydrate intake in the nourishment of children between 4–16 years of age. The protein and fat intakes were higher while carbohydrate intake was lower than the recommended ones in both sexes and the differences between the actual and recommended carbohydrate intakes were significant. In childhood total energy intake significantly exceeded the expected requirements while in the boys aged 11–13 and in the girls of 14 it was significantly less in the sample. In girls this relative "undernourishment" did not associate with retardation in body development, however, in boys the low total energy intake affects both dimensional measures and body fatness to some extent caused primarily by the low intake of carbohydrates.

Table 2. Food intake habits expressed by the relative frequency of the regularly consumed food and drinks according to the ELM.

Food and drinks	Educational level of the mother (ELM)																	
	0 to 7 school years			8 school years			8+vocational school			9 to 12 school years			13 to 18 school years			Total		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
1. Coffee[1, 3]	432	0.40	0.49	2470	0.24	0.43	992	0.22	0.41	1613	0.16	0.37	504	0.14	0.34	6011	0.22	0.41
2. Fruits[1, 3]	443	0.72	0.45	2550	0.84	0.37	1022	0.87	0.33	1645	0.89	0.32	508	0.92	0.28	6168	0.86	0.35
3. Coke[1, 8, 13]	446	0.76	0.43	2547	0.76	0.43	1019	0.75	0.43	1648	0.71	0.46	509	0.68	0.47	6169	0.74	0.44
4. Sweets[1, 3, 5, 6, 11, 13]	448	0.61	0.49	2545	0.70	0.46	1015	0.74	0.44	1646	0.75	0.43	504	0.81	0.39	6158	0.72	0.45
5. Vegetables[1, 3, 5, 6, 8, 11, 13]	449	0.46	0.50	2537	0.54	0.50	1019	0.61	0.49	1648	0.69	0.46	507	0.77	0.42	6160	0.60	0.49
6. Nuts	445	0.18	0.38	2536	0.16	0.37	1017	0.16	0.37	1642	0.16	0.37	508	0.16	0.37	6148	0.16	0.37
7. Fried potatoes	448	0.64	0.48	2540	0.67	0.47	1018	0.69	0.46	1649	0.69	0.46	508	0.64	0.48	6163	0.68	0.47
8. Chips[2, 9]	442	0.25	0.43	2537	0.25	0.43	1022	0.25	0.44	1648	0.23	0.42	508	0.17	0.38	6157	0.24	0.43
9. Hamburger	444	0.31	0.46	2542	0.33	0.47	1021	0.34	0.47	1649	0.34	0.47	507	0.31	0.46	6163	0.33	0.47
10. Brown bread[1, 11, 12, 13]	445	0.41	0.49	2532	0.34	0.47	1017	0.32	0.47	1641	0.35	0.48	507	0.41	0.49	6142	0.35	0.48
11. Milk[1, 4]	450	0.78	0.41	2551	0.90	0.30	1021	0.93	0.26	1651	0.94	0.23	509	0.96	0.20	6182	0.91	0.29
12. Fat bacon[1, 3, 4]	449	0.46	0.50	2545	0.38	0.49	1020	0.35	0.48	1647	0.30	0.46	509	0.24	0.43	6170	0.35	0.48
13. Chicken[1, 8, 12]	449	0.82	0.38	2541	0.83	0.38	1022	0.84	0.37	1648	0.85	0.35	507	0.90	0.30	6167	0.84	0.36
14. White bread	447	0.94	0.23	2542	0.92	0.27	1019	0.92	0.27	1644	0.91	0.28	509	0.94	0.25	6161	0.92	0.27
15. Fruit juices[1, 3, 8, 9]	447	0.49	0.50	2542	0.58	0.49	1019	0.65	0.48	1642	0.67	0.47	508	0.72	0.45	6158	0.62	0.48
16. Bread & drippings[1, 3]	448	0.47	0.50	2543	0.25	0.44	1014	0.21	0.41	1642	0.13	0.34	507	0.11	0.31	6154	0.22	0.41
17. Fish[1, 4, 10]	447	0.19	0.39	2543	0.16	0.36	1019	0.19	0.39	1645	0.20	0.40	508	0.22	0.42	6162	0.18	0.38
18. Butter[1, 3, 10]	450	0.76	0.43	2539	0.75	0.44	1020	0.75	0.43	1644	0.67	0.47	505	0.61	0.49	6158	0.72	0.45
19. Margarine[1, 3, 5, 6, 7]	443	0.63	0.48	2517	0.71	0.46	1009	0.73	0.44	1638	0.76	0.42	505	0.79	0.41	6112	0.73	0.45

ANOVA: significant on the level: $p<0.0001^{1}$; $p<0.002^{2}$; POST HOC tests, differences are significant:
on the level $p<0.0001^{3}$: in the case of coffee between 1/2, 1/3, 1/4, 1/5, 2/3, 2/4, 2/5, 3/1 and 3/2, in the case of fruits between 1/2, 1/3, 1/4, 1/5, 2/1, 2/4, 2/5 and 3/1, in the case of sweets 1/3, 1/4, 1/5, 2/5 and 3/1, in the case of vegetables between 1/3, 1/4, 1/5 and 3/5, in the case of milk 1/2, 1/3, 1/4, 1/5 and 2/4, in the case of fat bacon between 1/4, 1/5, 2/4 and 2/5, in the case of fruit juices 1/3,1/4, 1/5, 2/4, 2/5 and 3/1, in the case of bread & drippings between 1/2, 1/3, 1/4, 1/5, 2/4, 2/5, 3/4 and 3/5 and in the case of butter between 1/5, 2/4 and 2/5 and in the case of margarine 1/4 and 1/5; *on the level* $p<0.001^{4}$: in the case of milk between 2/5 and in the case of fat bacon between 1/3 and 3/5 and in the case of fish between ¾; *on the level* $p<0.002^{5}$: in the case of sweets 1/2, in the case of vegetables between 2/3, in the case of the margarine between 2/4 and 2/5; *on the level* $p<0.002^{6}$: in the case of sweets 1/2, in the case of vegetables between 2/3, in the case of margarine between 2/4 and 2/5; *on the level* $p<0.005^{7}$: in the case of margarine between 1/3; *on the level* $p<0.003^{8}$: in the case of coke between 2/4 and 2/5, in the case of vegetables 3/4, in the case of chicken between 2/5, in the case of the fruit juices between ½; *on the level* $p<0.004^{9}$: in the case of chips between 2/5, in the case of fruit juices between 2/3; *on the level* $p<0.01^{10}$: in the case of fish between 2/5, in the case of butter between 1/4; *on the level* $p<0.02^{11}$: in the case of sweets between 2/4, in the case of vegetables 1/2 and in the case of brown bread 2/5; *on the level* $p<0.03^{12}$: in the case of brown bread between 1/3 and in the case of chicken between 1/5; *on the level* $p<0.05^{13}$: in the case of coke between 3/5, in the case of sweets between 3/5, in the case of vegetables between 1/2 and in the case of brown bread 2/5

Table 3. Food intake habits expressed by the relative frequency of the regularly consumed food and drinks according to the PR.

Food and drinks	Place of residence (PR)																	
	1. Budapest			2. Large towns			3. Medium size towns			4. Small towns			5. Villages, farms			Total		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
1. Coffee[3]	1044	0.19	0.39	594	0.21	0.41	640	0.22	0.41	1395	0.21	0.40	2614	0.24	0.43	6287	0.22	0.41
2. Fruits	1073	0.88	0.33	621	0.86	0.35	657	0.86	0.35	1431	0.87	0.34	2666	0.84	0.37	6448	0.86	0.35
3. Coke[1, 2, 4,]	1072	0.70	0.46	622	0.72	0.45	658	0.71	0.45	1432	0.73	0.45	2668	0.77	0.42	6452	0.74	0.44
4. Sweets	1064	0.73	0.45	621	0.70	0.46	659	0.72	0.45	1429	0.74	0.44	2669	0.72	0.45	6442	0.73	0.45
5. Vegetables[1, 4, 6, 7]	1066	0.66	0.47	618	0.64	0.48	658	0.63	0.48	1431	0.62	0.49	2667	0.56	0.50	6440	0.61	0.49
6. Nuts	1064	0.15	0.36	619	0.18	0.39	656	0.16	0.36	1429	0.17	0.38	2662	0.16	0.37	6430	0.16	0.37
7. Fried potatoes	1067	0.65	0.48	622	0.66	0.47	659	0.67	0.47	1429	0.69	0.46	2669	0.68	0.47	6446	0.67	0.47
8. Chips	1067	0.23	0.42	622	0.25	0.43	658	0.24	0.43	1429	0.25	0.44	2663	0.24	0.42	6439	0.24	0.43
9. Hamburger[2]	1067	0.35	0.48	621	0.33	0.47	660	0.29	0.46	1429	0.37	0.48	2670	0.31	0.46	6447	0.33	0.47
10. Brown bread[1, 5]	1061	0.39	0.49	620	0.39	0.49	659	0.41	0.49	1426	0.31	0.46	2655	0.33	0.47	6421	0.35	0.48
11. Milk[3]	1072	0.93	0.25	623	0.92	0.27	662	0.92	0.28	1432	0.91	0.28	2676	0.90	0.31	6465	0.91	0.29
12. Fat bacon[1, 4]	1066	0.24	0.43	622	0.29	0.45	660	0.38	0.49	1430	0.34	0.48	2674	0.40	0.49	6452	0.35	0.48
13. Chicken	1067	0.87	0.34	623	0.85	0.36	660	0.82	0.39	1430	0.84	0.37	2671	0.84	0.37	6451	0.84	0.37
14. White bread[1, 4]	1070	0.87	0.34	622	0.90	0.30	656	0.89	0.32	1428	0.95	0.22	2666	0.95	0.23	6442	0.92	0.27
15. Fruit juices[1, 6]	1068	0.66	0.47	620	0.65	0.48	657	0.62	0.49	1426	0.64	0.48	2670	0.59	0.49	6441	0.62	0.48
16. Bread&dripping[1, 4]	1062	0.15	0.36	621	0.19	0.39	657	0.15	0.36	1427	0.21	0.41	2670	0.27	0.44	6437	0.22	0.41
17. Fish	1067	0.18	0.39	622	0.17	0.37	658	0.18	0.39	1428	0.20	0.40	2670	0.18	0.38	6445	0.18	0.39
18. Butter[1, 4]	1065	0.64	0.48	620	0.75	0.43	658	0.68	0.47	1428	0.73	0.44	2670	0.74	0.44	6441	0.72	0.45
19. Margarine	1062	0.75	0.43	613	0.73	0.44	651	0.75	0.43	1413	0.72	0.45	2652	0.72	0.45	6391	0.73	0.44

ANOVA: significant on the level: $p<0.0001^{1}$; $p<0.001^{2}$; $p<0.005^{3}$, $p<0.01^{4}$

POST HOC tests, differences are significant:

on the level $p<0.0001^{5}$: in the case of coke between 1/5, in the case of vegetables between 1/5, in the case of fat bacon between 1/3, 1/4, 1/5 and 2/5, in the case of white bread between 1/4, 1/5, 3/4 and 3/5, in the case of bread & drippings between 1/5 and 3/5 and in the case of butter between 1/2, 1/4 and 1/5,

on the level $p<0.002^{6}$: in the case of vegetables between 2/5, in the case of brown bread between 1/4 and 3/4, in the case of white bread between 2/5 and in the case of bread & drippings between 2/5,

on the level $p<0.003^{7}$: in the case of white bread between 2/5, in the case of vegetables between 4/5, in the case of brown bread between 1/5 and in the case of fruit juices between 1/5,

on the level $p<0.005^{8}$: in the case of brown bread between 3/5, in the case of fruit juices between 4/5 and in the case of bread & drippings 1/4,

on the level $p<0.02^{9}$: in the case of coffee between 1/5, in the case of vegetables 3/5, in the case of brown bread between 2/4, in the case of fruit juices between 4/5, in the case of the bread & drippings between 3/4,

on the level $p<0.05^{10}$: in the case of hamburger between 1/4 and 4/5, in the case of milk between 1/5 and 2/3, in the case of fat bacon 4/5.

Table 4. BMI of the conscripts according to the PR and the ELM.

ELM	N	BMI[1, 2] M	SD	PR	N	BMI[3, 4] M	SD
1. 0 to 7 school years	473	21.76	3.49	1. Budapest	1108	22.40	3.89
2. 8 school years	2617	22.10	3.85	2. Large towns	662	21.98	3.86
3. 8 school years+vocational school	1046	22.42	4.15	3. Medium size towns	667	21.69	3.41
4. 9 to 12 school years	1688	22.11	3.71	4. Small towns	1474	21.98	3.76
5. 13 to 18 school years	515	21.93	3.54	5. Villages	2721	22.20	3.85
Total	6339	22.12	3.82	Total	6632	22.11	3.80

PR: place of residence, ELM: educational level of the mothers, M: mean

[1]ANOVA: significant on the level $p<0.02$

[2]Post hoc tests: difference is significant in the case of the BMI between 5/3 on the level $p<0.05$

[3]ANOVA: significant on the level $p<0.001$

[4]Post hoc tests: differences are significant in the case of the BMI between 5/3 and 3/1 on the level $p<0.005$

It is interesting that there was no difference between the subgroups in the ingestion of hamburger according to the educational level of the mother. It can be explained by the fact that to eat junk food is a "fashion" of the young people in our time with different socioeconomic background, too. Another interesting finding was that there was no difference in the consumption of sweets between the subgroups according to the place of residence of the subjects. But, it is also understandable, because young people usually like to eat sweets everywhere very much.

Conclusions

The mean results of the study were the following:

- significant differences were found in the educational level of the mothers of the conscripts according to the place of residence;
- more "healthy" food and drinks were consumed by the conscripts whose mother was on the highest educational level and who lived in Budapest;
- more "unhealthy" food and drinks were consumed by the conscripts whose mother was on the lowest educational level and who lived in the villages and farms;
- the nutrition status of the conscripts (by the BMI) showed significant differences according to the place of residence and the educational level of the mothers.

As the mean conclusion of the study we can state that the effect of the examined socioeconomic variables was significant on the nutritional habits and nutritional status of the 18-year-old Hungarian males.

*

Acknowledgement: This study was supported by the Hungarian National Foundation for Science (OTKA grant T 043572).

References

Antal, M., Nagy, K., Bíró, L., Greiner, E., Regöly-Mérei, A., Domonkos, A., Balajti, A., Szabó, Cs., Mozsáry, E. (2003): Hazai reprezentatív felmérés a középiskolás fiatalok táplálkozás és életmódbeli szokásairól (National representative survey on the nutritional and lyfe-style habits of secondary school students, in Hungarian with English summary). *Orvosi Hetilap, 144:* 1631–1636.

Bielicki, T., Szklarska, A. (1999): Secular trends in stature in Poland: national and social class. *Ann. Hum. Biol., 26:* 251–258.
Bíró, Gy. (1994): Első Magyarországi Reprezentatív Táplálkozási Vizsgálat: az eredmények áttekintése. *Népegészségügy, 75:* 129–133.
Bodzsár, É., Pitti, K., Zsákai, A. (1998): Táplálkozás és a testösszetétel. *Anthrop. Közl., 39:* 9–17.
Drewnowski, A. (1997): Taste preferences and food intake. *Annual Rev. Nutr., 17:* 237–253.
Drewnowski, A., Specter, S.E. (2004): Poverty and obesity: The role of energy density and energy costs. *Am. J. Clin. Nutr., 79:* 6–16.
Gordon-Larsen, P., Adair, L.S. (2003): The relationship of ethnicity, socioeconomic factors, and overweight in U.S. adolescents. *Obesity Res., 11:* 121–129.
Gyenis, G., Joubert, K. (2002): Secular trends of body height, body weight and BMI of Hungarian university students and conscripts. *Humanbiologia Budapestinensis, 27:* 95–105.
Joubert, K., Gyenis, G. (2001): *A 18 éves sorköteles ifjak egészségi állapota, testfejlettsége I. (State of health and physical development of 18 years-old conscripts I.,* in Hungarian with English summary). KSH Népességtudományi Kutató Intézet, Kutatási Jelentések. 70, pp. 131.
Lichthammer, A., Zsákai, A., Pápai, J., Bodzsár, É.B. (2007): A study of nutrient intake in relation to body development in Hungarian children and adolescents. In. Bodzsár, É.B., Zsákai, A. (Eds) *Growth and Ageing: Facts and Factors.* Humanbiologia Budapestinensis, 31: 47–52.
Nasser, J. (2001): Taste, food intake and obesity. *Obesity Reviews, 2:* 213–218.
Németh, Á., Aszmann, A., Nyuli, K. (2000): Magyar serdülők táplálkozási szokásai egy nemzetközi vizsgálat tükrében (The nutritional habits of Hungarian teen-agers in the mirror of an international study, in Hungarian). *Egészségnevelés, 41:* 74–84.
Rankinen, T., Zuberi, A., Chagnon, Y.C., Weisnagel, S.J., Argyropoulos, G., Walts, B., Pérusse, L., Bouchard, C. (2006): The human obesity gene map: The 2005 update. *Obesity, 14:* 529–644.
Sobal, J., Stunard, A.J. (1989): Socioeconomic status and obesity: a review of the literature. *Psychol. Bull., 105:* 260–275.
WHO Features (1996): *Obesity: Take it seriously, deal with it now.* No. 190.
WHO TRS (2000): Obesity: Preventing and managing the global epidemic. Report of a WHO Consultation. *WHO Technical Report Series 894.* Geneva, World Heath Organisation.

Levelezési cím: Gyula Gyenis
Mailing address: Eötvös Loránd University
Department of Biological Anthropology
H-1117 Budapest
Pázmány Péter sétány 1/C
Hungary
gyenis@elte.hu