

## SHORT COMMUNICATION

**Positive and negative trends in university students' food intake**

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zuzana.stefanikova@fmed.uniba.sk***Abstract**

In the time period 1992–2004 the food intake data (24 hour recall, frequency questionnaire) in 3 417 students of Medical Faculty Comenius University in Bratislava (1257 men and 2160 women, the mean age  $22.38 \pm 1.34$ ) were obtained. The aim of this study was to evaluate the food intake and its trends in university students. Students' food consumption has not been in agreement with recommended dietary allowances (RDAs). The meat consumption was structurally unbalanced, though quantitatively sufficient (99 % RDA); milk intake (75 % RDA) was insufficient, fruit (65 % RDA) and vegetable intake (62 % RDA) even critical. On contrary, cereal products intake was excessive (130 % RDA). Men eat more meat ( $p < 0.001$ ), milk ( $p < 0.001$ ), eggs ( $p < 0.01$ ), cereals ( $p < 0.001$ ) and fat ( $p < 0.001$ ) than women. Women eat more fruit, vegetable and sugar than men. In the time period 1992–2004, students' meat consumption has decreased about 18 %, milk and eggs about 23 %, fruit about 42 % and cereals intake has decreased about 45 %. The fruit and vegetable intake structure has substantially improved (higher content of fresh fruit, fewer preserved products). In spite of a higher health awareness in students and tendency towards proper diet, their food intake has been negatively influenced by decreasing purchasing power in Slovak population (*Tab. 2, Fig. 1, Ref. 15*).

**Key words:** medical students, food intake, intersexual differences, food intake trends.

Nutrition and food intake are the result of complex interaction subjective and objective factors. Heredity, sex, age, activity, psychological factors such as personality, tolerance, experiences, knowledge and perception of sensory food properties and food preferences belong to inner determinants. Food intake has been significantly influenced by the food accessibility (given by geographic and climatic conditions, economic status, ethnicity, nationality, cultural community and social class affiliation, family and regional traditions and other objective factors (Brázdová 1994; Krebs-Smith et al, 1997; Roos et al, 1998; Štefániková et al, 2001).

The aim of this study was to evaluate the food intake in university students and intersexual differences and to analyze the trends in food intake in university youth.

**Subjects and methods**

The analyzed group of subjects comprised 3417 students of Medical School in Bratislava (1257 men and 2160 women). It was a group of young and healthy individuals (average age  $22.38 \pm 1.34$ ), examined in the time period 1992–2004.

Food intake was determined from the 24-hour recall data and frequency food questionnaire. All food intake records were evaluated using the program Nutrition and the data were statistically processed; information on nutritional regimen, energy and nutrient intake as well as food and beverages intake were obtained.

**Results and discussion**

Students' food intake was evaluated in relation to recommended dietary allowances – RDAs. RDAs represent an optimal

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**Acknowledgements.** This work was supported in part by Grant No. 1/0533/03 from the Scientific Grant Agency of Ministry of Education of Slovak Republic and Slovak Academy of Sciences.

This work was presented on the meeting of the Slovak Medical Society on the 2005, December 5.

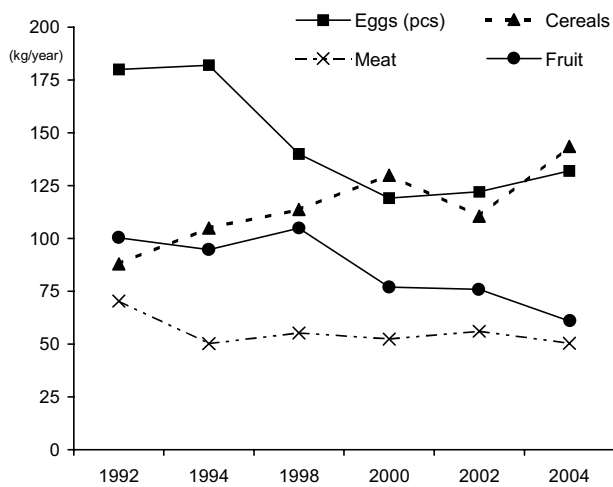


Fig. 1. Changes in selected foodstuffs intake in students.

variation of food composition that ensures a proper coverage of all nutritional requirements in the population. They represent an information base for updating state nutritional politics, planning foodstuff production and consumption. RDAs represent also an evaluation criterion for population nutritional status assessment and, using a statistical follow-up, also food intake trends (Ministry of Agriculture Bulletin, 1999).

Table 1 shows the comparison of students' food intake in the year 2004, expressed as a percentage of recommended dietary allowances fulfilment, with the average food intake in the Slovak Republic (year 2003). The table shows that students' food intake is not balanced and the RDA fulfilment is less than 100 % in the majority of individuals. Regarding some important commodities (fish, potatoes and legumes) the students' intake is lower

than the Slovak average. On the contrary, the consumption of cereal products (bread, bakery products), cheese and poultry is higher. Poultry is the most preferred type of meat in Slovak as well as Czech and Austrian students. Also the way of cooking in canteens – frying and baking contributes to the popularity of poultry (Huňková et al, 2001).

The average food intake per inhabitant (kg/year) could significantly differ from the intake in particular population group. For instance, nutrition in urban population is much better than in countryside population. It is not only the result of higher incomes in urban people, but also the result of higher education (more high school and university educated persons live in towns). Women eat more healthy food than men, what describes more active and responsible approach to their health. Pensioners have lower intake (especially fruit and vegetable) comparing to people in productive age, the reason is the financial factor (Roos et al, 1998; The Report about Program of Nutritional Recover in Slovak population, 2005).

University students, especially in medical school, represent the specific group regarding the nutrition. It is a group of people with relatively high knowledge of nutritional prevention - comparing to general population, but these young people are usually without stable financial income, mostly economically dependent on their parents (Štalič et al, 2004).

It should be noted, that different methodology for data capture and calculation has been used (24 hour recall, extrapolation on annual consumption in kg) compared to assessment of nationwide Slovak intake (annual global food intake, calculated per one individual).

In several subjects, the intentional or subconscious effort to optically revise the final results has been found in daily food intake records (Ballard-Barbash et al, 1996; Pryer et al, 1997). The tendency to underestimate the amount of consumed food

Tab. 1. Recommended dietary allowances (RDAs) and comparison of students' nutritional intake (2004) to the average intake of foodstuffs in Slovak Republic (2003).

Type of foodstuff	RDA and tolerable consumption interval kg/year	Consumption expressed as % RDA fulfilment	
		SR 2003	students 2004
Meat total	57.3 (51.6–63.0)	105.4 %	99.1 %
– beef, veal	17.4	38.5 %	58.0 %
– pork	22.2	143.7 %	87.8 %
– poultry	15.0	135.3 %	178.0 %
Fish	6.0	70.0 %	58.9 %
Milk and dairy products	220.0 (206–240)	73.1 %	75.1 %
– consumed milk	91.0	70.5 %	70.1 %
– cheese, curd	10.1	94.1 %	159.6 %
Eggs (pcs)	201	108.5 %	80.1 %
Fat total	22.0 (19.8–23.1)	112.3 %	67.9 %
Sugar	30.9	87.4 %	61.8 %
Cereal products	98.5 (94.0–103.0)	97.3 %	130.2 %
Potatoes	80.6 (76.3–84.9)	84.6 %	54.5 %
Legumes	2.6 (2.1–3.2)	65.4 %	50.6 %
Vegetable and products	127.9 (116.9–138.9)	62.9 %	61.8 %
Fruit and products	96.7 (86.7–106.7)	54.8 %	65.4 %

**Tab. 2. Intersexual differences in university students' food intake in the year 2004.**

Consumption in/day	x±SEM	
	Men (n=104)	Women (n =255)
Meat total	212.0±34.8	94.6±12.4***
– beef, veal	41.9±10.0	14.8±3.8***
– pork	88.5±11.4	32.0±4.3***
– poultry	81.6±17.9	47.9±7.4*
Fish	12.4±7.9	7.9±3.3
Consumed milk	230.0±25.4	111.0±10.5***
Cheese, curd	38.8±5.9	24.3±3.5**
Eggs	21.0±4.1	10.4±1.4**
Fat total	48.7±5.4	30.9±2.9**
Sugar, candies	48.1±8.3	49.9±4.5
Cereal products	434.4±20.1	263.2±11.5***
Potatoes	148.1±20.6	81.4±9.1**
Legumes	4.9±1.9	3.0±1.5
Vegetable and products	184.8±26.1	198.9±18.3
Fruit and products	161.8±36.6	201.2±22.5

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05

was observed also in students; the tendency is increasing with body weight and is more significant in women (Štefániková et al, 2000). It has been problematic to evaluate to what extent this phenomenon has influenced the final results.

Intersexual differences in students, food intake in the year 2004 are described in Table 2. Food intake in men and women is different. It is known, that physiological and also cultural and social differences play the role, and are projected into nutritional habits and foodstuff preferences. The total food consumption in men is higher than in women. Men eat more meat and meat products (p<0.001), milk and dairy products (p<0.001), eggs (p<0.01), potatoes (p<0.01) and cereal products (p<0.001). In women a higher intake of sugar and candies, vegetable and vegetable products, fruit and fruit products has been found. Our results regarding the intersexual nutritional differences and worse nutritional habits in men are consistent with the results of other researchers (Bernasovská et al, 2004; Szárazová et al, 2002; Fiala and Brázdová, 2000).

The economic accessibility of foodstuffs can markedly influence the nutrition and nutritional habits in population. The changes in living standard and purchasing power reflect the trends in food intake. Gradually increasing prices of basic food commodities since 1990, together with income stagnation in the majority of population has significantly influenced the food intake in Slovakia. In the time period 1990–2003, the annual consumption of meat and meat products has decreased from 84 kg to 60 kg, milk and milk products from 226 kg to 160 kg, sugar from 41 kg to 27 kg per one inhabitant. The consumption of eggs, cereal products and vegetable has decreased as well. Some of these changes have been consistent, others in contradiction with the Program of Nutritional Recover in Slovak population (Green Report, 2005).

The changes in food intake were observed also in university students (Fig. 1). The total meat and meat products consumption

was decreased during the period 1992–2004, in average about 18 %. In women, the lower consumption remains, in men, an increase was recorded in past years. The gradual change in intake structure was not favourable. In the year 1992 the meat products comprised 30 % and in the year 2004 49 % of total meat consumption.

A decrease was observed in eggs, milk and milk products intake, in average about 23 %. Nowadays it represents a critically low intake in women.

On the contrary, an intake increase was found in cereal products – in average about 45 %, especially in men. The intake structure reflects the regional nutritional habits: bread, pastry and other bakery products comprise 67.5 %, pasta 7 %, rise 8.5 % and other cereal products 17 %.

The last marked change concerns fruit and fruit products. There is a trend to an intake decrease – nearly to 42 %, the decrease is concerning mostly fruit products, less fresh fruit. This trend is projected into percentage in particular subgroups of the whole commodity. In the year 1992, fruit products comprised 30 % of fruit consumption, in the year 2004 only 15 %.

Paradoxically, the total food weight in students (men and women) has been increasing. In the year 1992, the average food weight was 2826.5 g, in the year 2004 it has increased to 3060.0 g (p<0.01). It is caused by an increase in beverages intake – mineral water, soda and others. The trend of food itself, without beverages, has been slightly decreasing (from 1728.5 g in the year 1992 to 1423.0 g in the year 2004).

## Conclusions

The most important findings in students, food intake include:

- meat consumption is structurally unbalanced, even though quantitatively sufficient (99 % RDA); milk intake (75 % RDA) is insufficient, fruit (65 % RDA) and vegetable (62 % RDA) intake is critical, but cereal products intake is excessive (130 % RDA);

- men consume significantly more meat and meat products, milk and milk products, eggs, cereal products and fat than women (p<0.001; p<0.01). On the contrary, women eat more fruit, vegetable and sugar than men;

- the most important changes in the students' food intake in the time period 1992–1994 comprise the decrease of meat consumption about 18 %, eggs about 23 %, and fruit about 42 % and the increase in cereal intake about 45 %. The structure of fruit and vegetable intake has changed significantly (higher content of fresh fruit, fewer fruit products).

Finally, it can be concluded, that nutritional habits of university youth still don't correspond to a new life style what means significant changes during the last period under the influence of civilization processes. The total food intake in university students, regardless a slow inclination to proper nutrition, has been more influenced by a decreasing purchasing power in Slovak population.

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Received March 8, 2006.

Accepted March 24, 2006.