

DIETARY SURVEY IN HUNGARY, 2009. PART II: VITAMINS, MACRO- AND MICROELEMENTS, FOOD SUPPLEMENTS AND FOOD ALLERGY

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The fourth countrywide nutrition survey was initiated and co-ordinated by the Hungarian Food Safety Office jointly to the yearly Household Budget Survey of Hungarian Central Statistical Office in 2009. The dietary assessment was performed by trained interviewers and skilled dieticians using a complex questionnaire system, containing three-day diary, short food frequency questionnaire and questions on taking of dietary supplements and on prevalence of food allergy. The data records were processed and the questionnaires were validated, the results obtained on the micronutrient intakes of the adult population are shown in this article. From fat soluble vitamins, the average daily intakes of vitamins A and D were lower than the national recommendations in case of both genders, meaning low intake for around 60% (in case of retinol) and 80–90% (in case of calciferols) of adults. The intakes of some water soluble vitamins belonging to B group, vitamin C and folates were low as well. Regarding the macroelements, the most important health problem on population level is the extremely high sodium load of the inhabitants, combined with unfavourable sodium/potassium ratio. The average daily calcium intake of every age and gender group was far below the recommended value. The average daily intake of iron was low for the 50% of adult females. The article also provides data on frequency of food supplement taking habits of inhabitants and of self-reported food allergy.

Keywords: nutrition survey, food consumption, vitamin intake, macroelements, microelements, food supplements, food allergy

After three Hungarian nutrition surveys listed in Part I, the fourth nationwide representative survey was co-ordinated by the Hungarian Food Safety Office (HFSO) in cooperation with the Hungarian Central Statistical Office (HCSO) in 2009. The first article of the authors has introduced energy- and macronutrient intake and anthropometric data (SZEITZ-SZABÓ et al., 2011). This contribution shows the daily intakes of micronutrients (macro- and microelements, vitamins), some data on taking of dietary supplements, on prevalence of food allergy, and on groups with possibly inadequate or excessive nutrient intakes.

1. Materials and methods

The detailed methodology was treated in Dietary survey in Hungary, 2009. Part I (SZEITZ-SZABÓ et al., 2011).

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1.1. Subjects

Jointly to the yearly National Household Budget Survey (HBS) of HCSO, 4992 persons completed the nutritional questionnaire, 3982 adults (1723 male and 2259 female), 1010 children and adolescents. This article analyses data derived from adults only, except data on food allergy and food supplement taking habit when all responders' answers have been taken into account.

1.2. Dietary assessment

To assess the nutritional habits including food consumption, daily energy- and nutrient intake of the individuals, a three-day dietary questionnaire was recorded by the subjects. Data records were processed by skilled dieticians in the study centre, calculations were performed using NutriComp Diet (Étrend) software (BIRÓ et al., 1999; RODLER et al., 2005). The possibly under- and over-reporters were categorised on the base of daily energy intake (EI)/basal metabolic rate (BMR) ratio, according to GOLDBERG and co-workers (1991). Their data were treated separately, and were not taken into account at calculation of nutrient intake but their answers have been considered regarding food allergy and food supplement.

1.3. Food allergy, taking dietary supplements

There were questions on existence of food allergy or food intolerance and on the type of causative foodstuffs. The custom and regularity of the taking of dietary supplements was examined as well.

1.4. Calculating the proportion of nutrient inadequacy

According to the suggested method of the Institute of Medicine in the USA to calculate extreme level of daily nutrient intake of subjects (IOM, 1998; 2000), 70% and 130% of the RDA were defined as lower (potentially inadequate) and higher border (excessive intake), respectively, as published earlier (BIRÓ et al., 2005; 2007; USDA, 2009).

1.5. Statistical analysis

The database was maintained in MS-Access 2003. Statistical analysis was carried out by SPSS for Windows 11.0 package. Results were expressed as mean, standard deviation (SD) and percent values of the appropriate variables.

2. Results and discussion

From 3982 adult responders 3077 (77.3%) adults had valid, reliable results beside 21.8% and 0.9% possibly under- and over-reporters, respectively. Age and gender groups were formed according to the categories of national nutrient recommendations as follows: 19–30, 31–60 and over 60 years. The results of average daily intakes were compared to the national recommendations. Table 1 shows recommendations – the Hungarian (ANTAL, 2005), European Communities (EC, 2008) and WHO (WHO/FAO, 2003) as well – for the possibility of wider comparison.

Table 1. Recommended Dietary Intakes of some micronutrients

Nutrients	H RDI ^a		EC RDI ^b		WHO RDI ^c	
	Males	Females	Males	Females	Males	Females
Sodium (g)	2	2	–	–	2	2
Potassium (g)	3.5	3.5	2	2	–	–
Calcium (mg)	800–1000 ^d	800–1000 ^d	800	800	1000–1300	1000–1300
Magnesium (mg)	350	300	375	375	230–260	190–220
Iron (mg)	10	15–18 ^d	14	14	11–14	9–29
Copper (mg)	1.1	1.1	1	1	–	–
Zinc (mg)	10	9	10	10	7–14	4.9–9.8
Manganese (mg)	4	4	2	2		
Chromium (µg)	120	120	40	40		
Phosphorus (mg)	620–775 ^d	620–775 ^d	700	700		
Retinol equ. (mg)	1	0.8	0.8	0.8	0.6	0.5
Thiamine (mg)	1.1	0.9	1.1	1.1	1.2	1.1
Riboflavin (mg)	1.6	1.3	1.4	1.4	1.3	1.1
Pyridoxine (mg)	1.3–1.7 ^d	1.3–1.5 ^d	1.4	1.4	1.3–1.7	1.3–1.5
Cobalamins (µg)	2	2	2.5	2.5	2.4	2.4
Ascorbic acid (mg)	90	90	80	80	45	45
Calciferols (µg)	5	5–6 ^d	5	5	5–15	5–15
Tocopherol (mg)	15	15	12	12	10	7.5
Niacin equ. (mg)	18	14	16	16	16	14
Folate (µg)	200	200	200	200	400	400
Pantothenic acid (mg)	5	5	6	6	5	5

^aHungarian Recommended Dietary Intake

^bRecommended Dietary Intake of EC

^cRecommended Dietary Intake of WHO

^dIt depends on age

2.1. Vitamins

From fat soluble vitamins (Table 2) the national recommendation of vitamin A (retinol) is formulated as Retinol Equivalent (recently Retinol Activity Unit). 1 RAU is equal to 1 µg retinol or 12 µg β-carotene (Ross, 2006). The average daily intake of both males (0.8 mg) and females (0.7 mg) is lower than the recommendation, which means low intake for 62% of males and 59% of females (Table 6).

Regarding the intake of vitamin D the average daily intake of calciferols was 3.7 µg and 2.8 µg in case of males and females, respectively, so these intakes were low for the 80% of males and 95% of females (Table 6).

In the recent study the average intakes of vitamin E (α-tocopherol) were 17.8 mg/day and 14.2 mg/day for males and females, respectively, which meet the requirements.

From water soluble vitamins (Table 3) the average daily intake of vitamin B₁ (thiamin) was 1.16 mg for males and 0.91 mg for females, which are adequate according to the national – but are lower than the international – recommendations (WHO/FAO, 2002; EAS, 2003).

Table 2. Average daily intake of fat soluble vitamins (mean \pm SD)

Average intake	Retinol (μ g)	β -carotene (mg)	Retinol equ. (mg)	Calciferols (μ g)	α -Tocopherol (mg)
Male					
19–30 y	567.5	2.9	0.8	2.8	18.2
n=278	\pm 789.7	\pm 1.8	\pm 0.8	\pm 1.9	\pm 6.1
31–60 y	595.3	3.0	0.8	2.7	18.3
n=812	\pm 865.9	\pm 2.1	\pm 0.9	\pm 1.5	\pm 5.9
> 60 y	459.6	2.8	0.7	2.3	15.8
n=270	\pm 619.2	\pm 1.7	\pm 0.7	\pm 1.3	\pm 5.7
Male total	562.7	2.9	0.8	2.6	17.8
n=1360	\pm 808.2	\pm 2.0	\pm 0.9	\pm 1.5	\pm 6.0
Female					
19–30 y	452.8	2.7	0.7	2.0	14.3
n=262	\pm 690.7	\pm 2.2	\pm 0.8	\pm 1.0	\pm 5.1
31–60 y	497.5	2.9	0.7	2.0	14.5
n=980	\pm 785.1	\pm 2.2	\pm 0.8	\pm 1.0	\pm 4.3
> 60 y	445.5	2.8	0.7	1.9	13.6
n=475	\pm 723.2	\pm 1.6	\pm 0.8	\pm 1.0	\pm 4.4
Female total	476.3	2.8	0.7	2.0	14.2
n=1717	\pm 754.5	\pm 2.0	\pm 0.8	\pm 1.0	\pm 4.5
Altogether					
19–30 y	511.8	2.8	0.7	2.4	16.3
n=540	\pm 744.8	\pm 2.0	\pm 0.8	\pm 1.6	\pm 5.9
31–60 y	541.8	2.9	0.8	2.3	16.2
n=1792	\pm 823.9	\pm 2.2	\pm 0.9	\pm 1.3	\pm 5.4
> 60 y	450.6	2.8	0.7	2.1	14.4
n=745	\pm 686.9	\pm 1.7	\pm 0.7	\pm 1.1	\pm 5.0
Total	514.5	2.9	0.8	2.3	15.8
n=3077	\pm 779.8	\pm 2.0	\pm 0.8	\pm 1.3	\pm 5.5

The average intakes of vitamin B₂ (riboflavin) were 1.46 mg/day and 1.22 mg/day for males and females, respectively, which are lower than the national recommendation, so these intakes were low for about the 20% of the adult people (Table 6).

The average daily intakes of vitamin B₆ (pyridoxine) were 2.1 mg and 1.6 mg for males and females, respectively, which averages meet the national recommendations.

In case of vitamin B₁₂ (cobalamins) the national recommendation is 2.0 μ g/day for both genders, so the average daily intake of 3.7 μ g and 2.8 μ g for males and females, respectively, seems to be adequate.

The average daily intakes of folates were 151.8 μ g for males and 130.0 μ g for females. Since the national recommendation is 200 μ g/day for both genders (400 μ g for pregnant women), these intakes were markedly low for 41% of males and 65% of females (Table 6).

The average intake of pantothenic acid (males: 4.2 mg/day, females: 3.2 mg/day) is considerable low for both gender.

Table 3. Average daily intake of water soluble vitamins (mean \pm SD)

Average intake	Thiamin (mg)	Riboflavin (mg)	Pyridoxine (mg)	Cobalamins (μ g)	Folate (μ g)	Panthotenic acid (mg)	Biotin (μ g)	Niacin equ. (mg)	Ascorbic acid (mg)
Male									
19–30 y	1.19	1.47	2.09	3.6	166.5	4.1	34.3	41.3	94.2
n=278	± 0.35	± 0.48	± 0.61	± 2.8	± 62.7	± 1.5	± 10.4	± 11.2	± 65.9
31–60 y	1.20	1.50	2.14	3.9	166.4	4.3	34.4	43.1	98.2
n=812	± 0.39	± 0.46	± 0.63	± 3.1	± 63.1	± 1.7	± 10.6	± 11.0	± 73.6
> 60 y	1.02	1.32	1.88	3.0	141.6	3.7	29.6	36.2	85.8
n=270	± 0.36	± 0.40	± 0.56	± 2.2	± 53.4	± 1.2	± 8.9	± 9.4	± 54.5
Male total	1.16	1.46	2.08	3.7	161.5	4.2	33.4	41.4	95.0
n=1360	± 0.39	± 0.46	± 0.62	± 2.9	± 62.0	± 1.6	± 10.4	± 11.1	± 68.8
Female									
19–30 y	0.92	1.21	1.66	3.1	130.4	3.1	26.7	30.4	81.4
n=262	± 0.27	± 0.38	± 0.55	± 3.3	± 50.0	± 1.0	± 10.3	± 7.5	± 54.8
31–60 y	0.92	1.24	1.64	2.9	132.6	3.3	26.5	31.7	84.7
n=980	± 0.27	± 0.37	± 0.46	± 2.5	± 50.0	± 1.1	± 8.4	± 7.4	± 54.8
> 60 y	0.86	1.20	1.56	2.6	129.0	3.1	25.6	29.7	83.9
n=475	± 0.26	± 0.33	± 0.46	± 2.0	± 50.0	± 1.0	± 8.1	± 8.6	± 52.9
Female total	0.91	1.22	1.62	2.8	131.3	3.2	26.3	31.0	84.0
n=1717	± 0.27	± 0.36	± 0.48	± 2.5	± 50.0	± 1.1	± 8.6	± 7.8	± 54.2
Altogether									
19–30 y	1.06	1.34	1.88	3.4	149.0	3.7	30.6	36.0	88.0
n=540	± 0.34	± 0.45	± 0.62	± 3.0	± 59.7	± 1.4	± 11.0	± 11.0	± 61.0
31–60 y	1.05	1.36	1.87	3.4	147.9	3.8	30.1	36.9	90.8
n=1792	± 0.36	± 0.43	± 0.60	± 2.8	± 58.8	± 1.5	± 10.2	± 10.8	± 64.3
> 60 y	0.92	1.24	1.68	2.7	133.6	3.3	27.0	32.0	84.6
n=745	± 0.31	± 0.36	± 0.52	± 2.1	± 51.5	± 1.1	± 8.7	± 9.4	± 53.4
Total	1.02	1.33	1.82	3.2	144.6	3.7	29.4	35.6	88.8
n=3077	± 0.35	± 0.42	± 0.59	± 2.7	± 57.6	± 1.4	± 10.1	± 10.7	± 61.3

The national recommendation of niacin is formulated as niacin-equivalent (niacin [mg] + tryptophan [mg] / 60), 18 mg/day for males and 15 mg/day for females, so the daily intake of 41.4 mg and 31.0 mg for males and females, respectively, seems to be high enough.

The average daily vitamin C intakes were 95.0 mg and 84.0 mg for males and females, which in view of the 90 mg national recommendation were low for the 39% of males and 44% of females according to the national recommendation. One has to remark that the EC RDI slightly, while the WHO RDI is remarkably lower than the HU RDI.

2.2. Macroelements

The average daily intakes of macroelements are shown in Table 4.

Table 4. Average daily intake of macroelements and sodium/potassium ratio (mean \pm SD)

Average intake	Sodium (g)	Potassium (g)	Sodium/Potassium	Calcium (mg)	Phosphorus (mg)	Magnesium (mg)
Male						
19–30 y	7.1	3.2	2.3	772.1	1376.1	457.3
n=278	± 1.9	± 0.8	± 0.6	± 325.0	± 339.4	± 124.2
31–60 y	7.4	3.2	2.4	697.9	1354.7	470.9
n=812	± 1.9	± 0.8	± 0.6	± 327.7	± 325.5	± 122.7
> 60 y	6.2	2.9	2.2	635.3	1169.7	413.5
n=270	± 1.7	± 0.7	± 0.6	± 270.8	± 294.6	± 126.6
Male total	7.1	3.1	2.4	700.7	1258.6	456.8
n=1360	± 1.9	± 0.8	± 0.6	± 319.4	± 354.5	± 125.7
Female						
19–30 y	5.0	2.6	2.0	690.8	1036.9	368.0
n=262	± 1.4	± 0.7	± 0.5	± 286.1	± 244.7	± 96.4
31–60 y	5.2	2.6	2.0	647.1	1032.8	374.5
n=980	± 1.3	± 0.6	± 0.6	± 278.8	± 227.9	± 93.5
> 60 y	4.9	2.6	2.0	635.9	987.4	358.7
n=475	± 1.2	± 0.6	± 0.5	± 246.0	± 228.4	± 87.8
Female total	5.1	2.6	2.0	650.7	1005.3	369.1
n=1717	± 1.3	± 0.6	± 0.5	± 271.7	± 239.6	± 92.6
Altogether						
19–30 y	6.1	3.0	2.1	732.7	1211.5	414.0
n=540	± 2.0	± 0.8	± 0.6	± 309.2	± 342.0	± 120.1
31–60 y	6.2	2.9	2.2	670.2	1178.7	418.2
n=1792	± 2.0	± 0.8	± 0.6	± 302.9	± 319.5	± 117.9
> 60 y	5.4	2.7	2.1	635.7	1053.5	378.6
n=745	± 1.6	± 0.7	± 0.5	± 255.1	± 268.9	± 106.8
Total	6.0	2.8	2.2	672.8	1118.9	407.9
n=3077	± 1.9	± 0.7	± 0.6	± 294.8	± 322.3	± 116.9

The uppermost recommended daily intake of sodium is 2.0 g for both males and females (it is equal to approximately 5 g salt), but this target seems to be inaccessible for decades. The current intakes are 7.1 g and 5.1 g sodium/day for males and females, respectively, which is an excessive intake for more than 99% of the subjects (Table 6). It would be necessary to diminish the sodium (salt) intake on population level, but the main problem is that most of the sodium comes from processed foodstuffs (bread, meat products, cheeses, etc.), not from table salting.

The average potassium intake is lower than the recommended 3.5 g/day in case of both genders, resulting in a definitely unfavourable (around 2.0–2.4 g/g) sodium/potassium ratio (which would be ideal around 0.6–1.0 g/g, depending on the different recommendations).

The national recommendation of calcium intake for middle-aged men and women is 800 mg/day, whereas above 60 years is 1000 mg/day. The average daily intake of all age and gender group (range is 635–772 mg) was far below the recommended value, which was remarkably low intake for around the 45% of the adult people (Table 6).

In the recent survey the average phosphorus intake of adult men was 1260 mg/day, the women's intake was 1005 mg/day. These intakes with the low calcium values produce extremely unfavourable calcium/phosphorus ratio (the equimolar 4:3 mass ratio would be ideal), which is disadvantageous among others for bone health (considering the inadequate calciferol intake).

Both of males' and females' average daily magnesium intake (457 mg and 369 mg, respectively) was greater than the national recommendation ensuring adequate intake for most adults.

2.3. Microelements

Table 5 reveals the daily intakes of microelements.

Table 5. Average daily intake of microelements (mean \pm SD)

Average intake	Iron (mg)	Zinc (mg)	Copper (mg)	Manganese (mg)	Chromium (μ g)
Male					
19–30 y	12.8	10.6	1.2	2.5	69.1
n=278	± 3.5	± 2.9	± 0.4	± 0.9	± 28.3
31–60 y	12.9	10.5	1.2	3.0	66.1
n=812	± 3.3	± 3.0	± 0.4	± 6.8	± 27.0
> 60 y	11.1	8.8	1.1	2.4	59.5
n=270	± 3.0	± 2.5	± 0.4	± 0.8	± 24.3
Male total	12.6	9.6	1.2	2.6	64.4
n=1360	± 3.4	± 3.1	± 0.4	± 4.7	± 26.9
Female					
19–30 y	9.6	7.9	0.9	2.0	56.1
n=262	± 2.5	± 2.1	± 0.3	± 0.9	± 22.7
31–60 y	9.7	7.7	0.9	2.3	54.4
n=980	± 2.4	± 2.0	± 0.3	± 4.4	± 22.4
> 60 y	9.2	7.0	0.9	2.2	55.6
n=475	± 2.4	± 1.9	± 0.4	± 3.4	± 23.0
Female total	9.6	7.4	0.9	2.2	55.1
n=1717	± 2.4	± 2.1	± 0.3	± 3.5	± 23.0
Altogether					
19–30 y	11.3	9.3	1.0	2.3	62.8
n=540	± 3.5	± 2.9	± 0.4	± 0.9	± 26.5
31–60 y	11.2	9.0	1.1	2.6	59.7
n=1792	± 3.2	± 2.9	± 0.4	± 5.6	± 25.3
> 60 y	9.9	7.7	1.0	2.3	57.0
n=745	± 2.8	± 2.3	± 0.4	± 2.7	± 23.5
Total	10.9	8.4	1.0	2.4	59.3
n=3077	± 3.2	± 2.8	± 0.4	± 4.1	± 25.2

The average daily intake of iron was 12.6 mg and 9.6 mg for males and females, respectively, so the intake of males was satisfactory, whilst that of females was low, compared to the national recommendations. The intake was low for the 50% of females (Table 6).

The average intake of zinc in case of both males and females was lower (9.6 mg/day and 7.4 mg/day, respectively) than the recommendation.

The average daily intakes of copper were 1.2 mg for males and 0.9 mg for females, which was low for 34% of women.

Both of males' and females' average manganese intake (2.6 mg/day and 2.2 mg/day, respectively) was lower than the national recommendation.

The average daily intakes of chromium were 64.4 µg for males and 55.1 µg for females, which was low for around 80% of the adults.

Table 6. Percentage of subjects with low and/or high intake of selected micronutrients

Nutrients ^a	Male (n=1360)			Female (n=1717)			Altogether (n=3077)		
	Intake of nutrients (%)			Intake of nutrients (%)			Intake of nutrients (%)		
	Low	Normal	High	Low	Normal	High	Low	Normal	High
Sodium (g)	–	0.1	99.9	0.1	1.0	98.9	–	0.6	99.4
Potassium (g)	19.1	76.1	4.8	43.6	55.7	0.6	32.8	64.7	2.5
Calcium (mg)	42.1	45.5	12.4	46.9	46.0	7.2	44.8	45.8	9.5
Magnesium (mg)	1.8	53.0	45.1	1.5	61.6	36.9	1.6	57.8	40.6
Iron (mg)	1.8	58.2	40.1	49.5	43.5	7.0	28.4	50.0	21.6
Copper (mg)	8.6	71.5	19.9	34.2	61.9	4.0	22.9	66.1	11.0
Zinc (mg)	12.1	71.1	16.8	28.7	68.1	3.3	21.4	69.4	9.2
Manganese (mg)	68.2	30.1	1.8	85.2	13.9	0.9	77.7	21.0	1.3
Chromium (µg)	80.6	18.4	1.0	89.0	10.8	0.2	85.3	14.2	0.6
Phosphorus (mg)	–	7.9	92.1	0.2	27.5	72.2	0.1	18.9	81.0
Retinol equ. (mg)	62.3	29.1	8.6	58.8	31.9	9.3	60.4	30.6	9.0
Thiamine (mg)	12.8	66.5	20.7	12.1	73.6	14.3	12.4	70.5	17.1
Riboflavin (mg)	22.9	67.5	9.6	18.9	70.5	10.6	20.6	69.2	10.2
Pyridoxine (mg)	2.1	17.4	80.5	5.6	59.4	34.9	4.1	40.8	55.1
Cobalamins (µg)	7.0	34.3	58.8	16.0	50.5	33.5	12.0	43.3	44.7
Ascorbic acid (mg)	38.7	33.2	28.1	43.9	35.0	21.1	41.6	34.2	24.2
Calciferols (µg)	79.5	17.9	2.6	95.5	4.5	0.1	88.4	10.4	1.2
Tocopherol (mg)	7.4	58.3	34.3	19.2	69.6	11.2	14.0	64.6	21.4
Niacin equ. (mg)	–	2.5	97.5	–	2.0	98.0	–	2.2	97.8
Folate (µg)	41.0	52.4	6.5	65.1	33.1	1.8	54.5	41.6	3.9
Pantothenic acid (mg)	37.8	55.4	6.8	66.9	31.8	1.3	54.0	42.2	3.7

2.4. Other factors, related to nutrition

The questionnaire had two important issues, dealing with taking of dietary supplements, and existence of food allergy of people in this study. In case of these topics data of all responders (including children and adolescents) were processed and are shown in Table 7.

Table 7. Proportion (as category percent) of food supplement takers

Age group M / F / A ^a	Food supplement takers (regular takers, %)		
	Male	Female	Altogether
<1 y	1 (1)	6 (3)	7 (4)
6/20/26	16.7 (100.0)	30 (50.0)	26.9 (57.1)
1–3 y	23 (19)	22 (16)	45 (35)
64/67/131	35.9 (82.6)	34.4 (72.7)	35.2 (77.8)
4–6 y	23 (16)	24 (19)	47 (35)
66/65/131	35.4 (69.6)	38.1 (79.2)	36.7 (74.5)
7–10 y	30 (20)	39 (29)	69 (49)
93/108/201	32.3 (66.7)	37.1 (74.4)	34.8 (71.0)
11–14 y	26 (14)	23 (11)	49 (25)
115/118/233	23.4 (53.8)	19.5 (47.8)	21.4 (51)
15–18 y	31 (13)	27 (14)	58 (27)
135/153/288	23.1 (41.9)	18.2 (51.9)	20.6 (46.6)
19–30 y	84 (33)	96 (48)	180 (81)
353/350/703	24.2 (39.3)	27.8 (50.0)	26.0 (45.0)
31–60 y	196 (110)	353 (171)	549 (281)
1038/1306/2344	19.0 (56.1)	27.3 (48.4)	23.6 (51.2)
>60 y	79 (44)	175 (109)	254 (153)
332/603/935	24.0 (55.7)	29.2 (62.3)	27.3 (60.2)
Total	493 (270)	765 (420)	1258 (690)
2202/2790/4992	22.6 (54.8)	27.8 (54.9)	25.5 (54.8)

^a n of males, females and altogether, respectively

2.4.1. Taking dietary supplements. According to the survey more than 25% of the whole population consume dietary supplements and more than 50% of those are regular (means: everyday) takers. The proportion of dietary supplement taker children has ranged in a wide scale between 16.7% (boys under 1 year) and 38.1% (4–6 years old girls). The proportion of regular takers under 18 years is extremely high (41.9–100.0%).

Regarding the adult groups, 19.0–29.2% of them took dietary supplement. Within these groups 39–62% of the subjects had consumed vitamin or mineral product(s) regularly (Table 7).

2.4.2. Food allergy The question related to food allergy of subjects did not differentiate the genuine allergy from food intolerance (e.g. the most frequent lactose intolerance) in the survey so the two terminologies are mixed at this stage. Regarding the grand total, 3.5% of the subjects had marked some kind of food related health problem. The highest degree (7.5%) was noticeable in case of 15–18 years old females, and it is observable, that more females had complaints than males (4.3% vs. 2.5%) (Table 8). According to the answers of subjects, Fig. 1 shows the most frequent causatives of food allergy and food intolerance.

Table 8. Subjects with food allergy

Age group M / F / A ^a	Male	Female	Altogether
<1 y 6/20/26	–	–	–
1–3 y 64/67/131	5 7.8%	1 1.6%	6 4.7%
4–6 y 66/65/131	–	2 3.2%	2 1.6%
7–10 y 93/108/201	4 4.3%	5 4.8%	9 4.5%
11–14 y 115/118/233	4 3.6%	5 4.2%	9 3.9%
15–18 y 135/153/288	4 3.0%	11 7.5%	15 5.4%
19–30 y 353/350/703	7 2.0%	11 3.2%	18 2.6%
31–60 y 1038/1306/2344	23 2.2%	57 4.4%	80 3.5%
>60 y 332/603/935	8 2.4%	27 4.5%	35 3.8%
Total 2202/2790/4992	55 2.5%	119 4.3%	174 3.5%

^a n of males, females and altogether, respectively

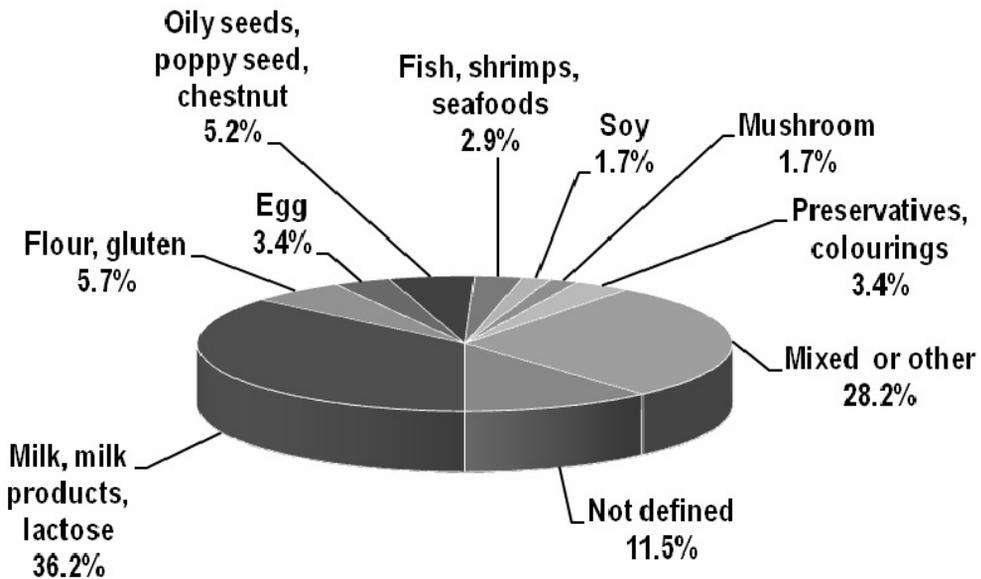


Fig. 1. Causatives of food allergy and food intolerance of the subjects

3. Conclusion

Regarding the intakes of macroelements, the most important health problem on population level is the extremely high sodium load of the inhabitants (referring to 99% of the people). This topic requires nationwide cooperation to face the challenge. On the other hand, the daily intake of some micro-nutrients is lower than the requirements for the larger or smaller proportion of the Hungarian population, in spite of the mostly high calorie intake. The average calcium intake is very low in every age and gender groups, which is worsened taking into account the serious vitamin D deficiency. The average iron intake of females, and the intakes of vitamin A-, B-group (partly), vitamin C and folate are also lower than the requirements of both genders.

At the evaluation of the micro-nutrients intake it should be noted that the results refer only to the supply from regular diet of population. Vitamin and mineral contents of fortified foodstuffs and food supplements generally were not included in the calculation of the average intakes due to lack of exact data. It is proposed carrying out analysis and evaluation of biological samples to explore the actual micronutrient level of population and to determine if the widespread consumption of food supplements has any effect on the nutritional status of the population.

According to the results of the recent countrywide representative survey, marks of the energy excess and micronutrient deficiency are together with the imbalanced structure of food consumption of the Hungarian people.

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