MALNUTRITION AND NUTRIENT INTAKE VALUES IN THE HUNGARIAN ELDERLY

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Summary
Introduction. Both obesity and malnutrition are health risks for the elderly, and deficiencies of certain vitamins and minerals also frequently occur.
Aim. The aim of this survey was to assess and analyse nutritional status, occurrence of malnutrition, and the nutrient intake of elderly persons over 55 years of age.
Material and method. Anthropometric data from 327 elderly persons were collected, and the Mini Nutritional Assessment (MNA) questionnaire was used to screen for malnutrition. Nutrient intake was assessed by 24-hour recall, and a nutrient calculator (NutriComp) was also used. The data were analysed using SPSS 15.0 software.
Results. According to MNA a quarter (25.07%) of participants were found to be either malnourished or to be at high risk of it, but – interestingly – only 3.98% of those had a subnormal BMI. On the other hand, a third of the subjects (31.19%) were obese (with BMI > 30 kg/m^2). Total energy intake in both genders was lower than recommended (8943 kJ for men and 7493 for women versus 10450 kJ recommended). Fat energy and sodium intake were higher, while carbohydrate, calcium, vitamin D, C, folate and dietary fibre intake were lower than recommended. Overall daily fluid consumption, which is important for the elderly, fell below the desirable level.
Conclusions. In the Hungarian elderly, a relatively high risk of malnutrition and imbalance of nutrient intake (sodium excess and insufficiency of fluid, dietary fibre, calcium, vitamin D, and folate) was found and should be corrected.

Key words: elderly, malnutrition, energy intake, nutrient intake, Hungarian

INTRODUCTION

By 2050 the number of European citizens over 65 years of age is expected to rise by 70%, and the number of octogenarians by 170% – a serious challenge for the Europe of the 21st century (1). In Hungary in 2009 the proportion of the population over 65 years old was 16.3% (2). Unfortunately, the life expectancy and healthy life span of this age group are lower than the European average.

In old age loss of lean body mass and increase of fat content occur, leading to a slowing down of the metabolism. Due to this and the more inactive lifestyle, there is a decrease in the energy requirement which – with unchanged appetite – results in body mass increase. On the other hand, malnutrition caused by poor appetite due to impaired taste and smell, or by difficulties with chewing and swallowing, is also frequent. In addition, disturbed nutrient absorption may lead to deficiencies of certain vitamins (D, B_{12}) and minerals (calcium) (3).

Therefore, the assessment of dietary patterns and nutrient intake in the Hungarian elderly with the aim of proposing and introducing modern, balanced nutrition sustaining health and quality of life is a professional and social responsibility.

AIM

The aim of the survey was to assess and analyse nutritional status, occurrence and risk of malnutrition and obesity, and nutrient intake values for home-living or institutionalized Hungarian persons over 55 years of age, and to identify nutrition-related risks which could hinder "successful aging".

MATERIAL AND METHOD

The survey was carried out in 2008-2009 on 327 volunteers over 55 years old, living independently or in institutions of community care. Gender, living status, education and age subgroups are shown in table 1.

Personal and anthropometric data were obtained by a questionnaire containing both open and closed questions. To screen malnutrition, the Mini Nutritional Assessment (MNA) developed for the elderly was used (4). Nutrient intake was examined by 24-hour recall plus the NutriComp nutrient calculator. Data processing and analyses were done using SPSS 15.0 statistical software.

RESULTS

25.07% of subjects were found to be malnourished or at high risk of malnutrition according to the Mini Nutri-

tional Assessment questionnaire (see table 2). Note that malnutrition was more frequent in the institutionalized versus home-living elderly and in the capital of Hungary versus the countryside.

Table 1. Data of examined subjects (N = 327).

		N	%
Gender	men	91	27.8
	women	236	72.2
Residence	Budapest	145	44.3
	country	182	55.7
Institutionalized or home-living	institutionalized	116	35.5
	home-living elderly	211	64.5
Education	higher educated	118	36.1
	secondary or lower educated	209	63.9
Age (years)	55-65*	62	19.0
	65-75	142	43.4
	75-85	106	32.4
	85 ≥	17	5.2

*Late middle age

Based on the body mass index (BMI) (tab. 3 and 4) only 3.98% of participants were found to be malnourished (BMI < 20 kg/m^2), which reflects significant divergence from the MNA results. As MNA was developed to study the elderly age group, its results may be more appropriate to be taken into account. There was no gender-related difference in the BMI distribution but 31.19% of the investigated elderly subjects were found to be obese (BMI > 30 kg/m^2), which occurred more frequently in the age group of 65-75 years than in younger or more advanced age.

The analysis of nutrient intake values (tab. 5) showed that total energy intake in the elderly is lower than recommended and lower in females than males. On the other hand, the fat energy % was higher than recommended, without a gender-related difference. Elderly people with a higher education level had a more favourable distribution of fatty acid intake (not shown in the tables). Cholesterol intake was adequate, but the most advanced age group showed a significant surplus (p = 0.038). Carbohydrate rate was lower than recommended for the age groups, but it is beneficial that the quantity of added sugar did not exceed the allowed limit. Interestingly, those in community care had higher sugar consumption (p = 0.012) than people living in their own homes. In both genders the consumption of dietary fibre was lower than recommended (tab. 5).

As for micronutrients (tab. 6), the survey showed that sodium intake surpassed the recommended rate in both sexes but was higher in men than women (p = 0.006) and in the subgroup of elderly with lower education (p = 0.045). Calcium and vitamin D intake was significantly lower than needed but those in community care had higher values (p = 0.032). Iron intake was acceptable. Vitamin B_{12} con-

Table 2. Evaluation of the Mini Nutritional Assessment (MNA) (N = 327).

		Normal nutritional status[1] (by screening)		Normal nutritional status[2] (by total score)		At risk of malnutrition[3] (by total score)		Malnourished[4] (by total score)	
		N	%	N	%	N	%	N	%
Institutionalized or home-living	**institutionalized**	65	56.03	1	0.86	37	*31.90	13	11.21
	home-living elderly	177	83.89	2	0.95	24	11.37	8	3.79
Age (years)	**55-65**	45	72.58	.	0.00	13	20.97	4	6.45
	65-75	113	79.58	3	2.11	16	11.27	10	7.04
	75-85	77	72.64	.	0.00	26	24.53	3	2.83
	85 ≥	7	41.18	.	0.00	6	35.29	4	23.53
Residence	**Budapest**	101	69.66	1	0.69	31	21.38	12	**8.28
	country	141	77.47	2	1.10	30	16.48	9	4.95
Total		242	74.01	3	0.92	61	18.65		6.42

1. > 12 points: normal – not at risk – no need to complete assessment
2. > 23.5 points: (screening assessment points) – normal
3. 17-23.5 points: (screening assessment points) – at risk of malnutrition
4. < 17 points: (screening assessment points) – malnourished
*p < 0.001 versus home-living elderly
**p = 0.014 versus countryside

Table 3. Distribution of BMI by gender (N = 327).

			N	Min	Max	Mean	Median	Std
BMI (kg/m^2)	**Gender**	**men**	91	14.69	40.27	27.15	26.57	4.67
		women	236	14.52	56.51	28.31	27.99	6.03

Table 4. Distribution of BMI by age (N = 327).

BMI		Age (years)				Total
		55-65	65-75	75-85	85 ≥	
< 20	N (%)	6 (1.83)	5 (1.53)	1 (0.31)	1 (0.31)	13 (3.98)
20-30	N (%)	38 (11.62)	86 (26.30)	77 (23.55)	11 (3.36)	212 (64.83)
> 30	N (%)	18 (5.50)	*51 (15.60)	28 (8.56)	5 (1.53)	102 (31.19)
Total	N (%)	62 (18.96)	142 (43.43)	106 (32.42)	17 (5.20)	327 (100.00)

*p = 0.038 versus other subgroups

Table 5. Distribution of energy and macronutrient consumption by gender (based on 24-hour recall) (N = 137).

		N	Min	Max	Mean	Median	Std	[1]Recommended nutrient values
Energy (kJ)	m	41	4534.08	17791.69	8943.21	8452.36	3150.048	10450
	w	96	2042.64	19575.44	*7493.71	7130.87	2828.539	
Protein 2(E%)	m	41	6.62	21.46	15.31	15.03	3.342	13
	w	96	6.58	26.41	14.71	14.10	3.318	
Fat (E%)	m	41	4.01	45.91	31.74	32.07	9.894	30
	w	96	15.10	81.91	35.39	33.53	10.034	
3SFA (E%)	m	41	0.59	17.55	9.27	9.15	3.831	10
	w	96	4.18	28.71	10.93	10.12	4.034	
4MUFA (E%)	m	41	0.54	18.53	10.13	9.41	4.437	12
	w	96	3.48	35.73	11.29	9.98	4.649	
5PUFA (E%)	m	41	0.36	13.44	7.78	8.16	3.271	6-8
	w	96	1.25	15.16	8.20	8.24	2.821	
n6/n3	m	41	5.55	62.82	31.73	31.15	16.535	40-50
	w	96	4.01	308.37	31.18	27.13	32.065	
Cholesterol (mg)	m	41	61.98	673.06	286.92	249.30	158.936	< 300
	w	96	33.71	807.20	247.08	204.74	147.898	
Carbohydrates (E%)	m	41	32.11	81.94	50.64	48.68	11.192	57
	w	96	11.12	71.97	49.38	50.62	9.788	
Added sugar (E%)	m	41	0.00	50.49	7.03	4.62	8.353	< 10
	w	96	0.00	29.52	5.76	4.91	5.009	
Dietary Fibre (g)	m	41	7.17	44.95	21.16	20.28	7.536	≥ 25
	w	96	4.51	42.39	21.00	20.08	7.265	

1. Recommended energy and nutrient intake for over 60 year-olds – Source: Rodler I. (ed): Hungarian Nutrient Data Bank, Medicina Könyvkiadó Rt., Budapest, 2005
2. %E = % of total energy;
3. SFA = saturated fatty acid;
4. MUFA = monounsaturated fatty acid;
5. PUFA = polyunsaturated fatty acid.
*p = 0.012 versus men

sumption of women did not reach the recommended value while for men and for the home-living elderly the intake was acceptable (p = 0.002). Vitamin C consumption was less than recommended, but higher in the subgroup of home-living elderly (p < 0.001). Folate intake was well below the recommended value (tab. 6).

Table 6. Distribution of micronutrients, alcohol, caffeine, and fluid consumption by gender (based on 24-hour recall) (N = 137).

		N	Min	Max	Mean	Median	Std	[1]Recommended nutrient values
Na (mg)	**m**	41	1758.66	9828.71	*4866.33	4554.62	1950.468	≤ 2000
	w	96	500.33	10071.29	3860.88	3687.12	1506.822	
Ca (mg)	**m**	41	160.95	1778.35	587.37	559.72	338.423	1000
	w	96	95.09	1625.39	589.65	543.01	290.484	
Mg (mg)	**m**	41	116.75	585.90	322.36	305.36	119.506	350
	w	96	110.87	695.29	315.20	303.49	108.052	300
Fe (mg)	**m**	41	3.21	16.88	9.20	9.35	3.262	10
	w	96	1.86	20.99	7.79	7.15	3.123	8
Vitamin B_{12} (μg)	**m**	41	0.33	11.06	**2.23	1.98	1.745	2.0
	w	96	0.00	5.85	1.67	1.59	0.922	
Vitamin C (mg)	**m**	41	4.29	368.98	78.88	40.99	83.286	90
	w	96	2.75	436.79	85.06	64.35	71.588	
Vitamin D (μg)	**m**	41	0.16	8.60	1.58	1.31	1.384	5
	w	96	0.00	9.97	1.52	1.26	1.211	6
Folate (μg)	**m**	41	44.85	297.84	123.52	102.25	59.358	200
	w	96	9.91	354.91	115.31	104.02	61.600	
Alcohol (g)	**m**	41	0.00	180.00	***6.53	0.00	28.895	–
	w	96	0.00	84.00	0.88	0.00	8.573	
Caffeine (mg)	**m**	41	0.00	300.00	31.38	0.00	58.848	–
	w	96	0.00	640.00	43.83	16.00	83.920	
Fluid (g)	**m**	41	243.58	4030.03	1240.53	1010.58	738.652	1500
	w	96	302.80	11145.85	1263.87	1009.73	1208.988	

1. Recommended micronutrient intake for over 60 year-olds – Source: Rodler I. (ed): Hungarian Nutrient Data Bank, Medicina Könyvkiadó Rt., Budapest, 2005

*p=0.006 versus women

**p=0.030 versus women

***p=0.004 versus women

Alcohol consumption was well below the tolerable level but was correlated with gender and education. Men, and people with higher education (p = 0.013) drank more. The overall fluid consumption was less than desirable (tab. 6).

DISCUSSION

The Seneca study (5) and the Ageing Nutrition Project (6) are probably the most important cross-sectional comparative European studies to investigate nutrition in the elderly, but a longitudinal study has not been carried out so far. Regarding Hungary, three cross-sectional surveys of all age groups have been performed between 1985 and 2003 (7-10).

We investigated only the elderly subpopulation, but in more detail than before. First, we also assessed life mode (residence, level of education), and found significant associations with the nutritional status (24-hour recall): Fat energy % and salt intake were lower in the more educated elderly persons but alcohol consumption was higher. Vitamin B_{12} and C intake of the home-living elderly was higher but sugar and vitamin D intake were lower versus the subgroup in community care. Additionally to BMI detailed anthropometric data were obtained (not shown in this paper). Malnutrition was assessed by MNA and BMI as well. We found – as a new finding – that there is a discrepancy between the two methods. We believe that MNA validated for the elderly is more informative and should be the method of choice.

It is not surprising that beside malnutrition obesity (BMI > 30 kg/m^2) is also common in the elderly, especially in the age group 65-75, being less frequent in younger and older age groups.

CONCLUSION

We conclude that characteristics of nutrition patterns in the elderly should be carefully evaluated to be able to identify nutrition related risks, which inhibit "successful aging" (11). As the study suggests, we must pay greater care to the optimal intake of macro- and micronutrients,

which may be imbalanced, excessive (as in the case of sodium) or insufficient (e.g. dietary fibre, calcium, vitamin D, folate, fluid) in the diet of the elderly. Modern, balanced "elderly specific" diets would greatly contribute to maintenance of good health (12-14). □

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