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Preliminary communication

HOW MUCH IS YOUR DIET? (ESTIMATION ABOUT PRICES OF "TRADITIONAL HUNGARIAN", DIABETIC, LOW ENERGY DIETS, AND RELATED LIFE-STYLE EXPENSES)

G. Iski[a], L. Biró[b], T. Ungvári[a] and I. Rurik[a]*

[a]Department of Family and Occupational Medicine, Faculty of Public Health, University of Debrecen, H-4032 Debrecen. Móricz Zsigmond krt. 22. Hungary
[b]NutriComp Ltd. H-1091 Budapest, Üllői út 179. Hungary

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Nutrition and lifestyle-related diseases are some of the leading morbidities among the Hungarian population. People who want to lose weight often complain that healthy diet is expensive.

Our aim was to quantify the costs of three different types of diet for a three-day period. We compared "traditional Hungarian", low energy, and diabetic diets, considering both energy content and expenses related to lifestyle.

According to our estimation: diabetic (including medication) and "traditional" Hungarian diets were the most expensive. Low energy diet proved to be the most cost-effective despite the extra expenditures of higher physical activity.

Keywords: costs, diabetic diet, expenses, Hungarian diet, low energy diet

Research has clearly indicated that diet plays an important role in the prevention of obesity and related conditions like diabetes. Nutrition has come to the fore as one of the major modifiable determinants of chronic diseases. Dietary and lifestyle patterns can produce substantial gains in the population's health (Story et al., 2007).

Proper diet can support the required lifestyle changes, treatments, and medications as well. A healthy diet should contain macro -and micro -nutrients with vitamins, minerals, and trace elements in sufficient quantities. The number of scientific evidence emphasizing the role of key nutrients in full health, vitality, and longevity is increasing (USDA, 2010).

Diet and lifestyle-related diseases (cardiovascular diseases, cancer, diabetes, and obesity) are the leading diseases of the Hungarian population and are responsible for the majority of early mortality (KSH, 2012).

Special diets are frequently used by obese persons to reduce body weight, by diabetics to provide the proper ratio of macronutrients, and often to reduce energy intake as well (Lehota et al., 2014).

Medical Nutritional Therapy can offer a special focus to the needs of diabetic and obese patients (Vetter et al., 2014). Organic diet has become more popular in the last decade based

* To whom correspondence should be addressed.
Phone: +36 52 25 52-52; fax: 36 52 25 52-53; e-mail: Rurik.Imre@sph.unideb.hu

on the natural way of production (and ripening) without using chemicals in the agricultural processes.

The so-called "traditional Hungarian diet" is rich in fats and added salt and requires specific preparation cooking/baking processes. Many of these foods and dishes are considered as unhealthy "typical flavours" (Biró, 2007).

"Very low carbohydrate" and „very low fat" diets recommended for weight reduction usually contain higher proportion of protein beside lower carbohydrates and fats.

Those who are obese or want to lose weight often complain that a healthy diet is too expensive. A significant proportion of obese people live in socially disadvantaged circumstances, making the cost/price of food an even more important issue. Food costs are frequently cited as a reason for failure to address eating behaviours in practice; this is a perceived barrier rather than a real one. Other factors, such as taste, time scarcity, and cooking skills of the family, impact upon family food-purchasing choices. In the present economic climate, it is possible that the current cost of healthier food might rise at a higher trajectory than low-cost, energy-dense food types (Banks et al., 2012).

1. Materials and methods

1.1. Diets

Our objective was to assess and compare three different diets in terms of expenses. The costs and energy contents of three different diets were estimated: I. "traditional Hungarian", II. "low energy", and III. "diabetic", subjected to a 3-day period and compared. Energy content, medications, and expenses related to lifestyle were considered as well.

1.2. Methods of analysis

The energy contents of three different 3-day sample diets were compared using a specific software, NutriComp® (Nutricomp LTD, Budapest). Besides the prices of food and dishes, the average expenses of physical activities and medications were also considered. Expenditures were determined by the average Hungarian retail and wholesale prices, in the year of 2013, based on the data published by the Hungarian Central Statistical Office (KSH, 2013).

Ethical permission was not required to this study.

2. Results and discussion

I. "Traditional Hungarian", known as generally consumed or habitual diet (Table 1): The average energy content of a traditional Hungarian diet per day is approximately 3000 calories. This includes many foods and ingredients that professionals do not recommend because of their high calorie content and unhealthy composition.

The daily average cost of the "traditional Hungarian" 3-day model diet was 2211 HUF. People who prefer this diet are usually overweight and usually drink sweetened soft drinks (Lugasi et al., 2010; Sarkadi Nagy et al., 2012). If we consider this extra consumption, the daily cost could be as much as 2800 HUF/day.

Table 1. „Traditional" Hungarian diet

		Price (HUF)/100 g	Energy (Kcal)/100 g	Consumed dose (g) If other*	Consumed food cost (HUF)
1. day	chocolate milk	24	64	250 ml*	60
	butter	128	727	10	13
Breakfast	jam/marmalade	166	263	60	100
(594 Kcal)	milk-loaf	99	403	50	50
Snack/ elevenses (670 Kcal)	butter	128	727	10	13
	crescent	40	616	100	40
	ham	239	160	50	120
Lunch	chicken soup with angel hair	101	87	400	404
(1196 Kcal)	pig stew, noodles	186	212	400	744
Dinner (533 Kcal)	sausage	316	293	125	395
	bread	28	259	60	17
	cucumber	50	12	100	50
Total				(2993 Kcal)	**2 006**
2. day	bread	28	259	60	17
	bacon	130	447	100	130
Breakfast (774 Kcal)	cucumber	50	12	100	50
	chocolate milk	25	64	250 ml*	63
Snack/ elevenses (712 Kcal)	pudding	54	70	200	108
	waffles	99	415	100	99
	jam/marmalade	166	263	60	100
Lunch (922 Kcal)	meatball and vegetable soup	120	49	400	480
	cottage cheese noodle with pork greaves	195	182	400	780
Snack (219 Kcal)	chestnut puree with whipped cream	250	219	100	250
Dinner (226 Kcal)	pizza	300	226	100	300
Total				(2854 Kcal)	**2 377**
3. day	bread	28	259	60	17
	sausage	316	293	125	395
Breakfast (543 Kcal)	tomato	100	22	100	100
	butter	128	727	10	13
Snack/ elevenses (494 Kcal)	bread	28	259	60	17
	cheese	170	372	50	85
	ham	239	160	50	120
Lunch (1303 Kcal)	bean soup	120	70	400	480
	garlic, roasted flitch rice with peas	204	256	400	816
Snack (216 Kcal)	pancakes with jam	160	270	80	128
Dinner (165 Kcal)	egg	80	165	2 pieces*	80
Total				(2721 Kcal)	**2 251**
Mean					2211

II. Low energy diet (Table 2): Estimating the costs of healthy (physically active) lifestyle in Hungary, expenses were the lowest with this type of diet. In a low energy diet the recommended energy intake was 1500–2000 calories/day for a man with average body size and physical activity. The daily cost of meal was 1870 HUF. People who would like to lose weight usually drink water, so the consumed fluid during the day from non-carbonated mineral water was 200 HUF/2 litre. In addition, (multi)vitamin supplementation, (approximately 2000 HUF/30 pieces) cost 67 HUF a day, amounting to a total of 2137 HUF. Being an essential element of healthy lifestyle, regular exercise in a fitness club or gym was estimated to cost 10 000 HUF a month; further sport-related cost/day was 334 HUF, making the daily total expenditure 2471 HUF.

Table 2. Low energy diet

		Price (HUF)/100 g	Energy (Kcal)/100 g	Consumed dose (g) If other*	Consumed food cost (HUF)
1. day	fruit tea	1400	0	1	14
	Trappist cheese	170	340	100	170
Breakfast (433 Kcal)	bread	28	259	30	9
	radish	300	15	100	300
Snack/ elevenses (149 Kcal)	puffed rice	149	354	20	30
	buttercream	180	380	10	18
	pepper	50	20	200	100
Lunch (675 Kcal)	currant cream soup, cauli-flower casserole, pork	230	169	400	920
Snack (70 Kcal)	apple	28	35	200	56
Dinner (455 Kcal)	frankfurter	100	105	60	100
	greenpea stew	100	392	400	400
Total				(1782 Kcal)	**2117**
2. day	orange juice	42	59	200 ml*	84
	egg	40	143	1 pieces*	20
Breakfast (486 Kcal)	bun	42	273	100	42
	cucumber	50	12	100	50
Snack/ elevenses (170 Kcal)	fruit salad	100	170	100	100
Lunch (977 Kcal)	potato soup with vegetables,fried liver, greenbean stew, bread	230	244	400	920
Snack (60 Kcal)	pumpkin	12	30	200	24
Dinner (428 Kcal)	ham	221	157	100	221
	cow's milk	25	88	200 ml*	50
	bread	28	259	30	9
	salad	85	17	100	85
Total				(2121 Kcal)	**1605**

Table 2 continued

		Price (HUF)/100 g	Energy (Kcal)/100 g	Consumed dose (g) If other*	Consumed food cost (HUF)
3. day	cow's milk	25	88	200 ml*	50
	poultry frankfurter	100	105	100	100
Breakfast (399 Kcal)	bread	28	259	30	9
	pepper	50	20	200	100
Snack/ elevenses (157 Kcal)	grape	70	81	150	105
	cracker bread	220	350	10	22
Lunch (764 Kcal)	chicken soup, pasta with cabbage	230	191	400	920
Snack (141 Kcal)	kefir	50	65	150 ml*	75
	wholemeal biscuit	150	423	10	15
Dinner (175 Kcal)	ham	239	160	50	120
	asparagus	250	16	100	250
	tomato	50	22	200	100
	cracker bread	220	350	10	22
Total				(1635 Kcal)	**1888**
Mean					**1870**

III. Diabetic diet as a part of the Medical Nutrition Therapy (Table 3)**:** A diabetic man with average anthropometric parameters is expected to consume 1600–1800 calories per day. The daily price of this specific diet was calculated to cost 2054 HUF (Fővényi & Gyurcsáné, 2014). Patients need sugar-free drinks, which usually cost more than mineral water. In comparison, mineral water costs 200 HUF/2 litre, sugar-free soft drinks are sold for 442 HUF/litre, while sugar-free syrup is 403 HUF/0.5 litre. Even if following the recommendations of Medical Nutritional Therapy strictly, most of the patients need medications as well. The monthly average cost of oral antidiabetic drugs falls in the range of 500–4000 HUF, i.e. (17–133 HUF/day. Diabetic patients are also advised to exercise at least three times a week, and the same expenses are considered as calculated above (334 HUF). Total daily cost amounts to 2892 HUF (Table 3).

Table 3. Diabetic diet

		Price (HUF)/100 g	Energy (Kcal)/100 g	Consumed dose(g) If other*	Consumed food cost (HUF)
	freshly squeezed orange				
1. day	juice	42	50	200 ml*	84
	cornflakes	120	423	30	36
	milk	24	53	200 ml*	48
Breakfast (575 Kcal)	wholegrain bread	40	256	50	20
	plant origin margarine	128	325	3.5	45
Snack/ elevences (118 Kcal)	apple	28	59	200	56

Table 3 continued

		Price (HUF)/100 g	Energy (Kcal)/100 g	Consumed dose(g) If other*	Consumed food cost (HUF)
Lunch (746 Kcal)	steamed seafish with wholegrain bread, plant origin margarine, butter-bean, grilled tomatoes, broccoli	322	187	400	1 288
Snack (154 Kcal)	wholegrain bread	40	256	30	12
	cottage cheese	143	76	100	143
Dinner (80 Kcal)	fibrous fruit juice or home-cooked soup	42	70	115	48
Extra dinner (106 Kcal)	pear	40	53	200	80
Total				(1779 Kcal)	**1 860**
2. day	tomato juice	30	20	115	35
	yogurt	127	65	125	159
Breakfast (175 Kcal)	puffed rice	149	354	20	30
Snack/ elevenses (89 Kcal)	grated apple or pear	40	59	150	60
Lunch (600 Kcal)	cold roast beef, baked potato greased with plant origin margarine, skimmed milk, mixed vegetable salad, orange	322	150	400	1 288
Snack (199 Kcal)	crispbread	289	36	2 slices*	29
	egg	80	165	2 pieces*	80
Dinner (230 Kcal)	brown rice, natural chicken	250	200	115	288
Extra dinner (208 Kcal)	orange	38	41	200	76
	sultanas	178	282	4 pieces*	80
Total				(1501 Kcal)	**2 125**
3. day	grapefruit juice	48	52	115	55
	egg	80	165	2 pieces*	80
Breakfast (424 Kcal)	wholegrain bread	40	256	50	20
	butter	128	727	10	13
Snack/ elevenses (173 Kcal)	wholegrain bread	40	256	50	20
	lean ham	239	157	30	72
Lunch (824 Kcal)	whole wheat bread greased with plant origin margarine, seafish (fresh or canned without oil), sliced cucumber, apple or pear	322	206	400	1 288
Snack (126 Kcal)	sultanas	178	282	4 pieces*	80
Dinner (150 Kcal)	vegetable or salad	333	100	150	500
Extra dinner (68 Kcal)	grapefruit	37	52	130	48
Total				(1765 Kcal)	**2 176**
Mean					**2 054**

3. Conclusions

As far as the financial rank list is concerned, diabetic diet turned out to be the most expensive. As excess weight is predominantly present years before the onset of diabetes, and also it plays a crucial role in triggering the disease, proper nutritional habits can prevent (or delay) the onset of disease. In Hungary, 5–6% of the total adult population is estimated to suffer from diabetes (KSH, 2014). At least 75% of them also have excess body weight. Weight reduction is essential for obese diabetic patients. The sooner this is achieved, the more significant improvement can be observed in the individual's life expectancy and therapeutic outcomes (Kékes & Kiss, 2014). In favourable cases diabetes may even regress or at least become easier to manage. Therefore, dietary treatment and proper medication are the main tools of management for obese diabetics.

Energy-rich, traditional Hungarian dishes constitute the second most costly diet, which, unfortunately, is combined with a basically sedentary lifestyle. Poor eating habits are inevitably passed on to the children as a model to follow.

Low energy diet and physically active lifestyle appear to be the most cost-effective combination. Obesity, the development of diabetes and certain other diseases caused by inappropriate nutrition and lifestyle are preventable (Móczár & Rurik, 2015), improved vitality being an extra bonus. According to the official estimations, approximately a monthly income of 120 000 HUF per capita is deemed necessary to keep up the average standard of living in Hungarian households; 70 000 HUF and 215 000 HUF representing minimum and good levels, respectively (KSH, 2013). According to our calculations, healthy lifestyle costs approximately 75 000 HUF.

In the United States, where the prevalence of obesity is the highest, low energy diet is less acceptable among low-income families. Based on the researchers' findings, 2000-calorie diet would just cost $3.52 a day if it consisted of junk food, compared with $36.32 a day for a diet of low energy dense foods (Parker-Pope, 2007). In the United Kingdom and in Germany, the cost of every lost kilogram from body weight was calculated as 122 USD (Fuller et al., 2013). Another US study examined the price elasticity of demand of sugar-sweetened beverages, fast food restaurants, and fruit and vegetables. The cheaper prices were associated with lower bodyweight, suggesting that reducing the cost of fruit and vegetables seems to be effective in reducing obesity (Powell et al., 2013).

Although this quasi arbitrary comparison considering the findings above and some previous studies proved that expenses related to nutritional habits and lifestyle practice could modify the health status of individuals even to improve or deteriorate, while individual differences could be wide and hardly comparable. Our study underlines the importance of healthy food choices and lifestyle, which could be the best saving of expenses for the future.

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Actual exchange rates at the time of survey (2013):

1 HUF=0.0032 EUR 1 EUR= 315 HUF

1 HUF=0.0039 USD 1 USD=255 HUF

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