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RISK IN NUTRITION HABITS OF SLOVAK POPULATION

ZAGROŻENIA W NAWYKACH ŻYWIENIOWYCH LUDNOŚCI SŁOWACJI

Abstract: The aim of the study was to provide a current assessment of the Slovakian adults self-reported dietary, and identify and analyze differences between females and males in anthropometries, food habits, preferences and eating attitude. Data are from a cross-sectional survey of 1 400 adults (700 males and 700 females) from different regions of Slovakia. Participants reported their usual consumption of meat and milk and their products, fruits and vegetables, legumes, sweets, and drinks. The study found that 34.05 % of participants (38.14 % females, and 30.0 % males) had a normal weight, while in 21.86 % of males and 15.72 % of females ($p < 0.01$) prevailed light obesity. Participants reported their usual weekly consumption (number of serves) of foods of vegetable and animal origin. The study found that 62.29 % of females were met the weekly consumption of dairy products three times and more ($p < 0.001$). Males (59.14 %) preferred consumption of pork meat at least once a week and beef (87.14 %). Consumption of poultry was law, with 83.86 % of all participants, having poultry meat at least once a week, 4.21 % eating rabbit meat and 20.43 % having fish (at least once a week). Fresh fruit ($p < 0.01$) as well as vegetable ($p < 0.001$) consumed at least three times a week more females than males (62 % and 42 % of females, respectively; $p < 0.01$). Age and gender difference occurred for more measures, and there were some socio-economic status differences. On the basis of the results of this study, it appears that a significant proportion of the Slovakian adults fall short of current, national dietary and physical activity recommendations for adults. Continual monitoring of these behaviours is essential to help inform research and policy and identify where future efforts should be directed.

Keywords: nutritional habits, food preferences, eating patterns, anthropometries, primary prevention, Slovak inhabitants

The value of the long-term programme of improving public health status in the Slovak Republic "Health for All in the 21st Century" lies in the fact that it represents a model of complex health prevention and health care and its improvement, which was developed according to current needs of medical fields including national health policy. The Report on Public Health Status in the Slovak Republic suggests a positive outcome of implementation of preventive programmes aimed at health promotion, although no

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significant changes were noted in the structure of mortality stratified according to death causes. Five most common causes of death, like cardiovascular diseases, cancer, external causes (accidents, intoxications, homicides, suicides etc.), respiratory diseases and diseases of digestive system resulted in 95 % of all deaths. Cardiovascular diseases and cancer account quantitatively for the most important causes of death. Trends in mortality changes in the Slovak Republic are similar, to some degree, to those in the European Union.

A trend of mortality due to cardiovascular diseases in the whole Slovak population is sluggish. The incidence of heart attack is decreasing for all age categories, especially in males at productive age. The highest mortality due to cardiovascular diseases in both sexes at the age of 65 years and older was noted in southern and south-eastern regions of the Slovak Republic. This also applies to cerebrovascular diseases, ischemic heart disease, and heart attack. A trend of age-specific mortality due to chronic heart diseases did not almost change in the whole population in the last three decades [1].

The occurrence of non-infectious diseases depends in high range from lifestyle and nutrition belongs also to these risk factors which can be influenced. To decrease the influenced factors in whole population should result in decreasing of morbidity and mortality of these non-infectious diseases [2]. Poor eating habits or exercise regimens and lifestyle choices could lead to chronic disease later in life [3]. Monitoring and evaluation of nutritional habits is very important step to form an opinion on healthy status of population, identification of deficiency in human nutrition and following intervention with the aim of the primary prevention of civilization diseases with the respect of principles in the right human nutrition, mainly in the current national dietary and physical activity recommendations for adults.

The aim of the study was to provide a current assessment of Slovakian adults self-reported dietary, and identify and analyze differences between females and males in anthropometries, food habits, preferences and eating patterns.

Material and methods

Approval to conduct the study was obtained from all appropriate ethics committees as well as participants. Following an established protocols, members of the research team administered the anonymous pencil-and-paper questionnaire to groups of up to 100, 200, 300, and maximum 400 adults on the given the region of Slovakia under their free-time under exam conditions. To ensure that disproportionate sampling did not bias the prevalence estimates, data were weighted by age, gender, and physical activity.

Nutritional habits, food repertoire and anthropometric measurements were assessed in 1400 randomly selected Slovak inhabitants, aged from 25 to 75 years, from different regions of Slovakia. Participants' age was recorded at last birthday. The study recruited 700 females and 700 males (the age of 345 females and 350 males was less than 50 years and 355 females and 350 males were at least 50 years).

With the aim, overweight and obesity prevalence examined by body mass index (BMI) was evaluated in all participants [4].

Waist-to-hip ratio (WHR) was calculated by dividing waist circumference (measured 1 inch ie 2.54 cm above the umbilicus) by hip circumference (measured at the maximum girth over the buttocks). According to waist-to-hip ratio was in the obese participants: the gynoid (in the case of WHR less than 0.85 by females and less than 1 by males) and android (in the case of WHR at least 0.85 by females and at least 1 cm by males) health risk detected [5].

Waist circumference (measured in cm) was used to make a survey of risk of metabolic complications of obesity: adequate risk at the waist circumference less than 80 cm and less than 94 cm by females and by males, respectively; increased risk at the 80 cm and more by females and 94 cm and more by males; very high risk at the minimum 88 cm by females and minimum 102 cm by males [4].

The questionnaire and food frequency questionnaire, which were used to analyze of the nutritional habits of subjects, were composed at the Department of Human Nutrition in Nitra. The data were collected during the year 2007. Evaluation of ingested food was given according to the energy intake of 150–160 kJ (35/38 kcal) per kg a day [6–9].

The statistical evaluation and differences between females and males were analyzed using Statgraphics software. Differences between males and females were evaluated by using t-test and chí-quadratic test.

Results and discussion

A total of 1 400 adults agreed to participate in this study from different regions of Slovakia. Data from all participants aged between 25 and 75 years were analyzed. A summary of the demographic profile of the sample is shown in Tables 1 and 2.

Table 1

Demographic profile of the sample (n = 1400)

Age group [years]	Female		Male		All	
	n	[%]	n	[%]	n	[%]
To 50	345	49.29	350	50.00	695	49.64
50 and more	355	50.71	350	50.00	705	50.36
All	700	100.00	700	100.00	1400	100.00

Table 2

Demographic profile of the sample

Age group [years]	Female		Male		All	
	n	[%]	n	[%]	n	[%]
25–35	143	20.43	142	20.29	285	20.36
36–45	144	20.57	144	20.57	288	20.57
46–55	143	20.43	143	20.43	286	20.43
56–65	138	19.71	134	19.14	272	19.43
66–75	132	18.86	137	19.57	269	19.21
All	700	100.00	700	100.00	1400	100.00

Table 3

A summary of the antropomethric parameters of female

Parameter	Less than 50 years				50 years and more			
	BMI	WHR	Waist	Hip	BMI	WHR	Waist	Hip
Count	345	345	345	345	355	355	355	355
Average	24.1383	0.796319	80.8899	101.551	27.2549	0.845042	90.6845	106.975
Standard deviation	3.9518	0.073797	11.4145	10.304	4.47615	0.0935501	13.7784	12.1205
Coeff. of variation	16.3715 %	9.26727 %	14.1111 %	10.1467 %	16.4233 %	11.0705 %	15.1938 %	11.3302 %
Minimum	16.96	0.62	60.0	74.0	18.29	0.0	60.0	65.0
Maximum	40.63	1.08	130.0	140.0	44.53	1.18	131.0	148.0
Range	23.67	0.46	70.0	66.0	26.24	1.18	71.0	83.0
Stnd. skewness	4.5717	4.17394	6.1358	4.27568	6.03909	–13.743	5.19443	2.21659
Stnd. kurtosis	1.97911	2.86442	3.06241	0.492298	2.82858	70.0023	0.151479	3.43683

Table 4

A summary of the antropometric parameters of males

Parameter	Less than 50 years				50 years and more			
	BMI	WHR	Waist	Hip	BMI	WHR	Waist	Hip
Count	350	350	350	350	350	350	350	350
Average	26.1535	0.914314	92.0429	100.754	28.2186	0.941971	97.9114	104.157
Standard deviation	3.51201	0.104593	10.6468	11.1431	3.91523	0.0894418	12.6128	11.6705
Coeff. of variation	13.4284 %	11.4395 %	11.5672 %	11.0597 %	13.8746 %	9.49517 %	12.8819 %	11.2047 %
Minimum	17.7	0.0	63.0	73.0	19.59	0.57	32.0	56.0
Maximum	53.76	1.22	130.0	195.0	42.27	1.31	140.0	155.0
Range	36.06	1.22	67.0	122.0	22.68	0.74	108.0	99.0
Stnd. skewness	12.9747	–15.591	2.72523	25.9879	4.18217	3.34342	0.581529	2.75388
Stnd. kurtosis	39.1862	66.8618	2.59984	103.582	0.537752	6.61415	8.61759	6.76192

Table 3 and Table 4 show a summary data of the antropomethric parameters of the participants, both males and females.

As shown in Table 3 and Table 4 the normal weight was observed in 34.07 % of respondents (38.14 % of females and 30 % of males). The overweight was higher with males contrary to females (21.86 % of males vs 15.72 % of females), ($p < 0.01$), where in both sexes prevailed light obesity. According to BMI, obesity prevailed in males (21.86 %) rather than with females (53.29 %).

The proportion of obesity was observed rather in the age group of 50 years and more, both males and females. The waist-hip circumference ratio (WHR) has been used to assess distribution of adipose tissue.

The WHR has been reported to be strongly associated with visceral fat, although waist circumference alone may be a better predictor of visceral fat deposition than WHR [2, 10, 11]. The significance of level of visceral (omental and mesenteric) adipose tissue is its reported relationship to higher risk for chronic disease. In response to the evidence supporting waist circumference as a predictor of morbidity and mortality from chronic disease. WHO has published a waist circumference scale to classify overweight and obesity [12]. According to this, in about 52.09 % of participants the gynoid obesity was observed (44 % in the age of less than 50, and 16.94 % in the group of females in the age of 50 and more). In males, the android obesity was higher at the age less under 50 years than over ($p < 0.001$).

As presented in Table 5, males met the recommended weekly requirement of consumed type of meat. Males were more likely than females to consume pork meat ($p < 0.001$) and beef ($p < 0.01$), and poultry, however, there was not significant age differences.

Table 5

Quantity of consumed meat [g], fish [g] and eggs [pieces] a week (average ± SD)

Meat	Consumption	
	Females	Males
Pork	180.88 ± 176.44	234.01 ± 260.07
Beef	70.38 ± 98.75	95.45 ± 176.84
Poultry	223.69 ± 167.68	235.32 ± 265.64
Fish	62.93 ± 81.53	64.42 ± 108.27
Another meat (lamb...)	2.87 ± 28.00	4.10 ± 29.74
Game	6.16 ± 27.00	6.27 ± 21.91
Eggs	2.78 ± 3.42	3.24 ± 3.74

It was reported eating only 62.93 g of fish (females) and 64.42 g (18.29 % males) at least once per week. The proportion of participants consuming the recommended amount of meat decreases with age. Fish never consumed 7.21 % of participants. It was observed that fish consumption rapidly decreased within the last six years, and it is prevailed in females rather than males [2].

The consumed meat amount was evaluated according to the basket of foods [8], which was arranged for one week and supply daily intake of 10 800–11 340 kJ (2400–2700 kcal), or 150–150 kJ (35/38 kcal) per kg body weight a day, respectively. According to this, it was observed higher intake of pork meat and poultry, namely in males, and full insufficient intake of fish, which is associated also with low intake of unsaturated fatty acids.

As shown in Table 6, females reported eating dairy products at least three times in week ($p < 0.001$). Females were more likely than males to consume yogurts, both low-fat and creamy. Males reported consuming low-fat curd and curd classic, in the amount of 3.43 g and 46.52 g per week, respectively. The similar consumption was observed also in other types of fermented liquid milk products, such as kefir, acidophilus milk, etc. Around 15 % of respondents do not consume fermented milk products at all. Milk was relatively popular in all age categories, but consumption of cheese was lowest among individuals aged 65 years and older. It seems, that a high price of the cheese products may play a significant role.

Table 6

Quantity of consumed dairy products [g] a week (average ± sd)

Dairy products	Female	Male
Yogurt low-fat	174.22 ± 268.30	124.22 ± 227.22
Yogurt creamy	164.63 ± 278.13	153.29 ± 322.32
Curd low-fat	30.43 ± 90.25	33.43 ± 112.91
Curd	45.40 ± 102.82	46.52 ± 112.35
Kefir, acidophilous milk	149.50 ± 277.23	151.42 ± 278.83
Cream	82.34 ± 131.38	77.86 ± 167.43
Cheese low-fat	62.47 ± 129.12	50.95 ± 113.84
Cheese	139.19 ± 208.50	137.18 ± 211.18
Processed cheese low-fat	89.75 ± 156.46	63.47 ± 135.80
Processed cheese	159.35 ± 233.28	186.30 ± 265.70
Cottage cheese	28.21 ± 93.71	29.74 ± 95.32
Others	13.62 ± 63.13	13.90 ± 67.88

It is generally known, that milk and milk products are rich in bone minerals, which are normally found in the skeleton and gives an outline of the normal physiology and metabolism of bone. The adult skeleton contains about 1 kg of calcium and is in equilibrium with the plasma calcium at a concentration of about 2.25–2.60 mmol/dm^3. A large number of factors control calcium balance. The mount of calcium within the skeleton changes with age, according to size and composition, increasing during growth and declining with the bone loss of later years [13].

As Table 7 and 8 indicate, any of adults did not meet the recommended daily requirement of four or more serves of vegetable ($p < 0.001$) and fresh fruits ($p < 0.01$). Only 56.28 % of respondents wee more likely to consume at least one (maximum four) serves per week, however, there was no significant age difference. The same percentage

of both females and males reported eating one to four weekly serves of fruit. Females were more likely than males to achieve this. The proportion of adults consuming the recommended amount of fruits and vegetables decreased with age [13].

Table 7

Quantity of consumed fruit [g] a week (average ± SD)

Fruit	Female	Male
Apple	523.09 ± 545.67	487.57 ± 470.57
Peer	49.10 ± 126.90	61.28 ± 183.53
Citrus fruit	273.22 ± 412.02	255.61 ± 359.29
Banana	173.19 ± 238.24	172.99 ± 251.76
Plum, apricot, peach	65.95 ± 292.98	39.79 ± 107.70
Cherry, sour cherry, Cornelian cherry	43.64 ± 126.23	29.73 ± 113.62
Strawberry, raspberry, ribese, gooseberry	58.99 ± 195.72	33.53 ± 81.41
Grape	66.81 ± 290.47	57.99 ± 157.41
Bilberries, cranberries, pineapple	30.06 ± 86.81	31.53 ± 100.46

Table 8

Quantity of consumed vegetables [g] a week (average ± SD)

Vegetables	Female	Male
Potato	374.41 ± 361.44	454.46 ± 409.85
Tomato	252.37 ± 301.67	225.32 ± 286.91
Paprika	169.03 ± 244.74	169.63 ± 234.52
Cucumber	143.79 ± 181.87	141.33 ± 188.57
Cabbage	105.25 ± 146.36	105.86 ± 154.33
Carrot	209.46 ± 249.57	185.23 ± 241.20
Onion, garlic, leek, chive	242.72 ± 272.11	222.20 ± 242.91
Broccoli, cauliflower	60.16 ± 74.74	47.95 ± 117.91
Cole, spinach, lettuce	50.06 ± 67.51	40.57 ± 86.03
Radish, mangold , kohlrabi, parsley	88.87 ± 174.58	73.91 ± 118.35
Others	3.82 ± 29.37	3.18 ± 30.13

Fresh fruit ($p < 0.01$) as well as vegetable ($p < 0.001$) consumed at least three times a week more women than men (62 % and 42 % of females versus 54.71 % and 30.14 % of males respectively; $p < 0.01$).

As presented in Table 9, consumption of legumes is absolutey insufficient in both groups of participants.

Around 32 % of participants reported consuming legumes at least ones a week. When combined, only 20 % of participants usually consumed three serves of legumes per

month. There were not observed any significant differences between males and females. Consumption of legumes was generally low and increases with age. Consumption of potatoes was also lower in all age categories, while that of pastes was too high. The weekly consumption of sweet and sweetened beverages was excessively high.

Table 9

Quantity of consumed legumes [g] a week (average ± SD)

Legumes	Female	Male
Bean	64.88 ± 73.26	62.93 ± 71.86
Pea	55.53 ± 96.71	50.42 ± 57.15
Lentil	60.22 ± 103.35	55.00 ± 73.47
Soya	22.30 ± 80.54	18.83 ± 63.84
Garbanzo and others	3.68 ± 14.68	6.28 ± 44.03

Age and gender difference occurred for more measures, and there were some socio-economic status differences. Insufficient consumption of fruit, vegetable and legumes may lead into depression not only some vitamins but also dietary fiber. Lack of dietary fiber can be associated with other chronic diseases, such as breast cancer, colon cancer, etc it seems that population of Slovakia will need to improve their knowledge about healthy lifestyle [11]. With regard to prevention of obesity and *diabetes mellitus* type 2 is consumption of food with lower glycemic index preferable [16].

In the study were evaluated several eating aspects, which showing different inadequacies in nutrition and possible risks (including low consumption of fish etc.). Rational diet is very necessary to fully support human health and primary to prevent nutrition associated civilization diseases [15]. Lifestyle refers to subject's behavior resting upon the interaction of environmental conditions, personal characteristics, social factors and economic factors. A healthy lifestyle serves as one of the priorities of the programme of NATIONAL HEALTH PROMOTION PROGRAMME aiming at public education in health issues. By combining health education and effective health promotion strategy, one can achieve improvement in public health. Public health awareness: The most recent survey of public health awareness and behavior in the Slovak Republic suggested that 78 % of men and 72 % women regarded their health status as good, and that women suffered from long-term diseases more than men. The most prevailing conditions in elderly men and women include cardiovascular diseases followed by cancer, while allergy predominates in a younger population. Sixty percent of respondents believe that their life expectancy can be modified by the way they live and care about their health. Ninety percent of respondents from all age categories reported indolence as the main cause of their unhealthy lifestyle.

Conclusion

On the basis of the results of this study, it appears that a significant proportion of the Slovakian adults fall short of current, national dietary and physical activity recom-

mendations for adults. Continual monitoring of these behaviours is essential to help inform research and policy and identify where future efforts should be directed.

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ZAGROŻENIA W NAWYKACH ŻYWIENIOWYCH LUDNOŚCI SŁOWACJI

Abstrakt: Celem pracy było zbadanie diety dorosłych Słowaków, określenie różnic w pomiarach antropometrycznych, nawykach i preferencjach żywieniowych występujących między kobietami i mężczyznami. Uzyskane dane pochodzą z badań przekrojowych, którymi objęto 1400 dorosłych osób (700 mężczyzn i 700 kobiet) zamieszkujących w różnych rejonach Słowacji. Uczestnicy badań byli pytani o ilość spożywanego mięsa, mleka i produktów mlecznych, owoców i warzyw, roślin strączkowych oraz słodyczy i napojów. Badania wykazały, że prawidłowa masa ciała występowała u 34,05 % osób (38,14 % kobiet i 30,0 % mężczyzn). U 21,86 % mężczyzn i 15,72 % kobiet ($p < 0,01$) występowała lekka otyłość. Uczestnicy badań podali ilość spożywanych produktów zwierzęcych i roślinnych w ciągu jednego tygodnia (liczba dań). Badania wykazały, że 62,29 % kobiet spożywa produkty nabiałowe trzy lub więcej razy w tygodniu ($p < 0.001$). Mężczyźni (59,14 %) spożywali wieprzowinę i wołowinę (87.14 %) jeden lub więcej razy

w tygodniu. Spośród uczestników badań 83,86 % osób spożywało drób, 4,21 % mięso królików i 20,43 % mięso ryb co najmniej raz w tygodniu. Świeże owoce ($p < 0.01$) i warzywa ($p < 0.001$) były konsumowane co najmniej 3 razy w tygodniu – częściej przez kobiety niż przez mężczyzn (62 % kobiet i 42 % mężczyzn; $p < 0.01$). Różnice związane z płcią i wiekiem wystąpiły również w przypadku innych badanych cech. Różnice te często były związane ze statusem społeczno-ekonomicznym. Przeprowadzone badania wykazały, że znaczna część dorosłych Słowaków zaniedbuje prawidłową dietę i aktywność fizyczną. Ciągły monitoring tych zachowań jest niezbędny dla kształtowania polityki oraz rozpoznania kierunków przyszłych działań.

Słowa kluczowe: nawyki żywieniowe, preferencje żywieniowe, modele żywienia, antropometria, profilaktyka, mieszkańcy Słowacji