

## Health inequalities in Lithuania: education and nutrition habits

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**Key words:** nutrition habits, education, men, women.

**Summary.** The aim of the study was to evaluate the associations between food behavior and educational level among Lithuanian adult population. Five health behavior surveys were carried out within the international Finbalt Health Monitor project in 1994–2002. For every survey the national random sample of 3000 inhabitants aged 20–64 was taken from the National Population Register. The study material was collected through mailed questionnaires covering sociodemographic characteristics and some nutrition habits. The respondents were categorized according to the level of education into three groups: persons having incomplete secondary, secondary and university education. Multiple regression analysis was used for evaluation of associations between level of education and nutrition habits. The persons with university education have a healthier diet than those with incomplete secondary education. The consumption of fish, vegetables and fruit, use of vegetable oil for cooking, was substantially higher in those with university education as compared to persons with incomplete secondary education. The proportion of persons drinking whole milk was the highest among the low educated men and women. The high-educated women consumed meat less often than those with incomplete secondary education did. However, persons with university education preferred butter on bread. The high-educated men consumed cheese daily more often than those with low education. The positive trends in nutrition habits of Lithuanians were observed between 1994 and 2002. However, educational differences in nutrition habits still remain significant. In conclusion, alongside with other health interventions, the programs aimed at reducing inequalities in health should consider the educational differences in nutrition habits of Lithuanians paying more attention to less educated persons.

### Introduction

Health inequalities have been well documented in many European countries (1). Therefore, the fostering of stronger equity in health among groups within each country is one of the most important aims of European health policy “Health 21 – health for all in the 21<sup>st</sup> century” (2). In order to find effective strategic decisions it is essential to know the reasons for health inequalities. It is well documented that health inequalities depend on economic, cultural, psychosocial, environmental and lifestyle factors. Social differences in eating habits may partly explain social inequalities in health (3, 4). Earlier studies have shown that people with higher socioeconomic status have healthier diet compared to those with lower socioeconomic status (4–6). They consume more vegetables and fruits and less animal fats. People from

higher social classes are more likely to choose modern and healthy food products, while people with lower socioeconomic status tend to follow a traditional diet (7–9).

The most common indicators of socioeconomic status used in the studies are education, occupation and income (10). Education has some advantages compared to occupation and income, because it is easy to measure and it undergoes minor changes over adult life. Therefore, education is frequently selected to be the main measure of socioeconomic status. Studies on inequalities in health carried out in Lithuania show that people with university level of education have significantly lower mortality than do those with other levels of education (11, 12). Life expectancy of men with incomplete secondary education was 11.7 years shorter and that of women – 4.3 years

shorter as compared with better-educated men and women (13). Cardiovascular disease contributed 26.8% of such difference among men and 44.9% – among women.

Nutrition is related to cardiovascular and other noncommunicable diseases (14, 15). Consumption of fruits and vegetables, vegetable oils and fish reduces the risk of the diseases, while consumption of animal fat increases it. The assessment of educational differences in food habits is important for planning of noncommunicable diseases prevention strategy.

The aim of the study was to evaluate educational differences in food habits of Lithuanian adult population.

### Material and methods

Since 1994 five health behavior surveys have been carried out within the international FINBALT HEALTH MONITOR project. For every survey the national random sample of 3000 inhabitants aged 20–64 was taken from National Population Register. In April the questionnaires were mailed to the selected inhabitants and they were asked to send them back within two weeks. Those who did not respond within a month received a second questionnaire in May. In 1994 the questionnaires were filled in by 1864 persons, in 1996 – by 2021, in 1998 – by 1874, in 2000 – by 2195 and in 2002 – by 1883 persons. The response rate was respectively 64.3%, 68.9%, 63.8%, 74.4% and 63.4%.

The standard questionnaire included questions about the respondents' age, education, place of residence, nutrition and other health behaviors. In 1994 and 1996 the questionnaire contained fewer questions about nutrition than the later studies. In order to evaluate the relationship between nutrition and education the pooled data of 1998, 2000 and 2002 surveys were analyzed. The participants were asked about the frequency of consumption of certain food products during the previous week. The possible responses were: never, 1–2 days, 3–5 days and 6–7 days.

Data were analyzed using statistical package "SPSS 10.0 for Windows". The relationship between qualitative variables was assessed using chi-square test. The association between nutrition habits and education was estimated by fitting logistic regression models to dichotomous variables. The respondents according to their educational level were categorized into three groups: persons with incomplete secondary education, secondary and high (university) education. The respondents were grouped according to their place of residence as living in cities, towns or villages. Table 1 illustrates the grouping of respondents according to age, education and residence. All the models were fit separately to men and women. The overall effect was added first followed by education, age and finally place of residence. The incomplete secondary education category was reference category. The results of the adjusted main ef-

**Table 1. The number of respondents and response rate according to basic characteristics**

Characteristics		Men (n=2649)		Women (3295)	
		abs.	proc.	abs.	proc.
Year of the study	1998	791	30.7	1019	31.6
	2000	968	37.5	1173	36.3
	2002	820	31.8	1035	32.1
Age group	<35	892	34.6	1068	33.1
	35–49	978	37.9	1275	39.5
	≥50	709	27.5	884	27.4
Degree of education	Incompleted secondary school	450	17.4	389	12.1
	Secondary school	1639	63.9	2093	64.9
	University	490	19.0	745	23.0
Urbanization	Cities	1347	52.2	1856	57.5
	Towns	784	30.4	932	28.9
	Villages	448	17.4	439	13.6

**Table 2. Prevalence (%) of analyzed nutrition habits men and women**

Nutrition habits	Men (%)	Women (%)	p
Use vegetable oil for cooking	76.5	89.2	<0.001
Eat fresh vegetables at least 6 days a week	15.8	22.1	<0.001
Eat fresh fruits at least 6 days a week	9.8	17.0	<0.001
Eat rye bread at least 5 slices a week	20.7	7.1	<0.001
Eat cereals at least 3 days a week	9.8	15.7	<0.001
Eat meat or meat products at least 6 days a week	25.3	15.3	<0.001
Eat fish at least once a week	78.6	77.1	>0.05
Use of animal fat on bread	41.5	42.7	>0.05
Drink whole milk	50.2	47.0	<0.05
Eat cheese at least 6 days a week	4.6	4.4	>0.05
Drink coffee at least 3 days a week	22.6	28.4	<0.001

fect models are presented in odds ratios and 95% confidence interval (CI).

### Results

Diet of women was healthier than that of men (Table 2). Women used vegetable oil for cooking, vegetables, fruits and porridges more often than men. Men reported higher frequency of daily consumption of meat and meat products, drinking of whole milk and eating at least 5 slices of rye bread daily. No

differences in fish and cheese consumption were found between men and women. The proportion of men and women using butter on bread did not differ significantly.

The positive relationship was found between education level of men and women and the intake of vegetable oil for cooking (Tables 3, 4). The odds of using vegetable oil among men with university education were higher by 93% and among women – by 57% than that among persons with incomplete secondary education.

**Table 3. Odds ratios for the likelihood of having certain nutrition habit by educational level in men**

Nutrition habits	Educational level			
	Secondary school		University	
	OR	95% CI	OR	95% CI
Use vegetable oil for cooking	1.31*	1.02–1.68	1.57*	1.16–2.16
Eat fresh vegetables at least 6 days a week	1.25	0.88–1.78	1.95*	1.31–2.91
Eat fresh fruits at least 6 days a week	1.13	0.72–1.80	2.35*	1.44–3.85
Eat rye bread at least 5 slices a week	1.02	0.76–1.37	0.92	0.64–1.31
Eat cereals at least 3 days a week	1.36	0.89–2.08	1.31	0.79–2.17
Eat meat or meat products at least 6 days a week	1.35*	1.03–1.76	1.19	0.86–1.65
Eat fish at least once a week	1.32*	1.01–1.73	2.0*	1.39–2.86
Use of animal fat on bread	1.35*	1.07–1.71	1.94*	1.47–2.57
Drink whole milk	0.69*	0.55–0.88	0.42*	0.31–0.56
Eat cheese at least 6 days a week	1.69	0.81–3.53	2.51*	1.14–5.46
Drink coffee at least 3 days a week	1.34	0.99–1.82	1.80*	1.26–2.55

OR - odds ratios; CI - confidence interval; \*  $p < 0.05$ .

Odds ratios adjusted for age and place of residence; Reference group - incomplete secondary education group.

**Table 4. Odds ratios for the likelihood of having certain nutrition habit by educational level in women**

Nutrition habits	Educational level			
	Secondary school		University	
	OR	95% CI	OR	95% CI
Use vegetable oil for cooking	1.56*	1.14–2.13	1.93*	1.28–2.89
Eat fresh vegetables at least 6 days a week	1.08	0.79–1.48	1.44*	1.02–2.03
Eat fresh fruits at least 6 days a week	1.31	0.88–1.94	2.85*	1.89–4.31
Eat rye bread at least 5 slices a week	0.78	0.52–1.18	0.55*	0.33–0.93
Eat cereals at least 3 days a week	0.86	0.62–1.19	1.09	0.76–1.56
Eat meat or meat products at least 6 days a week	0.78	0.58–1.06	0.69*	0.48–0.98
Eat fish at least once a week	1.17	0.88–1.55	1.68*	1.20–2.33
Use of animal fat on bread	1.23	0.97–1.57	2.17*	1.66–2.85
Drink whole milk	0.72*	0.56–0.93	0.49*	0.37–0.66
Eat cheese at least 6 days a week	1.05	0.56–1.98	1.04	0.52–2.09
Drink coffee at least 3 days a week	1.57*	1.15–2.13	1.39	0.99–1.96

OR - odds ratios; CI - confidence interval; \*  $p < 0.05$ .

Odds ratios adjusted for age and place of residence; Reference group - incomplete secondary education group.

High-educated men and women consumed fresh vegetables daily most often. The odds ratio of eating fresh vegetables daily among high-educated men was 2.35 and among women – 2.85 compared to the group with incomplete secondary education. Dark bread consumption was not related with education in men, while high-educated women consumed less dark bread than those with incomplete secondary education.

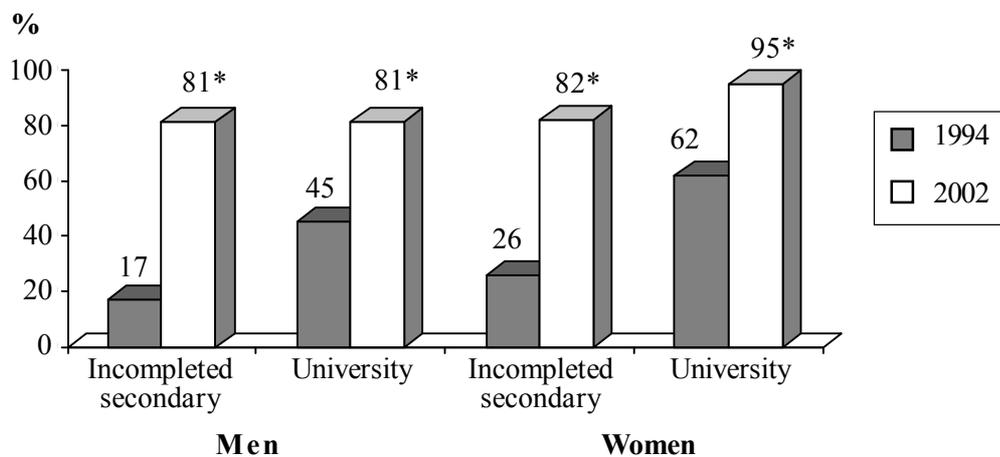
The proportion of men eating meat or meat products on a daily basis was the highest among those with secondary education (Table 3). In women the likelihood of eating meat daily was inversely related to educational level (Table 4). The odds of eating meat daily among high-educated women were lower by 41% than among those with incomplete secondary education. The positive relationship was found between fish consumption and education. Butter for spreading on bread was preferred by persons with university education (Table 3, 4). The odds ratio of spreading butter on bread in high-educated men was 1.94 and in women – 2.17 compared to those with incomplete secondary education. The proportion of persons drinking whole milk was the highest among the low educated men and women. Cheese was preferred by well-educated persons, i.e. the odds of eating cheese on a daily basis were 2.51 folds higher than among those with incomplete secondary education. High-educated men and women with

secondary education drank coffee most often. The consumption of porridge was not related to educational level.

The positive trends in nutrition habits of Lithuanians were observed between 1994 and 2002. The consumption of vegetable oil for cooking increased. The proportion of men using vegetable oil for cooking increased from 31.1% in 1994 to 83.2% in 2002, and that of women – respectively from 47.7% to 92.6% ( $p < 0.001$ ). The increase of using vegetable oil was higher among persons with incomplete secondary education compared to those with high education (Fig. 1).

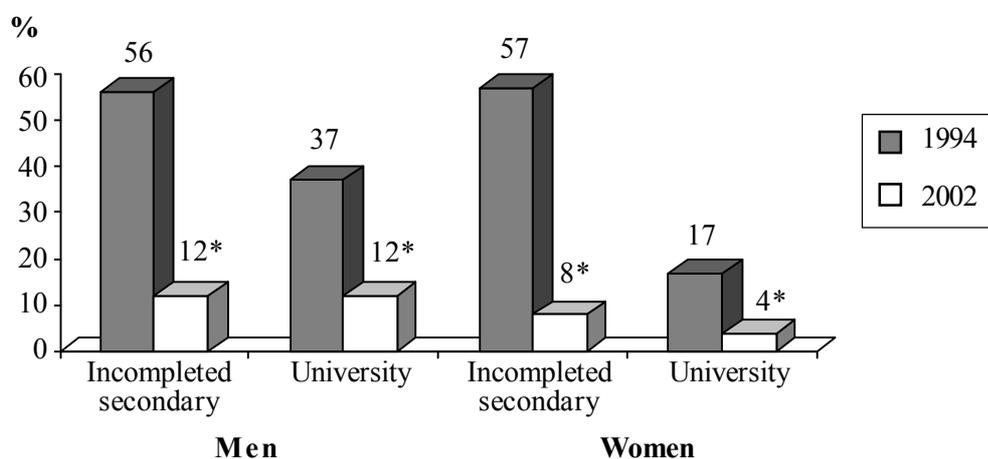
The use of lard and butter for preparing food decreased from 46.2% to 11.2% among men and from 30.8% to 4.8% among women ( $p < 0.001$ ). These changes were considerably higher among persons with incomplete secondary education than among better-educated persons (Fig. 2).

According to the results of the survey carried out in 1994, no association between education and usage of butter was estimated. While in the year 2002 this relationship became direct: people with university education used butter on bread more often than people with incomplete secondary education since the decrease in usage of butter among persons with incomplete secondary education was considerably higher than among better-educated persons (Fig. 3).



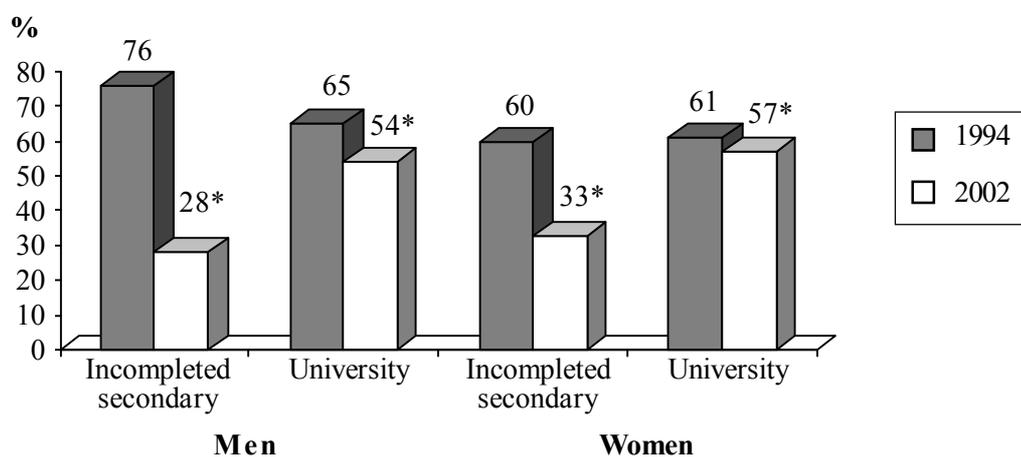
\*p<0.05 compared with 1994.

**Fig. 1. Proportion of persons using vegetable oil for cooking by level of education in 1994 and 2002**



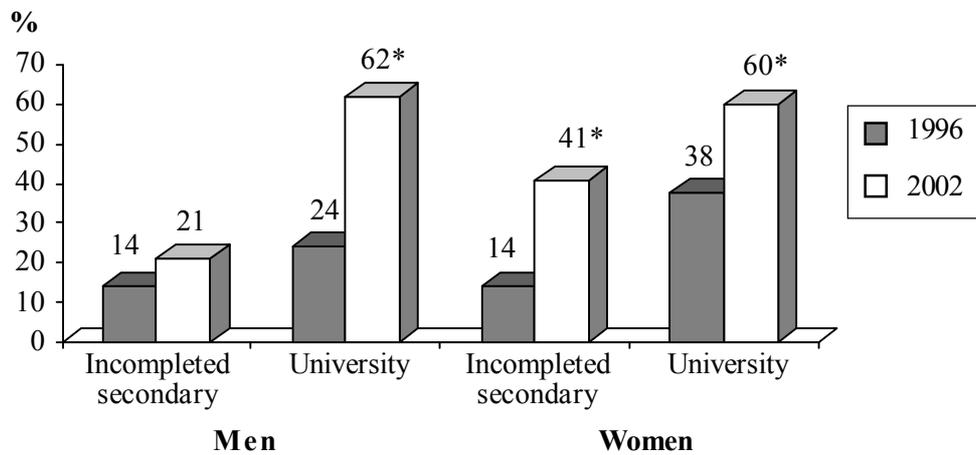
\*p<0.05 compared with 1994.

**Fig. 2. Proportion of persons using butter or animal fat for cooking by level of education in 1994 and 2002**



\*p<0.05 compared with 1994.

**Fig.3. Proportion of persons using butter on bread by level of education in 1994 and 2002**



$p < 0.05$  compare with 1996.

**Fig. 4. Proportion of persons eating fresh vegetables at least 3 days a week by level of education in 1994 and 2002**

The consumption of fresh fruits increased among Lithuanian inhabitants. In 1996 18.1% men and 24.8% women used fresh vegetables at least 3 days a week, whereas in 2002 – 45.7% men and 55.8% women respectively ( $p < 0.001$ ). Although the consumption of fresh vegetables has increased among all educational groups it still has remained higher among persons with high education (Fig. 4).

### Discussion

The study showed relationship between nutrition habits of Lithuanian population and education. The dietary habits of respondents with higher education were more in accordance with the recommendations of the World Health Organization (WHO) compared to those with lower education. The WHO recommends consuming less fat milk and meat products because they are rich in saturated fatty acids that increase the level of serum cholesterol and risk of coronary heart disease. The usage of vegetable oil is recommended instead of animal fats (14). Higher consumption of vegetables and fruits (at least 400 g/day), rich in antioxidants, vitamins, and minerals as well as whole grain products is emphasized for prevention of noncommunicable diseases.

In our study the consumption of fresh vegetables and fruits was higher among those with university education as compared to persons with incomplete education. The data of surveys performed in 15 European countries showed a link between education and consumption of vegetables and fruits: in many countries a higher education level was associated with a greater consumption of fruits and vegetables (5, 16).

A positive correlation between education level and consumption of fruits and vegetables was the strongest in the Nordic countries as compared with the South European countries (5). The results of a recent study indicated that Spanish people with university education consumed fruits and vegetables more often than those with low education (17).

In Lithuania the persons with high education consumed fish and used vegetable oil for cooking more often than people with low education. However, persons with university education preferred butter on bread. High-educated men consumed cheese more often than those with low education. Other investigators confirmed that low and high-educated people had different sources of fats. High-educated Finns consume less butter on bread and whole milk, but they eat more cheese than low educated people (9). As a result, the proportion of fat in food was similar among all educational groups. Norwegians with education of 13 years and more used less fat in their food than those with shorter education (18). Dutch people with higher socioeconomic status consumed less meat, milk products and fats, but more cheese as compared with persons with lower socioeconomic status (19). Similar results were found comparing the consumption of butter and cheese in 10 European countries (20). In most countries the usage of cheese was higher in high-educated persons than in those with low education. In the Nordic countries the consumption of butter was lower among those with university education, however, opposite data were found in Great Britain, Belgium and Poland. In most countries people with lower education tend to use animal fats more often. Meta-analysis of data from nine European

countries did not prove correlation between fats, fatty acids and education level (6).

The comparison of different educational groups showed that diet of people with university education tended to be closer to the national and international recommendations of dietary guidelines (18, 19, 21).

The most significant educational differences in Lithuanian nutrition habits were observed in 1994. All groups of Lithuanian inhabitants have changed nutrition habits over the last eight years. The evident decreasing trend in use of animal fat (lard and butter), and increasing trend in the consumption of vegetable oil and vegetables has been estimated. Nutrition habits of Lithuanians became healthier, but educational differences in nutrition still remained significant. According to the surveys carried out in Finland the consumption of whole milk and butter decreased while the consumption of vegetables increased during the last quarter of the century. More remarkable changes were among low educated people, therefore, differences in nutrition habits have diminished, without disappearing altogether (8). It was also observed that high-educated people increased the consumption of cheese but decreased the consumption of traditional recommended food such as potatoes and bread. Therefore not all changes in nutritional habits were positive and healthy. Within a decade the French population decreased the consumption of high-fat animal foods and increased the consumption of poultry, low-fat foods, fish, therefore, the intake saturated fatty acids decreased (22). The consumption of fruits and vegetables remained stable, but was greater among those with university education as compared to persons with incomplete secondary education. Fat intake in Dutch adults decreased over a decade, but the intake of fruits and vegetables decreased, too (19). Changes were found in all socioeconomic classes; therefore, social differences in nutrition habits still remained.

Highly educated people tend to choose modern foods, while those with less education use more traditional foods and their nutrition changes are with a time lag of five to ten years (7, 8). Persons with university education have more knowledge about healthy nutrition and choose healthier foods more easily (23–25). They pay more attention to healthy diets as compared to persons with incomplete secondary education (18). When choosing food, more high-educated respondents preferred health to food price more frequently than those with low education (23, 24). High-educated mothers introduced more eating restrictions to their children, thus forming their

eating habits from early childhood (23). “Price of food” was an important factor influencing food choice. The survey carried out in Lithuania showed that people tended to choose food according to its price (26). The lack of money, which is more common among people with low education, can restrict consumption of healthy food (4).

The European Region Office of World Health Organization has initiated the Food and Nutrition Action Plan for 2000–2005 (27). It states, that great attention must be paid to people with lower socioeconomic status.

In 2003 the Lithuanian Food and Nutrition Strategy and Action Plan for 2003–2010 were approved by the Government of the Republic of Lithuania (28). The aim of the Strategy is to protect and promote health of Lithuanian population and to reduce prevalence of diseases related to nutrition, including chronic noncommunicable diseases. Intersectorial cooperation is very important for the implementation of this strategy. Active involvement of the education system is essential for increasing the knowledge of inhabitants, their interest in nutrition and health.

### Conclusions

1. Lithuanian women have healthier diets than men. Women more often used vegetable oil for cooking, ate fresh vegetables, fruits and porridges, but consumed meat and meat products and whole milk less often as compared to men.

2. Nutrition habits were related with educational level. Persons with university education had a healthier diet than those with incomplete secondary education. The consumption of fresh vegetables, fruits, fish, and vegetable oil for cooking was substantially higher, while usage of whole milk and meat was less often in those with university education as compared to persons with incomplete secondary education.

3. Higher level of education did not always influence better nutrition habits, e.g. high-educated persons preferred butter on bread, high-educated men consumed cheese more often, while women consumed black bread less often than those with incomplete secondary education did.

4. Positive trends in nutrition habits of Lithuanians were observed in 1994–2002; however, educational differences in nutrition habits still remain significant.

Alongside with other health interventions, the programs aimed at reducing inequalities in health should consider the educational differences in nutrition habits of Lithuanians paying more attention to less educated persons.

## Lietuvos gyventojų sveikatos skirtumai: išsimokslinimas ir mitybos įpročiai

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**Raktažodžiai:** mitybos įpročiai, išsimokslinimas, vyrai, moterys.

**Santrauka.** Tyrimo tikslas. Įvertinti mitybos įpročių ir išsimokslinimo ryšį tarp suaugusių Lietuvos gyventojų. Dalyvaujant tarptautiniame FINBALT HEALTH MONITOR projekte nuo 1994 m., Lietuvoje kas antri metai atliekama trijų tūkstančių 20–64 metų žmonių, atsitiktinai atrinktų iš Lietuvos gyventojų registro sąrašų, apklausa paštu. Klausimyną sudarė klausimai apie tirtųjų amžių, išsimokslinimą, gyvenamąją vietą, mitybos ir kitus gyvenimo įpročius. Straipsnyje pateikiami duomenys apie mitybos įpročių priklausomumą nuo išsimokslinimo. Aukštojo išsimokslinimo žmonių mityba buvo sveikesnė palyginti su žmonėmis, turėjusius tik nebaigtą vidurinį išsimokslinimą. Žmonės, turintys aukštąjį išsimokslinimą, dažniau valgė šviežias daržoves ir vaisius, maistui gaminti vartojo aliejų, valgė žuvį, rečiau gėrė natūralų kaimišką pieną; moterys rečiau valgė mėsą palyginti su moterimis, turinčiomis nebaigtą vidurinį išsimokslinimą. Tačiau aukštojo išsimokslinimo žmonės dažniau sumuštiniams vartojo sviestą; vyrai dažniau valgė fermentinį sūrį, moterys mažiau valgė juodos duonos palyginti su žmonėmis, turinčiais nebaigtą vidurinį išsimokslinimą. 1994–2002 m. mitybos pokyčių įvyko visose išsimokslinimo grupėse, tačiau mitybos skirtumai tarp išsimokslinimo grupių išliko. Siekiant sumažinti Lietuvos gyventojų sveikatos skirtumus, greta kitų priemonių, būtina gerinti gyventojų mitybą, ypatingą dėmesį skiriant žemesnio išsimokslinimo žmonėms.

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