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*original scientific paper*

# Some Differences in Nutritional Habits between Males and Females in the Republic of Slovenia

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*Summary*

*In the study, we assessed the quality of food and some nutrition habits using the Food Frequency Questionnaire and some additional questions on nutrition habits. The sample included 954 males and 1229 females (between 18 and 65 years of age) from the whole territory of Slovenia. The Microdiet Version 9 computer program was used to determine the quantity of proteins, carbohydrates, total fats, saturated fats and alcohol in the average daily diet. Besides nutrition habits (number of servings, frequency of consuming some foods), risk factors such as physical activity, percentage of smokers, body mass index (BMI) were taken into consideration. The difference between sexes was analyzed by the statistical methods (chi-square and one-way analysis of variance). With respect to the average daily food intake, the results show that both males and females consume too much total fats and saturated fats, and not enough carbohydrates. The differences between the sexes were found in the mean quantity of consumed alcohol, in the intake of fruits, vegetables, meat and meat products, as well as in the frequency of regular supper intake. The results suggest the possibility of relating food with specific mortality rates and life expectancy for males and females in the Republic of Slovenia.*

*Key words:* nutrition, nutrition habits, adults, male, female

## Introduction

The results of numerous studies carried out all over the world supported the belief that diet inadequacy is one of the important risk factors for the occurrence of some cardiovascular diseases and some cancers.

The diet of Slovenians varies extensively across geographic regions, which indicates the influence of climatic conditions and cuisines of the neighboring countries.

According to the data of the Public Health Statistical Bulletin of the Republic of Slovenia, most of the frequent causes of mortality are cardiovascular diseases (44.6 %) and cancer (23.0 %) (*1*). Based on their studies, some authors (*2–14*) attribute the causes of such a condition to the inadequacy of diet.

Data on life expectancy in Slovenia show, similarly to other countries, higher figures for females, than for males (*15*).

Data on mortality in the Republic of Slovenia in 1994 and 1995 from some types of diseases related to inadequate food intake show lower mortality rates for females.

Apart from the already mentioned statistic data, in comparing the diet and nutrition habits of males and females we took as the starting point the study results referring to nutritional habits of adult Slovenians, which also show inadequate quality of the food intake. Adequate healthy food intake includes sufficient quantities of nutrient substances and ensures unimpeded functioning of the human body. Inadequacy of diet is connected

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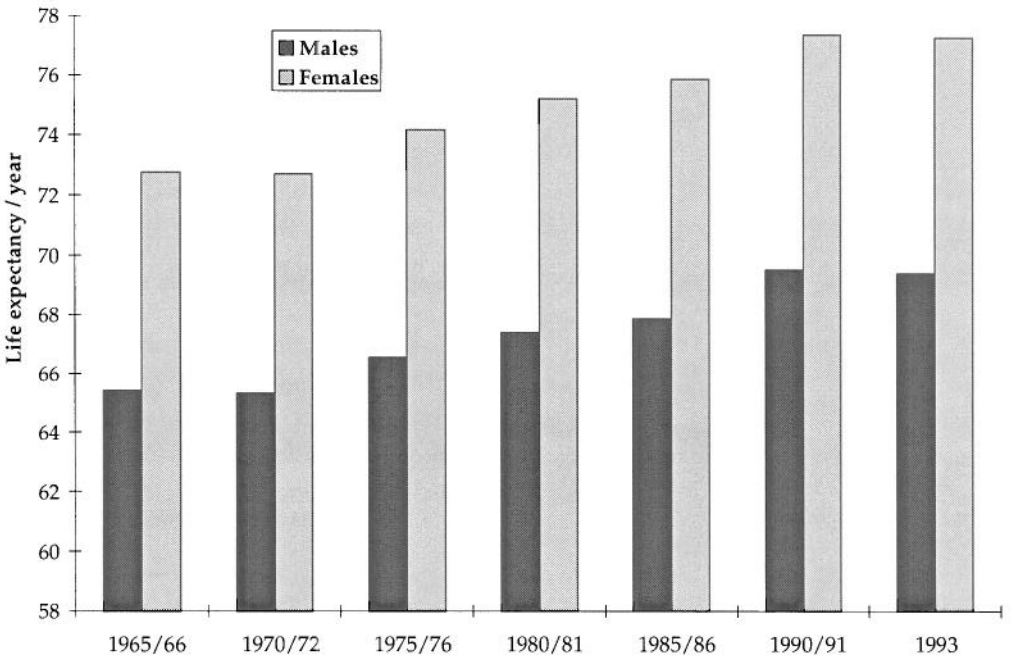


Fig. 1. Comparison of life expectancy for both sexes in the Republic of Slovenia

Table 1. Life expectancy in the Republic of Slovenia in comparison with some other countries

| Country | Year | Males | Females |
|---|---|---|---|
| Slovenia | 1993 | 69.4 | 77.3 |
| Italy | 1990 | 74.5 | 81.6 |
| France | 1990 | 73.4 | 81.9 |
| The Netherlands | 1993 | 74.0 | 80.3 |
| Spain | 1990/91 | 73.4 | 80.5 |
| Sweden | 1993 | 75.5 | 80.8 |
| Switzerland | 1991/92 | 74.3 | 81.2 |
| Canada | 1985/87 | 73.0 | 79.8 |
| USA | 1989 | 74.3 | 81.2 |
| South America | 1985 | 65–68 | 70.0 |

Table 2. Number of deaths by underlying cause of death and sex (Slovenia, 1994)

| | 1994 | | |
|---|---|---|---|
| | Total | Males | Female |
| All | 19 359 | 9 815 | 9 544 |
| Malignant neoplasm | 4 461 | 2 463 | 1 998 |
| Systemic circular diseases | 8 435 | 3 737 | 4 898 |
| Digestive system diseases | 1 162 | 680 | 482 |

with the occurrence of the so-called civilization diseases (*14,16–19*). In the dietary intake of Slovenian adult population some characteristics of inadequate, unhealthy food were assessed. A special cause for concern are excessive quantities of total fats and saturated fats, and too low quantities of carbohydrates and crude fibers in the average daily nutrition.

Apart from the inadequate quality of consumed food, some assessed nutritional habits also reveal shortcomings in the food intake.

Within the study of nutritional habits the differences between the sexes were also analyzed.

## Methods

For the purpose of this study we designed a questionnaire with items about the frequency of consuming certain foods, and questions referring to nutritional habits (*20–22*). The sample, chosen in multilevel and random manner, included 2183 participants- 954 males (43.7 %) and 1229 females (56.3 %) from the whole territory of Slovenia.

The survey was performed in the form of personal interviews.

The nutrient and energy value of the daily consumed food was calculated with the Microdiet Version 9 computer program (University of Salford, 1995).

The results were statistically analyzed with the SPSS/PC+ program (Statistical Package for Social Sciences).

Pearson coefficient was used to determine the statistical significance of the differences between males and females (* $p<0.05$, ** $p<0.01$ and *** $p<0.001$). The chi-square and analysis of variance were used for the assessment of difference homogeneity.

Data on mortality for males and females were prepared specially for the purposes of our study by the Institute for Public Health Protection of the Republic of Slovenia.

Data on life expectancy were taken from the Statistical Bulletin of the Republic of Slovenia.

Table 3. Statistical significance of differences in the consumption of some foods for both sexes, assessed with the one-way analysis of variance

| Food | F | F 1 | p | Food | F | F 1 | p |
|---|---|---|---|---|---|---|---|
| Yogurt | 46.1305 | 0.0000 | *** | | | | |
| Curd cheese | 18.1193 | 0.0000 | *** | Apple, pear | 13.7060 | 0.0002 | *** |
| Cauliflower | 27.7738 | 0.0000 | *** | Peach, apricot | 9.1737 | 0.0020 | ** |
| Carrots | 14.7021 | 0.0001 | *** | Strawberries | 15.7334 | 0.0001 | *** |
| Spinach | 15.2167 | 0.0001 | *** | Chicken | 16.3625 | 0.0001 | *** |
| Maize | 7.2216 | 0.0073 | ** | Beef | 16.6416 | 0.0000 | *** |
| Kale | 11.6597 | 0.0007 | *** | Veal | 20.0246 | 0.0000 | *** |
| Cucumbers | 10.9309 | 0.0010 | *** | Pork | 52.6791 | 0.0000 | *** |
| Pork fat | 10.4487 | 0.0012 | ** | Frankfurter | 21.6693 | 0.0000 | *** |
| Vegetable fat | 6.7009 | 0.0097 | ** | Salami | 84.9274 | 0.0000 | *** |
| Cracklings | 27.4396 | 0.0000 | *** | Ham | 92.5492 | 0.0000 | *** |
| Mayonnaise | 25.2870 | 0.0000 | *** | Eggs | 59.3528 | 0.0000 | *** |
| Flakes | 31.7079 | 0.0000 | *** | Sugar | 24.5890 | 0.0000 | *** |
| Semolina | 18.8347 | 0.0000 | *** | Chocolate | 19.7746 | 0.0000 | *** |
| Bread | 69.8255 | 0.0000 | *** | Pasta | 36.0920 | 0.0000 | *** |

Table 4. Statistical significance of the difference between the sexes in the consumption of some beverages, assessed with the one-way analysis of variance

| Beverage | F | F 1 | p | Beverage | F | F 1 | p |
|---|---|---|---|---|---|---|---|
| Coffee | 11.3438 | 0.0008 | *** | Beer | 580.1380 | 0.0000 | *** |
| Tea | 11.3791 | 0.0008 | *** | Wine | 257.6178 | 0.0000 | *** |
| Mineral water | 25.1425 | 0.0000 | *** | Spirits | 138.6612 | 0.0000 | *** |

## Results and Discussion

The obtained data were qualitatively evaluated for the energy content of proteins, total fats, saturated fats, total carbohydrates and alcohol.

As shown in Fig. 2, the results have demonstrated a moderately poorer dietary intake (in absolute value) in females, the difference not being statistically significant. Only the quantity of alcohol in the daily food intake is significantly higher in males ($p<0.001$).

The comparison of the recommended and calculated energy values of the average daily consumed food has shown considerably greater excessive values in females (Fig. 3).

Statistical significance of the differences in the quantities of some consumed foods have been assessed for both sexes with the one-way analysis of variance (Table 3).

The assessed differences show that on a daily basis females consume on the average more yogurt and cottage cheese than the males. The quantity of consumed fruits and vegetables is also higher in females. On the other hand, males consume more meat and meat products, eggs and cracklings.

Females consume significantly more flakes and semolina, but less bread, sugar and chocolate.

The difference between the sexes in the consumption of quoted beverages (Table 4) shows that in Slovenia females consume significantly more coffee ($p<0.001$), while males consume more of other beverages.

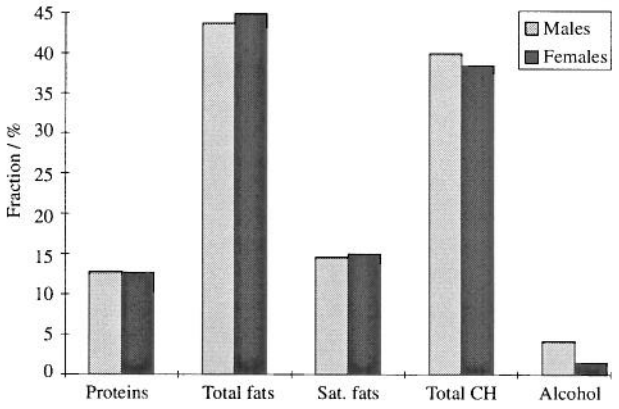


Fig. 2. Profile of the relative nutrients energy contribution in men and women (CH=Carbohydrates)

Regular consumption of daily meals is important in order to provide continuous intake of nutrient substances and energy necessary for work. It also assures adequate metabolism (23). A healthy diet should include daily three main meals (breakfast, lunch and dinner) and at least one snack between meals. Meals should be taken in 3–4 hour intervals (24,25).

On the basis of these results (Fig. 4) it can be concluded that the largest number of males and females regularly take lunch, while the proportion of consumed dinners is distinctively lower. The statistical analysis shows a highly significant difference between the sexes in the consumption of dinner ($p<0.001$).

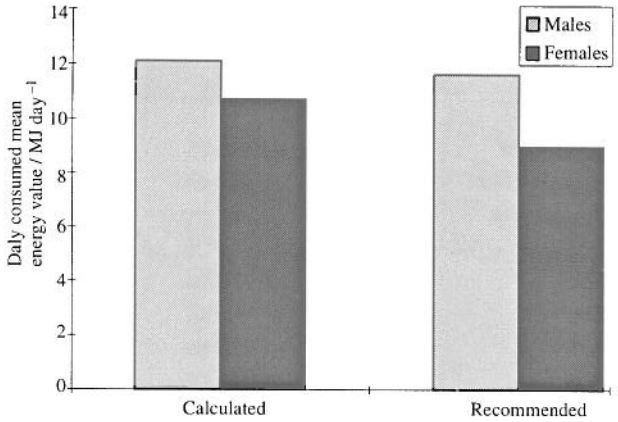


Fig. 3. Comparison of the energy value of the mean daily consumed food with the recommended value for males and females

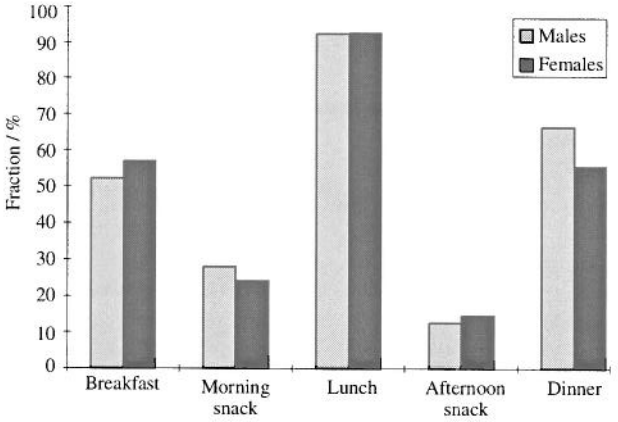


Fig. 4. Fractions of regularly consumed daily meals in males and females

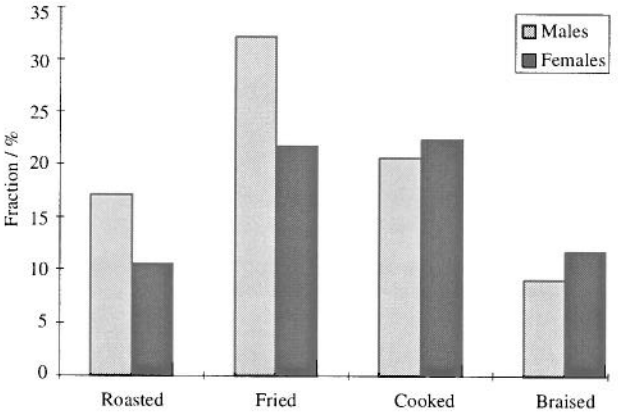


Fig. 5. Consumption fraction of diverse prepared meat by males and females

In comparison with males, there are only a few more women regularly taking breakfast, although the total proportion of the population not consuming breakfast regularly, is too high.

Our results show that, with the exception dinner, there are no statistically significant differences between the sexes with respect to regular consumption of meals.

Food preparation methods, especially for the preparation of meat, differ due to varying quantities of used fat. We studied the consumption frequency of diverse prepared meat in males and females.

The data show that, on the average, males and females consume all types of meat 2–3 times per week. A difference between the sexes can be noticed with respect to the preparation methods (Fig. 5).

The statistical analysis shows that females consume less roasted and fried meat ($p<0.001$) and more braised meat ($p<0.05$). There were no statistically significant differences between the sexes in the consumption of cooked meat.

Vegetables are known as the carriers of vitamins, minerals and nutritive fibers. From the aspect of health protection, they can be defined as protective substances. Considerable quantities of vitamins get lost during thermal processing of food. Therefore consumption of fresh vegetables is more recommendable. The results of this study have shown that there are no statistically significant differences between the sexes in the consumption of fresh vegetables or vegetables in the form of a side-dish. The differences occur in the usage of pork fat as vegetable seasoning ($p<0.001$) (Fig. 6).

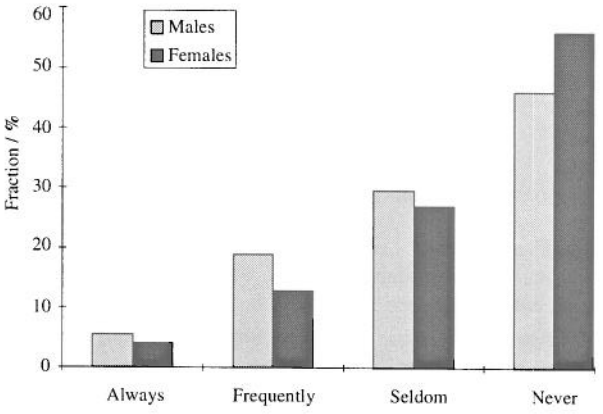


Fig. 6. Usage of pork fat as vegetable seasoning by males and females

Alcohol is one of the risk factors for the occurrence of the so-called civilization diseases *(6)*. Its content in our dietary intake should be as low as possible. According to WHO recommendations *(14)*, alcohol content in the daily food intake should not exceed 4 % of the energy value.

Because the Republic of Slovenia is a wine-growing country, there are high quantities of alcoholic drinks available, especially wine *(11)*. The survey included questions asking when the subjects consumed beer, wine and strong drinks: during their meals, between meals, or when they are thirsty.

The differences between the answers of males and females are highly statistically significant ($p<0.001$) and show that the quantity of alcohol consumed by females is much lower.

Inadequate and excessive dietary intake is connected with a higher body mass index (BMI) *(18,26–29)*.

The body mass index is an indicator of possible risks for the occurrence of diseases. In the sense of health protection it should range between 20 and 22 (*14, 30*) for adults. Due to the fact that the ratio of the body mass to body height changes in the course of years, the study participants were grouped as follows:

- I group BMI below 19.9
- II group BMI between 20 and 24.9
- III group BMI between 25 and 26.9
- IV group BMI exceeding 27

While making this classification, we took into account that the II group is the group with the lowest risk of disease and that with the increased BMI the risk increases.

The calculation of the body mass index showed the following allocation of males and females into the above mentioned groups (Table 9):

Table 9. Classification of males and females (in %) into groups according to the BMI

| | I group | II group | III group | IV group | (I–IV) |
|---|---|---|---|---|---|
| Males | 1.2 | 43.1 | 25.8 | 29.9 | 100 |
| Females | 13.4 | 51.8 | 12.0 | 22.8 | 100 |

Statistical analysis has exhibited significant gender differences in the classification into groups with respect to the BMI. The proportion of females in groups I and II is higher. Their proportion in groups III and IV group is also high, although lower than the proportion of males.

It has already been mentioned that dietary intake is only one of the possible risk factors for the appearance of diseases. They are also related to the way of life. This study showed that in Slovenia there are 38.8 % smokers among males, and slightly fewer among females (27.2 %).

With respect to regular physical activity, undoubtedly one of the preconditions for a healthy way of life (*3,31*), the results of this study proved, that in the Republic of Slovenia there are statistically significant differences ($p<0.001$) between males and females in its frequency and duration: 24.5 % of males and 17.0 % of females are engaged in regular physical activity.

## Conclusion

In this study have documented inadequate diet in terms of its quality, both in males and females.

The fraction of total fats in the average daily dietary intake of females in the Republic of Slovenia is moderately higher than that of males.

The classification of males and females into groups with respect to the BMI, which is connected with the energy value of consumed food, is moderately more favorable in females although fewer women are engaged in regular physical activity.

Some differences between the sexes in their nutritive habits have been found:

- the proportion of females regularly taking breakfast is higher;
- the proportion of females regularly taking dinner is lower;
- females consume less alcohol;
- on the average, females consume more vegetables and fruits;
- females consume less meat, meat products, eggs and cracklings;
- there are fewer smokers among females.

Our results indicate differences in dietary intake of males and females, which could be related with the differences in some specific mortality rates and the lifespan of males and females in the Republic of Slovenia.

*Acknowledgment*

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## Nekatere značilnosti prehrane moških in žensk v Republiki Sloveniji

*Izvleček*

*V raziskavi smo z metodo vprašalnika pogostosti uživanja živil in dodatnih vprašanj o prehranskih navadah določili kakovost prehrane ter nekatere prehranske navade. Vzorec je obsegal 954 moških in 1229 žensk, starih med 18 in 65 let, na celotnem področju Slovenije. Z uporabo računalniškega programa Microdiet Version 9 smo določili količino beljakovin, ogljikovih hidratov, skupnih maščob, nasičenih maščob in alkohola v povprečni dnevni prehrani. Poleg prehrambnih navad (števila obrokov, pogostost uživanja nekaterih živil) smo ugotavljali tudi druge dejavnike tveganja (telesna aktivnost, % kadilcev, BMI). S statistično analizo (hi-kvadrat test in enosmerno analizo variance) smo ugotavljali razliko med spoloma. Rezultati raziskave kažejo, da moški in ženske v povprečni dnevni prehrani zaužijejo preveč skupnih maščob in nasičenih maščob, premalo pa ogljikovih hidratov. Razliko med spoloma smo ugotovili v količini povprečno zaužitega alkohola, v uživanju sadja, zelenjave, mesa in mesnih izdelkov ter v deležu redno zaužitih večerij. Rezultati kažejo na možnost povezave prehrane s specifičnimi merami umrljivosti in pričakovano življenjsko dobo moških in žensk v Republiki Sloveniji.*