

NUTRITION HABITS AND FREQUENCY OF CONSUMPTION OF SELECTED FOOD PRODUCTS BY THE RESIDENTS OF URBAN AND RURAL AREA FROM THE SUBCARPATHIAN VOIVODESHIP

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ABSTRACT

Background. The dynamic development and change of rural lifestyle patterns towards urban patterns has been noticeable since the second half of the 20th century. Nutrition, as well as the lifestyle in urban and rural areas, has undergone a process of urbanization, which is evidenced by the following an increasing number of overweight people.

Objective. The aim of the study was to compare eating habits and frequency of consumption of selected groups of products between the urban and rural residents from the Subcarpathian voivodeship.

Material and methods. The survey was carried out on a sample of 279 persons from urban and rural areas of Subcarpathian voivodeship. In this study, the diagnostic survey method consisting of 3 (different) parts was used. To check the significance of differences, U *Mann-Whitney* and *Kruskal-Wallis* tests were used; whereas correlations between variables were determined by the *Spearman's* rank of correlation coefficient and *Pearson's* chi-quadrat test.

Results. In the part concerning eating habits, statistically significant differences occurred among others; for the circumstances of eating meals, the most commonly consumed snacks, food processing techniques and the most frequently selected fat. In the part concerning the frequency of consumption of individual product groups, significant differences occurred among others; for dairy products, grain products, fast food, alcohol. There was a correlation between the frequency of consumption of individual products and socioeconomic status.

Conclusions. The quality of the diet and eating habits of urban and rural residents of Subcarpathian voivodeship does not differ significantly. The detected differences in eating habits were more influenced by the education and socioeconomic status of the examined group than the place of residence.

Key words: eating habits, food consumption frequency, socio-demographic conditions, village, city, adults

STRESZCZENIE

Wprowadzenie. Dynamiczny rozwój i zmiana wiejskich wzorców stylu życia w kierunku miejskich wzorców zauważalne są już od drugiej połowy XX wieku. Sposób odżywiania podobnie jak styl życia na obszarach miejskich i wiejskich uległ procesowi urbanizacji czego dowodem jest m.in. zwiększająca się liczba osób z nadmierną masą ciała.

Cel. Celem badania było porównanie nawyków żywieniowych i częstotliwości spożycia wybranych grup produktów między ludnością miejską i wiejską z obszaru województwa podkarpackiego.

Material i metody. Badanie zostało przeprowadzone na próbie 279 osób z terenów miejskich i wiejskich województwa podkarpackiego. W pracy wykorzystano metodę sondażu diagnostycznego, której narzędziem była ankieta składająca się z 3 części. Do sprawdzenia istotności różnic użyto testów U *Manna-Whitneya* i *Kruskala-Wallisa*, korelacje między zmiennymi wyznaczono testami istotności współczynnika korelacji rang *Spearmana* oraz test chi-kwadrat *Pearsona*.

Wyniki. W części dotyczącej nawyków żywieniowych istotne statystycznie różnice wystąpiły m.in. dla okoliczności spożywania posiłków, najczęściej spożywanych przekąsek, technik obróbki potraw a także najczęściej wybieranego tłuszczu. W części dotyczącej częstotliwości spożycia poszczególnych grup produktów istotne różnice wystąpiły m.in. dla produktów mlecznych, zbożowych, dań typu fast food, alkoholu. Wykazano korelację pomiędzy częstością spożycia poszczególnych produktów a statusem społeczno-ekonomicznym.

Wnioski. Jakość diety i nawyki żywieniowe ludności zamieszkującej tereny miejskie i wiejskie województwa Podkarpackiego nie różnią się znacznie między sobą. Na wykryte różnice w sposobie odżywiania większy wpływ od miejsca zamieszkania miały wykształcenie i status socjoekonomiczny badanych osób.

Słowa kluczowe: nawyki żywieniowe, częstość spożycia produktów spożywczych, uwarunkowania socjodemograficzne, wieś, miasto, osoby dorosłe

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INTRODUCTION

The progress of civilization, which is noticeable today, was already visible in the second half of the 20th century. At that time, there was a transition from a traditional lifestyle to a modern model [23]. Research conducted among the rural population between 2000 and 2016, presented the changes in culture, leisure, recreation and modernization of homes that took place in these areas [7]. The progressive urbanization process in Polish villages and urban expansion are key factors affecting the quality and style of life [25].

The traditional diet of the rural population, characterized so far by a low intake of highly processed products and a high intake of natural products, is changing and acquiring more and more characteristics of an unhealthy diet, conducive to the development of overweight and obesity and civilization diseases. The diet of city dwellers quite rapidly diverged from that of country dwellers through industrialization, development of trade and catering in its broadest sense. This dietary pattern is characterized by a reduced intake of whole grains and legumes, and an increased intake of animal products, sugar, salt, fats and processed foods. The traditional way of eating in villages is approaching such a dietary pattern and the deterioration of health and increasing number of obese people in villages is the evidence of this [13].

Studies focusing on the progress of civilization and the accompanying changes in nutritional issues provide information within the nutritional transition with respect to place of residence. Low- and middle-income countries, as a result of the urbanization process, are characterized by an increasing consumption of processed foods and ready-to-eat meals. The development of cities and villages promotes more frequent eating out, which may result in a change in the regularity of meals and less control over calorie supply in the diet. Food consumption patterns in rural and urban areas may indirectly affect body mass index (BMI) and obesity prevalence [11, 21].

The differences in the quality of the diet of the rural and urban populations a few or a dozen years ago were clearly visible at the time. However, with the progress of civilization of both areas, the nature of the diet may change in a similar direction with similar dynamics. Unfortunately, in the literature there are few studies conducted among adults of both groups, taking into account dietary habits and the frequency of consumption of selected products, which allow to identify and justify possible differences in the diet.

In research, health inequalities in rural-urban status are observed, which may result in a higher prevalence of obesity among rural residents which may be caused by inappropriate dietary habits and frequency of consumption of specific food products.

Among the factors that may influence the prevalence of obesity among both populations, the study focused on dietary factors that may determine these issues [9].

The aim of the study was to compare dietary habits and frequency of consumption of selected groups of food products between inhabitants of cities and rural areas of Subcarpathian voivodeship.

MATERIAL AND METHODS

The study was conducted by trained members of the research team in April 2019, on a sample of 279 respondents in the age range 25-65 years (rural=160, urban=119), living in urban and rural areas of the Subcarpathian voivodeship. Information about the opportunity to participate in the survey was provided to residents through posters and flyers posted on information boards. The content of the announcements included basic information about the location and conduct of the study. With the approval of the management, the surveys were conducted in shopping malls and community centres, in specially designated areas. In the course of the study, the method of diagnostic survey with the use of questionnaire technique was applied. The research tool was a questionnaire consisting of 3 parts. Part I included questions on personal information, Part II was the author's questions on dietary habits and Part III included the validated FFQ-6 food frequency questionnaire.

The FFQ-6 questionnaire is an intermediate-level tool for obtaining data on the frequency of consumption of 62 assorted food groups, representing 8 food groups consumed in the past 12 months. Respondents can choose from 6 food consumption frequency categories: (1) never or almost never, (2) once a month or less often, (3) several times a month, (4) several times a week, (5) daily, (6) several times a day. Participation in the study was voluntary and anonymous.

Product consumption frequency categories, as qualitative data, were assigned ranks using conventional integers ranging from 1 to 6. The ranks assigned reflected the increasing consumption of the products (Table 1).

Table 1. Ranks assigned to frequency categories of consumption of products

Consumption frequency categories	Ranks assigned to frequency categories
Never or hardly ever	1
Once a month or less	2
Several times a month	3
Several times a week	4
Once a day / Daily	5
Several times a day	6

Qualitative variables (nominal and ordinal) were described by counts (n) and frequencies (%). Measurable variables were described by basic parameters: arithmetic mean, standard deviation, median and minimum and maximum value.

Nonparametric tests were used for statistical analysis. *Mann-Whitney U* test was used to test the significance of differences in the level of the measurable variable in two groups, *Kruskal-Wallis* test was used in at least three groups. Correlations between variables described at least on an ordinal scale were determined by *Spearman's* rank correlation coefficient significance test. Relationships between qualitative variables were examined by *Pearson's* chi-square and NW test of independence. A significance test of the difference between the two structure indices was used to compare the proportion of responses in the two groups.

The value of $p < 0.05$ was considered statistically significant. Statistical calculations were performed using the STATISTICA 10 PL statistical package.

RESULTS

Characteristics of the study group

Among the total number of subjects, women constituted 69.5% (194) and men 30.5% (85). Among the studied women, 60.3% (117) was rural dwellers and 39.7% (77) was urban women. Among the male respondents, 50.6% (43) was rural residents and 49.4% (42) was urban residents. The medium age in the study sample was 42 years (SD = 11.4). The medium age of women was 42.6 years (SD = 11), while among men this value was 40.8 (SD = 12.1). More than a half of the sample (52%) declared having higher education, 28% of respondents had secondary education, 15.8% had vocational education and 4.3% had primary education. Net income per family member varied greatly; in a small percentage of respondents (3.6%) it did not exceed 500 PLN, in 29.7% of people it was within the range of 500-1000 PLN, in 35.5% it reached from 1000 to 2000 PLN, while in 31.2% it was higher than 2000 PLN. Only a small proportion of those surveyed (5.7%) were receiving social security benefits. 81.4% (227) of working people participated in the survey.

Food habits

The second part of the questionnaire on eating habits included the times of eating the first and last meal, the circumstances of eating meals, the most frequently consumed snacks, the predominant food processing techniques, the most common fat product added to salads and the most frequently chosen fat for frying.

Residents of urban and rural areas consumed an average of 4 meals per day. A statistically significant

relationship occurred when the first meal was eaten. Urban residents (16%) were more likely than rural residents (10%) to eat a meal immediately after waking up or half an hour after waking up. However, rural residents (43.1%) were more likely to eat their first meal 1-2 hours after waking up than urban residents (31.9%).

Eating meals with the family at the table in the case of inhabitants of cities amounted to 43.7% and in the case of inhabitants of rural areas to 60.6%. Eating alone was indicated by 18.5% of urban residents and 13.8% of rural residents. Eating meals alone in front of a computer/television was declared by 19.3% of respondents from urban areas and 5% of respondents from rural areas. Additionally, there is a statistically significant correlation between the residence of the respondents and the circumstances of eating. Urban residents were more likely than rural residents to eat alone and in front of a computer/television. Rural residents were more likely than urban residents to eat meals with family around the table.

The most commonly consumed snacks by both urban (49.6%) and rural residents (51.9%) were fruit. On the other hand, the least frequently consumed snacks by urban residents (4.2%) and rural residents (3.1%) were vegetables. Consumption of salty snacks was declared by 14.3% of urban and 13.8% of rural residents. Snacking on sweets in those living in urban areas was reported at 23.5% and in those living in rural areas at 24.4%. The frequency of use of culinary techniques is shown in Figure 1.

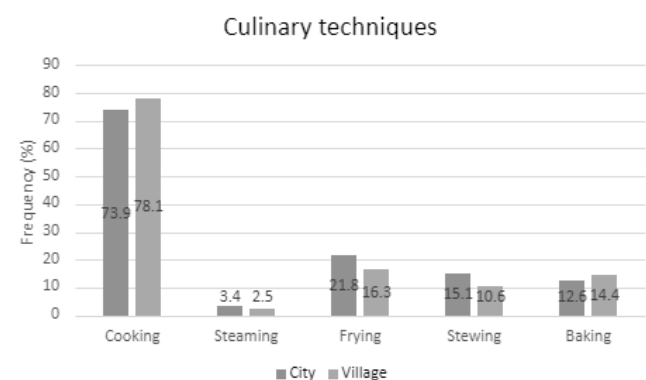


Figure 1. Place of residence of the persons surveyed and frequency of use of culinary techniques

The frequency of use of additions to salads is shown in Figure 2.

A statistically significant relationship exists between the place of residence of the respondents and the most frequently used frying fat. Urban residents (15.1%) were more likely to use olive oil than rural residents (3.8%). Rural residents were more likely to choose rapeseed oil and lard than urban residents. Rapeseed oil was chosen by 53.8% of urban residents and 68.1% of rural residents. The consumption of lard

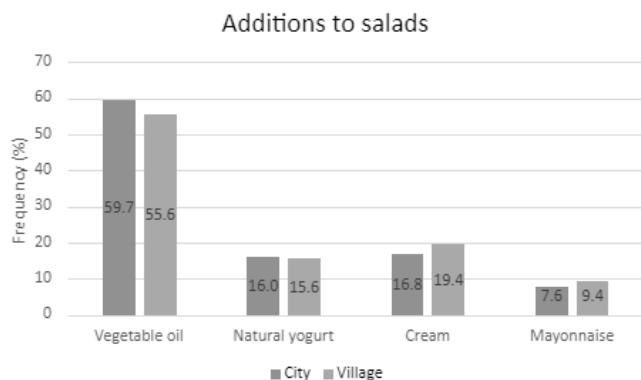


Figure 2. Place of residence of the persons surveyed and frequency of use of additions to salads

was 3.4% in people living in urban areas and 6.9% in people living in rural areas. The butter was indicated by 5.0% of urban residents and 1.3% of rural residents.

Frequency of food consumption

Between the place of residence and the frequency of consumption of the different product groups,

statistically significant differences occurred for: chocolate and chocolate products, dairy products, cereal products, groats, bananas, avocados, potatoes, nuts, cold cuts, canned fish, fast food dishes, powdered soups, fruit juices, total alcohol, beer and wine and drinks (Table 2).

Socio-economic status and frequency of consumption

The survey questions also include questions about net income per family member and education earned. The results are shown in Figure 3 and Figure 4.

An important correlation in the frequency of consumption of individual product groups by villagers and town residents was detected in the level of earnings and education of the subjects.

Statistically significant correlations between respondents' earnings and frequency of consumption occurred for white bread and potatoes. The higher the net income per family member, the lower the rate of consumption of these products by the subjects.

The level of education of the persons and the frequency of food consumption is shown in Table 3.

Table 2. Frequency of consumption of selected products (on a scale of 1-6) in persons living in urban and rural areas

No.	Products	Place of residence								U Mann-Whitney test	
		City n=119				Village n=160					
		M	SD	Min.	Max.	M	SD	Min.	Max.	Z	p
1.	Sweets and snacks (in total)	3.66	0.85	1	6	3.53	0.93	1	6	1.03	0.3026
2.	Sugar for sweetening	3.25	2.08	1	6	3.74	1.84	1	6	-1.68	0.0936
3.	Honey for dishes and sweetening	2.74	1.30	1	6	2.51	1.31	1	6	1.60	0.1102
4.	Chocolate products	3.38	1.02	1	6	3.07	1.09	1	5	2.35	0.0190*
5.	Dairy products (in total)	4.60	0.84	1	6	4.44	0.82	1	6	1.96	0.0499*
6.	Fermented dairy products	3.44	1.25	1	6	3.52	1.24	1	6	-0.21	0.8350
7.	Eggs and egg dishes	3.64	0.92	1	6	3.48	0.88	1	6	1.72	0.0863
8.	Natural cottage cheese	3.61	1.10	1	6	3.61	1.01	1	6	0.45	0.6501
9.	Cereal products (in total)	4.56	0.73	1	6	4.83	0.63	1	6	-3.01	0.0026*
10.	Wholemeal bread	3.87	1.18	1	6	3.81	1.37	1	6	0.04	0.9679
11.	White bread	3.45	1.29	1	6	3.68	1.38	1	6	-1.58	0.1137
12.	Groats (in total)	3.44	0.92	1	5	3.11	0.77	1	5	3.65	0.0003*
13.	Fats and oils (in total)	4.49	0.85	1	6	4.44	0.85	1	6	0.46	0.6425
14.	Oil	3.77	0.94	1	6	3.71	0.84	2	6	0.74	0.4566
15.	Butter	3.99	1.31	1	6	3.93	1.33	1	6	0.40	0.6917
16.	Cream	2.89	1.25	1	6	3.16	1.04	1	5	-1.67	0.0951
17.	Other animal fats	1.86	1.11	1	6	1.91	0.97	1	5	-1.01	0.3121
18.	Fruits (in total)	4.50	0.86	2	6	4.40	0.90	2	6	0.63	0.5290
19.	Stone fruits	3.14	0.95	1	5	3.13	1.11	1	6	0.39	0.7000
20.	Kiwi and citrus	3.40	0.88	1	6	3.39	1.06	1	6	0.02	0.9830
21.	Berry fruits	2.71	0.82	1	6	2.79	0.98	1	6	-0.40	0.6875
22.	Bananas	3.61	0.98	1	6	3.23	1.00	1	6	3.07	0.0022*
23.	Apples and pears	3.98	1.00	1	6	3.80	0.99	1	6	1.39	0.1653
24.	Avokado	1.86	0.99	1	5	1.61	0.84	1	5	2.14	0.0327*
25.	Vegetables (in total)	4.25	0.89	2	6	4.37	0.84	2	6	-1.24	0.2160
26.	Legume seeds	2.70	1.03	1	6	2.68	0.89	1	6	0.05	0.9624

27.	Potatoes	3.61	0.95	1	6	3.93	0.84	1	6	-2.91	0.0036*
28.	Nuts	2.95	1.12	1	5	2.65	1.02	1	6	2.27	0.0230*
29.	Meat (in total)	4.02	0.79	1	6	4.17	0.69	1	6	-1.86	0.0627
30.	Processed meats (in total)	2.51	0.96	1	6	2.56	0.83	1	5	-0.49	0.6243
31.	Cold cuts	3.61	1.15	1	6	3.91	0.95	1	6	-2.23	0.0255*
32.	Red meat	3.14	1.00	1	5	3.08	0.94	1	5	0.90	0.3696
33.	Poultry and rabbit meat	3.49	0.85	1	5	3.37	0.77	1	5	1.74	0.0812
34.	Fish (fatty and lean)	2.79	0.72	1	4	2.78	0.72	1	4	0.02	0.9861
35.	Canned fish	2.06	0.90	1	4	2.24	0.83	1	4	-2.06	0.0393*
36.	Fast food meals	2.23	0.86	1	6	1.91	0.83	1	4	3.05	0.0023*
37.	Ready to eat meals	1.72	0.89	1	6	1.60	0.78	1	5	1.03	0.3020
38.	Powdered soups	1.35	0.72	1	6	1.19	0.46	1	3	2.19	0.0286*
39.	Fruit juice	2.98	1.11	1	6	2.67	1.17	1	6	2.17	0.0297*
40.	Fruit nectars	2.20	1.05	1	6	2.06	1.15	1	5	1.41	0.1571
41.	Vegetable juices	2.10	1.20	1	6	1.88	1.04	1	5	1.42	0.1545
42.	Energy drinks	1.46	1.01	1	6	1.27	0.67	1	4	1.72	0.0853
43.	Alcohol (in total)	2.61	1.02	1	6	2.30	1.04	1	5	2.52	0.0117*
44.	Beer	2.32	1.06	1	6	1.97	1.05	1	5	2.94	0.0033*
45.	Wine and drinks	2.21	0.94	1	6	1.97	0.93	1	5	2.22	0.0263*
46.	Vodka and spirits	1.86	0.81	1	4	1.74	0.86	1	5	1.41	0.1578

M – mean, SD – standard deviation, Z – value of *Mann-Whitney* U test for large groups, p – the test probability level
* – statistically significant, $p < 0.05$

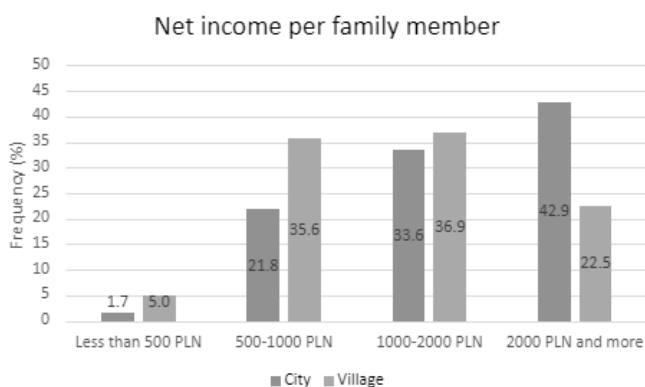


Figure 3. Place of residence of the persons surveyed and net income per family member

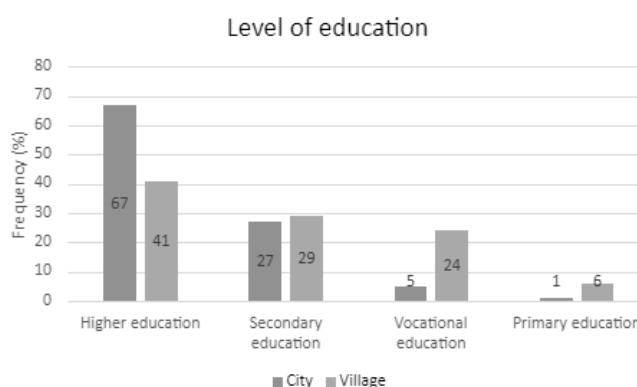


Figure 4. Place of residence of the persons surveyed and level of education

Table 3. Level of education and frequency of consumption of white bread, total processed meats, total vegetables, total fruit, total alcohol, lean fish and oily fish

Education and frequency of consumption of selected products	n	Rs	t(n-2)	p
White bread	279	-0.152	-2.56	0.0111*
Processed meat	279	-0.118	-1.98	0.0484*
Vegetables	279	0.103	1.72	0.0872
Fruits	279	0.108	1.82	0.0705
Alcohol	279	0.134	2.25	0.0252*
Lean fish	279	0.128	2.15	0.0327*
Oily fish	279	0.120	2.02	0.0448*

Education described as: primary, vocational, secondary, higher education

Rs – Value of R *Sperman's* coefficient for abundance n, t(n-2) – value of the t-statistic that checks the significance of the Rs factor for the number of degrees of freedom n-2, n – number of subjects surveyed, p – test probability level

* – statistically significant, $p < 0.05$

DISCUSSION

In the available literature there is very little scientific research carried out with adults, analysing their eating habits and frequency of consumption with the separation of urban and rural areas in Poland.

A 2018 study by the Statistics Poland (GUS) on the average monthly consumption of certain foods is an auxiliary reference element for the frequency of food intake shown in our study [3].

The first group was total cereal products and potatoes, which, as the results of our research showed, statistically is more consumed by the rural population. In the data submitted by the GUS, the urban population consumed 5.17 kg of bread and cereal products and 2.63 kg of potatoes, while the rural population consumed 5.96 kg of bread and cereal products and 3.52 kg of potatoes, which may confirm the results of our research.

There was no difference in sugar intake and in the GUS data the difference was 0.76 kg for the city and 1.21 kg for the village. The results of our study show a higher consumption of chocolate and chocolate products among city dwellers, while in the data presented by the GUS the results are similar: 0.20 kg city and 0.18 kg village. However, given the entire pool of products that is a source of simple sugars, the GUS data show the difference in consumption of these products (1.63 kg for the city and 1.96 kg for the countryside), which was not shown in our study.

Consumption of dairy products in our study turned out to be significantly higher for urban residents. According to the GUS data, yoghurts and cheese and cottage cheese (0.52 and 0.45 and 0.87 and 0.76 kg, in turn) had a slightly higher share of the diet of city dwellers (0.52 and 0.45 kg, in turn), while milk and cream contributed more to the diet of the villagers (3.25 and 2.74 and 0.37 and 0.34 kg). The difference in consumption of vegetables between the inhabitants of towns and villages was not significant. For GUS data it is also not very different, as for the city it was 3.79 kg and for the village it was 3.85 kg. There were no differences in consumption of fruit between villagers and city dwellers. According to GUS data, consumption of fruit in the city was 4.03 kg and in the countryside 3.32 kg. Consumption of meat did not differ significantly statistically. In the GUS study, urban consumption of meat was 4.93 kg and for rural residents it was 5.63 kg.

The data of the GUS mostly coincide with the correlations found in our survey and may constitute a certain indicator in the evaluation of the results of such studies, however, the average statistical consumption is not an ideal comparison to the data of the questionnaire frequency of consumption. However, in the absence of up-to-date studies comparing product

consumption among adults living in the countryside and in the city, such data might be helpful in analysing the study [3].

Another issue examined was the consumption of snacks between meals among urban and rural residents. The study by *Maruapula* et al. show that young people living in urban areas consumed significantly more snack servings and fewer servings of traditional foods compared to those living in rural areas. According to the authors, this may be due to the greater availability of outlets where snacks can be purchased in relation to rural areas [17]. When addressing consumption of fruit, our study did not show differences in consumption between residents of both areas. On the other hand, the analysis of the diet of rural and urban residents in a study conducted by *Utzig* shows a higher consumption of fruit among urban dwellers relative to the countryside [27]. *Cipora* et al. study among middle schoolers living in rural areas also confirms the frequency of consumption of fruit, which was eaten daily by almost half of those surveyed [8].

In the study *Calyniuk* et al. potatoes, in both the city and the countryside, were shown to be the most common addition to lunch, while our studies showed that potatoes were more often consumed by rural residents. A similar situation applies to the consumption of cold cuts. Our research indicates that these products were more often chosen by rural residents, while in this study they were the most popular sandwich product among both rural and urban residents. In addition, the *Calyniuk* et al. study raises the issue of eating the first breakfast among children, which reported that children from rural areas were more likely to eat breakfast, while our research has shown that city dwellers were more likely than rural residents to eat their first meal as soon as they woke up. In addition, the *Calyniuk* et al. study raises the issue of eating the first breakfast among children, which reported that children from rural areas were more likely to eat breakfast, while our research has shown that city dwellers were more likely than rural residents to eat their first meal as soon as they woke up [5]. *Karamnova* et al. study also touches on the issue of the consumption of cold cuts, which turned out to be higher among the inhabitants of the village. In addition, the results of the study show that the rural diet model was characterized by higher consumption of salt, sugar and butter. No such relationship was detected in our study [14].

When it comes to eating sweets in our study, snacking on products from this group in rural and urban residents was 24.4% and 23.5%. In the absence of sufficient studies on the consumption of sweets by adults living in rural areas, the *Cipora* et al. study can serve as a reference on the consumption of sweets

by middle schoolers living in rural areas. 22.6% of respondents declared daily consumption of sweets [8]. By contrast, in the *Suliburska et al.* study on the lifestyle and quality of diet of young adults from urban and rural areas, increased consumption of sweets among urban dwellers has been demonstrated in relation to rural residents [24].

The data from our study show a higher consumption of fast food by city dwellers than rural residents. *Cipora et al.* [8] also recorded a 53.0% intake of this type among rural middle schoolers for consumption less than once a week and 5.2% for daily consumption. These results suggest that rural residents relatively rarely consume fast food. Similar results are shown by the *Suliburska et al.* [24] study which also has an increased consumption of fast food among urban residents.

A study by *Chęcińska et al.* [6], which assessed the diet of urban and rural youth, showed that dairy products and groats were more likely to be consumed by city dwellers than rural residents. In rural areas, however, white bread was more often consumed. The results of this study confirm the results of our research. This study can only serve as a marginal comparative material due to the small amount of research among adults living in urban and rural areas. *Akaichi* [1], which shows an increased consumption of products such as fresh milk, milk powder, butter, margarine, yoghurts in urban and rural areas, also raises the issue of consumption of dairy products among the inhabitants of villages and cities.

Aziz and Malik's study attempts to analyse household consumption patterns in Pakistan between rural and urban households. In the study, consumption of cereal products was similar in both urban and rural areas and showed no correlation with socioeconomic status, as shown in our study. The authors also show that spending on vegetables and meat increased as income increased in rural areas. In the case of spending on fruits and milk and dairy products, higher income correlated with higher consumption among urban residents. Similar results were obtained in our study [2].

Martin et al. study carried out among women of childbearing potential living in urban

and rural areas show slight differences between the two populations in terms of eating habits and diet. Women in rural areas were found to have a slightly higher share of protein in their diet, fat, monounsaturated fats and cholesterol, iron and a higher share of meats in their diet than the women from urban areas. This study did not show significant differences in the frequency of consumption of these products in addition to cold cuts, which can be classified as both a source of protein and meat in the diet. *Martin et al.* also showed that higher annual

household income correlated with a higher diet value in all women. These results coincide with data from our survey, which show that higher respondents' income was linked to lower consumption of white bread and potatoes, products whose high consumption negatively affects the quality of eating habits [16].

Foreign literature also addresses the problem of differences in the nature and quality of diet of urban and rural residents. *Dean and Sharkey* note that for rural areas, the distance between the residence and the retail food outlet affects the frequency of fresh fruit and vegetable consumption. The greater the distance from the place of residence to a food retailer, the less frequently did rural residents consume fresh fruit and vegetables [12]. A study by *Mennen et al.* that assessed the habitual diet of rural and urban populations in Cameroon, Central Africa detected higher intakes of energy, fat and alcohol in rural men and women relative to those living in urban areas. Higher carbohydrate and protein intakes were also statistically significant for women living in rural areas [18]. In the study by *Colić-Barić et al.* [10] a higher consumption of fast-food products, soft drinks and alcohol was observed among urban residents compared to rural residents. The study by *Liebman et al.* conducted among rural populations in Wyoming, Montana and Idaho shows an association of excessive body weight with increased consumption of sweetened beverages and eating while watching television [15].

The level of food consumption, the quality and type of products selected are closely correlated with socioeconomic factors. Among the criteria of socioeconomic status, the authors of the study included education (primary, vocational, secondary, higher) and net income per family member (less than 500 PLN, PLN 500-1000 PLN, 1000-2000 PLN, 2000 PLN and more).

In our study, there were significant correlations between the education of the subjects and the frequency of consumption of the selected groups of products. Higher education respondents were much more likely to choose products such as fish and alcohol than those with lower levels of education. In contrast, people with lower education were more likely to consume white bread and processed meat. Significant results showed correlations between the level of earnings and the frequency of food consumed. Subjects with a higher income per family member were less likely to choose white bread and potatoes compared to people on lower incomes. The results obtained correlate well with the results of the *Niedźwiedzka et al.* study on the diversified consumption of food in the context of the socio-economic status of Polish elderly people. The higher socio-economic status of the subjects, i. e. higher education and high monthly income, increased food intake. These people were more

likely to consume products with beneficial health m. in fruits and vegetables, fish and fruit and vegetable juices [20]. Similar results were obtained in another study on the dietary styles of Poles. Respondents with higher education represented a “health-promoting style”, which included frequent consumption of raw vegetables and fruits, fish, wholemeal bread and reduced meat consumption. The level of earnings was not statistically significant [4].

The data of the GUS also provides information on the quantity of consumption of the products concerned in relation to the level of education. The results of our tests show the relationship between consumption of white bread, processed meat, alcohol and fish and education. It turned out that people with higher education were less likely to consume these types of products. The data from the GUS study did not separate bread into wholemeal and white, but there is a higher consumption of this product among people with lower education, which amounted to 3.10 kg for people with secondary education, 3.40 kg for people with vocational education and 3.90 kg for people with primary education. While, for those with higher education, it was 2.61 kg. For fish and seafood, consumption is represented at a similar level of 0.28 kg irrespective of the education of the test subjects. Consumption of processed meat shall be confirmed by the results of our tests. As the level of education declared by respondents increased, the amount of cold cuts and meat preparations they consumed decreased. They were: for people with a higher education of 1.64 kg, a secondary education of 2 kg, a vocational education of 2.17 kg and a primary education of 2.41 kg [3].

In the cross-sectional study *Mitra et al.* among 12000 people over the age of 35, 58 districts of Bangladesh showed that some socioeconomic factors correlated with the nutrition status of the study group. The authors of the study observed a positive correlation in overweight among the people in higher affluence, while negative for underweight. *Mitra et al.* showed no significant link between the state of nutrition and the level of education. On the other hand, the level of education may influence the dietary practice determining the quality of the diet, as demonstrated in our study [19].

The relationship of demographic and socioeconomic factors, and the glycemic load of the diet of adult Poles, was presented in the study of *Róžańska et al.* The authors observed a higher glycemic load of meals in the diet of rural residents and in people with lower education. A lower glycemic load of meals was recorded for city dwellers and those with higher education. Products and dishes with a higher glycemic load are a.o. boiled potatoes, white rice, white bread and pasta. In our study, a correlation was detected

between the increased consumption of cereal products and potatoes among the rural residents, which may confirm the results of the above-mentioned studies. In terms of education, our study showed that people with higher education were less likely to eat white bread, which may partly confirm the results of other researchers [22].

These studies and the results of our study may prove that the socioeconomic status of urban and rural residents and the place of residence may be linked to the quality of the diet and eating habits. Accessibility to health services in rural areas may also be important in terms of nutritional behaviour. A study conducted in rural areas in Poland on the availability of healthcare indicates a significant discrepancy in the level of availability of medical care in rural areas. Of the 16 provinces, the best access to health care was indicated in the Silesian and Subcarpathian voivodeship, while the smallest access was shown in the West Pomeranian, Warmian-Masurian and Pomeranian voivodeships. The authors conclude that access to health care is limited in 9 provinces, while in the remaining 7, access was good or very good [26].

The results of own study confirm that nowadays the quality of diet and eating habits of the population living in urban and rural areas do not differ significantly from one another. A significant impact on the frequency of consumption of individual product groups by the subjects of urban and rural areas had a level of income and their education. Also important were the circumstances of eating meals, from which it appears that rural residents were more likely than city dwellers to eat with their families at the table, indicating the traditional approach of the rural population in this area. Among certain groups of food products, significant differences were noted for the frequency of consumption depending on the place of residence of the subjects. The frequency of food consumption among the rural residents among others is higher for cereal products and cold cuts. By contrast, people living in urban areas had a higher consumption among other things for certain fruits, fast food and selected alcoholic beverages.

The correlations found in this study, regarding food intake, eating habits and socioeconomic factors, are only a slice of the diet characteristics of rural and urban populations, due to the pilot nature of the study. In the future, it is planned to repeat the research on more people and in more towns and villages, which will allow for a broader analysis of the detected compounds.

The present study was able to document differences and similarities in diet quality and eating habits between urban and rural sub-county populations. The strengths of the study were: weight and height in this study was directly measured by a team of healthcare

professionals who have a wide range of experience in collecting health information, this factor could mitigate the potential bias of recall information. There are also a number of potential limitations of the study that need to be taken into account when interpreting the results. This study was limited in geographic scope and should be replicated among a larger sample across more regions. Another limitation was the uneven gender distribution of the respondents due to the greater interest of women in participating in the study compared to men. Response bias, such as social desirability, is common in self-reported questionnaires, and might have led to underestimation or overestimation of the present associations. The food frequency questionnaire used in our study that does not give the exact amount of food eaten by respondents. In the future studies, it is planned to use a 24-hour Recall questionnaire. Due to the limited number of studies in this area, the authors plan to conduct future studies with more people covering a larger area.

CONCLUSIONS

1. When analysing the data provided in the own survey, it can be concluded that the quality of the diet and the frequency of consumption of food products are not only linked to the place of residence, but also to the education and economic status of the subjects.
2. The results collected may indicate the need for nutrition education in both urban and rural areas.
3. There is a significant need for more research into eating habits and food intake among adults living in urban and rural areas, which will allow for a broader assessment and analysis of the changes in diet in both areas and in different age groups.

Conflict of interest

The authors declare no conflict of interest.

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