

## NUTRITIONAL HABITS RELATING TO MEAT AND MEAT PRODUCTS CONSUMPTION AMONG YOUNG PEOPLE FROM SELECTED REGIONS OF POLAND

*Barbara Szczepaniak, Danuta Górecka, Ewa Flaczyk*

*Department of Human Nutrition Technology, The August Cieszkowski Agricultural University of Poznań, Faculty of Food Science and Technology*

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The aim of this study was to compare the consumption frequency of selected kinds of meat and its products by secondary school students from three regions of Poland (Łask, Kępno and Mragowo). The investigations were carried out using questionnaires. The Kendall correlation coefficient was used for results verification.

Poultry, followed by pork and fish are consumed most frequently by young people, irrespective of the region of their residence. Horse meat, mutton and *frutti di mare* are consumed least frequently. The frequency of meat products consumption is connected with the place of residence, and its structure depends on the financial situation of the population examined. Pupils from Mragowo and Kępno, whose financial situation is difficult, often consume cheaper offal and fine-ground sausages. The lack of different kinds of meat on the market (game, mutton, rabbit meat, *frutti di mare*), their high price (fish, veal and *frutti di mare*), BSE fear (veal, beef), as well as undesirable taste (fish and *frutti di mare*) are the most common reasons for the fact that they are not consumed.

### INTRODUCTION

The importance of rational nutrition, particularly in childhood and while growing up, has been scientifically documented. Inadequate nutrition of children and young people can cause unpredictable health problems in adults. Protein and calorie deficiency in this population group is particularly dangerous, because it may lead to inhibition of physical and intellectual development in children.

Meat and meat products that should be present in the diet for children and young people are the source of protein of a high biological value. Animal protein is rich in essential amino acids not synthesized by the human organism, which have to be supplied with food. Moreover, meat is the source of vitamin B complex (B<sub>12</sub>, B<sub>1</sub>, B<sub>2</sub>, niacin), and a small quantity of fat-soluble vitamins (A, D, E and K). Phosphorus, potassium, sodium, magnesium, sulphur, zinc, iron are mineral components which also affect the nutritive value of meat. Heme iron form and zinc contained in meat are much better assimilated by the human organism than those from vegetable products. Anaemia, occurring particularly in girls and women, may be a consequence of iron deficiency in their everyday diet.

A strict vegetarian diet which does not provide a sufficient quantity of exogenous amino acids necessary for proper protein metabolism may inhibit both physical and mental development of children and teenagers.

The aim of this study was to determine the frequency of meat and meat products consumption by secondary school students from selected regions of Poland, and to determine why some kinds of meat are not consumed at all.

### MATERIAL AND METHODS

The studies were carried out using a questionnaire and applying a method of purposeful selection. The study included 726 pupils aged 17 to 19 years, attending secondary schools in three selected regions of Poland (Table 1), *i.e.* Łask in the Łódź Province (200 students), Kępno in the Wielkopolska Province (282 students) and Mragowo in the Warmia and Mazury Province (244 students). The majority of the respondents were girls (72.2%). Fifty seven per cent of the pupils were city-dwellers, the other were country-dwellers. Most pupils (66.4%) described their financial situation as average, 18.7% as bad, 12.2% as good and 2.7% as very good. It should be emphasized that most of young people whose financial situation was bad come from Mragowo.

The consumption frequency of selected 11 kinds of meat and 12 kinds of meat products was determined using a 4-point scale with the following descriptions and numerical values: "every day" (4), "2 to 4 times a week" (3), "less frequently" (2), and "not at all" (1). The results obtained provided the basis for ordering the average consumption frequency by decreasing values in three series corresponding to the three regions of Poland mentioned above. The degree of compatibility between these series was verified using the Kendall correlation coefficient, comparing all series. The percentage of young people not consuming only selected kinds of meat was determined, giving the most common reasons for their choices. The question of the conjunctive cafeteria type was asked, taking into account price, diet, availability, BSE fear, habits, taste and vegetarianism.

TABLE 1. Socio-demographic structure of the population examined.

Specification		Łask		Kępno		Mrągowo		Total	
		N	%	N	%	N	%	N	%
Total		200	100	282	100	244	100	726	100
Sex	Girls	160	80	184	65.2	180	73.8	524	72.2
	Boys	40	20	98	34.8	64	26.2	202	27.8
Residence place	City	140	70	176	62.4	98	40.2	414	57.0
	Village	60	30	106	37.6	146	59.8	312	43.0
Financial situation	Very good	8	4	8	2.8	4	1.3	20	2.7
	Good	48	24.0	24	8.5	16	6.5	88	12.2
	Average	136	68.0	204	72.3	142	58.5	482	66.4
	Bad	8	4.0	46	16.3	82	33.7	136	18.7

N – number of young people

## RESULTS

The results of the studies show that meat and its products were present in the everyday diet of almost all of the pupils examined. Only 2.8% of girls from Kępno did not consume meat at all because they followed a vegetarian diet. Some young people resigned from certain kinds of meat only, which was connected with the reasons mentioned above. The results of studies concerning the consumption of particular kinds of meat are shown in Table 2. Poultry ( $x \geq 33.0$ ), was consumed most often (a few times a week), irrespective of the place of residence of the respondents. Pork and fish ( $x > 2.0$ ) were consumed less frequently. Offal, beef and veal were consumed less frequently than once a week ( $1.84 > x > 1.66$ ). Rabbit meat, game, *frutti di mare* and mutton were consumed sporadically only ( $1.37 > x > 1.21$ ), and horse meat ( $x = 1.03$ ) hardly ever. It should be emphasized that young people from Mrągowo consumed fish ( $x = 2.75$ ) more often than the other respondents. In the case of pupils from Łask and Kępno the Kendall correlation coefficient was 2.30 and 1.99, respectively.

The differences between ranks of particular meat kinds in the three consumption frequency series compared were small, not exceeding three units. Offal was placed in the

third position by the respondents from Kępno, whereas in Łask and Mrągowo it occupied the sixth and fourth position, respectively. On the other hand, the respondents from Mrągowo placed game in a higher position in the consumption frequency rank ( $R = 6$ ) than pupils from Łask ( $R = 9$ ) and Kępno ( $R = 8$ ). Only poultry ( $R = 1$ ) and horse meat ( $R = 11$ ) held the same ranks in all regions.

The Kendall correlation coefficient showed a high and medium correlation between the consumption frequency ranks for particular kinds of meat among young people representing three regions of residence, *i.e.* 0.82 (Kępno-Łask and Kępno-Mrågowo) and 0.70 (Mrągowo-Łask).

Medium- and fine-ground sausages and high-quality cured meats were consumed most often by the respondents ( $x > 2.5$ ). Offal and poultry sausages, canned fish and meat, as well as dry sausages ( $2.0 < x < 2.5$ ) were consumed less frequently, whereas smoked fish and fish marinades, as well as headcheese were consumed sporadically only (Table 3). Considerable differences, even 7 and 6 units, between the ranks of individual meat products should be emphasized. Poultry sausages placed in the consumption frequency series in the third position by young people from Łask, occupied the fifth position in Mrągowo, and the tenth position in Kępno. Canned fish had a higher rank ( $R = 3$ ) in Kępno than

TABLE 2. Consumption frequency of selected kinds of meat by the population examined.

Kind of meat	Total of population		City					
			Łask A		Kępno B		Mrągowo C	
	X	R	X	R	X	R	X	R
Poultry	3.31	1	3.47	1	3.00	1	3.50	1
Pork	2.73	2	3.10	2	2.51	2	2.60	3
Fish	2.35	3	2.30	3	1.99	4	2.75	2
Offal	1.84	4	1.77	6	2.05	3	1.70	4
Beef	1.75	5	2.09	4	1.68	5	1.54	5
Veal	1.66	6	1.97	5	1.55	6	1.45	7
Rabbit	1.37	7	1.56	7	1.35	7	1.20	9
Game	1.32	8	1.20	9	1.26	8	1.50	6
<i>Frutti di mare</i>	1.22	9	1.15	10	1.13	9	1.40	8
Mutton	1.21	10	1.52	8	1.05	10	1.12	10
Horse meat	1.03	11	1.00	11	1.00	11	1.10	11

X – mean consumption frequency, R – rank,  $r_k$  – Kendall's correlation-ranks coefficient,  $r_k$  A-B=0.82,  $r_k$  A-C=0.70,  $r_k$  B-C=0.82

TABLE 3. Consumption frequency of selected kinds of meat products by the population examined.

Kind of meat	Total of population		Łask A		Kępno B		Mrągowo C	
	X	R	X	R	X	R	X	R
Middle-ground sausages	2.81	1	3.01	1	2.16	4	3.28	1
Fine-ground sausages	2.59	2	2.59	4	2.32	2	2.84	2
High quality sausages	2.58	3	2.90	2	2.13	5	2.72	4
Pate, liver sausage	2.47	4	2.03	6	2.55	1	2.83	3
Poultry sausages	2.38	5	2.89	3	1.66	10	2.61	5
Canned fish	2.19	6	1.85	9	2.27	3	2.45	6
Canned meat	2.13	7	1.92	7	2.10	6	2.37	7
Dry sausages	2.00	8	2.26	5	1.72	8	2.03	8
Smoked fish	1.93	9	1.89	8	2.01	7	1.90	9
Fish marinates	1.67	10	1.70	10	1.62	11	1.70	10
Headcheese	1.41	11	1.18	11	1.70	9	1.37	11

X – mean consumption frequency, R – rank,  $r_k$  – Kendall's correlation-ranks coefficient,  $r_k$  A-B=0.24,  $r_k$  A-C=0.67,  $r_k$  B-C=0.56

TABLE 4. Percentage of youth non-consuming selected kinds of meat (%).

Meat kind	Total	Łask	Kępno	Mrągowo
Pork	13.3	12.0	15.6	12.3
Beef	38.24	20.0	51.8	43.3
Veal	57.1	47.0	54.6	69.8
Mutton	97.0	100.0	99.0	92.0
Venison	70.9	68.0	75.2	69.7
Horse meat	99.6	99.0	100.0	100.0
Poultry	4.4	3.0	9.2	1.0
Rabbit	77.9	64.0	89.5	80.3
Offal	24.1	26.0	14.2	32.0
Fish	10.1	11.8	18.4	0.0
<i>Frutti di mare</i>	82.4	87.0	86.5	73.8

in Mrągowo (R=6) and Łask (R=9). Considerable differences were also noted in the case of poultry sausages, which occupied the first position in the consumption frequency rank in Kępno, the third in Mrągowo, and the sixth in Łask. The Kendall correlation coefficient showed a medium relationship between the consumption frequency ranks among pupils from Mrągowo and Łask ( $r_k=0.67$ ), and Mrągowo and Kępno ( $r_k=0.56$ ), and a low correlation in Kępno and Łask ( $r_k=0.24$ ).

Table 4 presents the percentage of young people not consuming certain kinds of meat. The effects of different factors on their choices are shown in Figures 1–3. Most of the respondents, irrespective of the region, do not eat horse meat (99.6%), mutton (97.0%) and *frutti di mare* (82.4%). Rabbit meat and game are not consumed by about 70% of the population examined. Only a small percentage of the respondents resigned from poultry (4.4%), fish (10.1%) and pork (13.3%).

The main reason for not consuming game, mutton, horse meat, rabbit meat and *frutti di mare*, was their unavailability, particularly in Kępno. The price of meat was an important reason for the resignation from fish (only pupils from Kępno and Łask), *frutti di mare* veal (mainly pupils from Kępno and Łask), and game (only pupils from Łask and Mrągowo).

Undesirable taste and certain eating habits were very often the reasons for resigning from some kinds of meat. A very small percentage of the population examined declared taste

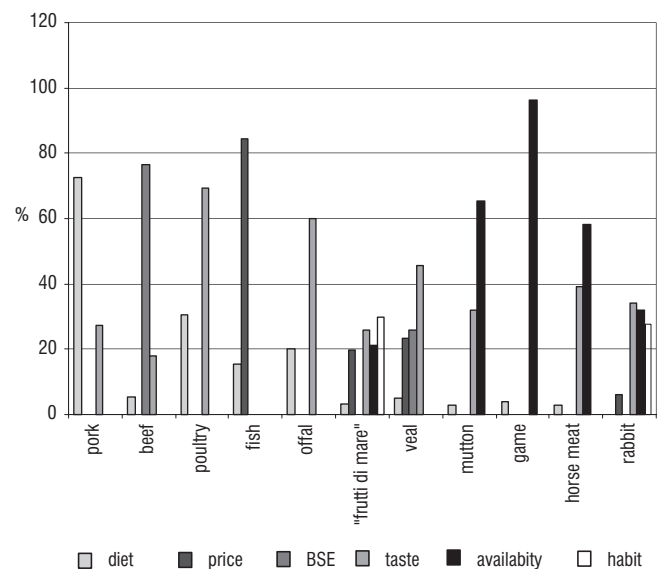


FIGURE 1. Causes of non-consumption of selected kinds of meat by the examined pupils from Łask.

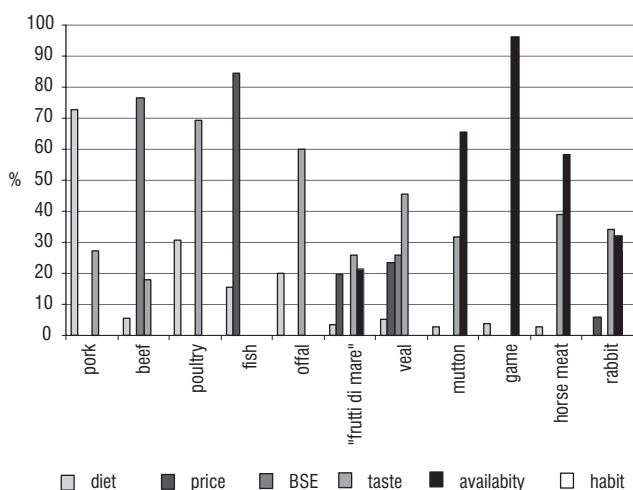


FIGURE 2. Causes of non-consumption of selected kinds of meat by the examined pupils from Kępno.

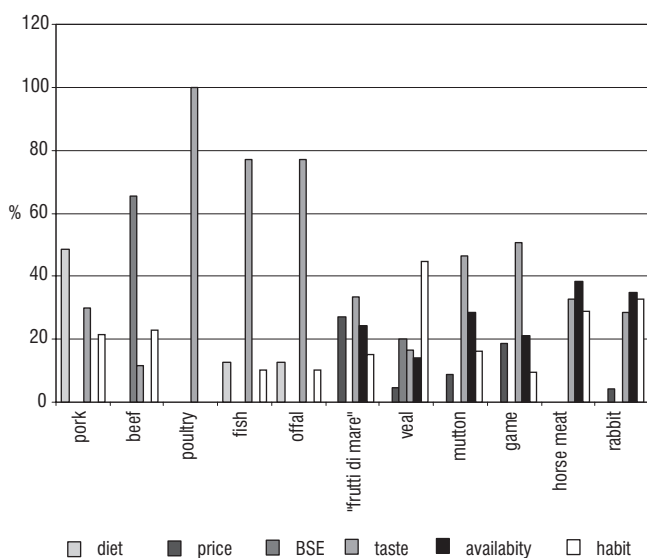


FIGURE 3. Causes of non-consumption of selected kinds of meat by the examined pupils from Mrągowo.

to the only reason for not consuming poultry. Reduced consumption of beef and veal resulted first of all from BSE fear.

## DISCUSSION

Although the nutritional habits of Poles and residents of EU states still differ from eating standards and recommendations, distinct changes were noted in the meat consumption structure in last few years [Combris & Grignon, 1996; Morin & Mainsant, 1996]. Many authors carrying out investigations in different regions of Poland, similarly as in the present work, have found that poultry is one of the most often consumed kinds of meat, and that the level of beef and veal consumption is decreasing [Babiczyńska, 1998; Górka-Warsewicz, 2002; Grzega, 2002; Kosicka, 2000; Kowalczyk & Graczyńska, 2002; Kowrygo & Rejman, 2000; Krupa & Majka, 2002; Szczepaniak et al., 2002, 2003; Szepieniec-Puchalska, 2002; Witek & Burlita, 2000]. The consumption of pork which according to statistical data, is still the predominant kind of meat in the Polish diet, undergoes stabilization or reduction [Gulbicka, 2000;

Kowalczyk & Graczyńska, 2002; Szepieniec-Puchalska, 2002]. This change in the consumption model should be, beyond a doubt, regarded positive. It may be connected with growing consumer awareness, aiming at reducing the fat content of everyday diet, as well as economic conditions, since poultry is one of the cheapest meat products. Pork consumption still predominates among inhabitants of south-eastern Poland, the Podlasie Province and the region of Dolny Śląsk [Bukała & Świda, 2000; Iłow et al., 1998; Stopnica et al., 1999]. Relatively high frequency of fish consumption by the respondents shows that fish is considered a valuable diet component, correlating with a general increase in fish consumption in Poland (about 13%) observed in the 1990s, which is however still the lowest in the EU countries [Kosicka, 2000; Kowrygo & Rejman, 2000; Zieziula & Pawlak, 2002]. It should be emphasized that none of the respondents from Mrągowo resigned from fish which in this region was placed in the second position (after poultry) in the consumption frequency rank. Frequent fish consumption by young people from the Warmia and Mazury Province, in comparison with other regions of Poland, was also reported by Sotkiewicz [2003]. This fact may be connected with fresh fish availability in this region, as well as with self supply. Game is also often consumed by the respondents from Mrągowo. This kind of meat is easily available in this region, abundant in wild animals. Very low consumption frequency of horse meat, mutton, rabbit meat, or *frutti di mare* was correlated with too low market supply, too high prices, and lack of tradition in the consumption of these kinds of meat [Krupa & Majka, 2002].

Medium- and fine-ground sausages, as well as high-quality cured meats were consumed most often, whereas headcheese was consumed sporadically only. A similar structure of meat products consumption was observed in other studies [Bukała & Świda, 2000; Górka-Warsewicz, 2002; Iłow et al., 1998; Krupa & Majka, 2002].

A comparison of meat products consumed most often by young people from particular regions shows a significant influence of financial situation on their choices. In Mrągowo and Kępno, where very few pupils declared a very good and good financial situation, cheaper offal sausages and fine-ground sausages were consumed more frequently. Pupils from Łask whose financial position is very good often decide on high-quality and dry sausages, and poultry. The correlation between the consumption structure and financial situation was also confirmed by high consumption frequency of offal, significantly cheaper than meat, by young people from Kępno and Mrągowo. BSE fear was the most common reason for resigning from veal and beef. As emphasized by other authors, information about health risks connected with epizootic diseases has a significant effect on purchase decisions [Morin & Mainsant, 1996; Górka-Warsewicz, 2002; Kowalczyk & Graczyńska, 2002].

## CONCLUSIONS

1. The population examined, irrespective of the place of residence, often consumed poultry, followed by pork and fish, whereas horse meat, mutton and *frutti di mare* were eaten least frequently.

2. There was a high and medium correlation between consumption frequency ranks of particular kinds of meat among young people from the three regions analysed.

3. A comparison of the consumption frequency ranks of meat products among the respondents from the regions studied showed a medium and low correlation between them. Young people from Mrągowo and Kępnno often consumed cheaper offal and fine-ground sausages.

4. The lack of different kinds of meat on the market (game, mutton, rabbit meat, *frutti di mare*), their price (fish, *frutti di mare* and veal), BSE fear (veal, beef), and undesirable taste (fish and *frutti di mare*) are the most common reasons for the fact that they are not consumed.

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## ZACHOWANIA ŻYWIENIOWE MŁODZIEŻY Z WYBRANYCH REGIONÓW KRAJU W ZAKRESIE SPOŻYCIA MIĘSA I JEGO PRZETWORÓW

*Barbara Szczepaniak, Danuta Górecka, Ewa Flaczyk*

*Katedra Technologii Żywienia Człowieka, Akademii Rolniczej im. A. Cieszkowskiego, Poznań*

Celem pracy było porównanie częstości spożycia wybranych rodzajów mięsa i jego przetworów przez młodzież szkół ponadpodstawowych z trzech regionów kraju (Łask, Kępno i Mrągowo). Badania prowadzono przy pomocy kwestionariusza ankietowego, a do weryfikacji wyników zastosowano korelacje rang Kendalla.

Młodzież, niezależnie od regionu zamieszkania najczęściej konsumowała drób, a następnie wieprzowinę oraz ryby, a najrzadziej koninę, baraninę i owoce morza (tab. 2).

Częstotliwość spożycia przetworów mięsnych była związana z miejscem zamieszkania ankietowanych. Uczniowie z Mrągowo i Kępna, gdzie większość posiadała gorszą sytuację materialną, częściej konsumowali tańsze wędliny podrobowe i drobno rozdrobnione (tab. 3). Najczęstszymi przyczynami nie spożywania różnych rodzajów mięsa był brak dostępności na rynku (dziczyzna, baranina, króliki, owoce morza), cena (ryby, owoce morza i cielęcina), obawa przed BSE (wołowina, cielęcina) oraz nieodpowiedni smak (ryby i owoce morza) – rys. 1–3.