BARBARA RACZYŃSKA[1], AGNIESZKA MICHALSKA[1], JAN CZECZELEWSKI[2], GRZEGORZ RACZYŃSKI[2]

THE EFFECT OF SOCIO-ECONOMIC AND DEMOGRAPHIC DETERMINANTS ON THE PATTERN OF CONSUMPTION OF RURAL ADOLESCENTS

WPŁYW SOCJO-EKONOMICZNYCH I DEMOGRAFICZNYCH UWARUNKOWAŃ NA SPOSÓB ŻYWIENIA DZIECI WIEJSKICH

Zamiejscowy Wydział Wychowania Fizycznego w Białej Podlaskiej
AWF J. Piłsudskiego w Warszawie
21-500 Biała Podlaska, ul. Akademicka 2
[1]Zakład Anatomii i Fizjologii
Kierownik: dr hab. prof. AWF *B. Raczyńska*
[2]Zakład Higieny i Promocji Zdrowia
Kierownik: prof. dr. hab. *G. Raczyński*

The effect of age, sex, number of children in the family, standard of living and father's education on the pattern of consumption of rural adolescents were determined with the use of cluster analysis. Standard of living and the father's education exerted a significant effect on the pattern of consumption

Key words: adolescents, pattern of consumption, determinants
Słowa kluczowe: dzieci, sposób żywienia, uwarunkowania

INTRODUCTION

A high unemployment rate in Poland in the period of structural transformation of the country (ca. 20% on average) affects especially the inhabitants of its poorly urbanized regions [1]. One of such areas is the central-eastern region – a typical rural one, in which the rural inhabitants constitute 71% of total population. Disadvantageous economic situation has been prevailing there until recently, i.e. till Poland's accession to the European Union. Apart from economic conditions, one of the major causes of unsatisfactory standard of living is the social status of the population which results from a lack of adequate education (7% of the population have higher education) and numerous families (41.4% of families have four or more children). The factors mentioned may exert a decisive effect on the con-

sumption patterns of children [5, 6, 8, 12]. This paper presents results of preliminary analyses obtained within a wider research program entitled „Development, physical capacity, health state and dietary habits of children and adolescents from the eastern regions of Poland".

The aim of the study was to determine the effect of selected socio-economic and demographic determinants (the number of children in the family, father's education, standard of living, sex and age) on the patterns of consumption in children aged 10-15 occupying rural areas of the central-eastern Poland.

MATERIAL AND METHODS

Cross-sectional study included 1112 children (548 girls and 564 boys), pupils of rural schools, whose parents and class tutors gave their consent for the experiment, was carried out. Data on the socio-economic status and dietary habits of children was collected by means of a diagnostic survey. The standard of living was evaluated subjectively taking into account opinions of children who assessed it as good, average or poor. Dietary habits of the children were determined based on a single 24-hour dietary recall [9]. The intakes of energy, selected minerals (Ca, P, Mg, Zn, Fe) and vitamins (A, E, C, B_1, B_2, B_6, PP) were calculated with computer software based on Polish dietary tables [3]. The results obtained in this study were compared with recommended dietary allowances (RDA) [13]. While assessing individual intakes of food components, their levels $\leq$ 2/3 RDA were accepted as indicative of the risk of their deficiency. The effect of socio-economic and demographic determinants on the patterns of consumption in the children was determined with the use of a cluster analysis. At the final stage of cluster selection, the degree of meeting the recommended dietary allowances for energy, protein, fat, phosphorus as well as vitamins B_1 and C, i.e. variables whose selection provided the minimal differentiation within clusters and the maximal one – between them, was also taken into account. Finally, the examined children were classified into five homogenous clusters (I, n=196, II, n=99, III, n=330, IV, n=251, V, n=236) each of who corresponded to a specified consumption pattern. The results were analysed statistically with STATISTICA package [7]. Quantitative data was compared between groups formed as a result of a cluster analysis with an analysis of variance using the RIR Tukey's test for unequal sample sizes. Differences between quality traits were analysed with the *Chi²* test. The differences were considered statistically significant at p≤0.05.

RESULTS

Energy and nutrient intakes

The highest intake compared to demand was observed in cluster I, especially for energy (136%), protein (199%), phosphorus (180%), iron (130%), vitamins E (153%) and B_1 (141%), Insufficient intakes were demonstrated in the case of calcium (66%), zinc (76%) and vitamin C (80%). The lowest intake as compared to RDA was observed in cluster V and referred to energy (66%), protein (85%), calcium (33%), phosphorus (77%), iron (65%), magnesium (57%), zinc (39%) as well as vitamins A and E (70%), C (32%), B_1 (50%), B_2 (45%), B_6 and PP (38%). Cluster IV was characterised by a low intake of energy (77%), calcium (36%), magnesium (68%), zinc (46%) as well as vitamins A and B_1 (80%), B_2, B_6

and PP (60%). In cluster III, dietary habits were the closest to meet the recommended dietary allowances, however unsatisfactory levels to meet the RDA were recorded for calcium (56%), zinc (65%), and vitamins C (56%), B_2 (78%), B_6 and PP (67%).

In considering the intakes of individual nutrients, it was demonstrated that cluster V was characterised by the highest per cent of children whose diets met less than 2/3 of the RDA in respect of most nutrients consumed (Table I). This applied to 80-95% of children in the case of intakes of calcium, magnesium, vitamin C and B-complex vitamins analysed, and to 40-70% of children in the case of intakes of phosphorus, iron, vitamins A and E. In addition, protein intake of every fourth child from that cluster was demonstrated to be lower than 2/3 of the RDA. In cluster IV, 70-90% of children failed to meet the RDA for calcium, zinc, vitamins B_2 and B_6, whereas 40-60% of children – for vitamins A, E, C and PP. Deficiencies of iron, phosphorus and vitamin B_1 were reported for 20-30% of children.

In the other clusters, the intake of dietary components at a level lower than 2/3 of the RDA was not that often as in clusters IV and V. Nevertheless, a number of diets (especially in cluster III) were still characterised by deficiencies of calcium, zinc, vitamin C and PP.

Table I.   The intake of selected nutrients ≤2/3 of RDA [13]
                  Spożycie wybranych składników odżywczych ≤2/3 normy [13]

Specification	Total n=1112	I n=196	II n=99	III n=330	IV n=251	V n=236
Protein	73[a] (6.6)[b]	–	1 (1.0)	1 (0.3)	15 (6.0)	56 (23.7)
Mineral components						
Calcium	747 (67.2)	120 (61.2)	74 (74.7)	107 (32.4)	227 (90.4)	219 (92.8)
Phosphorus	143 (12.8)	–	1 (1.0)	3 (0.9)	46 (18.3)	93 (39.4)
Iron	270 (24.2)	2 (1.0)	–	39 (11.8)	71 (28.3)	158 (66.9)
Zinc	769 (69.1)	88 (44.9)	60 (60.6)	176 (53.3)	219 (87.2)	226 (95.8)
Magnesium	398 (35.8)	10 (5.1)	7 (7.1)	59 (17.8)	135 (53.8)	187 (79.2)
Antioxidant vitamins						
Vitamin A	352 (31.6)	22 (11.2)	26 (26.3)	77 (23.3)	111 (44.2)	116 (49.1)
Vitamin E	395 (35.5)	33 (16.8)	24 (24.2)	99 (30.0)	106 (42.2)	133 (56.3)
Vitamin C	493 (44.3)	59 (30.1)	–	200 (60.6)	149 (59.4)	219 (92.8)
B-complex vitamins						
Vitamin B_1	311 (28.0)	1 (0.5)	–	42 (12.7	71 (28.3)	197 (83.5)
Vitamin B_2	545 (49.0)	18 (9.2)	26 (26.3)	115 (34.8)	177 (70.5)	209 (88.5)
Vitamin B_6	680 (61.1)	67 (34.2)	38 (38.4)	185 (56.1)	175 (69.7)	215 (91.1)
Vitamin PP	584 (52.5)	32 (16.3)	21 (21.2)	163 (49.4)	149 (59.4)	219 (92.8)

[a]) number of children, [b]) percentage of children with the intake of individual nutrients ≤2/3 of RDA
liczba badanych, [b]) odsetek badanych spożywających dany składnik poniżej ≤2/3 normy

Determinants of energy and nutrients intakes

Standard of living and father's education were demonstrated to exert a significant effect on the dietary habits of the children examined (Table II). In clusters IV and V characterised by the lowest intakes of energy and nutrients, the highest per cent of children declared their

Table II. Relationship between of the pattern of consumption in studied adolescents and selected dempgraphic and socio-economic determinants
Współzależność pomiędzy sposobem żywienia badanych dzieci a ybranymi czynnikami demograficznymi i społeczno–ekonomicznymi

Specification	Total N=1112		I n=196		II n=99		III n=330		IV n=251		V n=236		Chi² Test
	n	%	n	%	n	%	n	%	n	%	n	%	
Sex:													
Boys	563	50.6	111	56.6	48	48.5	165	50.0	122	48.6	117	49.5	3.6
Girls	549	49.4	85	43.4	51	51.5	165	50.0	129	51.4	119	50.5	
Age:													
10–12 years	591	53.1	118	60.2	53	53.5	180	54.5	119	47.4	121	51.3	7.9
13–15 years	521	46.8	78	39.8	46	46.5	150	45.4	132	52.6	115	48.7	
Number of children in the family:													
One	39	3.5	7	3.6	6	6.1	8	2.4	8	3.2	10	4.2	14.9
Two	261	23.5	54	27.5	23	23.2	84	25.4	53	21.1	47	19.9	
Three	333	29.9	63	32.1	35	35.3	97	29.4	67	26.7	71	30.0	
> three	479	43.0	72	36.7	35	35.3	141	42.7	123	49.0	108	45.7	
Standard of living:													
Good	888	79.8	172	87.7	83	83.8	275	83.3	187	74.5	171	72.4	28.6***
Average	216	19.4	24	12.2	16	16.2	54	16.4	61	24.3	61	25.8	
Poor	8	0.7	0	0	0	0	1	0.3	3	1.2	4	1.7	
Father's education:													
Higher	41	3.7	8	4.1	8	8.1	12	3.6	5	2.0	8	3.4	15.6*
Secondary	290	26.0	65	33.2	27	27.3	86	26.1	59	23.5	53	22.4	
Primary or occupational	781	70.2	123	62.7	64	64.6	232	70.3	187	74.5	175	74.1	

p≤0.05, *** p≤0.001 (Chi²test)

standard of living as average or poor (25.5% and 27.5%, respectively). In those clusters, also the per cent of children whose fathers had higher education was lower than in the other clusters. The effect of the number of children in the family on the pattern of consumption was also observed; still it was not statistically significant. The number of families with more than three children was the highest in clusters IV and V. Taking into account sex of the children analysed, in cluster I characterised by the highest intakes of energy and nutrients there was observed a slightly higher per cent of boys than girls. In that cluster, as well as in clusters II and III, younger children were found to prevail over the older ones.

DISCUSSION

The application of the cluster analysis enabled the identification of five consumption patterns typical of the children analysed and determination of relationships between dietary habits of the children and socio-economic status of their families. It was demonstrated that children from clusters IV and V were more prone to the effects of irrational nutrition. Those clusters were characterised by the highest per cent of children from numerous families with average, or even poor, standard of living and fathers with lower education. This situation is especially alarming since as much as 44% of the children examined were classified to those clusters. The results obtained confirm earlier investigations which demonstrated that consumption patterns of children and adolescents appeared to be affected to the highest extent by father's education, to a lesser extent – by the number of children in the family, and unaffected by the age and sex of children (Table II) [2, 8,10, 11]. In contrast, dietary habits in clusters I and II with most of children originating from families with one or two children and with better living standards, were characterised by lower deficiencies of individual food components. It should be emphasized, however, that also in this case consumption patterns of children failed to meet recommendations due to excessive intake of energy and protein, which consequently may lead to obesity and development of diet-dependent diseases [4]. It should be pointed out that those clusters were also characterized by a higher number of fathers with higher education, which in this case may indicate that higher education is not always accompanied by nutritional knowledge.

In conclusion, in the nearest future poor economic situation prevailing in this region as well as inadequate education of parents are bound to affect the physical development of adolescents in such an important stage of their lives.

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Summary

The aim of this study was to determine the effect of selected socio–economic and demographic determinants (the number of children in the family, father's education, standard of living, sex and age) on the pattern of consumption in adolescents occupying rural areas of the central–eastern Poland. The study included 564 boys and 548 girls 10-15-years-old. Data on the socio-economic status and dietary habits were collected by means of a diagnostic survey. Dietary habits were determined

based on a single 24-hour recall. Results obtained were compared with the RDA for Polish people. The effect of socio-economic and demographic determinants on the pattern of consumption were determined with the use of cluster analysis. The adolescents examined were classified into five homogenous clusters each of which corresponded to a specific pattern of consumption. It was demonstrated that standard of living and the father's education exerted a significant effect on the pattern of consumption in adolescents examined. This effect was hot indicated for the number of children in the family, age and sex.

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Streszczenie

Celem pracy było zbadanie wpływu wybranych uwarunkowań socjo-ekonomicznych i demograficznych (liczba dzieci w rodzinie, wykształcenie ojca, warunki materialne, płeć i wiek) na sposób żywienia dzieci wiejskich w wieku 10-15 lat zamieszkujących środkowo-wschodnie tereny kraju. Informacje na temat danych socjo-ekonomicznych i sposobu żywienia zbierano za pomocą sondażu diagnostycznego. Sposób żywienia oceniono na podstawie jednorazowego wywiadu o spożyciu z ostatnich 24 godzin poprzedzających badanie, a otrzymane wyniki porównano z normami dla ludności polskiej. Wpływ socjo-ekonomicznych i demograficznych uwarunkowań na sposób żywienia oceniono przy zastosowaniu analizy skupień. Badanych zakwalifikowano do pięciu jednorodnych skupień, z których każde odpowiadało określonemu modelowi żywienia. Wykazano, że warunki materialne i wykształcenie ojca wywierały istotny wpływ na sposób żywienia badanych dzieci. Natomiast liczba dzieci w rodzinie, wiek i płeć wpływu takiego nie wywierały.

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